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3. THE NEED TO ADDRESS NON-COGNITIVE SKILLS IN THE EDUCATION POLICY AGENDA[1]

INTRODUCTION

Multiple traits compose a broad definition of what it means to be an educated person. Indisputably, being an educated person is associated with having a certain command of a curriculum, and knowledge of theories and facts from various disciplines. But the term *educated* also suggests a more far-reaching concept associated with individuals' full development. Such development implies, for example, that individuals are equipped with traits and skills—such as critical thinking skills, problem solving skills, social skills, persistence, creativity, and self-control—that allow them to contribute meaningfully to society and to succeed in their public lives, workplaces, homes, and other societal contexts. These traits are often called, generically, non-cognitive skills.[2]

Despite non-cognitive skills' central roles in our education and, more broadly, our lives, education analysis and policy have tended to overlook their importance, and there are currently few strategies to explicitly nurture them within the school context or through education policies. However, after a relatively prolonged lack of consideration, non-cognitive skills are again beginning to be acknowledged in discussions about education, leading to the need for thoughtful and concerted attention from researchers, policymakers, and practitioners—as well as to the contention that non-cognitive skills should be an explicit pillar of education policy. This chapter contributes to the growing interest in these skills by providing a review of what we know about non-cognitive skills, including what they are, why they matter, and how they enter into the education process. This first section includes a definition of non-cognitive skills and explores the evidence-based findings on their role in education and adulthood outcomes, and on how they are nurtured. We then extend this discussion by providing a tentative list of skills that are both important for and can be nurtured by schools. The second section examines how education policy could help schools better nurture non-cognitive skills. Contrasting what we know about non-cognitive skills with how policy currently treats them, we contend that non-cognitive skills deserve more attention in the education policy arena. Toward this end, we propose some guidelines for how to design education policies that better nurture them, and describe the kinds of research needed to inform policy and practice. It includes some suggestions for researchers on how their work can provide new evidence geared toward policymakers, and a discussion of the goals

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of public education, education reform, and accountability. In the current context of debates about how to shape education reforms, a renewed focus on non-cognitive skills could provide an opportune chance to enact a more effective education strategy overall.

WHY DO NON-COGNITIVE SKILLS MERIT CORE CONSIDERATION IN THE EDUCATION POLICY AGENDA?

Resurgent interest in non-cognitive skills is driving the need to fully integrate them into our frameworks of both analysis and action in education policy. The foundations for the assertion that policy should explicitly aim to nurture these skills are threefold.

First, there has always been implicit recognition that non-cognitive skills play an important part in education. Non-cognitive skills represent valuable assets with respect to both traditional school outcomes and the broader development of individuals. Indeed, various strands of scholarship come together to point to non-cognitive skills' centrality. Historically, some scholars—mainly philosophers, psychologists, and sociologists—have noted that education has multiple dimensions, some more specifically cognitive, and others associated with personal or behavioral dimensions.[3] Many educators, policymakers, and societal leaders have argued that the mission of public education includes promoting not only cognitive skills, but also various individual and democratic skills (to paraphrase Martin Luther King Jr., "Intelligence plus character—that is the goal of true education"). And most teachers and parents inherently recognize both the intrinsic importance of certain behavioral skills and their relevance for building cognitive skills.[4]

Second, to the extent that non-cognitive skills can be developed in schools (during the period in which children's personalities are shaped), policymakers must understand the evidence regarding them. This includes identifying which skills are relevant for educational purposes. It also means creating definitions for the major skills that are to be developed (i.e., social skills, such as the ability to get along with others from varied backgrounds),[5] and assessing their role in the education process. Finally, as is true of cognitive skills, it requires recognition that while all students should develop a baseline level of non-cognitive skills that enables them to thrive in school and life, beyond that, variation across students is natural and desirable.

These two findings lead to a third: the need for a more comprehensive education policy agenda. Such a broadened approach will likely be at odds with many aspects of current policies, which have largely neglected non-cognitive skills. In fact, some have led schools to narrow their curriculum to focus on a small set of cognitive skills and to employ test preparation as a major instructional strategy. In his recent book, Paul Tough (2012) echoes the concerns of others that we have been wrongly focused on a "cognitive hypothesis."[6] This failure to pay attention to non-cognitive skills has proven to be quite problematic, as it depletes schools' incentives and capacities to contribute to the socialization and personal development of their students.

Policy must thus be broadened to solve the apparent contradiction between how the system is defined and the incentives are set up, on the one hand, and, on the other hand, the imperative to help children thrive and receive the rounded education they deserve.

Consequently, this chapter adopts the view that the education system should ensure all children have the opportunity to fulfill their potential by exploring these traits in their developmental years in school. In other words, as non-cognitive skills are educational outcomes whose intrinsic value makes them important per se, and whose production or accumulation in children's school years has demonstrated importance, we contend that education policymakers must embrace non-cognitive skills, and design policies that protect these skills and foster their development.[7]

WHAT DOES RESEARCH DEMONSTRATE REGARDING NON-COGNITIVE SKILLS?

In this section we define non-cognitive skills and explore the evidence-based findings on their role in education and adulthood outcomes. We then explore how these skills can be intentionally nurtured and developed. The review of literature is by no means exhaustive. Rather, it aims to highlight some of the most relevant evidence about non-cognitive skills, and we only briefly review some aspects that ought to be more fully addressed in complementary studies building on these initial discussions.

In Search of a Definition and a List of Skills

We begin by explaining the abstract concept of non-cognitive skills and then present a list of specific non-cognitive skills that are relevant to the education process.

What are non-cognitive skills? Defining non-cognitive skills is as challenging an endeavor as it is to identify, classify, measure, and quantify them.[8] Indeed, to illustrate the unique difficulty of defining these skills, we note the ongoing debate about how researchers and writers should refer to these skills (the current list includes such terms as behavioral skills, soft skills, personality traits, interpersonal and intrapersonal skills, non-cognitive abilities, character, socio-emotional skills, and non-cognitive skills), as well as the sometimes controversial delimitations between cognitive and non-cognitive skills, or between personal traits and learnable non-cognitive skills.

To produce the definition used in this paper, we combine several theoretical definitions that, together, capture the essence of non-cognitive skills in education. We define non-cognitive skills as representing the "patterns of thought, feelings and behavior" (Borghans et al., 2008) of individuals that may continue to develop throughout their lives (Bloom, 1964), and that play some role in the education process. Broadly, these skills encompass those traits that are not directly represented by cognitive skills or by formal conceptual understanding, but instead

by socio-emotional or behavioral characteristics that are not fixed traits of the personality, and that are linked to the educational process, either by being nurtured in the school years or by contributing to the development of cognitive skills in those years (or both).

Which non-cognitive skills are relevant to the education process? We recognize that the generic definition developed here may be of little use for the policymaking and practical uses we advance. A more concrete or tangible approach to getting at non-cognitive skills requires listing them. To our knowledge, however, such a list does not yet exist, and indeed, this can represent one major challenge to moving this field forward.[9] The lack of such a classification delays the development of metrics to measure and assess skills, and the design of strategies to nurture them.[10] Additionally, crafting such a list likely engenders controversy, in terms of which skills belong on the list, and how we can know this in the absence of proper metrics.

Our attempt to outline a concrete set of skills builds on both researchers' contributions (evidence- and/or theory-based) and on our understanding of the goals of public education. We subscribe to the idea that education is foundational both to sustaining a healthy democracy and to ensuring the ability of individuals to fulfill their natural personal and productive potentials, and that (public) schools are critical to fulfilling those goals. Given this understanding, we suggest that the following non-cognitive traits and skills should be a primary focus of education policy.

The list includes critical thinking skills, problem solving skills, emotional health, social skills, work ethic, and community responsibility, which are identified by Rothstein, Jacobsen, and Wilder (2008) as aligned with goals of public education similar to those we set forth above. Pianta and colleagues' contribution adds to the list factors affecting personal relationships between students and teachers (closeness, affection, and open communication), self-control, and self-regulation. We suggest, as well, the importance of persistence, academic confidence, teamwork, organizational skills, creativity, and communication skills.[11] We title this list the *education policy list of non-cognitive skills*.

It is important to note that this list is likely to grow (or shrink) as more evidence emerges, and that specific definitions of each skill may vary by age and other factors. We also note that references below either generically to non-cognitive skills or to specific non-cognitive skills are driven by the evidence itself. In some cases, a study has reviewed non-cognitive skills generally, while other studies explore a specific skill or a set of them. Given the relative newness of the field (in contrast to studies of cognitive skills), it is still common practice to refer to the broad type or category of skill, and many key contributions in this area (including most of James Heckman's and his coauthors' seminal works) use the term "non-cognitive skills," rather than anything more specific.

Why Do Non-Cognitive Skills Matter?

Now that we've established which non-cognitive skills matter, we discuss *why* they matter. As explained below, non-cognitive skills matter for their own sake, and they matter indirectly (i.e., they correlate with other individual and societal outcomes, such as academic performance, labor productivity, and earnings).

Non-cognitive skills matter for their own sake. Based on the above definition and list of non-cognitive skills, it is clear that they are valuable in their own right, and that they matter in a direct fashion. The importance of emotional, social, and democratic citizenship skills—or, to cite a few specific skills within those categories, self-confidence, respect for others, ability to build consensus, and willingness to tolerate alternative viewpoints—should be beyond debate. As noted above, nurturing these skills is indeed an implicit—sometimes explicit—goal of public education (Rothstein, Jacobsen, & Wilder, 2008), and from the perspective of schools, such traits as persistence, communication skills, creativity, and teamwork, among many others, should be considered important in themselves. As such, promoting these traits should be among schools' core mission; based on these definitions alone, these skills matter greatly.[12]

Non-cognitive skills matter indirectly. Another angle through which to understand the importance of non-cognitive skills is to explore their correlation with other individual and societal outcomes, from educational attainment and adult earnings to civic participation, among others (Almlund et al., 2011). As summarized by Levin (2012b), "[…] these dimensions play a role in forming healthy character and contribute to productive relations in work-places, communities, families, and politics." It is important to note, though, that in contrast to the extensive evidence documenting the relationship between educational attainment (and cognitive skills) and these other outcomes, the empirical literature on the links between non-cognitive skills and those outcomes is relatively scarce. It is even scarcer when we consider only empirical evidence that results from experimental (and, to a lesser extent, quasi-experimental) analyses. Happily, however, research in this area is increasing, and we acknowledge, in particular (in the economics field), the essential contributions of James Heckman and his coauthors.[13] Moreover, although it is still limited, this body of evidence consistently indicates positive relationships between non-cognitive skills and other dimensions or skills, as illustrated by the following examples.

The association between non-cognitive skills and academic performance

Scholars have long noted the positive association between non-cognitive skills and educational attainment. A century ago, Binet and Simon (1916, 254) noted that performance in school "admits other things than intelligence; to succeed in his studies, one must have qualities which depend on attention, will and character."

Recently, a more detailed explanation of how non-cognitive skills relate to academic performance was provided by Olson (2012). Social skills—children's ability to get along and interact with peers—and the absence of aggressive or disruptive behavior predict and facilitate learning (Olson 2012, 20). Heckman's (2008) core point in support of early investments in education—"skills beget skills"—makes a similar argument.

Several meta-analyses and compendiums of reviewed literature also affirm the positive association between non-cognitive skills and academic achievement.[14] Durlak et al. (2011) conducted a meta-analysis of over 200 interventions aimed at increasing the social and emotional learning of children from kindergarten through high school (ages 5–18). This study is one of the most extensive reviews of such interventions, and it relies on empirical evidence that included control groups for the analyzed interventions. Their conclusions suggest that participants benefited from the interventions, and, specifically, that their social and behavioral skills improved.[15] On average, participating students also exhibited higher academic achievement, with an associated gain in performance estimated to be equivalent to 11 percentile points, approximately constant across grades. Levin (2012a) translates this gain into a measure equivalent to one-third of a standard deviation, a significant increase from an education policy perspective. In a widely circulated newspaper column based on earlier versions of this meta-analysis, Shriver and Weissberg (2005) emphasized the extreme relevance of these findings in demonstrating that policy can effectively target both cognitive and non-cognitive aspects concurrently, and can appropriately balance benchmarks established for the two domains. In sum, this significant meta-analysis shows how non-cognitive skills support cognitive development, and demonstrates that these skills are interdependent and cannot be isolated from one another.

In addition to the evaluations included in Durlak et al.'s meta-analysis, other empirical studies show how specific non-cognitive skills affect academic performance. It is important to note that some of these interventions also affect non-cognitive performance, or affect cognitive performance through their influence on non-cognitive domains, again reflecting the interdependence of these categories of skills and their development.[16] Interesting findings derive from studies of how executive function skills—self-regulation and self-control—are important predictors of achievement. For instance, self-control and self-discipline are predictive of better behaviors in the classroom, which also correlate with improved report card grades and other measures of academic performance (Duckworth, Quinn, & Tsukayama, 2012; Duckworth & Seligman, 2005).[17]

A related area of research that is particularly promising examines how academic performance is affected by factors such as school climate or learning environment (these terms encompass human relationships and other conditions conducive to learning, such as safety, empowerment, collaboration, and an engaging environment). One especially useful reference in this area is the comprehensive examination by Bryk et al. (2010) of components that are critical to helping

struggling schools become more successful. Their work for the Consortium on Chicago School Research, which compares successful and unsuccessful public elementary schools in Chicago, extensively documents how differences in performance across seemingly similar schools can be explained by factors such as lack of safety, level of violence, and whether the school has established a student-centered learning climate (in addition to such critical components as rigorous instruction, leadership, and community participation). Over the years, research on school climate has gained traction, and it is currently an important area of analysis for researchers and institutions seeking to explain what constitutes a good school.[18] Most of the evidence in this area is correlational, but, again, strongly points to the importance of a whole-child development strategy; focusing on the whole child gives improvements in curriculum, instruction, and assessment a much greater chance of succeeding (Comer, 2005). As an example, a recent study (Hanson & Voight, 2014) using two years of data from students in a California middle school shows a positive correlation between performance in math and reading and various measures of school climate (safety and connectedness, caring relationships with adults, meaningful participation, and reduced substance use, bullying and discrimination, and delinquency). We would expect future research on how school climate variables affect non-cognitive skills to further confirm the strength of these associations.

The association between non-cognitive skills and labor productivity and earnings

While it is well-established that additional schooling leads to higher earnings and labor productivity (Card, 1999), there is no exact estimate of the degree to which non-cognitive skills are rewarded in the labor market. There are, though, several studies on the relevance of non-cognitive skills as determinants of long-term labor market outcomes, as well as some attempts to estimate the economic returns to these skills.

One way to document this association is to look at surveys of employers to determine how they value these skills in the workplace. For example, a ranking of the desired skill set needed for new entrants' workforce readiness (Casner-Lotto & Barrington, 2006) provides some interesting information in this regard. For new entrants with a four-year college degree, results from a survey of over 400 employers in the United States indicate that the four most important skills are oral communication, teamwork/collaboration, professionalism/work ethic, and critical thinking/problem solving. More than 90 percent of employers surveyed declared these skills to be "very important." In contrast, writing, mathematics, science, and history/geography were ranked 6th, 15th, 16th, and 19th, respectively, out of 20 skills.[19] These rankings may not be surprising on their face: Few occupations rely heavily on basic academic knowledge developed in school settings. But the fact that employers stress the value of non-cognitive skills in the workplace speaks to both those skills' overall impact and to the need to readjust our perceptions of such constructs as college-and-career readiness.[20]

A body of empirical evidence provides a second way to assess the contribution of non-cognitive skills to jobs and earnings. Heckman, Stixrud, and Urzua (2006) offer two paths through which non-cognitive skills can raise wages: direct effects on productivity, and indirect effects through their impact on schooling and work experience. Using data from the NLSY-1979, the authors' estimates indicated that the effects of cognitive and non-cognitive skills on earnings were very similar (see estimated coefficients in Tables 4 and 5). Murnane et al. (2001), who estimate the impact of adolescent measures of self-esteem on wages received 10 years later, find a positive association between the two. They suggest that self-esteem could be associated with being particularly good at working productively in groups, and also with higher levels of perseverance.[21]

Other evidence is found in indirect estimates of the importance of non-cognitive skills, and in explanations of these indirect connections. Gintis (1971) used the following approach to indirectly test non-cognitive skills' relevance to earnings. He suggested that omitting a variable representing non-cognitive skills in a model designed to estimate the returns to education (a traditional Mincerian equation) would introduce some bias in the estimate of the returns to education. In other words, part of the estimated returns to education are, in fact, due to the effect of non-cognitive skills on earnings. Heckman and Rubinstein (2001) use a similarly indirect method to attribute to non-cognitive skills the difference in earnings between individuals with seemingly equal levels of educational attainment (GED holders and high school graduates). And Bowles, Gintis, and Osborne (2001) estimated that the returns to educational attainment—measured by years of schooling—diminished by about 20 percent when non-cognitive skills were accounted for.

While acknowledging that non-cognitive skills affect many other adult outcomes beyond earnings, we summarize these relationships with a quote from Heckman and Kautz (2012): "The […] message is that soft skills predict success in life, that they produce that success, and that programs that enhance soft skills have an important place in an effective portfolio of public policies." Building on that statement, below we explore how these non-cognitive skills that lead to success in life are generated during children's school years.

What Do We Know about the Origins of Non-Cognitive Skills and How They Can Be Nurtured?

Factors hypothesized to influence the development of non-cognitive skills include genetics, nurturing, practices during early childhood education, health, school environment, teaching practices, and specific teacher characteristics, among others. In this section, we explore some of the processes that create or enhance non-cognitive skills. First, we focus on the importance of the child's environment for the development of non-cognitive skills. Second, we explore how other non-school factors can affect those skills. Finally, we explore how differences in school factors

(teacher and school characteristics, and other education inputs) influence these skills.[22]

The importance of the environment. First, we review evidence regarding how an individual's environment—including such individual, family, and contextual characteristics as social class, poverty, housing, student mobility, culture, etc.—affects his/her non-cognitive skills.[23] An important reference summarizing this is found in Shonkoff and Phillips (2000). The authors point out that "every aspect of early human development […] is affected by the environments and experiences that are encountered in a cumulative fashion, beginning in the prenatal period and extending throughout the early childhood years." While the mechanisms underlying these connections are best explained by developmental psychologists and neuroscientists, whose frameworks and explanations are beyond the scope of this project, current research is working to uncover the connections between environment and development, including the underlying causal mechanisms in early development (Knudsen et al., 2006).[24]

Building on the work of Shonkoff and others, Grissmer and Eiseman (2008) point out that some of the racial gaps in non-cognitive skills may be explained by differences in the "environmental mechanisms driving development from conception to kindergarten entrance." From other correlational studies, we also know that students' personality and incentives provided by their environment are important in explaining absenteeism and disruptive, inattentive, and tardy behaviors (Segal, 2008). Another study that touches on an important category of non-cognitive skills—executive function—explains the potential moderators and mediators between socioeconomic status and inhibitory control, cognitive flexibility, and working memory, which include household composition and family environment (Sarsour et al., 2011).

Data demonstrating the magnitude of the differences in non-cognitive scores when students enter kindergarten also help illustrate the role of the environment. Frequently, researchers use the child's socioeconomic status (SES), or social class, to measure variation in the environment in which he or she lives. This is because SES acts as a mediating variable for the effects of other mechanisms that affect skills acquisition, such as parenting behaviors and engagement, access to higher quality early childhood care, parents' work habits, and intellectual interests emphasized in the home.[25] As early as kindergarten, a relative disadvantage among children in the lowest socio-economic status quintile, versus the other students, is visible across multiple non-cognitive skills (García, 2015).

The impact of environmental-school factors on non-cognitive skills. Having established the general influence of socioeconomic and other environmental factors on non-cognitive skills, we now discuss some examples of interventions affecting the school environment that have been found to either drive or inhibit children's

development of those skills. As noted above, the goal of this section is to document the importance of non-cognitive skills in the educational context/environment broadly. (A detailed analysis of interventions found to effectively nurture one or more non-cognitive skills would constitute its own lengthy paper, see Durlak et al., 2015 for examples of such interventions.)

Research findings regarding the promise of interventions designed to improve behavior and school engagement suggest how different approaches and services (some of them outside the standard competencies of education policy) can influence them. For example, a community schools approach—which includes wraparound student, family, and teacher supports—has been found to be helpful in promoting students' sense of school as a welcoming place, which is in turn associated with improved motivation and academic confidence (see, e.g., Castrechini & London, 2012). A community school strategy in New York City led to improved academic performance and attendance, increased parental involvement, and created safer learning environments and better student–teacher relationships (Quinn, 2003). School-based health clinics, one of the supports found to be a factor in positive community schools outcomes, have likewise been linked to improved student mental health, and to reduced tardiness and increased attendance, as well as to a trusting relationship with a caring adult in the school setting (Anyon et al., 2013).[26] Finally, afterschool programs and others that address out-of-school time gaps in opportunity have been found to have positive impacts on student engagement, attitudes toward school, and other behavior-related non-cognitive skills (see, for instance, Quinn, 2003 for a review of the literature, and Durlak and Weissberg, 2013 regarding improvements in positive social behaviors, reduction in problem behaviors, and improved school attendance from "afterschool programs that follow evidence-based practices to promote social and emotional development").[27] A few detailed, evidence-based examples are discussed below.[28]

Cook, Murphy, and Hunt (2000) found that the School Development Program, an initiative serving disadvantaged students in inner-city Chicago schools that seeks to improve their interpersonal relationships and social climate, had a positive impact on student beliefs, feelings, and behaviors that led to reduced disruptive behavior.[29] Initiated in 1968 and designed by James Comer, the program seeks to improve children's social and emotional (and academic) outcomes through the cooperation of parents, educators, and the community by offering problem-solving initiatives conducive to creating a healthy school culture and environment. The program entails the development of an improvement plan for each school that is then overseen by a team composed of administrators, teachers, parents, other school staff and professionals (such as counselors), and, in some cases, students, taking a whole-student development approach (Comer, 2005). It has been adopted in more than 1,000 schools in over half of the states in the country (as well as internationally).[30]

Other studies have focused on school violence and disciplinary behaviors to diagnose how these affect students' performance in both cognitive and non-cognitive domains. Gottfredson (1987) describes an organizational development

method implemented by researchers and school staff to reduce school disorder in two junior high schools in Baltimore. The program consisted of modifying the schools' planning, rewards, and administration systems, and the school and classroom environment, which increased students' sense of belonging in school and prosocial peer support. Another example of these complex interconnections is the evaluation of Fast Track, a comprehensive program for students in grades one through 10 that seeks to reduce conduct problems and promote academic, behavioral, and social improvement. Fast Track's recent evaluation under the What Works Clearinghouse standards showed positive effects on emotional/internal and external behavior and had social benefits for children classified as having an emotional disturbance (as well as for those at risk of classification). The program also demonstrated benefits in reading achievement and literacy (U.S. Department of Education, 2014).

Finally, in studying the development of non-cognitive skills, it is of particular interest to understand how out-of-school and extracurricular activities help adolescents form their identity by developing skills and preferences, and building a relationship with others (Eccles & Barber, 1999; Valentine et al., 2002; Youniss et al., 2002).[31] Other studies examined the link between participation in extracurricular activities and adolescent functioning (Gilman, Meyers, & Perez, 2004; Huebner & Mancini, 2003; Zaff et al., 2003). Recently, Baker (2013) and Durlak and Weissberg (2013) highlighted that quality afterschool and summer learning programs have positive effects both on students' learning and on their personal and social development.

The importance of school and teacher factors. Empirical research on the production of education—in which a combination of inputs is used to produce a given school outcome (Todd & Wolpin, 2003)—has traditionally focused on studying how school and teacher factors (in addition to individual-level factors) correlate with cognitive performance,[32] but not so much on how they correlate with non-cognitive skills. If we accept the broad definition of education as encompassing both cognitive and non-cognitive skills, however, this framework can also be used to examine the connections between teacher and school variables (e.g., teacher experience, educational attainment and certification, or class size) and non-cognitive skills.

One example of this research is Dee and West's (2011) study of the effects of class size in eighth grade on students' engagement with school.[33] Their findings indicate that smaller class sizes are associated with small improvements in the measured skills, with effects between 0.05 and 0.09 standard deviations. Using a quasi-experimental approach, García (2013) finds that teachers' experience is positively associated with performance in non-cognitive skills.[34] In particular, students' non-cognitive skills are expected to increase by 0.06 standard deviations for each standard deviation increase in teacher experience. Some indicators of the effects of school inputs on non-cognitive performance skills suggest an improvement in skills among students who transferred to a school with a lower concentration of minority students (between 0.07 and 0.11 standard deviations). Also, students

whose class size decreased seemed to improve their behavioral performance (0.02 standard deviations from the index), a smaller coefficient than Dee and West's.

Thinking more specifically about particular non-cognitive skills, we also highlight the importance of evaluations of programs targeted at improving executive function skills. For instance, some additions to school curricula and computerized and interactive games have been found to have a positive impact on improving children's executive function skills, as summarized by Diamond (2013). The studies underlying her explanations (which also examine early childhood programs such as the Chicago School Readiness Project, or the practice of martial arts) used randomized evaluations to assess their impacts.

The importance of simultaneous effects. Several works cited in this chapter have indicated a mutual relationship between cognitive and non-cognitive skills. Indeed, although these skills are not often studied in an integrated way, multiple authors suggest that the processes of socio-emotional development and cognitive development are intertwined (Levin, 1970; Cunha et al., 2006; Cunha, Heckman, & Schennach, 2010; Olson, 2012; Shriver & Weissberg, 2005). Building on Levin's (1970) earlier work, a recent attempt to study the two types of skills in an integrated way within the school setting is provided by García (2013). Her framework models the production of both cognitive and non-cognitive skills, allowing for simultaneity (or interrelationship) between the two skills by using a simultaneous equation model.[35] García's study uses data for students between kindergarten and eighth grade (from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–1999) and two indices that represent the two main types of educational outcomes—cognitive and non-cognitive. She finds that the interdependent relationships between the two types of skills are statistically significant across the entire analyzed school period in both directions: Non-cognitive skills are important predictors of cognitive performance, and cognitive skills are also influential in the level of non-cognitive performance. The patterns over time suggest that the importance of non-cognitive skills as a determinant of cognitive performance increases very little over the earlier grade levels, but steadily increases across the later grades. Meanwhile, the absolute importance of cognitive skills as a determinant of non-cognitive skills significantly increases through the earlier grade levels (kindergarten through third), and then decreases in later grade levels (fifth through eighth).[36] Although the exact pattern may be driven by the items that compose the indices used and by their measurement,[37] the simultaneous relationship is very strong and raises important questions with implications for the evaluation of education policy.

In line with the research in this area, the findings affirm the importance of better understanding the interconnections between skills, so that the evaluation of interventions in one area—in particular, those targeting cognitive skills—also includes an assessment of how those affect the other domains (Olson, 2012, 23; and previous citations in this subsection). As such, they point to the difficulty of trying to boost cognitive skills while ignoring the need to nurture non-cognitive skills.

POLICY IMPLICATIONS

The above sections convey the importance of non-cognitive skills. These skills matter because they correlate with civic and democratic participation. They also matter because they correspond to what employers look for, and there is some evidence that they correlate with higher productivity and earnings. Non-cognitive skills correlate as well with academic performance. We also know that non-cognitive skills are developed in the school years, that their development is dependent on family and societal characteristics, and also on school and teacher factors, and that they are affected by the instruction and social interactions that take place in school.

Since non-cognitive skills matter and can be nurtured in schools, developing them should be an explicit goal of public education. Even though there is still much to learn about these skills' impacts and how to best nurture them, these conclusions indicate that education policy should be, at the very least, responsible for establishing structures that are conducive to their development, as is the case for cognitive skills.

Which Changes to Education Policy Can Help It Best Fulfill This Mission?

To ensure that non-cognitive skills are encouraged (and are not harmed), policy should shift in accordance with the following recommendations, which build both on theory and on practices already in place. While the recommendations require changes to some aspects of current education policy, they also reflect recent momentum in this direction that points to increasing recognition of the importance of non-cognitive skills.

In particular, we suggest a three-part set of actions: (1) build on growing momentum to shift to more positive and supports-based approaches to teacher and school accountability and student discipline; (2) learn from and adapt policies and practices in the areas of early childhood education, afterschool and summer enrichment, and special education—which have long emphasized non-cognitive skills—to make them core components of K–12 policies; and (3) look to districts that are piloting non-cognitive skills–related strategies as potential models and to state- and federal-level policies that support such strategies.

Broadening and refining accountability. Accountability practices and policies must be broadened in a way that makes explicit the expectation that schools and teachers contribute to the development of non-cognitive skills. Making the development of the whole child central to the mission of education policy would help improve evaluation and accountability through changes to curriculum, teacher preparation and support, other aspects of schools' functioning, and evaluation systems. Specifically, incentives promoted by the enhanced accountability system would be aligned with widening the curriculum, cultivating the proper climate within the school, promoting teachers' investment in relationships with students,

and ensuring teaching time for strategies that are conducive to the development of non-cognitive (as well as cognitive) skills.

Designing such a system requires ensuring that new policies avoid replicating the mistakes of current accountability systems focused on cognitive skills, which have turned out to be too rigid and too narrow (Ravitch, 2013). Indeed, such a broader education policy agenda could reverse some of the dysfunctional aspects of current systems, leading to fairer and more realistic education policies generally.

Curriculum and teaching methods

The identification of the non-cognitive skills that play important roles in education should prompt a discussion of how to design a broader curriculum as well as specific instructional strategies to promote those skills. Some non-cognitive skills can be taught both directly and also indirectly, i.e., they are outcomes/products of training in specific academic subjects.[38] That broader curriculum should thus include ways to both directly promote specific non-cognitive dimensions and to develop them indirectly, by leveraging other kinds of skills (Olson, 2012, 19). For example, having students work on group projects has been found to effectively nurture skills such as collaboration, critical thinking, and communication (Friedlaender et al., 2014).

For teachers to effectively convey these new curricular domains, they will need new and different kinds of preparation and support. Education policy thus must also be enhanced to ensure that teachers are appropriately supported and trained, and that they receive instruction in both the subject and content, and also help in learning how to teach it. For example, in their research into student-centered learning approaches, Diane Friedlaender and her colleagues list a number of supports for teachers, from higher-quality preparation and induction to increased time for planning and collaboration (Friedlaender et al., 2014).

Evaluation of teachers' performance

If teachers are expected to help students excel in both cognitive and non-cognitive dimensions, as is needed for those children's full development, then teachers should be incentivized to do so and held accountable for doing so. Indeed, many critics of current accountability systems see the lack of such balance as a key flaw. If teachers are held accountable only for their part in developing students' cognitive skills (essentially math and reading), there is an inherent disincentive to focus on developing their broader skills.

Given concerns regarding current evaluation systems—in particular, those that rely on student test scores and growth, like value-added models—adding non-cognitive skills to those models poses both added concerns but also the potential for improvement. Current models do not validly capture teachers' contribution to students' learning even in the few tested subjects (Baker et al., 2010; Haertel, 2013; American Statistical Association, 2014). Rather than trying to tweak such

models to also capture teachers' contribution to another, even harder-to-measure set of skills, we should therefore explore other options. These likely include some combination of higher-quality observations directly tied to support for teachers to improve in areas identified (Darling-Hammond, Wilhoit, & Pittenger, 2014; Friedlaender et al., 2014); school-level observations/inspections geared to helping struggling schools improve (Darling-Hammond, Wilhoit, & Pittenger, 2014; Rothstein, Jacobsen, & Wilder, 2008); and district- and state-level comparisons of similar student groups' test scores and other outcome data to identify best practices (Rothstein, Jacobsen, & Wilder, 2008). There are currently few options available, but the hope is that the demand to evaluate teacher performance more broadly will spur the development of more appropriate evaluation systems overall.[39]

As three prominent education scholars emphasize in their recent report on developing a new accountability paradigm, it is also critical that accountability be reciprocal: "Each level of the system – from federal and state governments to districts and schools – should be accountable for the contributions it must make to produce high-quality learning opportunities for each and every child" (Darling-Hammond, Wilhoit, & Pittenger, 2014, 2).

Adjust school disciplinary policies. Many of the existing disciplinary measures used to combat specific students' misbehavior are at odds with the goal of nurturing non-cognitive skills. Harsh measures, including in-school and out-of-school suspensions and expulsions, referrals to law enforcement, and even arrests (often called, collectively, zero-tolerance policies), are increasingly used to punish low-level infractions (Noguera, 2011).[40] Such responses to uncooperative, disorderly, or disruptive behaviors are not only unlikely to prevent such behaviors in the future, but have been found to be counterproductive for the child's development. Such strategies correlate negatively with school achievement and school climate and positively with dropouts (Emmer et al., 2013).

Disciplinary measures need to be rooted in an ability to support and promote better non-cognitive behavior, and in prevention of misbehavior, rather than in just sanctioning wrongdoing. These policies could include restorative practices such as peer mediation, group responsibility, and counseling, among others. And evidence points to the increased efficacy of such positive approaches, shifting from zero-tolerance to preventive and supportive policies that embrace support and promotion of safe learning environments (Boccanfuso & Kuhfeld, 2011; Skiba & Knesting, 2002; Skiba, 2010).

The Supportive School Disciplinary Initiative (spearheaded by the Department of Education and Department of Justice) was launched in 2011 with the goal of supporting the use of school discipline practices that foster safe, supportive, and productive learning environments while keeping students in school. One useful resource is a new guide explaining how states can develop such practices and how policymakers can work to enact and implement them (Restorative Practices Working Group, 2014).

Finally, there are encouraging examples at both the state and district levels of a shift away from harsh and punitive disciplinary practices and toward these types of supportive measures. California recently became the first state to ban suspensions for "willful defiance" (Siders, 2014). And a number of large school districts—including Baltimore, Boston, New York City, Minneapolis, and Oakland—have adopted restorative policies that steer students toward positive and reinforcing means of addressing problem behaviors (Restorative Practices Working Group, 2014, 10–11).

Learn from out-of-mainstream school settings: early-childhood education, special education, and after-school activities. There are at least three prominent education contexts in which experts know quite a lot about how to effectively nurture non-cognitive skills. These include early childhood education, after-school and summer programs, and special education. Adapting lessons learned in these settings to K–12 education is another path toward making the development of non-cognitive skills a core component of U.S. education policy.

In contrast to the heavily cognitive focus in K–12 settings, the early childhood field has long acknowledged the importance of socio-emotional skills and, as such, made their development a key part of curriculum and measurement strategies. Early childhood education thus provides examples of how to ensure that non-cognitive skills are nurtured, and also of how the assessment of outcomes and practices can be adapted to include non-cognitive skills.[41]

Key contributions from the early childhood field include the importance of playtime in helping children to develop certain non-cognitive skills, such as self-regulation and confidence (Galinsky, 2006; Albert Shanker Institute, 2009). Scholars also point to the role of strong teacher–student relationships in building other skills, including trust and curiosity (Galinsky, 2006). And many point to the need for nurturing classroom environments and student-centered learning in order to boost these and other skills (Pianta et al., 2005). A whole-child approach to both curriculum and experiences is the norm; it is assumed and emphasized across the board (Barnett et al., 2009; Galinsky, 2006).

Indeed, Paul Tough (2012) points to these factors in his observation of how a high-quality prekindergarten classroom helps disadvantaged preschoolers develop their non-cognitive skills. And Robert Pianta and his colleagues have drawn on this evidence to develop and refine their CLASS (Classroom Assessment Scoring System) method, which is intended both to promote the classroom and teacher attributes that research finds help children to thrive, and to assess the degree to which providers have achieved them (reviewed below, La Paro & Pianta, 2003; La Paro, Pianta, & Stuhlman, 2004; Pianta, La Paro, & Hamre, 2008).

In light of findings regarding the positive impacts of quality after-school experiences not only on students' academic progress, but on their personal development (as discussed earlier), this is another area of focus from which K–12 education policy can learn and adapt. Afterschool enrichment activities that have been the focus of studies range from music, arts, and drama programs to organized

sports and more academically focused initiatives such as tutoring, mentoring, and help with homework. Scholars point to the range of activities, and of skills targeted, as a key reason for their efficacy in nurturing a range of both non-cognitive and cognitive skills.

Indeed, research shows that participation in extracurricular activities helps adolescents form their identity by developing skills and preferences, and by building relationships with others (Eccles et al., 2003; Valentine et al., 2002). Other skills, such as engagement and confidence, are also critical to the mission of out-of-school activities. In fact, there is growing recognition of the need to bring the kinds of engaging, hands-on, project-based activities that are the norm in afterschool and summer settings into classrooms, so that their promise can be harnessed to a much greater extent (Performance Standards Consortium, n.d.; Friedlander et al., 2014). Recently, Baker (2013) and Durlak and Weissberg (2013) have shown that quality afterschool and summer learning programs have positive effects on both students' learning and on their personal and social development. These evaluations can also constitute good additional examples to provide education policy with instruments to assess non-cognitive skills that can be incorporated into standard assessments.

Finally, the inherent recognition that students eligible for special education services have unique needs and capacities has spurred the development of practices and policies that could be adapted to better address every student's unique needs and capacities. Perhaps most prominent, the individualized education plan (IEP)—to which special education students are legally entitled—offers potential to help schools support students' development of non-cognitive skills. The Schott Foundation for Public Education, which is devoted to whole-child learning, has translated the IEP into a similar concept—a Personal Opportunity Plan—intended to support both the cognitive and non-cognitive needs of a broader set of students throughout their academic careers (Lieber, 2014). Project-based learning, which is gaining traction in K–12 policies and, as noted above, features prominently in many afterschool settings, also has its roots in special education (Ferretti, MacArthur, & Okolo, 2001; Webster, 2014). Again, recognition of each student's unique needs and capacities, which has long been a staple of special education, is a key foundation for ensuring that schools and teachers are equipped and incentivized to promote non-cognitive skills among all students.

Learn from and expand pilot efforts.[42] While no state yet stands out as a model of the policies and practices advanced here to better attend to non-cognitive skills, a growing group of school districts has embraced this as part of their core mission.[43] These include Boston, where the City Connects initiative has been scaling up for over a decade to serve the broad range of students' needs in 16 Boston public schools. Full-time site coordinators meet with every classroom teacher to discuss each child's strengths and needs in the areas of academics, social/emotional/behavioral growth, health, and family.[44] Each student is then linked to a personalized set of services and enrichment opportunities in the school and/or community that address his or

her unique strengths and needs. In the rural Black Oak Mine School District in the Georgetown Divide region of California, this mission is manifested in the form of student-centered classroom and extracurricular activities that encourage youth development, participation, and sense of empowerment.[45]

The Collaborative for Academic, Social, and Emotional Learning (CASEL) works with several pilot districts to effect similar improvements. Based on the premise that district-level leadership is critical to securing and sustaining the type and level of supports needed to ensure whole-child education, in 2011 CASEL launched the Collaborating Districts Initiative. Among the best examples is Austin, Texas.[46] As CASEL reports, the Austin Independent School District (AISD) "is a recognized leader in urban education and one of the first districts in the nation to commit to the development of the whole child by incorporating social and emotional learning [SEL]. In AISD, SEL implementation focuses on three core areas: positive culture and climate, SEL skill and concept integration, and explicit SEL instruction."[47]

The Developmental Studies Center, which has worked for over three decades to promote students' academic, ethical, and social development, offers another source of guidance. The center's activities focus on providing professional development to teachers to help them support whole-child development, both in school and after school. As part of that work, it has developed a number of programs and evaluation instruments that have been shown to improve students' academic performance and prosocial skills, and to reduce problem behaviors such as drug and alcohol use.[48]

While neither any state nor the federal government has yet made nurturing non-cognitive skills a core component of its education policy, there are promising examples at both levels that could be enhanced or scaled up. For example, the New York State Board of Regents Social and Emotional Developmental guidelines serve as a useful model that other states could adapt to fit their resources, priorities, and needs.[49] These initiatives were incorporated into the Board of Regents' P-16 Plan Action 11 in 2008 as a way to reduce barriers to learning. And across many districts that have developed targeted strategies to advance schools' capacity to support non-cognitive skills, federal 21st Century Community Learning Center Grants are one important source of funding and policy support.

Unfortunately, these examples also highlight the continuing conflict between such supportive laws and others, particularly narrow accountability and disciplinary policies, that overshadow these positive strategies and greatly dilute their positive impact. Ensuring that policies at all levels are better aligned, and that they do not work at cross-purposes, will thus be key to effectively promoting non-cognitive skills in education contexts.

These district-level examples of intentional strategies to nurture non-cognitive skills, and sample state and federal policies that support them and others like them, also illustrate the influence of a small but growing group of foundations that have embraced the importance of non-cognitive skills and are working to incorporate them more fully into the education policy agenda. Individual philanthropists and

foundations have played an increasingly prominent role in shaping education policy in recent years—through both research and advocacy—so these contributions merit consideration. A few of the more prominent include the Ford Foundation, the Charles Stuart Mott Foundation, the Nellie Mae Foundation, the Annie E. Casey Foundation, the Atlantic Philanthropies, the Schott Foundation for Public Education, the NoVo Foundation, and the Lumina Foundation (among others).[50]

How Can Research Help Education Policy Achieve These Goals?

The policy recommendations, which build on existing research, also pose significant demands for researchers. In this section, we discuss the need for researchers to identify definitions of non-cognitive skills and develop good metrics systems. We offer some examples of existing instruments that could be expanded to assess non-cognitive skills in the K–12 period. The recommendations related to accountability outlined above also suggest new areas of study for researchers, which are needed to inform enhanced curriculum, teacher training and preparation, and assessment of school performance.

Also, researchers' added examination of the role of non-cognitive skills in education processes could certainly improve our understanding of these processes (sometimes called "black boxes"), and thus further improve educational interventions. Finally, although not exclusively associated with research, we include a discussion of how all actors involved in children's education must join forces to achieve successful adoption and implementation of more effective policies.

Design good metrics and systems to measure non-cognitive skills. As discussed above, integrating non-cognitive skills into the education policy agenda requires, first, the identification of a satisfactory and concrete list of these skills, as well as systems or scales to measure them. Measurement and methodological research are required to validate an *accurate and complete* list of education-related non-cognitive skills,[51] and to provide us with metrics that are both reliable and valid.[52]

While we recognize the many challenges entailed in developing these metrics, we note two strong examples to which researchers can look and upon which they could build. Robert Pianta's CLASS method for classroom protocols documents the interactions between teachers and students in domains like behavior management and instructional dialogue, and accounts for other classroom features and environmental factors (La Paro & Pianta, 2003; La Paro, Pianta, & Stuhlman, 2004; Pianta, La Paro, & Hamre, 2008). Substantive work has validated the instrument at younger ages, and some work to extend it to kindergarten through third grade has also been pursued. A second example is the work developed by the Educational Testing System on the integration of non-cognitive dimensions in its assessments. Patrick Kyllonen and his colleagues provide a framework for the whole-person assessment in education, including a set of non-cognitive constructs such as affective

competencies and attitudes (see Kyllonen, 2005, Figure 1). This work is specifically relevant for measuring older students' college readiness, and it provides some solutions to problems with measurement, such as the tendency of those surveyed to provide false information about their own socio-emotional status.

An additional challenge is ensuring that in designing metrics, researchers do not suggest a given skill level is generally appropriate or desirable. For example, we may expect all children to identify a certain set of words within a text, but not necessarily to attain a specific high measure of creativity, though we may appreciate improvements in both over time. While we recognize that researchers are not responsible for misuse of "value-added" and similar measures, it is critical that they fully explore the implications of their work while it is being conducted, and that any relevant caveats are issued along with it, not after the fact. Perhaps the biggest lesson learned from problems with accountability systems is that researchers' concerns sometimes come too late—after such systems have been institutionalized to great detriment and at a point at which fixing the problem becomes politically and/or logistically difficult.

As such, as they embark on important work in this emerging field, we call on researchers to incorporate some safety measures. For example, when designing measurement systems, they must include both quantitative metrics (e.g., scores on a psychological scale) and qualitative ones (e.g., the degree to which a specific characteristic is manifested). And when designing longitudinal assessments, they must take into account information on child development, in order to balance the goal of growth of skills with expected variation across children.[53] This caution needs to be stressed as education policy evolves in this area.

Using research to inform the teaching profession. Research also has the potential to inform the teaching profession through improving teacher preparation and support, and by guiding the appropriate design and utilization of assessments.

Teacher preparation and support

Fully integrating non-cognitive skills into student curriculum requires that researchers produce evidence on a number of issues related to teachers' preparation and professional support. Research should contribute to informing how the curriculum used in schools of education could include training specifically geared toward the development of students' non-cognitive skills.[54] Similarly, there is substantial room for research to inform how professional development can provide teachers with knowledge of how to support the socio-emotional skills that are sought to be developed in schools. Through the provision of pedagogic, leadership, and organizational skills training, this professional development could complement existing training designed to improve teachers' effectiveness as instructors by incorporating a new component that is more focused on the child's full development and that gives them insight in using the principles of child development (Comer, 2005).

It is also critical to ensure that schools are appropriately staffed with experts on mental and emotional health; i.e., teachers cannot and should not supplant the role of counselors or psychologists (or others). As set out above, education is not confined to what happens within school walls, nor can the nurturing of cognitive or non-cognitive skills be the sole responsibility of teachers. It takes the whole school, family, and community to do so effectively.

Research to inform both learning and teaching: Assessment versus utilization of the assessments

In light of some misuses of assessments for accountability purposes, research is needed to guide the appropriate design and utilization of assessments so that they can inform both learning and teaching.[55] Research should devote significant effort to improving current systems by rethinking the assessment of cognitive skills, redesigning how accountability is utilized, and building solid assessment and accountability systems that are based on inclusive, quantitative and qualitative procedures that inform performance, teaching, and learning. If individuals' full development is the ultimate goal of education, assessments and accountability should be tools to reflect learning and development, and to inform pedagogical strategies, learning pathways, and cognitive abilities and other knowledge acquired.

Using non-cognitive skills to improve educational policies: Opening the black box of educational processes and interventions. Students, teachers, and school performance are not the only aspects that would be subject to evaluation when non-cognitive skills are incorporated into the education policy agenda. As Heckman (2004) states:

[C]urrent policies regarding education and job training are based on fundamental misconceptions about the way socially useful skills embodied in persons are produced. By focusing on cognitive skills as measured by achievement of IQ tests, they exclude the critical importance of social skills, self-discipline and a variety of non-cognitive skills that are known to determine success in life. Furthermore, this preoccupation with cognition and academic "smarts" as measured by test scores has led to the exclusion of social adaptability and motivation and causes a serious bias in the evaluation of the human capital interventions.

This statement highlights the multiple areas in which *education effects* could be reassessed: transitions across educational levels, investment in education, assessment of the quality of education, returns to education, or benefit – cost analysis in education, etc.

Opening up "black boxes" in the education process means trying to better understand how what we do in education policy, and how we structure policies, influence cognitive and non-cognitive outcomes. It also indicates the need to design interventions and conduct research that satisfactorily explains how non-cognitive skills can be enhanced (Durlak et al., 2011; Levin, 2012b), and that ascertains which specific roles they play in the education process.[56]

Research, policy, and politics: An opportunity to reinforce joint work among education institutions and agents. The development of children is not solely schools' responsibility. Parents, of course, play the primary role, and many components of society, including schools, must provide support in a collaborative manner. To fulfill its role, policy must help establish connections across the research and academic worlds, as well as with the testing and measurement industry. Given the growing influence of philanthropy in education, donors and individuals must coordinate their work with that of these various actors, in an appropriately limited manner.

An expansion of the policy agenda to include non-cognitive skills could provide the opportunity for joint work among schools, parents, and education policy agents (research, academia, and industry, in multiple disciplines, and policymakers). Such collaboration is also required if we are to meet each child's various needs.

CONCLUSION

Non-cognitive skills are reemerging as an important issue in education policy discussion. This paper offers some reflections on how the integration of non-cognitive skills in the education policy agenda could substantially improve how education policy is conceptualized and implemented, and discusses a number of challenges entailed in doing so. We began with reflections about accepted notions of what constitutes being an educated person, and of what happens during children's school years to move toward that goal. We then reviewed various perspectives on the importance of non-cognitive skills and contrasted that importance with the relative lack of curricula and standards to nurture them in our children. We also explained how the interaction between cognitive and non-cognitive skills means that this failure to pay attention to the full development of children will greatly limit the potential for success of current attempts to improve curriculum, instruction, and assessment (Comer, 2005).

We then discussed that, in considering how to make non-cognitive skills key ingredients of the education process and education policy, we face three major challenges. First, non-cognitive skills in the education process need to be defined: We need to know *which ones matter*—i.e., we need to reach a consensus regarding which skills can and should be promoted in the school years. We contribute to this discussion by providing *what we call the education policy's list of non-cognitive skills.* This list includes skills that all students should possess to some degree, and that should be nurtured by schools in order for children to thrive in school and life, while recognizing each person's own individuality and a natural variation in skill levels, as we do with cognitive skills.

Second, it is necessary to establish *how they matter*, i.e., their roles as both inputs and outcomes. As such, we must design systems to represent, measure, and quantify these skills. Such systems must reliably and validly capture all important skills and be applied appropriately, giving educators the information they need to nurture

skills without losing sight of children's unique needs and capacities. *Empirical research* needs to validate these, as well as to assess whether and how students' learning and development is occurring.

Third, we set forth guidelines for changes to the education system that are necessary to achieve improvements around non-cognitive skills. In discussing this framework, we also called on researchers to provide new evidence in a range of relevant areas. We also noted the need for coordinated work by students, teachers, parents, the measurement and testing industries, foundations, and policymakers. Indeed, as the district-level examples above illustrate, such major change to how education systems operate requires nothing less than the full alignment of goals, actions, policies, and incentives, at the federal, state, and local levels.

We present these ideas to those in charge of guiding our policy in education with the belief that, in the current context of debates about how to shape education reforms, rethinking the role of non-cognitive skills provides an opportune chance to enact a more effective strategy overall. Also, this chapter is written with the conviction that education policy needs to take action around these important skills that are nurtured in classrooms. Given the key contributions of both cognitive and non-cognitive dimensions to our understanding of what it means to be an educated person, education policies must establish the strategies, actions, and safeguards needed to help individuals to become *fully* educated.

NOTES

[1] This chapter was first published by the Economic Policy Institute (www.epi.org). The original version has been slightly modified to adapt it to the requirements of the current publication and to incorporate a few publications released since then. Still, the acknowledgments of the original paper apply here. I gratefully acknowledge Elaine Weiss, who cowrote the policy implications section of this paper and contributed substantially throughout the process. I also offer sincere appreciation for the extraordinary guidance provided by Jane Quinn, who reviewed multiple versions of the original paper. I also thank Richard Rothstein, Robert Pianta, and Lawrence Mishel for their helpful comments and advice on earlier drafts of the paper. Finally, I am grateful to Michael McCarthy for his edits of that work.

[2] Other terms used to describe these skills include soft skills, personality traits, non-cognitive abilities, character skills, and socio-emotional skills (Heckman & Kautz, 2013). The terms interpersonal and intrapersonal skills are also used in the literature (Levin, 2012a, 2012b, 2015).

[3] These contributions date from a few decades ago, and in some cases, centuries ago. For an introduction to the philosophy of education, with references to the meaning and goals of education from Plato to the 20th century, see Phillips and Siegel (2013). See Castaneda (1968); Dewey (1916); and Goodlad, Soder, and Sirotnik (1990) for discussions about the meaning and purposes of education, and the commission of teaching. See Elias (1997) for a request for school reform to provide greater attention to social and emotional learning, or to find the "missing piece" in the education system.

[4] One recent study on the opinion of teachers on non-cognitive skills was conducted by Bridgeland, Bruce, and Hariharan (2013).

[5] Examples extracted from Rothstein, Jacobsen, and Wilder (2008).

[6] See Ravitch (2011); Rothstein, Jacobsen, and Wilder (2008); and Tough (2012).

[7] In contrast to cognitive outcomes, there is currently no consensus on what represents a high "level of [non-cognitive skills] performance." See the policy implications section of this paper for a discussion of the scaling of these traits, and a call upon research to contribute to ascertaining these relationships.

[8] Most of the existing work classifying non-cognitive skills relies on the contributions of psychologists, who have developed different conceptual frameworks and constructs, in different attempts to narrow the concepts they represent and attach quantifiable indicators. The history of the development of a conceptual approach to personality assessment is summarized by Digman (1990) and Goldberg (1993), and more recently, by Borghans et al. (2008), and by Almlund et al. (2011). Another recent attempt to develop constructs and measures representing non-cognitive skills is Kyllonen et al. (2009). While there are several traits taxonomies, the most famous classification of personality traits is probably the "Big Five" construct of personality, which organizes all personality traits along five uncorrelated dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. See Almlund et al. (2011, 74, Figure 4) for some of these and other traits' taxonomies.

[9] We acknowledge the (increasing) work that countries, national and international committees or advisory teams are doing in these regards, mostly related to the identification of skills and competencies needed in the 21st century. In the United States, one example is the publication by the National Research Council (2012).

[10] Another important issue to note here is that this list and any possible list are tied with the need to specify a "for what and for whom" the included items would matter (Duckworth & Yeager, 2015). In addition, skills and corresponding measures "must be culturally, educationally, age, and gender appropriate, and be sensitive enough to measure changes among program participants across regions and sectors of the world." (Lippman et al., 2015, p. 46).

[11] It is not clear that all of these belong in the non-cognitive camp; some might be skills that fall between cognitive and non-cognitive extremes. Also, some skills may be more static or fixed, while some may be more adaptable and learnable, depending on each individual. Additionally, some degree of overlap can be detected among some of the skills included in the list.For work building on existing classifications that aims at providing a representative framework of skills and competencies (including noncongitive skills), see Fadel, 2015.

[12] Promoting non-cognitive skills as defined and listed is a mission for education policy. Promoting the full development of children and ensuring acquisition of a broader list of skills for democratic as well as education reasons is a mission for public policy in general, for society, and more importantly, for families and communities. This paper refers exclusively to educationally relevant non-cognitive skills.

[13] Very recent literature reviews such as Lippman et al. (2015) and the book edited by Durlak et al. (2015) are important additions to the work done from an academic perspective.The review below exclusively focuses on studies examining the relationships between non-cognitive skills and education and earnings, and does not include studies that examine the association between these skills and other individual and societal outcomes.

[14] One recent literature review of the contribution of non-cognitive skills to academic performance is provided by Farrington et al. (2012). This review assumes that academic performance, as measured by grades or test scores, reflects not only knowledge of academic contents but also other important student attributes or non-cognitive factors, such as a "range of academic behaviors, attitudes, and strategies that are critical for success in school and in later life." Farrington and colleagues' list includes study skills, attendance, work habits, time management, help-seeking behaviors, metacognitive strategies, and social and academic problem-solving (some of which, as noted above, may be considered in part cognitive). In the authors' conceptual framework, non-cognitive skills operate in a three-level environment, determined by student background, school and classroom context, and socio-cultural context, which may, in turn, shape their specific impact on achievement. Other literature reviews on the same topic include Rosen et al. (2010) and Gutman and Schoon (2013). Rosen et al. (2010) focus on the relationships between academic performance and seven non-cognitive skills, such as motivation, effort, self-regulated learning, self-efficacy, self-concept, social behavior, and coping and resilience, among students in grades kindergarten to 12. Gutman and Schoon (2013) review studies that discuss how non-cognitive skills can be defined and measured and explore interventions that aim to improve non-cognitive skills in children. Additional references are found in the works by Brunello and Schlotter (2011) and García (2013, chapter 2).

[15] See table 2 on page 414.

[16] We briefly summarize some evaluations and correlational studies that look at how improving non-cognitive skills could boost cognitive performance. We will examine whether these interventions worked through improving non-cognitive skills as well in later sections.

[17] Interesting work in the self-regulation field, particularly concerning self-regulation's importance at earlier stages in children's development, has been conducted by Bierman, Domitrovich, and colleagues. See, for example, Bierman et al. (2008); Bierman et al. (2009).

[18] For example, see Carter (2013) for a discussion; Fergus, Noguera, and Martin (2014) for some evidence associated with single-sex schools' efforts to improve both cognitive and non-cognitive skills of their minority male students; and OECD (2010, 2013). An example using the OECD's Programme for International Student Assessment (PISA) data is the work developed by Weiss and coauthors looking at the relationship between students' engagement with the school and the teacher (i.e., measuring the degree to which the student feels connected with his/her school), and academic performance or competencies. Results for the United States suggest that, net of standard individual and education controls, higher values of engagement with teachers are associated with higher reading scores, and higher values of engagement with school were predictive of performance (Weiss & García, 2015; Weiss, García, & Torrats, 2014). Other countries examined are Canada, Japan, South Korea, and Mexico. Among others, the comparisons highlight the cross-cultural variation among the associations in the different countries.

[19] See Table 5, page 21. This specific survey/ranking does not ask which specific cognitive skills new entrants may use at work. From a cumulative learning perspective, it is reasonable to assume that some of the cognitive skills used in the workplace build on basic concepts learned in school. This argument should not be interpreted to mean that cognitive skills do not matter, but rather that non-cognitive skills *do* matter.

[20] In other words, these rankings may be comparing job-specific cognitive skills with general, non-job-specific non-cognitive skills. Evidence of the importance of job- and sector-specific non-cognitive skills is found in Mourshed, Farrell, and Barton (2012). From the point of view of labor economists or business leaders, the subset of non-cognitive skills may differ from the list of skills relevant for educational purposes. For example, see Murnane and Levy's (1996) new basic skills, or materials from the 21st Century Skills Partnership.

[21] Other references of interest in this regard are Heineck and Anger (2010) and Lindqvist and Vestman (2011).

[22] As we review the literature, keep in mind that while some studies explore specific skills and impacts on them, much of the research discusses non-cognitive skills writ large. As such, we may not yet be able to understand the degree to which given child-rearing and/or school practices influence the development of various non-cognitive skills, or their impact at different ages.

[23] For instance, Rothstein (2004) reviews the importance of different factors in explaining cognitive gaps. See Brooks-Gunn and Duncan (1997) for a detailed study on how poverty in childhood can affect a multitude of outcomes, including emotional and behavioral domains.

[24] Olson (2012, 11) points to new evidence on genetics that "indicates that behavior influences genes […] and that experiences are able to change genetic activity that once was assumed to be hard-wired" and how "neuronal structure and function change in response to experiences." Nisbett (2009) provides a comprehensive study of the importance of the environment for the development of intelligence (in all its various forms).

[25] Publications that report such findings include Bloom (1964), Lee and Burkam (2002), Barnett and Belfield (2006), and Rothstein (2004). For a more recent compendia analyzing the multiple ways in which socioeconomic status or social class influence children's development, see Duncan and Murnane (2011).

[26] See Gall et al. (2000); Hall (2001); and Strolin-Goltzman (2010) for other references.

[27] This should probably not be surprising, given the explicit goals of many out-of-school-time programs of compensating for lack of attention to these factors during the school day/in the classroom. See, for example, Carter (2013); and Heckman and Sanger (2013).

[28] Some of these and other interventions aiming at altering the learning climate, or other school aspects, in order to boost students' non-cognitive skills are listed in Durlak et al.'s (2011) meta-analysis. Note

that these interventions are implemented during the school time and year. Rothstein (2004) reviews some empirical research that highlights the importance of after-school activities and summer programs for "laying the foundations for academic success" as well as for building "social skills, like leadership, conflict resolution, and teamwork" (101). Zins et al. (2004) also provide a review of studies that show the relationship between socio-emotional learning and academic performance.

[29] In addition to its positive impact on a number of non-cognitive skills, the intervention also improved standardized test scores (that is, a type of intervention leading to associations and outcomes such as those explained in the section *Why cognitive skills matter*).

[30] Comer School Development Program, Child Study Center, Yale School of Medicine, http://schooldevelopmentprogram.org/about/index.aspx.

[31] Earlier work on this topic by Clark (1990) showed that after-school activities mattered largely for minority and disadvantaged children and were predictive of high achievement among them.

[32] The best-known examples of studies examining the determinants of academic performance are those developed by Hanushek (for instance, Hanushek, 1979, 1989), and with their roots in the well-known Coleman Report (Coleman et al., 1966).

[33] Their identification builds on having the same students take different academic subjects in classes with different sizes, which allows contemporaneous within-student and within-teacher comparisons across two academic subjects, and first differences.

[34] See chapter six. The non-cognitive skills index is constructed using the standardized variables by grade level for students' scores in externalizing behavioral problems, internalizing behavioral problems, and self-control, as reported by teachers.

[35] See chapter seven. Other examples of this identification are found in the literature in the 1970s and 1980s. In addition to Levin (1970), see Boardman, Davis, and Sanday (1977); and Schneider (1985). The cognitive skills index is constructed using information on achievement in reading, mathematics, and science/general knowledge. The non-cognitive skills index is constructed using the scores in students' and teachers' reported externalizing behavioral problems and internalizing behavioral problems, teachers' reported self-control, and students' reported locus of control and self-concept. Both indices are constructed using the standardized variables by grade level.

[36] According to the empirical estimates (with controls for individual- and school-level covariates), an increase of one standard deviation in cognitive skills would increase non-cognitive performance by 0.084 standard deviations in kindergarten, by over 0.223 standard deviations in third grade, and 0.185 standard deviations in eighth grade. An increase of one standard deviation in non-cognitive skills is associated with an increase in a student's academic performance of 0.053 standard deviations in kindergarten. The coefficients are 0.093 standard deviations in first grade, 0.082 standard deviations in third grade, 0.095 standard deviations in fifth grade—and a substantial rise to 0.169 standard deviations in eighth grade.

[37] See García (2013) for more detailed explanations and sensitivity checks, and for a discussion of the stability of the patterns over time based on different personality traits.

[38] See Nisbett (2009) or Kusche and Greenberg (1994), on the PATHS Curriculum. For example, project-based learning allows students to learn about specific academic issues while also providing an opportunity to use and develop a number of organizational, communication, and teamwork skills.

[39] For example, the work of Jackson (2013) can be used to illustrate new attempts to measure teachers' contribution to non-cognitive development.

[40] These practices and policies vary widely from state to state and, within states, across districts. As such, the first step is to examine current policies and to determine how changes to state and district laws factor in. For example, only 3 percent of the disciplinary actions for students in middle and high schools in Texas were for conduct for which state law mandates suspensions and expulsions, and the remainder of disciplinary actions were made at the discretion of school officials (primarily in response to violations of local schools' conduct codes) (Fabelo, 2011).

[41] For an assessment of the evolution of quality instruments in early education in the last decade, see La Paro, Pianta, and Stuhlman (2004); La Paro et al. (2012); Pianta, La Paro, and Hamre (2008).

[42] This short section includes initiatives and strategies in the U.S. only. For information of initiatives targeting or promoting non-cognitive skills in other countries, see, for example, Durlak et al. (2015), chapter 37.

[43] As is true of other examples in this section, the few that we highlight are intended to provide illustrations of what we discuss. There are many more that merit attention, and these are not necessarily representative of them.

[44] For a one page summary of this intervention, see Broader, Bolder Approach (2010a). For more detailed information, see City Connects (2014).

[45] For a one-page summary of this intervention, see Broader, Bolder Approach (2010b). For more detailed information, see Black Oak Mine Unified School District (2014).

[46] The other districts taking part in the Collaborating Districts Initiative, which vary greatly in terms of strengths and challenges, include Anchorage, Chicago, Cleveland, Nashville, Oakland, Sacramento, and Washoe County, Nevada. Several of these districts also highlight the frequent conflicts between districts' desire to focus on non-cognitive skills and state and federal mandates and requirements that may impede or even drown out those efforts.

[47] See http://www.casel.org/collaborating-districts/austin-independent-school-district.

[48] More information about these programs and their effectiveness is provided at http://www.devstu.org.

[49] See New York State Board of Regents (2011). The State of New York, like the State of Illinois before it, was advised by CASEL and conducted a survey to learn about practices pertaining to a comprehensive approach to implementing school-wide social and emotional development and learning. See Tanyu et al. (2005). Other institutions, such as the UCLA Center for Mental Health, are working with other states to advance similar statewide strategies to embed non-cognitive skills in education policy.

[50] Just as it is beyond the scope of this paper to provide a detailed analysis of how accountability policies could be improved, there is no way to list all of the foundations that might fall into this category. We include in this category foundations that have focused on this issue for at least several years and/or supported multiple initiatives.

[51] In other words, not only would we need to define what, for example, collaborative problem solving is, but also to find a way to measure it through a computer.

[52] The list we put forth earlier in the paper is likely to be adapted as more evidence becomes available.

[53] Although this is beyond the researchers' control, a potential institutionalization of non-cognitive skills (from their definition, measurement and evaluation through standards, to the design of a learning curriculum, or teachers' training on the new curriculum, etc.) could drive the development of stereotypes or pressure, and, thus, be at odds of living up to their unique potential.

[54] The preparation of aspiring teachers should include a more comprehensive preparation program incorporating support regarding knowledge and practice of teaching strategies to nurture non-cognitive skills (in the same way that teachers currently learn not only math, reading, and writing content, but strategies to teach subtraction, decoding, and persuasive writing, for example).

[55] Concerns exist about the fact that misuse and poor design of cognitive assessments, and inappropriate accountability in recent years, have caused substantial harm. Traditional testing tended to exclude many of the school outcomes we truly value and to inherently narrow the schools' focus regarding what teachers should teach and students should learn. Numerous voices advise that the *utilization* of standardized achievement test data as the main element of education accountability, with punishing purposes, is ineffective, poor policy, and immoral (Baker et al., 2010; Gordon, 2013; Ravitch, 2013, among multiple other voices). See also American Educational Research Association (2014).

[56] For example, issues such as peer effects and teaching practices, among many others, are areas that could be reassessed in light of non-cognitive skills affecting the channels through which they can work and the outcomes that they can produce (García & Gottfried, 2013).

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