

Early Social-Emotional Functioning and Public Health: The Relationship Between Kindergarten Social Competence and Future Wellness

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Understanding what early characteristics predict future outcomes could be of great value in helping children develop into healthy adults. In recent years, much research has been directed toward understanding noncognitive traits in children that may increase the likelihood of healthy personal development and eventual adult well-being.¹ For predicting future success in the workplace, levels of cognitive ability measured through IQ or test scores alone are less predictive than measures of educational attainment, which require not just cognitive ability but also noncognitive characteristics such as self-discipline, academic motivation, and interpersonal skills.² Future likelihood of committing crimes is greatly influenced by noncognitive processes in development, such as externalizing behavior, social empathy, and effectively regulating emotions.³ A recent study found that noncognitive ability in the form of self-control in childhood was predictive of adult outcomes ranging from physical health to crime to substance abuse.⁴ The value of noncognitive skills has also been determined through evaluation of interventions such as the landmark Perry Preschool program, in which improvements in noncognitive skills related to behavior and academic motivation were found to be central to long-term effects on crime and employment.⁵

Inadequate levels of social and emotional functioning are increasingly recognized as central to many public health problems (e.g., substance abuse, obesity, violence). Just as researchers study how academic achievement in a population can lift groups out of poverty, public health scientists are now studying how these noncognitive factors affect health and wellness across domains.

Classification of characteristics into complementary cognitive and noncognitive categories is a convenient way to characterize

Objectives. We examined whether kindergarten teachers' ratings of children's prosocial skills, an indicator of noncognitive ability at school entry, predict key adolescent and adult outcomes. Our goal was to determine unique associations over and above other important child, family, and contextual characteristics.

Methods. Data came from the Fast Track study of low-socioeconomic status neighborhoods in 3 cities and 1 rural setting. We assessed associations between measured outcomes in kindergarten and outcomes 13 to 19 years later (1991–2000). Models included numerous control variables representing characteristics of the child, family, and context, enabling us to explore the unique contributions among predictors.

Results. We found statistically significant associations between measured social-emotional skills in kindergarten and key young adult outcomes across multiple domains of education, employment, criminal activity, substance use, and mental health.

Conclusions. A kindergarten measure of social-emotional skills may be useful for assessing whether children are at risk for deficits in noncognitive skills later in life and, thus, help identify those in need of early intervention. These results demonstrate the relevance of noncognitive skills in development for personal and public health outcomes. (*Am J Public Health.* 2015;105:2283–2290. doi:10.2105/AJPH.2015.302630)

competencies in human development. Cognitive skills involve achievement-oriented tasks, such as problem solving, and academic abilities, which are measured by achievement tests; the noncognitive category covers everything else, such as behavioral characteristics, emotion regulation, attention, self-regulation, and social skills. Designation of cognitive versus noncognitive skills oversimplifies the complexity of skills and the role of cognition. Cognitive skills are involved not only in intelligence and achievement, but also in attention, emotion regulation, attitudes, motivation, and the conduct of social relationships (e.g., Farrington et al. provide an overview of noncognitive traits in educational research⁶).

Noncognitive skills interact with cognitive skills to enable success in school and the workplace.^{7,8} This is most easily seen in an educational setting. Achievement is driven by intellectual ability as well as by the

self-regulation, positive attitudes, motivation, and conscientiousness that are required to complete educational milestones. Substantial differences in noncognitive skills have been found between those who graduate from high school on time and those who complete a general equivalency diploma, as reflected in subsequent adult and economic outcomes.⁹ Interpersonal skills are also important for children navigating the social setting, and positive interactions with adults are essential for success in school. Success in school involves both social-emotional and cognitive skills, because social interactions, attention, and self-control affect readiness for learning.^{10,11}

An additional feature of noncognitive competencies is that they may be more malleable than cognitive skills and thus may be appropriate targets for prevention or intervention efforts.¹² Of course, the degree to which this is true depends on the specific skill and on

multiple factors associated with children's characteristics and environment. Regardless, a challenge lies in effectively assessing children's competencies at an early enough age that intervention or prevention efforts might be introduced. Although an assessment at any 1 point may be inadequate for summarizing an individual's overall noncognitive competencies, it is useful to know what early competencies predict future success and avoidance of problems. This is especially relevant in light of studies showing the value of enhancing the social-behavioral and learning environment of young children,¹³ to foster positive child development as well as to alter adult health and labor market outcomes.^{11,14}

A key characteristic of noncognitive ability in young children is social competence. Social competence encompasses both the ability to complete tasks and manage responsibilities and effective skills for handling social and emotional experiences. Children's social competence can be assessed by their kindergarten teachers, who observe many instances in which children need to manage relations with peers and adults. The school setting provides the opportunity to observe children's abilities to interact interpersonally as they cooperate with others to complete daily tasks and resolve conflicts. Such skills are important for successful progression in early grades.

We investigated how well key late adolescent and early adult outcomes were predicted by teacher ratings of children's social competence (1 indicator of early noncognitive ability) measured many years previously in kindergarten in participants from low-socioeconomic status neighborhoods. Specifically, we examined how a measure of early prosocial skills predicted outcomes spanning important sectors of education, employment, criminal justice, substance use, and mental health domains. We used a straightforward analytic approach: modeling the link between social competence measured in kindergarten and outcomes measured 13 to 19 years later. These models did not determine causal associations, despite the temporal ordering between predictors and outcomes. However, inclusion of several control variables, representing various characteristics of the child and family context, enabled us to explore the unique contribution of featured predictors.

For predictors we focused on the earliest age for which data were available: measures obtained when children were in kindergarten. Throughout the analytic process we found it useful to consider whether other important background variables predicted future outcomes. However, our primary objective was to determine how well an inexpensive, easily obtained snapshot of social competence at formal entrance to school predicted important outcomes, after adjustment for other expected influences on development, such as family circumstances, gender, academic ability, and behavior. If such a measure can identify early noncognitive deficiencies, this could provide important information for determining potential targets for early intervention.

METHODS

We used data from the longitudinal, non-intervention subsample of the Fast Track Project, an intervention program designed to reduce aggression in children identified as at high risk for long-term behavioral problems and conduct disorders.¹⁵ The Fast Track study design comprised an intervention group and a matched control group sample of high-risk children as well as a non-high-risk (normative) subsample of students attending control schools. We focused on the high-risk control students and the normative sample—those individuals who did not receive any Fast Track prevention services. The total sample size was 753 (high-risk control group, $n = 367$; non-high-risk, normative group, $n = 386$).

Participants were recruited from the 4 study sites (3 urban, 1 rural): Durham, North Carolina; Nashville, Tennessee; Seattle, Washington; and central Pennsylvania. Further information on the Fast Track Project sample recruitment process is available in study publications.^{15,16} In the total sample, 58% were boys, about 50% were White, 46% were African American, and 4% had other racial/ethnic backgrounds. The study oversampled higher-risk students, and we employed sampling probability weights in all analyses. More information on the design is provided in Appendix A, which describes the screening and recruitment process (available as a supplement

to the online version of this article at <http://www.ajph.org>).

The project first collected data when children were attending kindergarten; initial data collection for the first cohort took place in 1991. Final follow-up data were collected 19 years later, when participants were aged approximately 25 years. Participation from the original sample was high, and we found no differential response in analyses considering a range of baseline variables. More detail on this assessment and the follow-up sample are provided in a recent study of long-term intervention effects.¹⁷

Our outcome measures concerned education, employment, public assistance, crime, mental health, and substance use. The project measured all outcomes through late adolescence or early adulthood. We included relevant background variables in the models to control for characteristics of the children at kindergarten age and their families. Most importantly, we selected control variables that would better enable identification of unique prediction attributable to early social skills. Thus, models included variables representing family demographics (gender, race, number of parents in the home, socioeconomic status), early childhood aggression (both in school and at home), early academic ability, and other contextual factors. We did not include the indicator for gender in models of justice system outcomes because of the very low rate of criminal offenses among female participants. We did not include region as a covariate in models. Initially we included 3 dummy variables to represent project site, but we removed this covariate when initial tests indicated little difference between regions on the study outcome variables.

Table 1 provides the outcomes and control variables for all analytic models, with information on the scales used and the data sources. Appendix A (available as an online supplement) provides more details on measurement sources and scale reliabilities for all variables used in analyses.

To represent social competence in kindergarten, we chose the Prosocial-Communication Skills subscale of the Social Competence Scale.³² The score combined 8 items that teachers rated on a 5-point Likert scale, assessing how the child interacted socially with others. Examples

TABLE 1—Measures and Data Sources in Study of Social-Emotional Functioning in Kindergarten as Predictor of Adolescent and Young Adult Outcomes

Variable	Survey	Source
Model outcomes		
Education/employment		
High school graduation on time ^a	National Longitudinal Surveys ¹⁸	Self-report
College graduation ^a		Self-report
Currently employed full-time ^a		Self-report
Stable employment ^a		Self-report
Years of special education services, ^b no.	School Archival Records Survey ¹⁹ (grades 1-12)	School records
Years of repeated grades, ^b no.		School records
Public assistance		
On waiting list for public housing ^a	Neighborhoods and Government Programs ²⁰	Self-report
Receiving public assistance ^a		Self-report
Receiving unemployment compensation ^a		Self-report
Crime		
Arrests for severe offense, ^a no.	Juvenile and adult court data ²¹	Court records
Ever arrested ^b	Service Assessment for Children and Adolescents ²²	Self-report
Ever arrested ^c		Self-report
Ever made court appearance ^b		Self-report
Ever made court appearance ^c		Self-report
Ever had police contact ^b		Self-report
Ever stayed in detention facility ^{b,c}	Combined outcomes from self-report and criminal records ^{21,22}	Self-report, court records
Substance abuse		
Alcohol dependence ^a	Self-Reported Substance Use and Dependence ²³	Self-report
Drug dependence ^a		Self-report
Smoked regularly in past month ^a	Tobacco, Alcohol and Drugs survey ²⁴	Self-report
Days of binge drinking in past month, ^a no.		Self-report
Days of marijuana use in past month, ^a no.		Self-report
Mental health		
Externalizing problems ^a	Young Adult Self-Report ²⁵	Self-report
Internalizing problems ^a		Self-report
Years on medications, ^{b,d} no.	Life Changes ²⁰	Primary caregiver
Model predictors (for child at kindergarten age)		
Gender (female)	Family information form ²⁶	Primary caregiver
Race (African American)		Primary caregiver
Family socioeconomic status (Hollingshead code)		Primary caregiver
Mother an adolescent at child's birth		Primary caregiver
Neighborhood total score	Neighborhood Questionnaire ²⁷	Primary caregiver
Life stresses total score	Life Changes ²⁰	Primary caregiver
Letter-word identification score	Woodcock-Johnson Psycho-Educational Battery ²⁸	Administered survey
Authority acceptance	Teacher Observation of Child Adaptation-Revised ²⁹	Teacher
Externalizing score	Child Behavior Checklist ³⁰	Primary caregiver
Prosocial-communication skills	Social Competence Scale ³¹	Teacher

^aMeasured at age 25 years.

^bThrough high school.

^cMeasured after high school (aged 19–20 years).

^dFor emotional or behavioral issues.

of these items include “cooperates with peers without prompting,” “is helpful to others,” “very good at understanding feelings,” and “resolves problems on own.” Internal reliability coefficients were very high ($\alpha=0.97$), and univariate assessment demonstrated good distributional characteristics (unweighted mean = 1.90; SD = 0.97). The subscale was highly associated with other subscales in the measure, such as the Emotion Regulation subscale ($r=0.90$).

A natural question in this type of research is whether associations may differ because of differing background variables. Although we did not formally investigate potential moderation of associations, we explored whether race or gender moderated links within domains. We executed a representative number of models from each domain with an interaction term entered for the cross between the potential moderator and prosocial skills. In this preliminary investigation, we found no patterns of moderation exerted by race or gender on any outcome domains. We therefore did not conduct extensive tests of moderation (to keep the number of statistical tests for overall models manageable). Follow-up research could include a more specific focus on the potential differences in linkages within a given outcome domain across key demographic distinctions.

We used separate regression models for each study outcome. We regressed dependent variables on our control variables as well as on the social competence score. We ran logistic regressions for all dichotomous outcomes and count-based regressions for the measures of amounts. The latter involved Poisson regression unless outcomes were overdispersed, in which case we used a negative binomial modeling specification.³² We used a zero-inflated Poisson model for 1 count outcome (number of arrests for severe crimes by age 25 years). We conducted analyses with M-Plus software with full-information maximum likelihood estimation techniques,³³ which provided results representing the full sample ($n=753$) at kindergarten (integrating over the missing cases). We used Monte Carlo integration techniques for parameter estimates, because of the categorical nature of the outcomes. We also specified robust standard error estimation for all models.

Rates of missing data varied by outcome (Table 2). Attrition was lower for outcomes

obtained prior to the end of high school. Missing data rates also were lower for outcomes obtained through public criminal records at early adulthood. Accommodation of missing data through full-information maximum likelihood procedures assumes that missing data are conditionally missing at random, with all measured covariates in the analytic model considered.³⁴

RESULTS

Table 2 provides the means and standard deviations for predictors in all analytic models and for the separate adolescent and adult outcomes that we examined. Results from regression models are presented in Table 3 for the estimate on prosocial skills. Odds ratios (ORs) are provided for results from logistic regression models; incidence rate ratios (IRRs) are provided for results from count-based regression models. We considered results significant at $P<.05$. Appendix B (available as a supplement to the online version of this article at <http://www.ajph.org>) shows statistical significance results for all model covariates and details on joint prediction among all variables; estimates are indicated in terms of direction of association.

Our analyses included 4 education and employment outcomes representing attainment through age 25 years. Kindergarten prosocial skills were significantly and uniquely predictive of all 4 outcomes: whether participants graduated from high school on time (OR = 1.54; 95% confidence interval [CI] = 1.09, 2.19; $P<.05$; Table 3), completed a college degree (OR = 2.00; 95% CI = 1.07, 3.75; $P<.05$), obtained stable employment in young adulthood (OR = 1.66; 95% CI = 1.13, 2.43; $P<.01$), and were employed full time in young adulthood (OR = 1.46; 95% CI = 1.02, 2.08; $P<.05$). For the 2 outcomes spanning school ages, we observed a negative association for number of years of special education services (IRR = 0.54; 95% CI = 0.44, 0.67; $P<.001$) and number of years of repeated grades through high school (IRR = 0.79; 95% CI = 0.65, 0.97; $P<.05$).

Two of the 3 outcomes representing public assistance in young adulthood were significantly linked to early social competence. Early

prosocial skills were negatively related to the likelihood of living in or being on a waiting list for public housing (OR = 0.55; 95% CI = 0.36, 0.85; $P<.01$; Table 3) and of receiving public assistance (OR = 0.63; 95% CI = 0.43, 0.91; $P<.05$). We found no significant association for receiving unemployment compensation in young adulthood.

Results for justice system outcomes demonstrated consistent patterns across different ages and variables. Early prosocial skills were significantly inversely predictive of any involvement with police before adulthood (OR = 0.65; 95% CI = 0.45, 0.94; $P<.05$) and ever being in a detention facility (OR = 0.61; 95% CI = 0.40, 0.94; $P<.05$). Although juveniles' self-report of whether they had been arrested and or had appeared in court followed the same pattern, the estimates were not statistically significant at conventional levels. In young adulthood, early social competence was significantly and uniquely linked to being arrested (OR = 0.60; 95% CI = 0.44, 0.90; $P<.05$) and appearing in court (OR = 0.63; 95% CI = 0.43, 0.91; $P<.05$). Finally, early social competence significantly predicted the number of arrests for a severe offense by age 25 years (IRR = 0.68; 95% CI = 0.49, 0.94; $P<.05$), as determined through public records.

Although early social competence was not associated with alcohol and drug dependence diagnoses in early adulthood, our models showed that it correlated with substance abuse behavior. We found statistically significant associations in separate models of the number of days of binge drinking in the past month (IRR = 0.66; 95% CI = 0.44, 0.97; $P<.05$) and the number of days marijuana was used (IRR = 0.55; 95% CI = 0.35, 0.87; $P<.01$). An association with regular tobacco use was not significant.

Results were mixed on associations between early prosocial skills and future mental health outcomes, although patterns were consistent with findings in other domains. Links between kindergarten prosocial skills and future internalizing and externalizing problems were nonsignificant at conventional levels. Finally, early prosocial skills significantly predicted number of years on medication for emotional or behavioral issues through high school (OR = 0.54; 95% CI = 0.40, 0.75; $P<.001$).

TABLE 2—Model Predictors and Adolescent and Young Adult Outcomes Associated With Social-Emotional Functioning in Kindergarten: Fast Track Project, United States, 1991–2010

Variable	No.	Mean (SD)
Model predictors		
Gender (female)	753	0.42 (0.49)
Race (African American)	753	0.46 (0.50)
Family socioeconomic status (Hollingshead code)	753	25.65 (12.90)
Mother an adolescent at child's birth	636	0.16 (0.37)
Neighborhood total score	752	0.03 (0.61)
Life stresses total score	745	1.51 (0.75)
Woodcock-Johnson letter-word identification score	752	12.83 (4.22)
Authority acceptance (teacher-rated behavior)	749	57.34 (11.57)
Child Behavior Checklist externalizing score (parent-rated behavior)	746	57.57 (10.20)
Prosocial-communication skills	686	1.90 (0.97)
Model outcomes		
Education/employment		
High school graduation on time ^a	620	0.63 (0.48)
College graduation ^a	620	0.11 (0.32)
Currently employed full-time ^a	621	0.49 (0.50)
Stable employment ^a	611	0.32 (0.47)
Years of special education services, ^b no.	736	2.19 (3.56)
Years of repeated grades, ^b no.	751	0.66 (0.90)
Public assistance		
On waiting list for public housing ^a	615	0.16 (0.37)
Receiving public assistance ^a	603	0.34 (0.47)
Receiving unemployment compensation ^a	603	0.18 (0.38)
Crime		
Arrests for severe offense, ^a no.	753	0.12 (0.33)
Ever arrested ^b	516	0.34 (0.47)
Ever arrested ^c	525	0.26 (0.44)
Ever made court appearance ^b	519	0.35 (0.48)
Ever made court appearance ^c	534	0.33 (0.47)
Ever had police contact ^b	562	0.60 (0.49)
Ever stayed in detention facility ^{b,c}	526	0.22 (0.42)
Substance abuse		
Alcohol dependence ^a	556	0.26 (0.44)
Drug dependence ^a	550	0.10 (0.30)
Smoked regularly in past month ^a	575	0.38 (0.49)
Days of binge drinking in past month, ^a no.	602	1.69 (4.65)
Days of marijuana use in past month, ^a no.	607	3.60 (8.94)
Mental health		
Externalizing problems ^a	620	0.21 (0.41)
Internalizing problems ^a	620	0.29 (0.46)
Years on medications, ^{b,d} no.	720	0.93 (2.14)

Note. Participants were recruited from 4 study sites (3 urban, 1 rural): Durham, NC; Nashville, TN; Seattle, WA; and central Pennsylvania.

^aAt age 25 years.

^bThrough high school.

^cMeasured after high school (aged 19–20 years).

^dFor emotional or behavioral issues.

DISCUSSION

We examined whether early childhood social competence predicted outcomes measured up to 2 decades later. We evaluated outcomes that broadly represented personal well-being, covering domains of education, employment, crime, substance use, and mental health. Such outcomes are markers of personal success or avoidance of problems. These outcomes are also economically relevant to both individual and public resources. Overall, results indicated statistically significant and unique associations between teacher-assessed prosocial skills and outcomes in all domains examined.

We used a rich database that combined a long time frame of data collection with coverage of various domains of human development and adult outcomes. Such data provided the unique opportunity to investigate the importance of early social-emotional characteristics. An additional strength of these data was that they involved multiple sources of information: teachers, parents, self-reports, and public records.

Our results support previous research that examined long-term prediction from noncognitive skills, most by notably Moffitt et al., who found that self-control across early childhood was a significant predictor of outcomes in multiple domains of early adult functioning.⁴ Other important research has shown that noncognitive skills are not as reliable predictors for some outcomes (e.g., achievement), as other, more strictly cognitive characteristics, such as academic achievement at school entry.^{10,35} Results across studies likely differ because of variation in predictors used, quality of measurement of study constructs, outcome domains, age at baseline and follow-up, and other characteristics of the population studied.

Our results demonstrate the predictive power of teacher-measured prosocial skills independent of child, family, and contextual factors that typically predict adult outcomes, because we controlled for socioeconomic status, family risk status, neighborhood quality, and children's characteristics (notably behavioral traits and early academic ability). Our results confirm that these control variables are indeed predictive of some adult outcomes but

TABLE 3—Logistic Regression and Negative Binomial Regression Results for Associations of Social-Emotional Functioning in Kindergarten With Adolescent and Young Adult Outcomes: Fast Track Project, United States, 1991–2010

Outcome	OR (95% CI)	IRR (95% CI)
Education/employment		
High school graduation on time ^a	1.54* (1.09, 2.19)	
College graduation ^a	2.00* (1.07, 3.75)	
Currently employed full-time ^a	1.46* (1.02, 2.08)	
Stable employment ^a	1.66** (1.13, 2.43)	
Years of special education services, ^b no.		0.54*** (0.44, 0.67)
Years of repeated grades, ^b no.		0.79* (0.65, 0.97)
Public assistance		
Living in/on waiting list for public housing ^a	0.55** (0.36, 0.85)	
Receiving public assistance ^a	0.63* (0.43, 0.91)	
Receiving unemployment compensation ^a	0.89 (0.55, 1.45)	
Crime		
Arrests for severe offense, ^a no.		0.68* (0.49, 0.94)
Ever arrested ^b	0.67 (0.44, 1.02)	
Ever arrested ^c	0.60* (0.40, 0.90)	
Ever made court appearance ^b	0.70 (0.47, 1.03)	
Ever made court appearance ^c	0.63* (0.43, 0.91)	
Ever had police contact ^b	0.65* (0.45, 0.94)	
Ever stayed in detention facility ^{b,c}	0.61* (0.40, 0.94)	
Substance abuse		
Alcohol dependence ^a	0.89 (0.59, 1.35)	
Drug dependence ^a	0.86 (0.45, 1.65)	
Smoked regularly in past month ^a	0.71 (0.48, 1.04)	
Days of binge drinking in past month, ^a no.		0.66* (0.44, 0.97)
Days of marijuana use in past month, ^a no.		0.55** (0.35, 0.84)
Mental health		
Externalizing problems ^a	0.61 (0.36, 1.02)	
Internalizing problems ^a	0.70 (0.48, 1.03)	
Years on medications, ^{b,d} no.		0.54*** (0.40, 0.75)

Note. CI = confidence interval; IRR = incidence rate ratio; OR = odds ratio. Participants were recruited from 4 study sites (3 urban, 1 rural): Durham, NC; Nashville, TN; Seattle, WA; and central Pennsylvania. Control variables were gender, race (African American), family socioeconomic status, neighborhood quality, family life stressors, whether mother was an adolescent, early academic skill, teacher-rated aggression, and parent-rated aggression.

^aAt age 25 years.

^bThrough high school.

^cMeasured after high school (aged 19–20 years).

^dFor emotional or behavioral issues.

* $P < .05$; ** $P < .01$; *** $P < .001$.

that additional, unique variance can be attributed to social competence at school entrance.

In many cases, social competence was a stronger predictor (according to statistical P values) than factors seemingly more directly aligned with the outcome. This was most striking in our comparison of associations of kindergarten teacher-rated aggression and social competence with later crime outcomes: the

measure of prosocial skills was a consistent predictor of future crime outcomes, but the level of aggression observed by the same teacher was not usually significantly predictive after adjustment for other factors (including a separate measure of aggression from the primary caretaker). A partial explanation may be that aggression is a less stable characteristic among kindergarteners than is the broader

domain of positive social relations. Furthermore, although a relatively small percentage of children show early aggressive behavior and, thus, skew the distribution, social competence is more normally distributed and therefore may be a better predictor across the spectrum. The 2 measures shared the same rater and were moderately correlated (roughly 0.50 in this sample), as would be expected.

Limitations

Focusing on a single measurement at an early age is somewhat risky because characteristics of social competence as recognized by teachers may manifest in different ways in later years. We could not determine causal associations, but our findings suggest the potential for such a measure to be used in screening for intervention at an early stage of development. Noncognitive factors such as conscientiousness, self-regulation, motivation, academic ability, and other attitudes and behaviors in later childhood years may be more important markers of long-term outcomes, but they have not yet been fully developed and thus have not been efficiently assessed in children at 5 years of age.

Our measure of social competence was a continuous composite from teacher observation that combined multiple social-behavioral scenarios for the child. This measure, although subject to measurement error, likely represents children's social competence relatively well, because the teacher has been a daily observer in the classroom setting. For the kindergarten data, we were not able to clearly distinguish between social competence and self-regulation, because the 2 scales were so highly correlated (and thus were not included in the same multiple regression). Self-regulation is likely reflected in socially competent behavior but is multidimensional and may be assessed independently through tests of executive function as children mature and take on more responsibility to progress through school.

Our measure of social competence was continuous, raising the issue of whether there may be certain cutoffs (e.g., very low competence) where this characteristic might be especially predictive of later outcomes. In addition, with the available data, we were not able to assess the validity of the measure for prosocial skills. We focused on what was measured at

school entry and likely fell well short of completely understanding noncognitive ability and what it might entail throughout development.

Conclusions

Our goal was to examine what can be assessed at school entrance when plans for addressing problems or enhancing skills may best be initiated. Our results suggest that perceived early social competence at least serves as a marker for important long-term outcomes and at most is instrumental in influencing other developmental factors that collectively affect the life course. Evaluating such characteristics in children could be important in planning interventions and curricula to improve these social competencies. Although “softer” skills can be more malleable and, thus, possibly better candidates for intervention, they are also less likely to be captured in a single measurement at a single time than are variables such as IQ.³⁶ Certainly, interventionists are challenged not only by what specific skills to focus on, but also by what ages to assess, how to consider the likely interactions with other traits (including cognitive skills), the role of contextual factors, and how best to measure (what sources, whether to combine measures, etc.).⁶

The growing body of literature that demonstrates the importance of noncognitive skills in development should motivate policymakers and program developers to target efforts to improve these skills to young children. Much evidence has shown how effective intervention in preschool and the early elementary years can improve childhood noncognitive skills in a lasting way.^{9,37–40} Enhancing these skills can have an impact in multiple areas and therefore has potential for positively affecting individuals as well as community public health substantially.

Our study demonstrates the unique predictive nature of early social competence on important outcomes in late adolescence and early adulthood. Our results showed that teacher-rated prosocial skills in kindergarten were a consistently significant predictor across all outcome domains studied; thus, a measure such as this may be a good candidate for assessing whether children are at risk for deficits in noncognitive skills at school entry. We look forward to further research on the

importance of social-emotional competencies in early development, especially among individuals more at risk for problems or less prepared to succeed in school or (eventually) the labor force. Such research ideally will advance understanding of the appropriate constructs and measures to focus on, with consideration of the age and context of the individual. ■

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Contributors

D. E. Jones analyzed the data and was primary writer of the article. M. Greenberg helped plan data analysis and write the article. M. Crowley helped with analytic strategy and writing.

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Human Participant Protection

The Pennsylvania State University Institutional Review Board determined that no protocol approval was required because the study used secondary, de-identified data.

References

1. Carneiro P, Crawford C, Goodman A. *The Impact of Early Cognitive and Non-cognitive Skills on Later Outcomes*. London, UK: Centre for the Economics of Education, London School of Economics; 2007.
2. Levin HM. More than just test scores. *Prospects*. 2012;42(3):269–284.

3. Heckman JJ. Skill formation and the economics of investing in disadvantaged children. *Science*. 2006;312(5782):1900–1902.
4. Moffitt TE, Arseneault L, Belsky D, et al. A gradient of childhood self-control predicts health, wealth, and public safety. *Proc Natl Acad Sci USA*. 2011;108(7):2693–2698.
5. Heckman J, Pinto R, Savelyev P. Understanding the mechanisms through which an influential early childhood program boosted adult outcomes. *Am Econ Rev*. 2013;103(6):2052–2086.
6. Farrington C, Roderick M, Allensworth E, et al. *Teaching Adolescents to Become Learners: The Role of Noncognitive Factors in Shaping School Performance: A Critical Literature Review*. Chicago, IL: University of Chicago Consortium on Chicago School Research; 2012.
7. Duckworth K, Schoon I. Progress and attainment during primary school: the roles of literacy, numeracy and self-regulation. *Longit Life Course Stud*. 2010;1(3):223–240.
8. Kautz T, Heckman JJ, Diris R, Ter Weel B, Borghans L. *Fostering and Measuring Skills: Improving Cognitive and Non-cognitive Skills to Promote Lifetime Success*. Paris, France: Organization for Economic Co-operation and Development; 2014.
9. Heckman JJ, Kautz T. Hard evidence on soft skills. *Labour Econ*. 2012;19(4):451–464.
10. Duncan GJ, Magnuson K. The nature and impact of early achievement skills, attention skills, and behavior problems. In: Duncan GJ, Murman RR, eds. *Whither Opportunity*. New York, NY: Russell Sage Foundation; 2011:47–69.
11. Conti G, Heckman J. The developmental approach to child and adult health. *Pediatrics*. 2013;131(suppl 2):S133–S141.
12. Almlund M, Duckworth AL, Heckman JJ, Kautz TD. Personality psychology and economics. In: Hanushek EA, Machin S, Woessmann L, eds. *Handbook of the Economics of Education*. Amsterdam, Netherlands: Elsevier; 2011:1–181.
13. Greenberg MT, Weissberg RP, O'Brien MU, et al. Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. *Am Psychol*. 2003;58(6–7):466–474.
14. Barnett WS, Frede E. The promise of preschool: why we need early education for all. *Am Educ*. 2010;34(1):21–29, 40.
15. Conduct Problems Prevention Research Group. A developmental and clinical model for the prevention of conduct disorder: the Fast Track Program. *Dev Psychopathol*. 1992;4(4):509–527.
16. Lochman JE. Screening of child behavior problems for prevention programs at school entry. The Conduct Problems Prevention Research Group. *J Consult Clin Psychol*. 1995;63(4):549–559.
17. Dodge KA, Bierman KL, Cole JD, et al. Impact of early intervention on psychopathology, crime, and well-being at age 25. *Am J Psychiatry*. 2015;172(1):59–70.
18. Howe D, Frazis H. *What Researchers Have Learned From the National Longitudinal Surveys About Youth Unemployment*. Washington, DC: Bureau of Labor Statistics; 1992. Report 828.

19. Walker HM, Block-Pedego A, Todis B, Severson H. *School Archival Records Search (SARS): User's Guide and Technical Manual*. Longmont, CO: Sopris West; 1991.
20. Dodge KA, Bates JE, Pettit GS. Mechanisms in the cycle of violence. *Science*. 1990; 250(4988): 1678–1683.
21. Godwin J. *Juvenile and Adult Court Data (Technical Report)*. Durham, NC: Fast Track Project; 2011.
22. Stiffman AR, Horwitz SM, Hoagwood K, et al. The Service Assessment for Children and Adolescents (SACA): adult and child reports. *J Am Acad Child Adolesc Psychiatry*. 2000;39(8):1032–1039.
23. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC: American Psychiatric Association; 1994.
24. Bureau of Labor Statistics. *National Longitudinal Survey of Youth 1997 (1997–2001)*. Columbus, OH: Ohio State University; 2002.
25. Achenbach T. *Manual for the Young Adult Self-Report and Young Adult Behavior Checklist*. Burlington: University of Vermont, Department of Psychiatry; 1997.
26. Conduct Problems Prevention Research Group. Family information form. 1990. Fast Track Project. Available at: <http://www.fasttrackproject.org>. Accessed February 5, 2014.
27. Greenberg M, Lengua L. *Scale Construction for the Neighborhood Questionnaire*. Seattle, WA: University of Washington; 1995.
28. Woodcock RW, Johnson MB. *The Woodcock-Johnson Psycho-Educational Battery Revised*. Chicago, IL: Riverside Publishing Co; 1989.
29. Werthamer-Larsson L, Kellam S. Teacher observation of classroom adaptation-revised (TOCA-R). In: Kellam S, ed. *Johns Hopkins Prevention Center Training Manual*. Baltimore, MD: Johns Hopkins University; 1989.
30. Achenbach TM. *Manual for the Child Behavior Checklist and 1991 Profile*. Burlington: University of Vermont; 1991.
31. Conduct Problems Prevention Research Group. Social Competence Scale (teacher version). 1990. Fast Track Project. Available at: <http://www.fasttrackproject.org>. Accessed February 5, 2014.
32. Hilbe JM. *Negative Binomial Regression*. New York, NY: Cambridge University Press; 2011.
33. Muthén L, Muthén B. *Mplus Software, Version 6* [computer program]. Los Angeles, CA: Muthén and Muthén; 2010.
34. Enders CK. *Applied Missing Data Analysis*. New York, NY: Guilford Press; 2010.
35. Duncan GJ, Dowsett CJ, Claessens A, et al. School readiness and later achievement. *Dev Psychol*. 2007; 43(6):1428–1446.
36. Duckworth AL. (Over and) beyond high-stakes testing. *Am Psychol*. 2009;64(4):279–280; discussion 285–287.
37. Durlak JA, Weissberg RP, Dymnicki AB, Taylor RD, Schellinger KB. The impact of enhancing students' social and emotional learning: a meta-analysis of school-based universal interventions. *Child Dev*. 2011;82(1):405–432.
38. Bierman KL, Domitrovich CE, Nix RL, et al. Promoting academic and social-emotional school readiness: the Head Start REDI program. *Child Dev*. 2008; 79(6):1802–1817.
39. Campbell F, Conti G, Heckman JJ, et al. Early childhood investments substantially boost adult health. *Science*. 2014;343(6178):1478–1485.
40. Bierman KL, Coie JD, Dodge KA, et al. The effects of a multiyear universal social-emotional learning program: the role of student and school characteristics. *J Consult Clin Psychol*. 2010;78(2):156–168.