

Social and Emotional Learning in Adolescence: Testing the CASEL Model in a Normative Sample

Journal of Early Adolescence

2018, Vol. 38(8) 1170–1199

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DOI: 10.1177/0272431617725198

journals.sagepub.com/home/jea



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Abstract

As Social and Emotional Learning (SEL) expands to focus on adolescent populations, the broadly accepted theoretical framework put forth by the Collaborative for Academic, Social, and Emotional Learning (CASEL) should be empirically tested for measurement utility. Using longitudinal data from the 4-H Study of Positive Youth Development, we first tested and validated the five (self-awareness, self-management, social awareness, relationship skills, responsible decision-making) SEL factor model using confirmatory factor analysis (CFA) in a normative sample of 1,717 U.S. fifth grade youth. The model was then subjected to longitudinal measurement invariance testing using CFA models that included the sixth- and seventh-grade samples to confirm SEL as a robust model across these grades. Validity was further evidenced through relation of the SEL model to important youth outcomes (e.g., academic achievement). Relations were significant and in the expected direction. Implications for application of the model to adolescent development are discussed.

Keywords

social and emotional learning, adolescence, academic achievement, positive youth development

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Several theoretical frameworks have been developed to provide an organizational or conceptual approach to understand and track the positive benchmarks of adolescent development. Two particularly influential approaches have been the Positive Youth Development (PYD; Eccles & Gootman, 2002; Lerner et al., 2005; Pittman, Irby, & Ferber, 2001; Roth & Brooks-Gunn, 2003) and the Social and Emotional Learning (SEL; Elias et al., 1997) frameworks. While PYD conceptually arose from observations of strengths exhibited as part of adolescent development, SEL arose from theories of emotional intelligence (Goleman, 1995) and the collective literature attending to multiple social and emotional skills that affect school and life success. While the PYD framework has been subjected to an empirical formulation of measurement and dimensional relations among key constructs, in the United States (Bowers et al., 2010; Lerner et al., 2005; Phelps et al., 2009) and internationally (e.g., Conway, Heary, & Hogan, 2015; Shek & Ma, 2010; Shek, Siu, & Lee, 2007), the SEL framework has not. Reviews of SEL have identified a set of constructs theorized to represent the major dimensions of social and emotional skills, but there has not been a test of this formulation as a measurement model. Moreover, the primary focus of SEL formulations and reviews has been on elementary aged children. SEL programming in schools and after-school settings is growing, social and emotional learning standards are developed in many states at the secondary school level, and the SEL approach is increasingly of interest to those studying adolescent development. Despite this growth in practice and policy, the empirical justification for use of this model with adolescent populations is limited. This article seeks to address this gap by examining the factor validity of the five-construct SEL model in a normative, early adolescent sample and its relation to indicators of functioning. This study utilizes the dataset applied to test the PYD measurement model, which facilitates comparison of correspondence and distinction between the frameworks' constructs and features.

The Positive Youth Development (PYD) Framework

The PYD framework focuses on how aligning adolescent strengths with external resources and opportunities can promote optimal development or "thriving." PYD emphasizes the dynamic nature of development, adolescents as agents of their own development, and the effects of these in eventuating thriving functioning (Lerner, Dowling, & Anderson, 2003). The PYD framework is comprised of "Five Cs": (a) Competence, which refers to positive views and performance in the social, academic, cognitive, health, and vocational domains; (b) Confidence, or an overall sense of positive self-worth; (c) Connection, which refers to positive and reciprocal relationships with peers, family, school,

and community members; (d) Character, or acting within the moral, societal, and cultural expectations; and (e) Caring, which refers to showing compassion toward others (Bowers et al., 2010; Zarrett & Lerner, 2008). The Five Cs PYD model was validated with confirmatory factor analysis and predicted youth social and emotional functioning in an early adolescent sample (Bowers et al., 2010). For example, the five constructs positively correlated with measures of educational and civic engagement and negatively correlated with mental illness symptoms and delinquency (Bowers et al., 2010; Phelps et al., 2009).

The Social and Emotional Learning (SEL) Framework

The SEL framework also focuses on positive development. SEL emerged as findings from the emotional intelligence literature (e.g., Goleman, 1995) suggested that these “non-cognitive” skills are just as, if not more important, than “cognitive” skills for life success (Zins, Bloodworth, Weissberg, & Walberg, 2007). Thus, the framework emerged to connect findings of many different studies evidencing social and emotional skills’ relation to development and collectively thought to comprise those essential for school and life success. Concern that schools were not addressing the mental health and social development needs of students also propelled the field. Since the conception of SEL, a large number of studies have supported the importance of social and emotional functioning for behavioral and academic success (e.g., Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Hawkins, Kosterman, Catalano, Hill, & Abbott, 2008; Oberle, Schonert-Reichl, Hertzman, & Zumbo, 2014). The Collaborative for Academic, Social, and Emotional Learning (CASEL; 2012) proposed a five-factor SEL model, based on studies of development and interventions meant to affect various social and personal skills (Durlak, Domitrovich, Weissberg, & Gullotta, 2015; Humphrey, 2013; Oberle, Domitrovich, Meyers, & Weissberg, 2016; Zins et al., 2007). Notably, the majority of these studies focused on elementary school age samples.

The CASEL Model has become prominent in social and emotional competency studies. The five competencies of this model are (a) self-management, or the ability to regulate thoughts, emotions, and behaviors; (b) self-awareness, or the ability to recognize one’s emotions and accurately assess one’s strengths and weaknesses; (c) social awareness or awareness of the culture, beliefs, and feelings of the people and world around them; (d) relationship skills or the ability to effectively communicate, work well with peers, and build meaningful relationships; and (e) responsible decision-making or the ability to make plans for the future, follow moral/ethical standards, and contribute to the well-being

of others (Oberle et al., 2016; Payton et al., 2000). The CASEL model asserts that these five competences impact major short- and long-term outcomes including positive attitudes and social behavior, conduct problems, emotional distress, academic success, graduation rates, mental health, criminal behavior, substance abuse, and engaged citizenship (Durlak et al., 2011; Durlak, Domitrovich, Weissberg, & Gullotta, 2015; Greenberg et al., 2003; Sklad, Diekstra, De Ritter, Ben, & Gravestijn, 2012; Zins et al., 2007).

Theoretical Comparison of SEL and PYD

Theoretically, SEL and PYD overlap substantially. Both approaches have a strengths-based perspective and view development through the lens of opportunity, as opposed to deficit. Further, both perspectives purport five essential elements of positive development. However, SEL and PYD differ in their theoretical linkages and outcomes. In terms of theoretical linkages, SEL is focused on specific skill promotion and behavior change through teaching and practicing, often in structured classroom settings (e.g., Social-Cognitive Theory, Problem Behavior Theory, Social Learning Theory, Health Belief Model; Payton et al., 2000). PYD, however, stresses the alignment of external resources with existing strengths/assets in youth (social developmental model; Hawkins & Weis, 1985), often takes place in community or after-school settings, and is less structured and prescribed. In terms of outcomes, SEL tends to focus on social and academic outcomes, and PYD tends to focus on societal contribution and engagement outcomes. Perhaps these differences have also led to differences in developmental focus, where studies of SEL are predominantly with early childhood and elementary students, and studies of PYD are predominantly with adolescents. Nevertheless, these approaches overlap in developmental territory in practice, begging for an empirical investigation of their potential strengths, pitfalls, and unique contributions with specific aged populations. A more detailed review of these approaches and a call for empirical work is outlined in a recent review (Tolan, Ross, Arkin, Godine, & Clark, 2016).

Determining the applicability of the SEL model to early adolescent populations is a primary step in this work. The components of the CASEL model have been primarily tested with preschool and early elementary populations but are now being presumed to apply into middle school programming as well. In addition, there has not been a test of the five competencies as a multidimensional measurement model (similar to the process followed for PYD identified above and typically applied to conceptual frameworks). This leaves unclear (a) whether these competencies act as distinct but related component of a model of social and emotional development and (b) the relation of each

competency and the overall framework to important indicators of academic, emotional, and social functioning. There have been other attempts to measure social and emotional competencies as informed by the CASEL model, and some measures have been developed for adolescent populations (e.g., DESSA; LeBuffe, Shapiro & Naglieri, 2008; EQ-i: YV; Bar-On & Parker, 2000). However, neither of these were specifically intended to follow the CASEL five competencies model, and neither tested this specific model as part of the measurement development.

Recent reviews and meta-analyses substantiate the effectiveness of programs captured under the CASEL model, with evidence in school and after-school settings (e.g., Durlak et al., 2011; Sklad, Diekstra, De Ritter, & Ben, 2012). In a meta-analysis of over 207,000 students in K-12th grade, Durlak and colleagues (2011) saw an average increase of 11 percentile points on standardized test scores for students participating in universal school-based SEL programs. In addition to academic achievement improvements (mean effect size of $d = .27$), the findings pointed to improvements in social and emotional skills (mean effect size $d = .57$), attitudes (mean effect size $d = .23$), and behaviors (mean effect size $d = .24$). These results were consistent with previous meta-analyses that explored similar outcomes (DuBois, Holloway, Valentine, & Cooper, 2002; Durlak & Wells, 1997; Haney & Durlak, 1998; Horowitz & Garber, 2006; Losel & Beelman, 2003; Wilson, Gottfredson, & Najaka, 2001; Wilson & Lipsey, 2007). These results also seem to hold for SEL interventions administered in afterschool settings. In a review of 48 afterschool programs that targeted personal and social skills, Durlak, Weissberg, and Pachan (2010) saw significant positive associations with feelings and attitudes (mean effect size ranging from $d = .14$ to $d = .34$), behavioral adjustment (mean effect size of $d = .19$), and school performance (mean effect size ranging from $d = .12$ to $d = .17$).

The interest in conceptualizing SEL as a framework for promoting positive development and ongoing understanding of intervention effects suggests a need to determine whether the framework functions as a multidimensional model. Two primary questions are (a) whether all five competencies are distinct, critical, and/or complimentary components of effects on positive functioning and (b) whether this SEL formulation, as drawn predominately from studies of children, applies to early adolescents.

Applicability of the SEL Model to Early Adolescence

A review by the Raikes Foundation on the state of knowledge about SEL assessment for middle school youth noted the limited work in this area and

called for more and improved assessment methods that were comprehensive and developmentally informed (Haggerty, Elgin, & Woolley, 2011). Moreover, the importance of establishing a developmental understanding of SEL in adolescence was noted. While many SEL reviews and recommendations encompass kindergarten through 12th grade, a closer look at the included studies shows the predominance of research focused on elementary school age populations. For instance, in the Durlak et al. (2011) review, the majority of the samples were from elementary school only. Only 31% included middle school students in the sample. This is also reflected in the SEL measurement development and literature. In a review of measures that support SEL implementation, the authors only included measures developed for preschool through 5th graders (Denham, Ji, & Hamre, 2010).

These trends are also present in the policy arena, where all 50 states have free-standing SEL standards at the pre-kindergarten level, but only four states have free-standing and comprehensive SEL standards that extend into secondary school (Dusenbury, Weissberg, Goren, & Domitrovich, 2014). Reviews have noted the need for focus on developmental subgroups in future studies (Durlak et al., 2011). While it is possible that the SEL model is robust across adolescence and is similar in form as that thought to apply to children, this has not been tested, to date.

The current study used data previously collected on a diverse, nationwide, and normative adolescent sample to validate the PYD Five C's measurement model (Lerner et al., 2005). Utilizing this data set, intended to help establish the validity of measurement of a multidimensional framework for positive development, can facilitate understanding of the fit of the CASEL model for adolescents. The items included provide a rich basis to construct scales to test the fit of the proposed five-factor SEL model. In previous investigations, the proposed model of PYD was found to be a good representation of the interrelation of the Five C constructs and robust in multiple waves of data from this early adolescent, longitudinal sample (Bowers et al., 2010; Lerner et al., 2005; Phelps et al., 2009). By utilizing the same candidate items and the same sample, the fit of SEL as an alternative positive youth development schema can be tested, and some comparison of the overlap and difference from the PYD measurement model can be completed.

Specifically, this study investigates the following research questions:

Research Question 1: Does the CASEL theoretical model hold in a normative early adolescent sample? Is there evidence that five constructs (Self-Management, Self-Awareness, Social Awareness, Relationship Skills, and Responsible Decision-Making) form a robust model for early adolescent positive functioning?

Research Question 2: Is this model robust across early adolescence (specifically also in sixth and seventh grade)?

Research Question 3: Does this model have predictive validity at a single point in time, such that it is positively related to academic achievement, as measured by school engagement and grades, and negatively related to risky behaviors, delinquency, and depressive symptoms?

Method

Participants and Procedures

This study used data collected by the National 4-H Study of Positive Youth Development. Data were collected in the United States from 40 cities or towns in 13 different states, starting in 2002. Data collection occurred through strategically contacting schools to gather a youth sample that was diverse in terms of regional, racial or ethnic, and rural-urban composition. Within each participating school, all fifth-grade students were contacted for participation in the first year (all sixth-grade students were contacted the second year, and so on). Surveys were administered to youth and their parent or guardian (Lerner et al., 2005). More details on the recruitment and methods of this study can be found in previously published work (e.g., Lerner et al., 2005; Phelps et al., 2007). The participants were a diverse group of U.S. adolescents beginning in fifth grade and following them through high school.

The present study used the data from the first wave of data collection (fifth grade) for the building and testing of the measurement model and for the questions of predictive validity. The second and third waves (sixth and seventh grade) of data were used for the purposes of determining the model's appropriateness for early adolescence and for further exploration of predictive validity. For Wave 1, a diverse sample of 1,717 fifth-grade (10- and 11-year-old) students were engaged. For Waves 2 and 3, youth from Wave 1 were retested, and an additional group was added to maintain power in light of attrition (911 added in sixth grade, and 669 added in seventh grade). Attrition in this sample, like most, was not completely random and happened at both the individual and site level. In some instances, participants from an entire school/site were lost when principals withdrew consent. For example, this resulted in the loss of over 500 participants from Wave 1 to Wave 2 and over 300 participants from Wave 2 to Wave 3 (Phelps et al., 2007). At the individual level, only 10% to 20% of participants attrited between Waves 1, 2, and 3. Previous studies have compared youth who dropped out of the study to youth who continued participating and found relatively few differences; retained youth were less likely to be Latino/a and to be from suburban areas.

Table 1. Sample Characteristics.

	Wave 1	Wave 2	Wave 3
Number of youth	1,717	1,879	1,839
Number lost	—	749	709
Number added	—	911	669
Age (<i>M</i> , <i>SD</i>)	10.97 (0.53)	12.09 (0.69)	13.13 (0.87)
Male (%)	48.0	42.6	40.3
Geographic location (%)			
Urban	27.8	26.3	28.8
Suburban	44.4	33.2	28.3
Rural	27.9	40.8	43.0
Race/ethnicity (%)			
African American	8.3	7.8	7.9
Asian American	3.6	2.6	2.7
American Indian	4.1	3.6	1.8
European American	54.0	60.9	68.0
Latino/a American	17.7	15.6	12.1
Multiracial	5.1	4.2	4.7
Other	7.2	4.6	2.7
Socioeconomic Status indicators			
Annual per capita income (<i>M</i> , <i>SD</i>)	\$13,657 (8,348)	\$13,636 (8,621)	\$16,553 (10,631)
Mothers' Ed in years (<i>M</i> , <i>SD</i>)	13.66 (2.40)	13.94 (2.51)	14.16 (2.31)

There were no other significant differences (e.g., Phelps et al., 2007; Phelps et al., 2009). For the purposes of this study, the differences in sample composition from one wave to the next can be seen as a strength, as our primary interest was in the robustness of the model over age and sample variations. Maximum likelihood parameter estimates (MLR) were used in the Mplus analysis to account for missing data, which allows full use of the data available, making analysis possible even if participants vary in the number or spacing between data points (Cillessen & Borch, 2006; Singer & Willett, 2003). Details about the participant characteristics for each wave are reported in Table 1.

This was a secondary data analysis study and intended to test a different theoretical organization of the positive development items than previously tested and reported in other publications. Thus, there has been utilization of the items and similar scale development test reported in prior publications but for substantially different purposes (e.g., Lerner et al., 2005). Previous studies that utilized the 4-H dataset did use items and scales that were used in this study. However, the outcome measures used for testing validity of the Five Cs PYD model were also used in the testing validity section of this study. This was purposeful on part of the authors, to examine SEL as an alternative

or complimentary model to PYD and to determine whether this model was also related to the outcomes that we tend to be interested in for adolescent samples. Items used in the SEL scale development do overlap with items in the PYD measure to some extent; however, the overlap is minimal, and the configuration of the items is unique to this article. Table 2 summarizes the items utilized to measure the five competencies here and the relation to loadings on the Five Cs PYD model.

Measures

The measures used in this study were drawn from the 4-H dataset. The same outcome measures used were those also used in the original validation study of the PYD model (Bowers et al., 2010; Phelps et al., 2009). A short description of each is provided below. The items used in the development of the SEL model do not overlap with items on any of the measures used as outcomes in the validity analysis.

Social and emotional learning. The items used to create this measure were derived from the Selection, Optimization, and Compensation scale (SOC; Freund & Baltes, 2002), Target-Based Expectations Scale (TBES; Buchanan & Hughes, 2004), Search Institute's Profiles of Student Life: Attitudes and Behaviors scale (PSL-AB; Benson, Leffert, Scales, & Blyth, 1998), Peer Support Scale (PSS; Armsden & Greenberg, 1987), and the Self-Perception Profile for Adolescents and Children (SPPA; Harter, 1988; SPPC; Harter, 1983). Items were selected if they related to SEL conceptually. The creation of this measure, including reliability and validity analyses, are reported in the "Results" section.

School engagement. The school engagement measure consisted of four items from the Search Institute's Profiles of Student Life—Attitudes and Behaviors (PSL-AB; Benson et al., 1998) questionnaire. An example item is, "*How often do you come to classes without your homework finished?*" The items were on a 3-point Likert-type scale where 1 = *usually*, 2 = *sometimes*, and 3 = *never*. Scales were calculated by summing the four items. The Cronbach's alpha ranged from .63 to .65.

Grades. Grades were measured using a self-report item from the PSL-AB (Benson et al., 1998) questionnaire. The item asked participants to report the grades they earned in school from *mostly As* to *mostly Ds*. The items were then coded to reflect a number on the GPA scale of 0 to 4.0, which were used in these analyses.

Table 2. Retained Item List With Original Source and Overlap With PYD Model.

Scale	Item name	Item description	Original scale source	If used in PYD measure
Self-Management	SM15	When I decide upon a goal, I stick to it OR I can change a goal again at any time.	Selection scale from the SOC scale (Freund & Baltes, 2002)	
	SM17	When I do not succeed right away at what I want to do, I don't try other possibilities for very long OR I keep trying as many different possibilities as are necessary to succeed at my goal.	Optimization scale from the SOC scale (Freund & Baltes, 2002)	
	SM19	I don't think long about how to realize my plans, I just try it OR I think about exactly how I can best realize my plans.	Optimization scale from the SOC scale (Freund & Baltes, 2002)	
	SM20	I make every effort to achieve a given goal OR I prefer to wait for a while and see if things will work out by themselves.	Optimization scale from the SOC scale (Freund & Baltes, 2002)	
	SM21	When I have started something that is important to me, but has little chance at success, I make a particular effort OR When I start something that is important to me but has little chance at success, I usually stop trying.	Optimization scale from the SOC scale (Freund & Baltes, 2002)	
	SM24	Even if something is important to me, it can happen that I don't invest the necessary time or effort OR For important things, I pay attention to whether I need to devote more time or effort.	Compensation scale from the SOC scale (Freund & Baltes, 2002)	
Self-Awareness	SA13	Some kids often get mad at themselves BUT Other kids are pretty pleased with themselves.	Self-Worth scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Confidence
	SA17	Some kids aren't very happy with the way they do a lot of things BUT Other kids think the way they do things is fine.	Self-Worth scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Confidence
	SA38	Some kids don't like the way they are leading their life But Other kids do like the way they are leading their life	Self-Worth scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Confidence
	SA39	Some kids usually get in trouble because of the things they do But Other kids usually don't do things that get them in trouble.	Conduct Behavior scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Character
	SA40	Some kids do things they know they shouldn't do But Other kids hardly ever do things they know they shouldn't do.	Conduct Behavior scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Character

(continued)

Table 2. (continued)

Scale	Item name	Item description	Original scale source	If used in PYD measure
Social Awareness	SO4	Caring	Pro-Social scale from Target-Based Expectations scale (Buchanan & Hughes, 2004)	
	SO5	Honest	Pro-Social scale from Target-Based Expectations scale (Buchanan & Hughes, 2004)	
	SO7	Considerate of others	Pro-Social scale from Target-Based Expectations scale (Buchanan & Hughes, 2004)	
	SO9	Respectful	Pro-Social scale from Target-Based Expectations scale (Buchanan & Hughes, 2004)	
	SO11	Helpful	Pro-Social scale from Target-Based Expectations scale (Buchanan & Hughes, 2004)	
Relationship Skills (Creating)	RS13	Some kids find it hard to make friends BUT for other kids it's pretty easy.	Social Competence scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Competence
	RS15	Some kids are kind of hard to like BUT others are really easy to like.	Social Competence scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Competence
	RS17	Some kids wish that more kids liked them BUT Others feel that most kids do like them.	Social Competence scale from the SPPA (Harter, 1988) and SPPC (Harter, 1983)	Competence
	RS19	I trust my friends.	PSS (Armsden & Greenberg, 1987)	Connection
Relationship Skills (Quality)	RS20	I feel my friends are good friends.	PSS (Armsden & Greenberg, 1987)	Connection
	RS21	My friends care about me.	PSS (Armsden & Greenberg, 1987)	Connection
	RS22	My friends are there when I need them.	PSS (Armsden & Greenberg, 1987)	Connection

(continued)

Table 2. (continued)

Scale	Item name	Item description	Original scale source	If used in PYD measure
Responsible Decision-Making	RD5	Helping other people	Social Conscience scale on the Search Institute's PSL-AB scale (Benson, Leffert, Scales, & Blyth, 1998)	Character
	RD6	Helping to make the world a better place to live in.	Social Conscience scale on the Search Institute's PSL-AB scale (Benson et al., 1998)	Character
	RD7	Giving time and money to make life better for other people.	Social Conscience scale on the Search Institute's PSL-AB scale (Benson et al., 1998)	Character
	RD8	Helping to reduce hunger and poverty in the world.	Social Conscience scale on the Search Institute's PSL-AB scale (Benson et al., 1998)	Character
	RD9	Helping to make sure all people are treated fairly	Social Conscience scale on the Search Institute's PSL-AB scale (Benson et al., 1998)	Character
	RD10	Speaking up for equality (everyone should have the same rights and opportunities)	Social Conscience scale on the Search Institute's PSL-AB scale (Benson et al., 1998)	Character
	RD11	Doing what I believe is right even if my friends make fun of me.	Personal Values scale from the Search Institute's PSL-AB scale (Benson et al., 1998)	Character
	RD13	Telling the truth, even when it's not easy.	Personal Values scale from the Search Institute's PSL-AB scale (Benson et al., 1998)	Character
	RD14	Accepting responsibility for my actions when I make a mistake or get in trouble.	Personal Values scale from the Search Institute's PSL-AB scale (Benson et al., 1998)	Character

Note. PYD = Positive Youth Development; SOC = Selection, Optimization, and Compensation; SPPA and SPSC = Self-Perception Profile for Adolescents and Children; PSS = Peer Support scale; PSL-AB = Profiles of Student Life: Attitudes and Behaviors.

Risk behaviors. Risk behaviors were measured using a combination of items from the PSL-AB scale (Benson et al., 1998) and the Monitoring the Future (Johnston, O'Malley, & Bachman, 2000) questionnaire. There were five items assessing the frequency of risk-taking activity (e.g., smoke cigarettes) with responses ranging from 1 (*never*) to 4 (*regularly*). All items contained the prefix, "*During the last 12 months, have you ever done any of the following?*" An example item is, "*Have you ever smoked cigarettes?*" The score used in this analysis was the summation of the five items on this scale. The Cronbach's alpha for this scale ranged from .70 to .87.

Delinquency. Delinquency was measured using four items from the PSL-AB scale (Benson et al., 1998). The items assessed the frequency of delinquent behaviors (e.g., damaged property) with responses ranging from 1 (*never*) to 5 (*five or more times*). An example item is, "*During the last 12 months, how many times have you stolen something from a store?*" The score used in this analysis was the summation of the four items on this scale. The Cronbach's alpha for this scale ranged from .70 to .87.

Depressive symptoms. Depressive symptoms were measured using the Center for Epidemiological Studies–Depression (CES-D) scale (Radloff, 1977). It consisted of 20 items on a Likert-type scale where participants indicated from 0 (*rarely or none of the time [less than 1 day]*) to 3 (*most of the time [5-7 days]*) how often they experienced symptoms during the past week. An example item is, "*During the past week I felt sad.*" The score used in this analysis was the summation of the 20 items on this scale. The Cronbach's alpha for this scale ranged from .81 to .89.

Results

Scale Development and Replication

In order to address the first two research questions of whether the CASEL theoretical model was appropriate in a normative early adolescent sample and would replicate over three waves, similar procedures utilized by Lerner et al. (2005), Bowers et al. (2010), and Phelps et al. (2009) to form the scales and the measurement model for the Five Cs PYD model with these data were applied, as follows.

The 4-H survey contained over 100 items that aimed to capture information on physical and mental health, engagement in school and community, goals for the future, behaviors, and so on. First, we selected items within the survey that seemed to distinctly capture one of the five constructs in the SEL

model, adhering to the CASEL definitions outlined in the introduction. The original list was gathered with a broad lens and resulted in a substantial number of items. This item list was then reduced in two ways, first by an independent rater item-sort task and second by conducting an Exploratory Factor Analyses (EFA) for each scale.

Four independent raters (lab members, familiar with PYD and SEL) were given the full item list with the definitions of each of the five constructs. They were asked to sort the items into the five constructs, strictly adhering to the definitions. If an item did not fit into any of the five constructs, they were able to note that, as well. Items that had more than two raters disagree on construct assignment were removed from the item list. Items that had complete agreement or only one rater disagreement on construct assignment were retained and subjected to EFA. The data was randomly split in half to conduct the EFA (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Items with loadings below .30 were excluded from further consideration. If the number of items per scale was still large (greater than 10 items), additional items were dropped if they seemed redundant or had a low loading relative to the other items on the scale. This procedure was intended to ensure equal representation of each scale and to not artificially increase reliability due to redundancy within a scale.

A model of these retained items with assigned membership on the five construct scales was then subjected to a confirmatory factor analysis (CFA) using MPlus version 7.1. This model is illustrated in Figure 1 (and subsequently Figure 2), and the item list is included in Table 2. The resulting structure was then tested for fit with Waves 2 (sixth grade) and 3 (seventh grade) data. A reliability analysis was also run on all five scales in each wave using SPSS version 21.0.

Scale factor structure and model fit. The first model (Figure 1) was tested for Wave 1 (fifth grade) using CFA and resulted in a fit that was not within the acceptable range for all indices ($\chi^2 = 1805$, $df = 459$, $p < .01$; root mean square error of approximation [RMSEA] = .041 [.096, .043]; comparative fit index [CFI] = .893; Tucker Lewis Index [TLI] = .885). Modification indices and the loadings of items were evaluated and directed toward improvements. In particular, the Relationship Skills scale seemed to be comprised of items that split into two distinct themes. The first theme was related to creating relationships and an example item was, “Which kind of kid is more like you: Some kids find it hard to make friends OR For other kids it’s pretty easy.” The second theme was related to relationship quality and an example item was, “My friends are there when I need them.” Thus, it seemed that the model should contain two subscales for relationship skills: a creating relationships subscale and a relationship quality subscale. This modified model (Figure 2), when subjected to CFA, resulted in all hypothesized pathways being significant; however, the

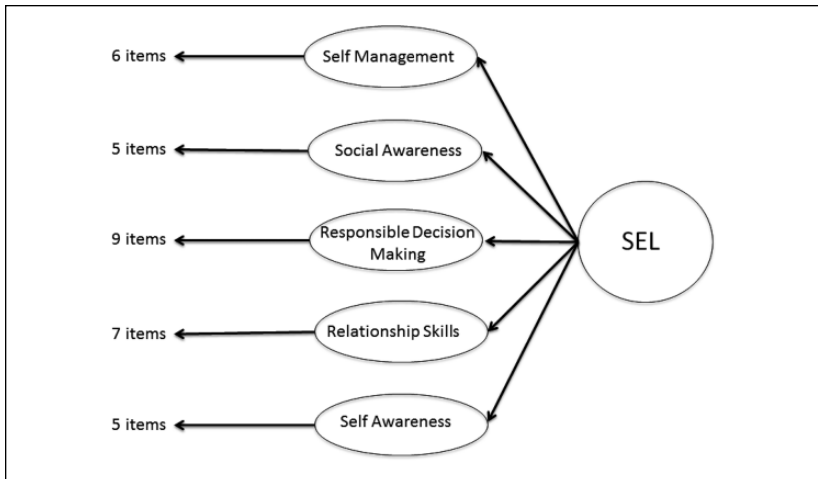


Figure 1. Hypothesized SEL measurement model for initial CFA.

Note. SEL = Social and Emotional Learning; CFA = confirmatory factor analysis.

model fit was still below the level fully acceptable for some indices, $\chi^2 = 1997$, $df = 520$, $p < .01$; RMSEA = 0.041; CFI = 0.889; TLI = 0.881. Review of the modification indices suggested fit could be improved by allowing residual correlations among some items within scales (e.g., RD14—“*Accepting responsibility for my actions when I make a mistake or get in trouble*” with RD13—“*Telling the truth, even when it’s not easy*”) as well as one correlation between a scale and a subscale (Self-Awareness with Creating Relationships). These were inspected within the context of the theoretical framework and employed where appropriate. These modifications improved the fit that was retained as the final model, $\chi^2 = 624$, $df = 443$, $p < .001$; RMSEA = 0.015 [0.013, 0.018]; CFI = 0.986; TLI = 0.984. The model can be seen in Figure 2. As shown there, standardized factor loadings for the items in this final model ranged from .31 to .89.

Longitudinal model fit. This established model was then tested for longitudinal fit through measurement invariance testing. First, the final model was tested for Wave 2 and Wave 3. Results from each CFA indicated good stability of the model over these three waves through good fit indices, factor loadings, and standardized estimates, as detailed in Table 3. Reliability analyses further supported the model robustness, with Cronbach’s alpha mostly stable across waves (Table 4).

We tested for configural invariance across waves, which requires that the factor structure (number of factors and loading pattern) is stable over time, by

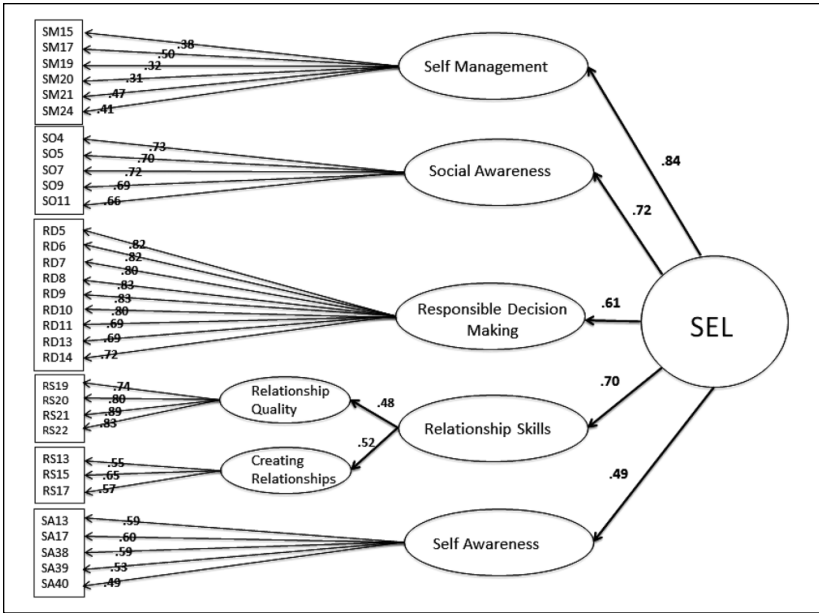


Figure 2. Revised SEL model for Grade 5 (Wave 1).

Note. Correlations among items are not shown here to maintain clarity of the figure ($\chi^2 = 624$, $df = 443$, $p < .001$; RMSEA = 0.015 [0.013, 0.018]; CFI = 0.986; TLI = 0.984). SEL = Social and Emotional Learning; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker Lewis Index.

including all three waves in the CFA model (Geiser, 2013). This resulted in good fit ($\chi^2 = 6974$, $df = 4398$, $p < .001$; RMSEA = 0.014; CFI = .953, TLI = .951). We tested for metric invariance of the SEL model by testing whether the first and second order loadings of like items were stable across time (Bowers et al., 2010). First, the first order factor loadings of like items were constrained to be equal. This resulted in good fit ($\chi^2 = 6896$, $df = 4374$, $p < .001$; RMSEA = 0.013; CFI = .954, TLI = .952). Second, the second order factor loadings were constrained to be equal, which also resulted in good fit ($\chi^2 = 7385$, $df = 4313$, $p < .001$; RMSEA = 0.015; CFI = .944, TLI = .941). These results support that both the first and second order factor loadings were invariant across time (Bowers et al., 2010; Geiser, 2013).

Scale Validation

In order to test the validity of the model in explaining indicators of functioning, we ran a regression in a structural equation modeling (SEM) framework. We ran

Table 3. Measurement Models for Grades 5, 6, and 7 SEL Standardized Estimates (Residual Errors).

	Grade 5 (Wave 1)	Grade 6 (Wave 2)	Grade 7 (Wave 3)
Self-Management			
SM15	0.378 (0.031)	0.376 (0.032)	0.362 (0.031)
SM17	0.498 (0.031)	0.521 (0.031)	0.562 (0.027)
SM19	0.318 (0.031)	0.373 (0.029)	0.350 (0.028)
SM20	0.313 (0.032)	0.397 (0.034)	0.456 (0.032)
SM21	0.474 (0.031)	0.398 (0.034)	0.443 (0.033)
SM24	0.413 (0.031)	0.467 (0.033)	0.416 (0.030)
Self-Awareness			
SA13	0.585 (0.023)	0.611 (0.022)	0.638 (0.023)
SA17	0.600 (0.027)	0.702 (0.021)	0.613 (0.025)
SA38	0.586 (0.026)	0.637 (0.023)	0.713 (0.023)
SA39	0.529 (0.027)	0.540 (0.025)	0.534 (0.026)
SA40	0.492 (0.028)	0.568 (0.025)	0.507 (0.027)
Social Awareness			
SO4	0.730 (0.021)	0.828 (0.017)	0.835 (0.014)
SO5	0.697 (0.023)	0.788 (0.016)	0.756 (0.018)
SO7	0.716 (0.022)	0.833 (0.015)	0.841 (0.015)
SO9	0.690 (0.024)	0.746 (0.021)	0.704 (0.022)
SO11	0.662 (0.025)	0.720 (0.022)	0.741 (0.021)
Creating Relationships			
RS19	0.735 (0.022)	0.722 (0.020)	0.790 (0.018)
RS20	0.803 (0.019)	0.772 (0.019)	0.849 (0.014)
RS21	0.888 (0.012)	0.897 (0.012)	0.929 (0.010)
RS22	0.827 (0.016)	0.822 (0.015)	0.906 (0.009)
Relationship Quality			
RS13	0.553 (0.027)	0.610 (0.024)	0.637 (0.027)
RS15	0.645 (0.023)	0.692 (0.022)	0.674 (0.027)
RS17	0.573 (0.026)	0.648 (0.024)	0.615 (0.029)
Responsible Decision-Making			
RD5	0.823 (0.018)	0.827 (0.014)	0.774 (0.017)
RD6	0.815 (0.017)	0.843 (0.012)	0.797 (0.014)
RD7	0.802 (0.018)	0.807 (0.014)	0.796 (0.014)
RD8	0.831 (0.015)	0.790 (0.016)	0.747 (0.016)
RD9	0.829 (0.016)	0.847 (0.012)	0.718 (0.018)
RD10	0.802 (0.019)	0.802 (0.015)	0.622 (0.023)
RD11	0.687 (0.026)	0.736 (0.020)	0.572 (0.023)
RD13	0.690 (0.025)	0.735 (0.018)	0.565 (0.023)
RD14	0.716 (0.024)	0.751 (0.018)	0.582 (0.023)
Relationship Skills			
Creating Relationships	0.476 (0.050)	0.512 (0.041)	0.746 (0.040)
Relationship Quality	0.517 (0.050)	0.540 (0.043)	0.536 (0.040)
SEL			
Self-Management	0.836 (0.040)	0.629 (0.036)	0.732 (0.033)
Self-Awareness	0.490 (0.038)	0.561 (0.032)	0.579 (0.031)
Social Awareness	0.721 (0.035)	0.827 (0.025)	0.827 (0.023)
Relationship Skills	0.703 (0.057)	0.747 (0.047)	0.729 (0.038)
Responsible Decision-Making	0.610 (0.039)	0.711 (0.026)	0.665 (0.026)

Note. Original item names were retained for clarity. For reference, please refer to Table 3. SEL = Social and Emotional Learning.

Table 4. Reliability Coefficients for SEL Scales.

	Cronbach's alpha		
	Wave 1	Wave 2	Wave 3
Self-Awareness	.71	.76	.76
Social Awareness	.83	.89	.89
Self-Management	.48	.48	.49
Responsible Decision-Making	.93	.94	.90
Relationship Skills	.76	.78	.83

Note. SEL = Social and Emotional Learning.

the model for each wave (Waves 1, 2, and 3) separately to test for replication (robustness). In the model applied, the specific SEL scales were modeled as contributing to a main latent factor (SEL) to test correlation with the five outcomes of interest (school engagement, grades, risk behaviors, delinquency, and depression), repeating this validity test for each wave. These analyses followed the same procedures followed for validity tests as used for the PYD model (Lerner et al., 2005). As in that study, there was not an expectation that specific SEL factors correlate to functioning, but that collectively will. We examined individual factors contributions to functioning as a secondary consideration. The analysis was run in MPlus version 7.11 (Muthén & Muthén, 1998-2015).

The SEL model was significantly related to all but one outcome (Wave 3, school engagement) in the expected direction (see Figure 3). As can be seen there, the model fit well for each wave with the SEL higher order factor (composite) predicting each outcome significantly. Subsequently, we tested for correlation of the five SEL scales not through a latent factor (Self-Awareness, Self-Management, Social Awareness, Relationship Skills, and Responsible Decision-Making) to school engagement, grades, risky behaviors, delinquency, and depression. This model for each wave is illustrated in Figures 4 to 6. For ease of interpretation, only significant coefficients are listed in the figure. Within the models, there is a consistent pattern of many SEL scales correlating to outcomes with positive relations with positive outcomes and negative relations with negative outcomes. Within that general pattern, which scales are significant contributors varies by outcome and across years. For each outcome at least on SEL scale correlates consistently to that outcome across waves. Overall, these findings validate the model and substantiate stability across waves.

Discussion

Understanding positive youth development in general and social and emotional models of contributors to such development rests on validating

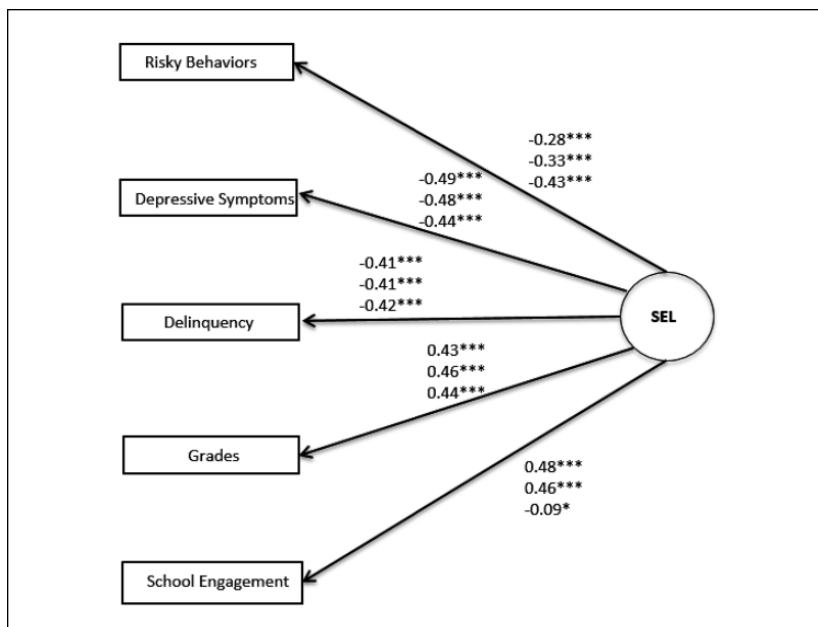


Figure 3. Predictive validity of SEL on positive and negative outcomes (Waves 1, 2, and 3, respectively).

Note. Wave 1: ($\chi^2 = 939$, $df = 598$, $p < .001$; RMSEA = 0.018; CFI = .975, TLI = .973), Wave 2: ($\chi^2 = 1320$, $df = 598$, $p < .001$; RMSEA = 0.025; CFI = .962, TLI = .958), Wave 3: ($\chi^2 = 1686$, $df = 635$, $p < .001$; RMSEA = 0.030; CFI = .946, TLI = .940). SEL = Social and Emotional Learning; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker Lewis Index.

the conceptual models through measurement schema. The CASEL model of SEL is perhaps the most prominent conceptual framework. It is presented as capturing a set of primary social and emotional skills thought to constitute essential contributors to healthy development. However, prior to this study, the CASEL model of the five SEL competencies has not been tested for whether it is a multidimensional model and valid in explaining outcomes. Nor has there been much consideration about how this model may or may not provide utility for understanding adolescents. Yet, it is increasingly offered and referred to as a comprehensive multidimensional framework of the skills essential for successful social and emotional development (Domitrovich, 2015; Durlak et al., 2015; Phelps et al., 2009). Thus, it seems valuable to determine whether this is more than an umbrella term with the components simply a list of constructs or, if as it is typically described and relied on, the components identified are

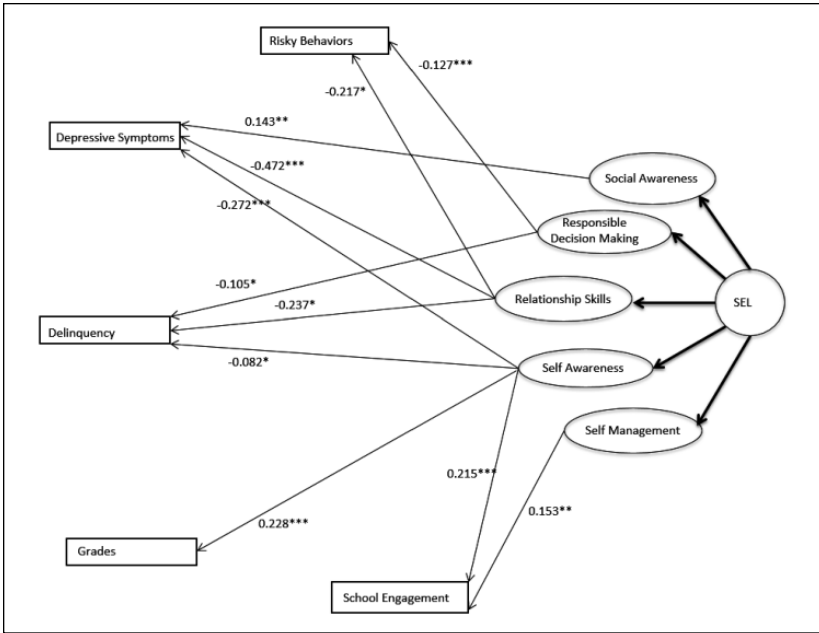


Figure 4. Predictive validity of SEL on positive and negative outcomes: Wave I
Note. $\chi^2 = 1030$, $df = 642$, $p < .001$; RMSEA = 0.020; CFI = .971, TLI = .966.

a set of interdependent dimensions. This is a first test of the model for those characteristics, to test its coherence or completeness.

When tested in a normative adolescent sample, confirmatory factor analysis support the CASEL five-factor model with the dimensional components as theorized, although some modifications of the initial tested model were required, and the final model included one substantial variant from the theorized framework. The modifications employed correspond to the interdependence of the skills, which while distinct, are at varying levels highly intercorrelated. The initial model did not suppose that constraint. Similarly, the items used were drawn from an existing data set and as such may not have been as sensitive or specific as might occur if a brand new set of items were developed. This led to some cross-item correlations; factors were not simply distinct dimensions. However, the advantages of testing this complex model with existing data with less than custom designed items was to allow comparison with another prominent positive development model (e.g., Bowers et al., 2010) and to see whether the model emerged even with less than optimal measurement seems to more than balance this limitation.

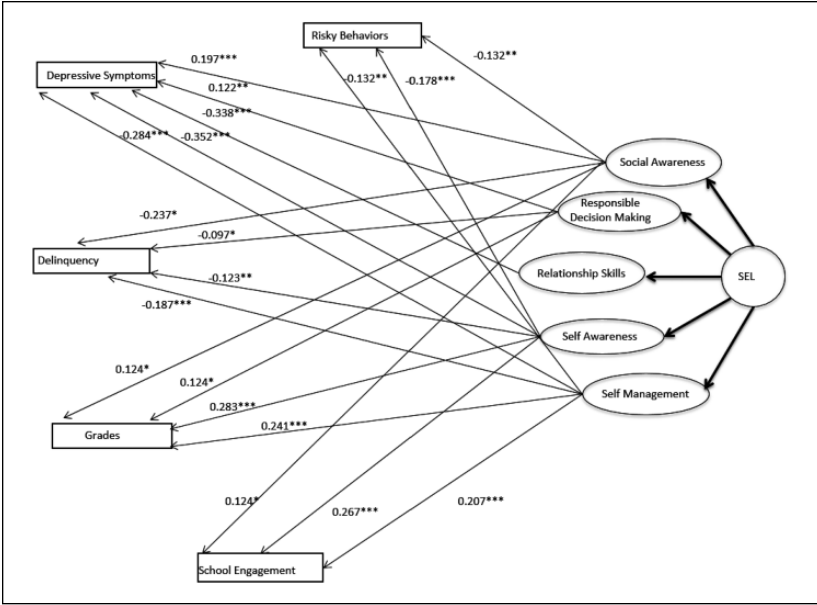


Figure 5. Predictive validity of SEL on positive and negative outcomes: Wave 2.
Note. $\chi^2 = 1380$, $df = 642$, $p < .001$; RMSEA = 0.026; CFI = .961, TLI = .955.

These measurement features are congruent with how the SEL model is characterized in reviews and intervention organization. The improvement of one dimension is thought to promote the improvement of others, whether through increasing positive development skill use opportunities or because they share source skills. Certainly, how these skills specifically relate, which are more primary and which are more secondary and perhaps derivative, is of great importance. Similarly, how their relation may change across development is also an important further area of study suggested by this initial work. The initial work of this study suggests that as an overall framework, the SEL dimensions emerge and have validity for explaining functioning.

The substantive variant in these analyses from the general casting of the CASEL model was that the Relationship Skills scale did not emerge as a unitary dimension but as comprised of two subscales, creating relationships and relationship quality. This finding points to several possibilities worthy of further exploration. First, it may be that relationship creating and quality are distinct enough components of SEL to warrant being separate components in a revised model. On the other hand, this found difference may be developmentally dependent; it could be that this differentiation emerges in adolescence

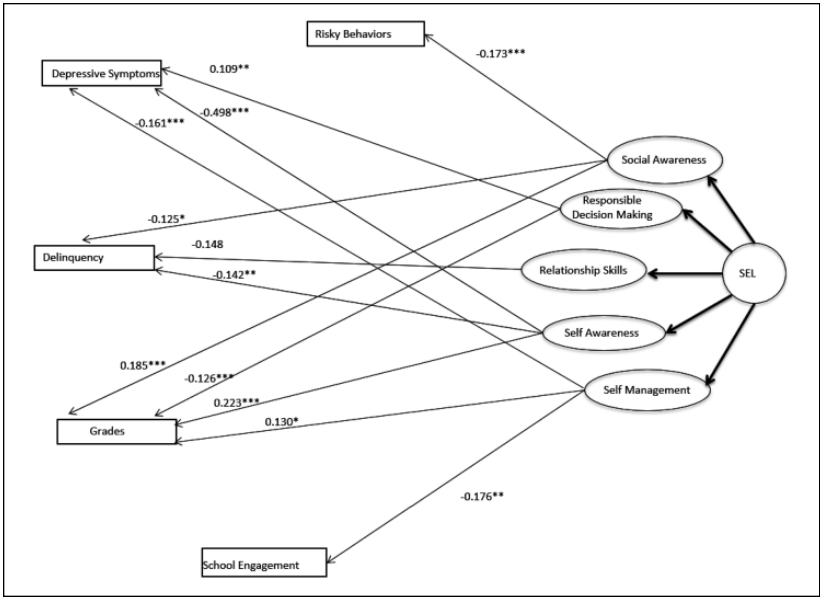


Figure 6. Predictive validity of SEL on positive and negative outcomes: Wave 3.
Note. $\chi^2 = 1477$, $df = 610$, $p < .001$; RMSEA = 0.028; CFI = .955, TLI = .948.

when peer relationships rise to primacy in personal concern and in developmental influence (Siegel, 2013; Steinberg, 2005). A factor analytic study of younger age samples could inform the developmental specificity of this finding. Second, as any item pool cannot capture all possible applicable items, it could be that the items accessible in this data set pulled for differentiation of these skills or did not adequately tap across the domain to cause a single dimension to emerge. However, the clarity of the loadings and the fit of the model, as well as the subsequent confirmation, suggest this is not simply a measurement artifact or unstable finding. While further consideration of the specificity and completeness of the items is certainly needed, these results seem to suggest careful consideration that the skills for starting or forming relationships and those that affect maintaining those relationships are distinct.

The resulting scale structure was confirmed across each wave of data, corresponding to sixth and seventh grade. The configural and metric invariance suggest that this model is valid for early adolescence (fifth through seventh grade) in that both first and second order factors are stable across measurement occasions (Bowers et al., 2010; Geiser, 2013). The sample utilized, while not representative of the United States and of limited ethnic diversity,

is normative in the sense of being a cross-section of youth engaged in widespread youth organizations and schools. Thus, whether these factors apply nationally or to subgroups underrepresented here is uncertain and seems an important next step.

The validity analysis in this study supports the model's relation to important indicators of functioning for adolescence. Overall, SEL is positively related to school engagement and grades, and negatively related to risky behaviors, delinquency, and depressive symptoms, and each outcome relates to one or more specific scales, with substantial consistency in which SEL skills relate to which outcome over early adolescence. These results support the notion that social and emotional competencies are importantly linked to outcomes of success and thriving in adolescence. This finding is consistent with findings of explanatory value of a multidimensional SEL formulation focused on children (Payton et al., 2000). Within the overall validation, there is differential patterns across waves and by outcome. For instance, self-awareness consistently relates to outcomes across all three waves, particularly depressive symptoms, delinquency, and grades. On the other hand, relationship skills is related to more outcomes in Wave 1 (risky behaviors, depressive symptoms, and delinquency), than in Wave 2 (depressive symptoms) and Wave 3 (delinquency). These findings suggest delving into these patterns could be very valuable, whether to relate variations to developmental conditions, to track patterns related to maturing, or to provide insights into how to promote positive development most effectively. For instance, perhaps during early adolescence, responsible decision-making takes on resistance to peer pressure and academic goals, components that were not captured by (or socially available to) this skill in elementary youth. Future work is needed to further examine the specific manifestations of these skills at particular developmental stages and what this implies for programs and practice, and the relation to important outcomes. In addition, it will be important to do longitudinal analyses of predictive validity to expand upon these findings.

While this is not a statistical comparison to the Five Cs model nor is it meant to be a comparison of which is more advantageous, when juxtaposed to the Five Cs model, the findings highlight the complimentary nature of the models while also indicating need for reconciling the relation between them. It is apparent that there is some overlap in what each model emphasizes but some distinction in conceptual organization. The Five Cs model emphasizes some characteristics the CASEL model does not, including positive identity (in the Confidence scale), physical competence (in the Competence scale), personal values (in the Character scale), values diversity (in the Character scale), community connection (in the Connection scale), family connection (in the Connection scale), and school connection (in the Connection scale);

Phelps et al., 2009). This comparison using the same data suggest there are important conceptual and construct component similarities. There is not only overlap in the items retained in the SEL model and the items on the Five Cs PYD scale but also substantial difference. For instance, the Self-Awareness (SEL) scale has three items in common with the Confidence (PYD) Scale and two items in common with the Character (PYD) scale. Self-awareness may be capturing some confidence and character traits of PYD. In addition, creating friendships (SEL) overlaps with competence (PYD). Creating friendships might be a subtheme of the competence construct that is not overtly reflected in the current definition (positive view and performance in the social, academic, cognitive, health, and vocational domains), but perhaps inherent. The Relationship Quality (SEL) scale also shares items with the Connection (PYD) scale, which makes sense intuitively, as does the overlap between responsible decision-making (SEL) and character (PYD). Conceptually, the SEL model suggests that the component skills should be promoted in all youth, while the Five Cs PYD model focuses more on alignment of resources to strengths in a more individualized manner (Lerner et al., 2003). Divergently, SEL is traditionally applied to educational settings while PYD has spanned many settings that include educational and community, among others (Elias et al., 1997; Greenberg et al., 2003; Lerner et al., 2003). This may point to a broad conceptual overlap between the models but distinction in constructs composing the models and how competencies or skills are formulated.

Limitations

The authors must point out several limitations to this work. First, the 4-H dataset was not collected with the intent to create an SEL measurement model. For this reason, the items on the scales may not have captured appropriately, broadly, or in depth important representations of all the five constructs. This may especially be the case in the Self-Management scale, which had the lowest item loadings overall (although still within the acceptable range of above .40) and the lowest reliability. Ideally, additional items would be available to add to the scale to fully capture the construct of self-management, but in this case, the authors were limited to the items available within a pre-existing data set and view the strength of the large, longitudinal sample and the original nature of this investigation as justification for reporting and further exploration. In addition, the Self-Awareness scale had the lowest loading, relative to the other scales. The authors purport that the key interest in this study was the validation of the overall theorized model and, with the strong findings for the overall model fit and the loadings of the items on the factors, retaining the Self-Awareness scale is justified. One other limitation is

the sample. While having many strengths, the sample has relatively limited ethnic and economic diversity and size for sensitively detecting variations related to these demographic differences.

Conclusion

Overall, the results support viewing a slightly modified version of the CASEL model as a valid, and perhaps alternative or complimentary, framework for adolescent research and practice. While both the Five Cs and SEL models have now been empirically supported as appropriate models for early adolescent development, it is important to note that these models have similarities and distinctions. The models similarly approach development from a positive lens as opposed to a deficit lens. It does seem apparent that each model has distinct features, and both models are appropriate (have strong factor reliability and predictive validity of youth outcomes) when considering early adolescent development. Further examination of their interrelation and utility in varying contexts of adolescent development is necessary.

This is the first test of the CASEL conceptual model as a measurement model and provides robust support for its utility in studying adolescent social and emotional development. While limited by reliance on single sources and self-report, the results hold across age groups and changing membership of cohort samples. Further studies with larger, more diverse, and child-through adulthood samples are needed to determine the extent of robustness across age groups and different populations. However, these results suggest a reliable basis for measurement in those studies and for further developmental studies that examine the trajectories of the five SEL constructs and the meaning of differences in these trajectories for overall functioning and intervention design.

Authors' Note

The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The research reported here was supported

by the Institute of Education Sciences, U.S. Department of Education, through Grant R305B090002, to the University of Virginia. This research was supported in part by a grant to Richard M. Lerner, Tufts University, from the National 4-H Council.

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