

# Intentional Self-Regulation and Positive Youth Development in Early Adolescence: Findings From the 4-H Study of Positive Youth Development

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In this research, the authors examined the development of intentional self-regulation in early adolescence, which was operationalized through the use of a measure derived from the model of selection, optimization, and compensation (SOC). This model describes the individual's contributions to mutually influential relations between the person and his or her context. Through use of data from a longitudinal sample of 5th and 6th graders who were participating in the 4-H Study of Positive Youth Development (PYD), structural equation modeling procedure, reliability analyses, and assessments of convergent, divergent, and predictive validity suggested that a global, 9-item form of the SOC measure was a valid index of intentional self-regulation in early adolescence. Scores for this index of SOC were related to indicators of positive and negative development in predicted directions. The authors discuss the idea that self-regulation is a global process in early adolescence that contributes to PYD.

*Keywords:* self-regulation, positive youth development, selection, optimization, compensation

The adolescent period is marked by the emergence of new cognitive and emotional characteristics; the development of physical and sexual maturity; changing relationships with family, teachers, and peers; and the formulation of a more differentiated self-definition (identity), which influences all aspects of the young person's development. Brandtstädter (1998) explained that adolescence is characterized by the emergence of a notion of personal future that becomes integrated into the process of self-regulation, that is, selecting and enacting behaviors that may attain goals of pertinence to the self. Normatively, self-regulation capacity attains higher levels of functioning (Freund & Baltes, 2002) and becomes a significant moderator of the person's actions (Baltes, Lindenberger, & Staudinger, 2006). As discussed by Baltes et al. (2006; see also Freund & Baltes, 2002), in adolescence, as well as in other portions of the life span, selecting goals—when coupled with developing the means of obtaining goals and with adjusting goals when opportunities for reaching them are blocked or lost—constitutes a fundamental feature of a young person's successful interactions with his or her social ecology. However, Brandtstädter (1998) noted that, insofar as adolescence is concerned, the development of self-regulation has not been adequately studied.

As is the case in regard to most contemporary theories within developmental science, current theories of adolescent development are framed by developmental systems models (see Lerner, 2006). These models may be a useful frame for the study of self-regulation in adolescence. These models are predicated on a relational metatheory that emphasizes that, as a consequence of the integration of all levels of organization within the ecology of human development, the key process of human development involves mutually influential relations between an individual and his or her context (represented as individual  $\leftrightarrow$  context relations; Lerner, 2004; Overton, 2006). Termed *developmental regulation*, this process of mutual influence connects levels ranging from genes and cell physiology through individual mental and behavioral functioning to society, culture, the designed and natural ecology and, ultimately, history (Elder & Shanahan, 2006; Gottlieb, Wahlsten, & Lickliter, 2006; Valsiner, 2006).

When developmental regulations are mutually beneficial (to both individual and context), they may be termed *adaptive developmental regulations* (Brandtstädter, 2006). Such regulations align levels associated with the individual (physiology, mental functioning, and behavior) with levels associated with his or her ecology (e.g., peer and family relations as well as connections to schools and to community institutions). Adaptive developmental regulations result during adolescence in positive youth development (PYD), a construct that has been operationalized within the youth development literature through the *five Cs*; that is, the subscales of Competence, Confidence, Connection, Character, and Caring (Eccles & Gootman, 2002; Lerner, Lerner, et al., 2005; Roth and Brooks-Gunn, 2003a, 2003b). A key idea linking goal-oriented, self-regulation behavior with PYD is that as increases occur in the capacity for selecting goals, for recruiting the means of reaching them, or for making adjustments when goals are blocked, PYD (as an index of adaptive self-regulation) should increase; by the same reasoning, indices of problematic behavior should decrease. The present research presents data supporting this idea.

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This article is based, in part, on a dissertation submitted by Steinunn Gestsdóttir to Tufts University in partial fulfillment of the requirements for the PhD degree.

This research was supported, in part, by a grant from the National 4-H Council to Richard M. Lerner. The authors thank Erin Phelps and Stacy Zimmerman for their invaluable contributions to the research reported in this article.

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The attributes involved in, and the means through which the adolescent contributes to, developmental regulations may be termed *self-regulation* (Gestsdóttir, 2005). Self-regulation encompasses multiple forms of functioning, ranging from physiological attributes of the organism (e.g., circadian rhythms) through biopsychological features of behavioral style (e.g., temperament) to intentional thought processes involving self-selected, goal-directed actions.<sup>1</sup> A key example of the latter type of actions is the model of selection, optimization, and compensation (SOC) created by Baltes, Freund, and colleagues (e.g., Baltes, 1997; Baltes & Baltes, 1990; Baltes et al., 2006; Freund & Baltes, 2002; Freund, Li, & Baltes, 1999). The model describes how each person is presented with a combination of expected and unexpected events throughout the life span; these experiences require the person to negotiate among resources in the environment, examine his or her own abilities, and, consequently, choose appropriate goals and goal-related strategies for attaining positive individual  $\leftarrow$   $\rightarrow$  context relations. The three components of the SOC model refer to the self-regulatory processes that an individual uses to regulate his or her relationship with the environment and to manage his or her external and internal resources (Baltes, 1997; Baltes & Baltes, 1990; Freund & Baltes, 2002). *Selection* refers to how a person identifies goals, *optimization* refers to the person's attempts at maximizing the chances of recruiting the resources necessary for goal attainment, and *compensation* refers to the person's ability at modifying behaviors in the face of the blocking of or loss of goal-directed actions.

Selection, then, requires choosing from a broad range of alternative goals, identifying an appropriate number of goals, and forming a goal hierarchy, thereby guiding attention and organizing behaviors. Optimization occurs after a goal system has been created and requires a person to apply and refine appropriate, goal-relevant means of achieving desired outcomes as well as monitor a possible discrepancy between a present state and the goal being sought. The investment of time and energy, through qualities such as persistence and the focus of attention, are instances of optimization. For maintenance of adaptive developmental regulations, compensation must occur if there is a loss in functional capacity (e.g., through injury or aging) or if goal-relevant means are blocked. Compensation involves means similar to those used in optimization, such as practice, but such actions are aimed at avoiding losses in the face of the loss of goal-relevant means rather than approaching positive states. For example, if a person was absent from school for a period of time because of illness, the individual can seek alternative means, such as taking an extra class, to maintain functioning (Baltes & Baltes, 1990; Freund & Baltes, 2002; Wiese et al., 2000).

The intentional self-regulations specified within the SOC model and in other action theoretical accounts of individual  $\leftarrow$   $\rightarrow$  context relations (e.g., Brandstädter, 2006; Brandstädter & Lerner, 1999; Heckhausen, 1999, may be distinguished from organismic regulation (cf. Eisenberg, Fabes, & Spinrad, 2006). The former instances of self-regulation, which are the focus of this research, involve contextualized actions that are actively aimed toward harmonizing personal goals with demands and resources in the environment with the goal of attaining better functioning and enhancing self-development (Baltes, 1997; Baltes et al., 2006). Intentional self-regulation is characterized by goal-directed behaviors that, although potentially not conscious, are more readily available to

consciousness than are the processes and structures of organismic regulation. The latter processes and structures are broad, consistent attributes of a person that involve biologically based, physiological structures and functions (e.g., temperamental style; Rothbart & Bates, 2006) that contribute to the relationship that an individual has with the environment (cf. Eisenberg et al., 2006, who uses the terms *effortful control* and *reactive control*, respectively, to denote these two features of self-regulation).

In turn, although not measured within the SOC model, organismic instances of self-regulation (e.g., involving hypothalamic control of body temperature, circadian rhythms, pubertal timing, and, as noted, temperamental attributes such as threshold of responsiveness or quality of mood) are under relatively less control of the person and do not involve intentional or effortful effects of the person at regulating his or her exchanges with the context (Eisenberg et al., 2006). Organismic regulatory characteristics tend to show relative continuity through the life span and contribute to consistencies in behavior across situations and over time (Hooker & McAdams, 2003; Susman & Rogol, 2004).

### Self-Regulation in Adolescence

Although organismic regulation continues to contribute to the person's relationship with his or her environment throughout the life span (Kagan, 1998), it may be expected that intentional self-regulation will undergo significant developmental change in adolescence. Few developmental phases are characterized by changes that are as dramatic as those experienced during adolescence, a period encompassing the second decade of life (Lerner & Steinberg, 2004). The individual-level changes that occur during adolescence and the changing world in which the adolescent is embedded means that the relationship between the young person and his or her context is changing, as well, making the study of self-regulation in early adolescence (Lerner, 1982; Lerner, Theokas, & Jelicic, 2005) especially pertinent.

The SOC model is aimed at providing a comprehensive approach to describing the multiple processes that are involved in goal setting and goal pursuit across the life span (Baltes, 1997). Freund and Baltes (2002) have discussed the nature of intentional self-regulatory functioning in adolescence insofar as the three components of the SOC model are concerned. They suggested that, consistent with Werner's (1957, 1948) orthogenetic principle, the processes depicted within the SOC model should, in childhood and early adolescence, exist in a global and undifferentiated structure; however, across the second decade of life (i.e., the adolescent period; Lerner & Steinberg, 2004), this global structure should differentiate into a structure with three identifiable (albeit obliquely related) components that reflect the three facets of the SOC model: selection (S), optimization (O), and compensation (C). That is, Freund and Baltes noted that children and young adolescents may have more limited abilities and opportunities for making goal selections and for providing direction to their own development than do older adolescents or adults and that they "expect that individuals . . . acquire and refine their knowledge and expression

<sup>1</sup> Labels other than "intentional" self-regulation, such as "effortful" and "voluntary," may also be used for depiction of the processes to which we are pointing.

of SOC-related behaviors . . . [so that] adults should show a stronger preference for S, O, and C . . . than should adolescents or children" (Freund & Baltes, 2002, p. 644).

Of course, even in early adolescence (e.g., 5th and 6th grades or about 10 and 11 years of age), youth have opportunities to select their goals (e.g., relating to leisure-time activities, allocation of money available to them, and participation in within-school and after-school structured activities) and to recruit the means (e.g., in school, home, and community settings) of attaining these goals (i.e., "optimizing," in the terms of Baltes & Baltes, 1990). For instance, young adolescents can earn extra money to purchase desired goods or to participate in entertainment experiences, and they can recruit friends to support their goals in school or in after-school activities (Eccles & Gootman, 2002). Damon, Menon, and Bronk (2003) discuss such *purposive* (goal-directed or selective) behaviors at this age level and point to the young adolescents' capacities for pursuing what they describe as "noble purposes." Of course, the young adolescent may feel a need to compensate when, for instance, he or she does not achieve the goal of making a sports team or when his or her attendance at a music event is blocked because the performance is sold out.

The SOC process may be observable, therefore, in early adolescence. Nevertheless, an expectation of orthogenetic change in intentional self-regulation across the adolescent decade may be derived from the idea that the confluence of new cognitive abilities and behavioral skills (e.g., Fischer & Bidell, 1998), new opportunities for social exchanges (East et al., 1992; Eccles & Gootman, 2002), and changed social expectations placed on youth (Damon et al., 2003) impel the young person to develop new approaches to intentional self-regulation. As adolescents internalize the social standards and behavioral mechanisms of those around them, they may transform external bases of regulation into more internal, mindful forms of self-regulation (Brandtstädter, 2006). Such internalization enables them to make better interpretations, choices, and decisions depending on the environment in which they are interacting (Demetriou, 2000). Because intentional self-regulation involves actions that are aimed at changing a part of a developmental system (e.g., a person) toward a particular goal, a person must be able to form representations of himself or herself and of others that inform the person of past experiences, offer self-evaluations, and provide directions for future actions. Only by having such representations can he or she set and attain goals (Demetriou, 2000). It can be expected that the internalization of standards as well as a sense of identity and of personal future, which are fundamental for the development of successful self-regulation, will develop across adolescence and even into adulthood (Brandtstädter, 1998).

Theories of intentional self-regulation, such as SOC, are theories of successful life management, and empirical evidence links various forms of positive self-regulation with the absence of indicators of negative development. Indeed, it has been hypothesized that intentional self-regulation is the key means through which the individual can contribute to his or her positive development (Lerner, Dowling & Anderson, 2003). Low levels of self-regulation have been linked to various forms of negative developmental outcomes in adolescence. Raffaelli and Crockett (2005) found that adolescents' abilities at regulating attention, emotions, and behavior was associated with sexual risk taking, especially with the ability at minimizing the risk associated with being

sexually active. These findings are consistent with our expectation that increased intentional self-regulatory abilities are inversely related to problematic behaviors, presumably because, in regard to the SOC model, there is a capacity for choosing healthy behaviors and for manifesting related optimization and compensatory behaviors.

Additional support for our expectation of a positive correlation between SOC and PYD derives from extensive research pertinent to the tripartite SOC model (Baltes, 1997; Baltes et al., 1998; Baltes & Baltes, 1990; Baltes et al., 2006; Freund & Baltes, 2002); this scholarship has indicated the reliability and validity of the Freund and Baltes (2002) SOC measure and has demonstrated its use in understanding successful regulation in adult and aging populations. This utility has been manifested in regard to general functioning and to domain-specific behaviors.

For instance, Wiese et al. (2000) found that participants who reported using SOC behaviors scored higher on indicators of overall successful life management and on measures of successful occupational and partnership functioning. Freund and Baltes (1998, 2002) found that self-reported SOC behaviors were positively related to various indicators of successful life management and well-being, such as life satisfaction, positive relations, and a sense of purpose in life. These studies are consistent with the theory of SOC-related behaviors as strategies for successful life management and for healthy development within and across periods of development, for example, for PYD among adolescents.

Accordingly, in the present research, we tested the idea that SOC, as an index of adaptive self-regulation, is positively related to PYD and negatively related to indices of problem behaviors among youth developing across a 2-year period in early adolescence. We assessed whether the structure of SOC may be better represented as a global structure or as a tripartite one. On the basis of Freund and Baltes's (2002) ideas, we expected that a global structure would exist within the early adolescent period that we assessed in this research. Moreover, on the basis of the ideas of Baltes et al. (2006) and Brandtstädter (1998, 2006), we expected that SOC processes would positively predict outcomes of adaptive developmental regulation (PYD in the present research) and would negatively predict indices of problems of development (indices of depression, risk behaviors, and delinquency in the present research).

However, prior to this research, the SOC model had not been empirically tested, nor had the SOC measure been used, with early adolescent samples, although it has been proposed as a promising approach to understanding intentional self-regulation in adolescence (Lerner, Freund, De Stefanis, & Habermas, 2001). Accordingly, in this research, we explored the use of the SOC model and the use of a measure developed by Freund and Baltes (2002) for indexing the intentional self-regulatory actions depicted in the model. We used data from the first two waves (Grades 5 and 6) of the 4-H Study of Positive Youth Development (Jelicic et al., in press; Lerner, Lerner, et al., 2005), a longitudinal study involving annual assessments (beginning with 5th grade as Wave 1) of about 1,700 5th-grade youth from 13 U.S. states, to contribute simultaneously to several interrelated issues.

First, we assessed the structure of intentional self-regulation in early adolescence as indexed by the SOC measure. We explored whether, within the 5th and 6th grades, evidence exists for the presence of the three components of intentional self-regulation

specified by Baltes (1997; Baltes et al., 1998, 2006; Freund & Baltes, 2002; Freund et al., 1999); that is, selection, optimization, and compensation, or if the structure of self-regulation exists as a more global, undifferentiated phenomenon.

Second, we assessed the psychometric characteristics of Freund and Baltes's (2002) SOC measure. We appraised reliability, as indexed by Cronbach's (1951) alpha scores for internal consistency.

Third, we assessed concurrent validity (through findings associated with data from within the 5th and 6th grades, respectively) and predictive validity (through longitudinal findings across the 5th to 6th grades) so that we could test the theoretical expectations that better intentional self-regulation (i.e., higher SOC scores) covaries positively with indicators of PYD and covaries negatively with indicators of problem or risk behaviors.

Within the 4-H study data set, PYD is operationalized through (a) scores for the five Cs of PYD, that is, scores for five first-order latent variables identified by Lerner, Lerner, et al. (2005) and discussed by Roth and Brooks-Gunn (2003a, 2003b) and Eccles and Gootman (2002) as competence, confidence, character, connection, and caring and (b) a score for a second-order latent variable of PYD. Problem and risk behaviors are operationalized in the 4-H data set by scores for depression, for risk behaviors associated with substance use (i.e., tobacco, alcohol, and drug use), and for what may be labeled as delinquent behavior (e.g., fighting and property damage).

In sum, this research sought to (a) describe the psychometric characteristics of the Freund and Baltes (2002) measure of SOC use among the 4-H study participants assessed within the 5th and 6th grades and (b) increase understanding of whether, across a 2-year period within early adolescence, a relation exists between intentional self-regulation and the positive and problematic development of youth.

## Method

The current investigation was conducted as part of the *4-H Study of Positive Youth Development*, which is a longitudinal investigation starting with 5th-grade youth in the United States and their parents. The 4-H study is designed for testing a theoretical model about the role of developmental assets in the promotion of PYD, as conceptualized by the five Cs of PYD (the subscales of Competence, Confidence, Connection, Character, and Caring), and the promotion of the sixth C (the scale of Contribution) as well as in the diminution of problem and risk behaviors (Lerner, Lerner, et al., 2005). Full details of the methodology of the 4-H study have been presented in prior reports (Lerner, Lerner et al., 2005; Theokas & Lerner, 2006; see also Jelcic et al., in press). Accordingly, we present here those features of methodology pertinent to the focus of this investigation.

## Design

In the 4-H study, we used a form of longitudinal sequential design (Baltes, Reese, & Nesselroade, 1977). Fifth graders, gathered during the 2002–2003 school year (which was Wave 1 of the study) were the initial cohort within this design, and this cohort was the only one studied in Wave 1. However, for maintenance of at least the initial levels of power for within-time analyses and for

assessment of the effects of retesting, all subsequent waves of the study involved the addition of a retest control cohort of youth who were in the current grade level of the initial cohort; this new cohort was then followed longitudinally. Accordingly, in Wave 2 of the study (6th grade for the initial cohort), a retest control group of 6th graders who were new to the study were gathered; these youth became members of a second longitudinal cohort. Similarly, each subsequent wave of the study will introduce a new cohort, which will then be followed longitudinally throughout the rest of the study.<sup>2</sup>

In the present report, which presents data from the first two waves of the 4-H study, analyses involve three different subsets of the overall set of study participants. First, the participants who were studied longitudinally at the first two waves of testing were used in analyses aimed at examining the predictive validity of SOC from Wave 1 to Wave 2 and examining a possible change in levels of SOC-related behaviors from Wave 1 to Wave 2. Second, all 5th-grade participants who were studied at Wave 1 (i.e., the initial cohort involved in the study) were used in analyses aimed at examining the factor structure of the SOC measure at the 5th-grade level. Third, all 6th-grade participants (the participants from the initial cohort that remained in the longitudinal sample for Wave 2 and the participants from the new cohort of 6th graders, introduced into the study as members of the Wave 2 retest control group) were used in analyses aimed at examining the factor structure in 6th grade. Details about these groups of participants are provided in the *Participants* section.

## Participants

At Wave 1, participants came from sites located in 13 states that provided regional, rural/urban, racial/ethnic, and religious diversity. Schools were chosen as the main method for collecting the sample. Assessment was conducted in 57 schools and in four after-school programs. The sample consisted of 1,659 5th-grade adolescents (48.5% boys,  $M = 10.9$  years of age,  $SD = 1.13$  years; 51.5% girls,  $M = 10.8$  years of age,  $SD = 0.97$  years).

In 6th grade, 854 youth who were in the initial cohort during Wave 1 were retested (45.6% boys; 54.4% girls), and, in addition, a retest control sample of 733 6th graders was added (39.3% boys; 60.7% girls). The combination of longitudinally studied (Wave 1–Wave 2) participants from the initial cohort and the retest control participants from Wave 2 resulted in a total of 1,587 6th-grade participants at Wave 2 (42.4% boys;  $M = 12.1$  years of age,  $SD = 0.71$  years; 57.6% girls,  $M = 12.1$  years of age,  $SD = 0.70$  years).

At Wave 2, youth were sampled from 53 schools and five after-school programs in 18 states across the nation. We asked

<sup>2</sup> In the 4-H Study, we selected a yearly division because, in conducting a school-based survey of the scope involved in the present study, we could not gain access to the schools more than once a year and, because little is known about the developmental pace or course during early adolescence of the self-regulatory processes, we believed that a yearly division of the  $x$ -axis was a reasonable starting point for indexing such changes. Other longitudinal studies of the age levels and of the size of the present investigation (e.g., Nesselroade & Baltes, 1974) have found that yearly interesting intervals have been sufficiently sensitive at testing for the presence of such differentiation for the constructs in which they were interested (e.g., Fitzgerald, Nesselroade, & Baltes, 1973).

participants to describe their ethnicity. This information exists for 1,496 of the participants at Wave 1: 57.2% described themselves as European American, 19.9% described themselves as Latino/a, and 8.4% described themselves as African American. Other ethnic groups were smaller. At Wave 2, information exists for 1,462 participants. Of those participants, 67.5% described themselves as European American, 14% described themselves as Latino/a, and 6.4% described themselves as African American. The remaining 12.1% described themselves as belonging to other ethnic groups.

In regard to household annual income, 989 participants who answered provided this information at Wave 1: 21.6% reported household income of under \$25,000, 38.4% reported household income between \$25,000 and \$64,999, and 40% reported household income of \$65,000 or more. Information on household income existed for 968 participants at Wave 2: 19.6% reported a yearly household income of less than \$25,000; 39.7% reported a yearly household income of \$25,000–\$64,999; and 40.7% reported a yearly household income of \$65,000 or more.

Attrition in the 4-H sample is not randomly distributed across schools. In Wave 2, some principals withdrew consent for their schools' participation, and, thus, these students dropped out before we had the opportunity to ask them if they wanted to remain in the study. For example, in one state, we were unable to collect data in Wave 2, resulting in the loss of more than 250 participants. Overall, we lost 561 participants in Wave 2 because of the absence of principal or superintendent permission for continuing. In turn, however, attrition from Wave 1 to Wave 2 for students whose principals and superintendents allowed us to ask them to remain in the study was only 10%.

The two groups of Wave 1 youth—those who continued into Wave 2 and those who did not—were compared on several background and outcome variables.<sup>3</sup> It is likely that the youth who continued in the study were slightly more advantaged, as indexed by family income and mothers' education; were European American; came from suburban areas; had parents who also participated; and had slightly higher levels of PYD (as a result of higher Competence and Connection scores). However, both groups had equivalent levels of SOC scores.

### Measures

The measures used in the present report pertain to assessment of the actions associated with the SOC model of developmental regulation (Freund & Baltes, 2002; Freund, Li, & Baltes, 1999) and with features of positive and problematic development that were expected to covary positively and negatively, respectively, with the scores derived from the SOC measure.

*Indexing intentional self-regulation: A measure of SOC.* We used the *Selection, Optimization, and Compensation (SOC) Questionnaire* (Freund & Baltes, 2002) to measure intentional self-regulation. The Elective Selection (S) subscale represents the development of preferences or goals, the construction of a goal hierarchy, and the commitment to a set of goals. The Optimization (O) subscale refers to acquisition and investment of goal-relevant means for achieving one's goals, and the Compensation (C) subscale refers to the use of alternative means for maintaining a given level of functioning when specific goal-relevant means are not available anymore. As conceptualized by Freund and Baltes (2002), researchers have used loss-based selection to describe an

aspect of regulation observed in older populations, for whom a decline or loss of previous levels of functioning is a major challenge. Loss-based selection is certainly a feasible component of adolescent self-regulatory behavior (e.g., when youth lose the opportunity for participation in elite sports teams or lose friends because of family relocation). However, the lack of an age fit between (a) the design by Freund and Baltes (2002) of the item pool used for measurement of loss-based selections and (b) the developmental status of participants in the present study resulted in the decision for omitting the Loss-Based Selection subscale items from those used with the current sample. The original SOC measure, which was created in German for use with an adult population, includes 48 items (12 items in each subscale of Elective Selection, Loss-Based Selection, Optimization, and Compensation). A shorter version of this measure (with only 6 items per scale) has equivalent psychometric characteristics (Freund & Baltes, 2002), and, in deference to the need for not requesting more attention and longer participation from the participants when a shorter index would provide comparable measurement, the shorter version of the SOC measure was used. Three subscales were used: Elective Selection, Optimization, and Compensation. Thus, 18 items were used in the present version of the SOC measure. Table 1 presents these items.

The items in the SOC are forced-choice format, and each item consists of two statements, one describing behavior reflecting S, O, or C and the other describing a non-SOC-related strategy. The SOC asks participants to decide which of the statements is more similar to how they would behave. For example, an item from the Elective Selection subscale is "I concentrate all my energy on few things [Person A] OR I divide my energy among many things [Person B]." A sample Optimization subscale item is "When I do not succeed right away at what I want to do, I don't try other possibilities for very long [Person A] OR I keep trying as many different possibilities as are necessary to succeed at my goal [Person B]." A sample item from the Compensation subscale is "Even if something is important to me, it can happen that I don't invest the necessary time or effort [Person A] OR For important things, I pay attention to whether I need to devote more time or effort [Person B]." Responses that are consistent with the use of a SOC-related strategy are totaled, which then provides a score for each individual on each subscale.

It has been found that the SOC measure has adequate psychometric characteristics among adult samples. For instance, indices of internal consistency reliability (Cronbach's alphas) were reported as .75 for Elective Selection, .70 for Optimization, and .67 for Compensation (Freund & Baltes, 2002). Freund and Baltes (2002) report that SOC scores have good convergent and divergent relations with other psychological constructs (e.g., goal pursuit, thinking styles) and have positive correlations with measures of well-being (Brandstädter & Renner, 1990; Freund & Baltes, 2002). The psychometric characteristics of the SOC measure within the present data set are presented in the Results section.

*Indexing PYD and risk/problem behaviors.* As described in Lerner, Lerner, et al. (2005), we used several measures derived from the overall measurement model of the 4-H Study of PYD to

<sup>3</sup> A table providing these data is available upon request from Steinunn Gestsdóttir.

Table 1  
*SOC Items Retained After Reliability Analysis at Waves 1 and 2*

Item no.	Item	Retained at Wave 1	Retained at Wave 2
	Selection item		
13	When I decide upon a goal, I stick to it.	Yes	Yes
18	I always pursue goals one after the other.	Yes	Yes
1	I concentrate all my energy on few things.		
2	I consider exactly what is important for me.		
11	I always focus on the one most important goal at a given time.		
12	When I think about what I want in life, I commit myself to one or two important goals.		
	Optimization item		
3	I keep trying as many different possibilities as are necessary to succeeding at my goal.	Yes	Yes
6	When I want to achieve something difficult, I wait for the right moment and the best opportunity.	Yes <sup>a</sup>	
7	I think about exactly how I can best realize my plans.	Yes	Yes
8	I make every effort to achieve a given goal.	Yes	Yes
10	When I start something that is important to me but has little chance at success, I usually stop trying.	Yes	Yes
14	When I want to get ahead, I also look at how others have done it.		
	Compensation item		
5	For important things, I pay attention to whether I need to devote more time or effort.	Yes	Yes
15	When things don't work the way they used to, I look for other ways to achieve them.	Yes	Yes
17	When something doesn't work as well as usual, I look at how others do it.	Yes	Yes
4	When something does not work as well as before, I listen to advisory broadcasts and books as well.		
9	When things aren't going so well, I accept help from others.		Yes <sup>a</sup>
16	When I can't do something as well as I used to, then I ask someone else to do it for me.		

*Note.* The items listed here are the choices in the forced-choice questions that are consistent with the use of a selection, optimization, and compensation (SOC) strategy.

<sup>a</sup> All items were retained at both waves, except for Item 6 (only retained at Wave 1) and Item 9 (only retained at Wave 2). These two items were not included in the nine-item version of the measure.

index PYD, operationalized through the assessment of the five Cs (the subscales of Competence, Confidence, Character, Connection, and Caring; Eccles & Gootman, 2002; Roth & Brooks-Gunn, 2003a, 2003b), and risk/problem behaviors. Table 2 lists the measures (including their Cronbach's alpha reliabilities) which were included as part of a questionnaire administered to youth participants. Full details about these measures, including scoring instructions and descriptive statistics, are provided in Lerner, Lerner, et al. (2005; see also Theokas & Lerner, 2006, and Jellicic et al., in press). A brief summary of the features of these measures is provided here.

We used the *Self-Perception Profile for Children (SPPC)* (Harter, 1983) to index several of the Cs of PYD. The SPPC was developed for assessment of perceived Competence in regard to six specific domains of functioning and to global self-worth. We used three of the scales to index the Cs: (a) Academic Competence (reflecting school performance); (b) Social Competence (emphasizing peer popularity); and (c) Self-Worth (indexing feelings of self-esteem, in general).

In each scale, all items are scored from 1 to 4 (1 = *low perceived competence*, 4 = *high perceived competence*). Overall scores are then computed for each scale.

It has been shown that each of the six SPPC subscales has adequate to good reliability and validity ( $\alpha$ s = .76–.90; e.g., East et al., 1992; Harter, 1983; Talwar et al., 1986; Windle et al., 1986), and moderate and significant correlations exist between (a) self and other ratings and (b) scores on psychosocial standardized assessments (e.g., East et al., 1992; Harter, 1982; Talwar et al., 1986; Windle et al., 1986).

In turn, and as detailed in prior publications (Lerner, Lerner, et al., 2005; Jellicic, et al., in press; Theokas et al., 2005), we also used several items from the Search Institute's 156-item *Profiles of Student Life-Attitudes and Behaviors Survey (PSL-AB)* (Benson, Leffert, Scales, & Blyth, 1998) to index several of the Cs of PYD (Confidence: 6 items; Competence: 5 items; Character: 18 items; Connection: 22 items). The response formats for all items are Likert-type scales, with the majority measured on a 5-point scale and with higher scores indicating better outcomes. In addition, we included the four items of the *Peer Support Scale (PSS)* (Armsden

Table 2  
*Measurement Model of the Five Cs and Positive Youth Development (PYD)*

Measure	Cronbach's alpha coefficients	
	5th grade (Wave 1)	6th grade (Wave 2)
<b>Confidence</b>		
Positive identity (Benson et al., 1998; Theokas et al., 2005)	.70	.79
Self-worth (Harter, 1983)	.69	.76
<b>Competence</b>		
Academic competence (Harter, 1983)	.65	.78
Grades <sup>a</sup> (self-reported; Benson et al., 1998; Theokas et al., 2005)	—	—
School engagement (Benson et al., 1998; Theokas et al., 2005)	.56	.65
Social competence (Harter, 1983)	.62	.74
<b>Character</b>		
Personal values (Benson et al., 1998; Theokas et al., 2005)	.89	.91
Social conscience (Benson et al., 1998; Theokas et al., 2005)	.92	.93
Values diversity <sup>a</sup> (Benson et al., 1998; Theokas et al., 2005)	—	—
Interpersonal values and skills (Benson et al., 1998; Theokas et al., 2005)	.68	.73
<b>Caring</b>		
Sympathy: Disadvantaged (Eisenberg et al., 1996)	.87	.90
Sympathy: Loneliness (Eisenberg et al., 1996)		
Sympathy: Unfortunate (Eisenberg et al., 1996)		
Sympathy: Pain (Eisenberg et al., 1996)		
Sympathy: Rejection (Eisenberg et al., 1996)		
<b>Connection</b>		
Family (Benson et al., 1998; Theokas et al., 2005)	.79	.85
School (Benson et al., 1998; Theokas et al., 2005)	.78	.82
Community (Benson et al., 1998; Theokas et al., 2005)	.87	.85
Peer support (Armsden & Greenberger, 1987)	.89	.89
<b>Risk/problem behaviors</b>		
Depression (CES-D; Radloff, 1977, 1991)	.81	.84
Risk/problem behaviors (substance use; Benson et al., 1998; Lerner et al., 2005; National Institute on Drug Abuse, 2000)	.65	.66
Delinquency (Benson et al., 1998; Lerner et al., 2005; National Institute on Drug Abuse, 2000)	.98	.65

Note. CES-D = Center for Epidemiologic Studies–Depression.

<sup>a</sup> Some of the measures comprise a single item; therefore, we do not report Cronbach's alphas for these measures.

& Greenberger, 1987), which assesses adolescents' relationships with friends, to index Connection. The response format ranges from 1 (*always true*) to 5 (*almost never true*). Examples of items include "I trust my friends" and "My friends care about me." When all items are reverse coded, higher scores indicate higher peer support. In the present data set, the Cronbach's alpha for the Peer Support Scale was .89.

The five items of the *Eisenberg Sympathy Scale (ESS)* (Eisenberg et al., 1996) were used for assessing the degree to which participants feel sorry for the distress of others. This measure was included as a measure of Caring. The ESS shows adequate reliability ( $\alpha = .63$  to  $.73$ ; Eisenberg et al., 1996, 1998), and there is evidence for its validity. Teachers' reports of sympathy were significantly related to children's reports of sympathy when watching a film in which the intent was inducement of sympathy ( $r = .38, p < .001$ ) and to children's physiological responses to the film (Eisenberg et al., 1996). Sympathy scores also have been modestly to moderately related to a variety of social competence measures,

including teachers' ratings of social skills and peers' reports of popularity (Eisenberg et al., 1996; Murphy, Shepard, Eisenberg, Fabes, & Guthrie, 1999). Examples of items include "I feel sorry for people who don't have the things I have" and "I feel sorry for other kids who don't have toys and clothes." The response format ranged from 1 (*really like you*) to 3 (*not like you*). High scores indicate low levels of sympathy.

The *Center for Epidemiological Studies–Depression Scale (CES-D; Radloff, 1977)* is a widely used self-report measure of depressive symptomatology and was included as a measure of risk. The measure has been used extensively in adolescence, and validity and reliability with populations in high school and junior high school have been established (Radloff, 1991). For instance, Windle et al. (1986) demonstrated the construct validity of the measure with 6th graders.

Adolescents responded to 20 individual items and reported how often they felt that way during the past week. Examples of items include "I was bothered by things that usually don't bother me"

and “I felt sad.” The response format ranged from 0 (*rarely/none of the time*) to 3 (*most/all of the time*). Items are then summed for a total score. Higher scores are indicative of higher depressive symptomatology.

Finally, using additional items adapted from the PSL-AB and items from the *Monitoring the Future* questionnaire (Bachman, Johnston, & O’Malley, 2000), we constructed indicators of risk and problem behaviors (pertinent to substance use and delinquency). Five items assessed the frequency of substance use (e.g., cigarettes, alcohol) in the last year. The response format ranged from 1 (*never*) to 5 (*regularly*). Four items assessed the frequency of delinquent behaviors. The response format ranged from 1 (*never*) to 5 (*5 or more times*). A sample item is “During the last 12 months, how many times have you hit or beat up someone?”

To obtain indices of the each of the Cs or of the risk/problem behaviors, we weighted items equally to create a summary score for each construct; in all cases, a higher score indicated either greater presence of a C or more frequent risk behaviors (substance use or delinquency), respectively.

### Procedure

Participants were tested in groups within their schools (in more than 95% of the cases) or within after-school programs. In both the 5th and 6th grades, teachers or program staff gave youth an envelope to take home to their parents. The envelope contained a letter explaining the study, consent forms, a parent questionnaire, and a self-addressed envelope for returning the parent questionnaire. Data collection was conducted by trained study staff or assistants, who began all testing sessions by reading the instructions to the participants.

## Results

In this research, we investigated the tripartite or global structure of SOC through several factor analyses using structural equation modeling procedures (i.e., LISREL 8.72; Jöreskog & Sörbom, 1996). Internal consistency (Cronbach’s alpha) reliability was assessed, as was concurrent and predictive validity (and, thus, the predicted links between SOC scores and PYD and risk/problem behaviors, were assessed, as well).

### Measurement Characteristics of the SOC Measure in Early Adolescence

We organize the presentation of these analyses pertinent to the structure of SOC among our early adolescent participants by, first, presenting findings pertinent to assessing the evidence for a three-factor structure for SOC, one reflecting the structure of intentional self-regulation identified among adults with this measure (Freund & Baltes, 2002). We also report the internal consistency reliability of the factors derived from the analyses and discuss whether reliability can be improved by using item deletion procedures. In turn, we then present findings pertinent to assessing the evidence for a one-factor structure for the SOC measure, which, as predicted, would correspond to what Freund and Baltes (2002) discuss as the expected, nondifferentiated status of intentional self-regulation processes in early adolescence. We also report the

internal consistency reliability of the factors derived from these analyses within Grades 5 and 6.

### Testing a Three-Factor Model: 5th and 6th Grades

We applied a confirmatory factor analysis using LISREL 8.72 (Jöreskog & Sörbom, 1996) to evaluate the SOC model for each wave. We report five fit indices for each analysis: (a) minimum fit function chi-square, (b) normed fit index (NFI), (c) comparative fit index (CFI), (d) goodness-of-fit index (GFI), and (e) root-mean-square error of approximation (RMSEA). A matrix of polychoric correlations was analyzed with the weighted least-squared method of estimation on polychoric correlation and asymptotic covariance matrices, as recommended for models including dichotomous variables (Jöreskog & Sörbom, 1996). First, we computed a three-factor model to assess the fit of the 18 items with three latent variables: selection, optimization, and compensation.

In regard to our computation at Wave 1 (5th grade) of a three-factor model (based on 18 items),  $\chi^2 = 469.22$  ( $df = 132$ ,  $p < .001$ ), NFI = .57, CFI = .64, GFI = .98, and RMSEA = .045 (confidence interval [CI] = .041–.049). In turn, for Wave 2 (6th grade), computation of a three-factor model (based on 18 items) resulted in a chi-square value of 492.38 ( $df = 132$ ,  $p < .001$ ), NFI = .65, CFI = .71, GFI = .98, and RMSEA = .046 (CI = .042–.051). These findings do not suggest that there is an acceptable fit between (a) a proposed tripartite structure of SOC, representing the S, O, and C components of the model, and (b) our data from adolescents in 5th and 6th grades.

*Testing internal consistency for the three-factor models.* Consistent with findings of the confirmatory factor analyses of the three-factor model, internal consistency among the subscales (S, O, and C) of the 18-item measure were very low at both waves. At Wave 1 (i.e., for the overall sample of 5th grade participants), Cronbach’s alphas associated with the Selection, Optimization, and Compensation subscales were .21, .30, and .10, respectively. The overall alpha for all 18 items included in the SOC measure was also low (i.e.,  $\alpha = .34$ ;  $N = 1,265$ ). Internal consistency reliability analyses of the three subscales of the measure for the overall sample of Wave 2 participants again resulted in low alphas ( $\alpha$ s = .26, .32, and .18, respectively) and also in a somewhat higher but still low alpha ( $\alpha = .46$ ) for all 18 items ( $N = 1,302$ ).

*Item deletion procedures.* On the basis of the ideas of Freund and Baltes (2002) regarding the orthogenetic course of the development of the internal self-regulating processes included within the SOC model, we did not expect that all items in an 18-item set designed for use with adults would necessarily be useful for indexing what we expected was the more global structure of SOC in the early adolescent period. Accordingly, we assessed the factor structure of SOC when items that lowered the internal consistency of the measure (through having low item–total correlations) were deleted. Specifically, if keeping an item in the measure resulted in a lower alpha for the measure, the item was deleted. At Wave 1, 8 items were deleted through this process: Four items were deleted from the Selection subscale, 3 from the Compensation subscale, and 1 from the Optimization subscale. The 10 remaining items yielded a higher overall alpha than did all 18 items ( $\alpha = .53$ ;  $N = 1,378$ ), but the alphas for the three subscales of Selection, Optimization, and Compensation were still low (i.e.,  $\alpha$ s = .25, .33, and .24, respectively). Moreover, the reduced SOC subscales included



only 2, 5, and 3 items, respectively, and, especially for the first and the third subscale, the few items used for indexing the construct may have contributed to the low alphas (see Table 1).

We conducted similar analyses at Wave 2. As with the Wave 1 data, 8 items were identified for deletion through this process. Of the 10 items that were retained, 9 had also been retained during the Wave 1 analyses (see Table 1). At Wave 2, an additional item was retained from the Compensation subscale, whereas 1 item that had been retained at Wave 1<sup>4</sup> was deleted from the Optimization subscale. Although the alphas for the three SOC components associated with the retained items were again low ( $\alpha$ s = .35, .47, and .26 for the 2, 4, and 4 items indexing the three SOC processes, respectively), the overall alpha for the 10 items was .63 ( $N = 1,382$ ), which is an alpha level found for some of the SOC processes among adult samples (Freund & Baltes, 2002).

Accordingly, the alpha coefficients for the reduced, overall version of the SOC measure ( $\alpha = .53$  at Wave 1,  $\alpha = .63$  at Wave 2) approach the lower end of the distribution of these coefficients found by Freund and Baltes (2002) among older samples. If, however, the analyses of the concurrent and predictive validity of the SOC measure resulted in confirmation of the predicted patterns of covariation between (a) SOC scores and (b) indices of positive and of problematic functioning, there would be reason for regarding the SOC measure as a useful index of internal self-regulation in early adolescence. In this regard, Schmitt (1996), in a discussion of the issues involved in interpreting alphas, noted that alpha is a lower bound estimate of reliability, and he stated that "when a measure has other desirable properties . . . low reliability may not be a major impediment to its use" (pp. 351–352). This view underscores the importance of evaluating evidence for the validity of the SOC measure within the present sample.

### *Testing a One-Factor Model in the 5th and 6th Grades*

We again did a confirmatory factor analysis using LISREL 8.72 (Jöreskog & Sörbom, 1996) to examine if, as expected, evidence existed for the presence of a global structure for SOC. Two different one-factor models were tested at each wave: First, we tested the 10-item version, in which 1 item was different between waves. Second, we tested a 9-item version of the model, in which only the items that had been retained at both waves were included. At both Waves 1 and 2, the items that changed between waves had the lowest item–total correlation of all the items retained at that wave. As before, we report five fit indices for each analysis.

In regard to our computations at Wave 1, for the 10-item, one-factor model,  $\chi^2 = 93.26$  ( $df = 35$ ,  $p < .001$ ), NFI = .78, CFI = .85, GFI = .99, and RMSEA = .036 (CI = .027–.045). The  $t$  value for the item that was different from Wave 2 (Item 6) was not significant, and the  $R^2$  was very low (1%) compared with the other variables, providing support for use of the 9-item model. For the 9-item, one-factor model,  $\chi^2 = 67.32$  ( $df = 27$ ,  $p < .001$ ), NFI = .83, CFI = .89, GFI = .99, and RMSEA = .034 (CI = .024–.045), which presents a better fit to the data than does the 10-item model.

Similarly, in regard to our computations at Wave 2 for the 10-item, one-factor model,  $\chi^2 = 113.18$  ( $df = 35$ ,  $p < .001$ ), NFI = .84, CFI = .88, GFI = .99, and RMSEA = .042 (CI = .033–.050). Again, although significant, the loading for the single item that differed from Wave 1 (Item 9) was much lower than the

loadings of the other items, and the  $R^2$  (8%) was very low compared with the  $R^2$  for the other items. For the 9-item, one-factor model,  $\chi^2 = 92.22$  ( $df = 27$ ,  $p < .001$ ), NFI = .85, CFI = .89, GFI = .99, and RMSEA = .043 (CI = .034–.053), which again provides stronger support for the presence of a one-factor solution on the basis of the nine items that were retained at both waves.

Confirmatory factor analyses for both the 9-item and the 10-item versions at both waves showed a significantly better fit to the data than did the LISREL analyses of the tripartite structure presented earlier. The relatively strong support for a one-factor model on the basis of the 9 items of the SOC measure, which shows stability between waves, suggests that SOC strategies may be expressed as one undifferentiated component among 10- and 11-year-old youth.

We have noted previously in this article the internal consistency of the one-factor model at Waves 1 and 2 when a 10-item version of the measure was used. Because the items that we deleted to create the 9-item version of the measure at each wave had the lowest item–total correlation of all the items, internal consistency of the 9-item measure was almost identical to that of the 10-item version (for the 9-item version, Wave 1  $\alpha = .55$  and Wave 2  $\alpha = .64$ ;  $N$ s = 1,389). Consequently, the alpha for the 9-item version was, similar to that of the 10-item version, higher than the alpha for all 18 items.

Taken together, then, the findings presented here suggest that, at least as operationalized through this item set, intentional self-regulation in early adolescence is manifested as a single, global component rather than as three distinct processes in the 5th and 6th grades. This view is consistent with the findings of Raffaelli et al. (2005), in which assessments of the regulation of affect, behavior, and attention in a longitudinal sample and the structure of self-regulation provided support for a single-factor model of self-regulation rather than for a more differentiated model.

In short, given the lack of empirical support within the present data set for the presence of the three SOC components as well as the results of past research (Raffaelli et al., 2005) and the present analyses, the nine-item SOC measure was used as an index of intentional self-regulation for the 5th and 6th grade participants in the 4-H Study. Therefore, subsequent analyses were aimed at validating the use of this measure by appraisal of its covariation within and across time with indices of PYD and of risk/problem behaviors.

### *Differences and Change in Levels of Self-Regulation*

Table 3 provides means and standard deviations for the nine-item SOC measure at Waves 1 and 2 for the whole sample and for the sample differentiated by gender. The SOC score for each participant was a sum across the nine items, with a range, therefore, of 0–9. In addition, Table 3 provides means and standard

<sup>4</sup> Item deletion on the basis of reliability analyses resulted in the retention of 9 of the same items and 2 different items at Wave 1 and Wave 2. Therefore, we conducted further analyses to compare these different versions of the measure—a 9-item version in which all items at Waves 1 and 2 were identical and a 10-item version in which 1 item differed between waves. Confirmatory factor analyses comparing the fit for a one-factor, 9-item version of the measure and a one-factor, 10-item version are reported in the Results section.

Table 3  
*Reduced (Nine-Item) Version of the SOC Measures: Means and Standard Deviations for Boys and Girls at Wave 1 and Wave 2 for the Overall Sample and for the Longitudinal Sample*

Samples	Wave 1			Wave 2		
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Overall sample	6.63	1.88	1,619	6.51	2.02	1,563
Boys	6.57	1.88	780	6.41	2.07	663
Girls	6.69	1.88	839	6.59	1.97	900
Longitudinal sample	6.69	1.86	840	6.57	2.00	839
Boys	6.67	1.81	381	6.59	1.97	381
Girls	6.71	1.89	459	6.56	2.03	458

Note. SOC = selection, optimization, and compensation.

deviations for the longitudinal sample only, as we used this sample to assess the SOC scores across the two waves of testing.

We conducted a 2 (Gender) × 2 (Time: Wave 1, Wave 2) between-within, mixed-model analysis of variance (ANOVA), with the total SOC score as the dependent variable, to evaluate gender differences and changes in SOC over time. In this analysis, we found no significant main effects of time and gender and no Time × Gender interaction.

Obviously, in using a repeated-measures ANOVA to detect change, we used only the data of the longitudinal sample. As discussed earlier, attrition between waves may result in differences between the overall sample and the longitudinal sample. However, the data reported in Table 3 indicate that there are no differences in means on SOC between the longitudinal sample and the overall sample.

*SOC and Features of PYD and Problem/Risk Behaviors*

SOC is a theory of successful life management and is expected to be positively related to positive indicators of development and negatively correlated with indicators of problematic functioning. We noted earlier that Lerner, Lerner, et al. (2005) found that the five, first-order latent variables represented by the Cs converge on

a second-order latent variable that can be labeled as PYD. In the absence of prior studies examining the interrelations between the Cs or between PYD and SOC, we concluded that assessing if there were any individual Cs for which the predicted relations did not hold was useful. Correlations among the Cs ranged from  $r(1190) = .12$  (between Competence and Caring) to  $r(983) = .47$  (between Connection and Character) at Wave 1 and from  $r(1290) = .23$  (again, between Competence and Caring) to  $r(1290) = .62$  (between Competence and Confidence) at Wave 2. All correlations were significant at  $p < .01$ .

Table 4 presents correlations between (a) SOC scores and (b) indicators of positive and negative development within each time point as well as SOC scores at Wave 1 and developmental indicators at Wave 2. All correlations were significant and in the predicted direction, suggesting that even if processes of self-regulation still may be developing during this early portion of adolescence, intentional self-regulation plays a role in multiple aspects of healthy functioning in early adolescence. Of course, correlations can be misleadingly low when one or both measures have low reliability. As such, correlations were corrected for the limited reliability of the SOC scales. As reported in Table 4, the correlations between SOC and the Cs ranged from  $r(1399) = .22$

Table 4  
*SOC and Indicators of Positive and Negative Development: Correlations Within the Same Wave of Assessment (Wave 1 and Wave 2) and Among SOC at Wave 1 and Indicators of Development at Wave 2*

Indicators	SOC at Wave 1		SOC at Wave 2		SOC at Wave 1	
	Indicators at Wave 1	<i>N</i>	Indicators at Wave 2	<i>N</i>	Indicators at Wave 2	<i>N</i>
Indicators of positive development						
Confidence	.393***	942	.356***	1,227	.331**	677
Competence	.252***	1,212	.342***	1,313	.335**	723
Connection	.282***	1,211	.284***	1,544	.285**	832
Character	.338***	996	.312***	1,334	.257**	731
Caring	.217***	1,399	.194***	1,435	.139**	823
PYD <sup>a</sup>	.350***	1,438	.373***	1,563	.329**	840
Indicators of negative development						
Depression	-.261***	1,373	-.303***	1,508	-.205**	814
Risk behaviors	-.122***	1,467	-.136***	1,531	-.119**	826
Delinquency	-.178***	1,443	-.210***	1,524	-.145**	819

Note. SOC = selection, optimization, and compensation.

<sup>a</sup> Positive youth development (PYD) is a composite of confidence, competence, connection, character, and caring.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

to  $r(942) = .39, p < .001$ , at Wave 1 (between SOC and Caring and between SOC and Confidence, respectively) and from  $r(1435) = .19$  to  $r(1227) = .36, p < .001$ , at Wave 2 (again, between SOC and Caring and between SOC and Confidence). As expected, correlations between SOC and the Cs were higher when they were corrected for attenuation. For instance, corrected correlations ranged from  $r(1399) = .32$  to  $r(942) = .60, p < .001$ , at Wave 1 (between SOC and Caring and between SOC and Confidence, respectively) and from  $r(1435) = .25$  to  $r(1227) = .49, p < .001$ , at Wave 2 (again, between SOC and Caring and between SOC and Confidence).

*Wave 1.* As shown in Table 4, at Wave 1, correlations between SOC and positive indicators were moderate, as they ranged from  $r(1399) = .217, p < .001$ , for Caring, to  $r(942) = .393, p < .001$ , for Confidence. We used Fisher's  $r$  to  $z$  transformation to compare correlations among SOC and indicators of positive development. Caring had the weakest relation with SOC, as the correlation between SOC and Caring was lower than that between SOC and Confidence, SOC and Character, and SOC and PYD ( $p < .01$ ). We found that few of the differences between correlations of the other Cs and SOC were significant. The fact that there were relatively few significant differences between the strength of correlations of the positive indicators and the SOC measure may indicate that intentional self-regulation is involved in all aspects of the healthy development of the person.

On the other hand, when using Fisher's  $r$  to  $z$  transformation, we found that correlations between SOC and negative indicators were lower than the correlations between SOC and positive indicators at Wave 1. When comparing the correlations among SOC and the three indicators of negative development, we found that depression had a higher, negative correlation with SOC than did risk behaviors and delinquency ( $p < .05$ ). This difference may be due to the low variability in risk behaviors within the sample (Lerner, Lerner, et al., 2005; Theokas & Lerner, 2006). Alternatively, these results may indicate that intentional self-regulation is more pertinent in promoting positive attributes of a person and has less bearing on reducing negative behaviors. Future waves of data collected in the 4-H Study, which will assess an age period that is typically marked by an increase in risk behaviors, will provide more information regarding the relationship between SOC and positive and negative indicators of development.

*Wave 2.* As noted also in Table 4, correlations between SOC at Wave 2 and positive indicators at Wave 2 were comparable to the correlations observed at Wave 1, as they ranged from  $r(1435) = .194, p < .001$ , for Caring to  $r(1563) = .373, p < .001$ , for the second-order latent variable of PYD. Consistent with findings from Wave 1, there were not many significant differences between correlations of SOC and the six indicators of positive development. Again, using Fisher's  $r$  to  $z$  transformations, Caring was found to have a significantly lower correlation to SOC than all of the other Cs and the latent PYD variable ( $p < .01$ ). Differences among correlations between SOC and the other Cs were less clear.

Again, consistent with Wave 1 findings, correlations between SOC and all three negative indicators were significantly lower than those between SOC and the positive indicators. In addition, depression had a higher, negative correlation with SOC at Wave 2 than did risk behaviors and delinquency ( $p < .05$ ). When comparing correlations among SOC and indicators of positive and negative development for the 5th and 6th grade participants, cor-

relations were not systematically higher or lower at either time point.

*SOC at Wave 1, indicators at Wave 2.* Scores on SOC at Wave 1 were correlated to scores on negative and positive indicators at Wave 2. Correlations were moderate, significant, and in the expected directions (see Table 4). This finding about the predictive validity of the SOC measure provides further confirmation regarding the effectiveness of the SOC measure in capturing a construct of intentional self-regulation in early adolescence.<sup>5</sup>

## Discussion

Although there is theoretical and empirical evidence that self-regulatory processes mature and develop during the 2nd decade of life, research on self-regulation has suffered because of the relative scarcity of longitudinal studies with a focus on the development of such processes during late childhood and adolescence (Raffaelli et al., 2005). Accordingly, the purpose of the present research was exploration of the interrelation between intentional self-regulation in the course of positive development and intentional regulation in the course of problematic development during early adolescence.

Using data from the first two waves of data collection (5th and 6th grades) of the 4-H Study of PYD, in this research we aimed at ascertaining the measurement characteristics of a measure devised by Freund and Baltes (2002) for use in testing ideas associated with a key theoretical model of intentional self-regulation—that is, the Baltes and Baltes (1990; Baltes, 1997; Baltes et al., 1998, 2006) SOC model. We also assessed whether, with this measure, we could gain increased understanding about the theoretically expected positive relation, in early adolescence, between intentional self-regulation and PYD and, in turn, the expected negative relation between such regulation and problem or risk behaviors among youth.

In regard to the psychometric features of the SOC measure used for indexing intentional self-regulation among the 5th and 6th grade participants of the present study, the results of factor analyses that used structural equation modeling procedures and of

<sup>5</sup>To ascertain if, in addition to within- and across-time covariation between SOC scores and scores for the positive and negative outcome variables, SOC scores predicted changes in these outcomes, partial correlations were calculated between SOC at Wave 1 and the outcomes variables at Wave 2 (i.e., the scores for PYD, Depression, Risk Behaviors, and Delinquency). Scores for these outcomes at Wave 1 were controlled in these analyses. There was a low, significant correlation between the Wave 1 SOC score and the change scores. The correlation between SOC and the PYD change score was  $r(775) = .19, p < .001$ , and the correlation between SOC and the Depression change score was  $r(721) = -.13, p < .001$ . Correlations between SOC and the Risk and Delinquency change scores were lower but also significant,  $r(777) = -.09, p < .01$ , and  $r(759) = -.08, p < .05$ , respectively. These findings suggest that the ability of using self-regulatory behaviors, as reflected in the SOC model, predicts an increase in PYD from Grade 5 to Grade 6 and a decrease in Depression, Risk Behaviors, and Delinquency during this same time period. However, these correlations, although statistically significant, are extremely low, and we question whether they have psychological significance. We expect that future waves of data (when SOC will be more fully developed and we will see an increase in, and more variance associated with, problem behaviors) will better allow us to evaluate the role that SOC plays in increased positive behaviors and decreased negative behaviors.

associated analyses of internal consistency reliability indicated that a one-factor solution involving nine items in both 5th and 6th grades best fit the present data. These findings are consistent with the idea that self-regulatory processes are not orthogenetically well developed in 5th and 6th graders—that is, it does not appear that the tripartite processes evident among young adults and older individuals are differentiated in the early adolescent participants in the present study (Freund & Baltes, 2002; Werner, 1957).

Although future waves of data collection within the 4-H Study will be needed for ascertaining if and when the expected tripartite structure of SOC emerges, other findings in the present report are consistent with the purported links between intentional self-regulation and adaptive relations between individuals and their contexts (e.g., Baltes, 1997; Brandtstädter, 1998, 2006; Heckhausen, 1999). That is, summary scores for the nine items were related, in predicted ways, to indices of PYD and of risk/problem behaviors. These associations—positive relations between intentional self-regulation and indicators of positive development (the Five Cs and PYD) and negative relations between SOC scores and indices of risk/problem behaviors—existed at both waves of assessment and between SOC scores at 5th grade and positive and negative indicators at 6th grade. Considering that the expectation may be that the SOC measure will capture processes that are still developing among the participants of the current study, these correlations provide good support for the relation between intentional self-regulation and positive development. In addition, the longitudinal findings suggest the predictive validity of the SOC measure, indicating its potential use in further research about intentional self-regulation in early adolescence.

Moreover, the pattern of theoretically expected, positive relations among scores for intentional self-regulation, the individual Cs, and PYD shown in Table 4 have interesting implications for additional research and for practice in youth development. The positive relation among these constructs suggests that researchers who are interested in links between self-regulation and only one or a few of the five Cs may focus on these constructs without having to index the overall PYD construct. In turn, practitioners can still promote positive developmental outcomes and overall PYD, even if a particular adolescent is showing, for instance, poor competence or few positive social connections. Although positive, the fact that the interrelations among the Cs are not perfect suggests, for practice, that there is enough variability in the system that all is not lost for a given young person if he or she shows even quite low scores on any given C. PYD can be promoted by focusing on the other Cs.

Of course, it is expected that intentional self-regulation may still be developing in early adolescence, and such development may moderate the important influences that ecological characteristics, such as a youth's relationships in family, school, and peer group settings (e.g., Theokas & Lerner, 2006), may have on youth development. Thus, it can be expected that processes of intentional self-regulation play a significant role in the lives of the young adolescents who are participating in the 4-H Study. In short, the present findings about SOC and PYD are consistent with previous studies of self-regulation (through use of measures other than SOC) in childhood and adolescence (Eisenberg et al., 2006) as well as with SOC as a theory of successful life management (Baltes, 1997; Baltes & Baltes, 1990; Freund & Baltes, 2002).

### Limitations of the Current Study and Future Steps

The youth who participated in the 4-H study of PYD were recruited through schools, and, as such, their participation depended on permission from a superintendent and principal as well as on consent from their parents. Therefore, the sample is one of convenience and, although it provides regional, rural/urban, racial/ethnic, and socioeconomic variation, it does not provide for generalizability in the manner associated with a sample that is representative of the overall adolescent population in the United States. In particular, it can be expected that schools that are stressed for time and resources find it challenging to participate in a study such as the 4-H Study, and parents who do not speak English as a first language may be less likely to send in a signed consent form. Moreover, the survey methodology that we used to assess participants provides only a single means of appraising participants' intentional self-regulating behaviors and the predicted positive and negative covariates of these behaviors.

Furthermore, although intentional self-regulation plays an increasing role in moderating an individual's developmental trajectory as he or she moves through adolescence and adulthood, conceptually, organismic regulation also makes an important contribution to how adolescents contribute to their own development. The SOC model, which measures intentional self-development, aims to capture only one aspect of regulation. Future research will profit by seeking to understand more about the links between intentional self-regulation and organismic regulation in adolescence. Accordingly, a measure of temperament will be added to future waves of data collection for the 4-H Study. These measures will allow examination of how temperament, as an instance of organismic self-regulation, and SOC, as an index of intentional self-regulation, contribute, both independently and together, to a person's functioning.

In addition, as noted in the Method section, adolescents encounter loss of functioning (e.g., loss of hearing or loss of mobility) less frequently than do older individuals; therefore, at the start of the study, we decided to not include the Loss-Based Selection subscale of the SOC measure. However, as we continue to explore the development of self-regulatory processes across adolescence, we plan to include this subscale in future waves of the study.

As previously noted, it is believed that adolescents have various opportunities to affect their own development (Lerner, 1982; Lerner et al., 2001) and, thus, to engage in the selection and optimization processes of interest within the SOC model (e.g., Damon et al., 2003; Freund & Baltes, 2002). During this age period, a person can select goals pertinent to recreational activity, participation in after-school programs, and the use of financial resources for purchasing goods and services as well as activities pertinent to serving his or her family, school, or community (Damon et al., 2003). In addition, at this age, it is expected that the person take more responsibility for his or her own life, such as choosing an occupational path, being responsible for school attendance, contributing to his or her school or neighborhood (e.g., by volunteering or by undertaking leadership roles), or resisting pressure at engaging in risk behaviors. Such changes provide individuals with increased opportunities at regulating their interactions with their ecological settings. Still, we expect that opportunities for contributing to their own developmental trajectories in a positive way will differ among individuals and among groups of individuals. Although beyond the scope of this article, we acknowledge

the need for understanding how contexts—including family, school, and community contexts—can create (or obstruct) opportunities for the young person to contribute to his or her own positive development. Ongoing work is being done within the 4-H Study of PYD, in which opportunities for such regulation in different contextual settings are being investigated (see Theokas & Lerner, 2006).

Although the current study reports data from two points in time, the development of self-regulatory processes must be studied over a longer period. The findings of this research suggest that some developmental change may be observed between 5th and 6th grades (e.g., the increased interconnectedness of the SOC items, as represented in an increase in alpha from Wave 1 to Wave 2, may indicate that the SOC strategies are becoming better integrated). However, future waves of data will provide more complete information about how processes of intentional self-regulation develop in adolescence and will add to information regarding the reliability, construct validity, and predictive validity of the SOC measure when used across the adolescent years.

In sum, this study represents a first step toward creating an understanding of how intentional self-regulation develops during the adolescent years and of the relation between self-regulation and the positive development of youth. The findings presented in this research are consistent with the perspective of action theories that, across the life span, people are both products and producers of their environment and, thus, are active agents in their own development. The current findings provide empirical evidence for the importance of recognizing the active role that adolescents play in their development. Future studies should focus on the development of self-regulation over subsequent years in the adolescent period and should identify the ecological and individual characteristics that, if supported, foster adaptive regulation and thriving among children and adolescents.

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Received October 22, 2005

Revision received October 19, 2006

Accepted November 20, 2006 ■