Developmental trajectories of intentional self-regulation in adolescence: The role of parenting and implications for positive and problematic outcomes among diverse youth


Tufts University, United States
University of Iceland, Iceland
University of Kansas, United States
University of Zurich, Switzerland
Michigan State University, United States

Abstract

This study assessed 1574 Grades 5 to 11 youth (63.6% female) from the 4-H Study of Positive Youth Development (PYD), a longitudinal study involving U.S. adolescents, to assess if patterns of intentional self regulation (ISR) existed; whether these trajectories differed in relation to several Grade 5 parenting characteristics; and whether ISR trajectories were linked to positive and negative developmental outcomes at Grade 11. Growth mixture modeling identified a four-group solution of ISR trajectories: Steady Decline, Elevated, Late Onset, and Pronounced Decline. Most adolescents reported an incremental decrease in ISR from Grades 5 to 11 (Steady Decline). Lower levels of parental warmth, monitoring, and school involvement at Grade 5 predicted Late-Onset ISR development while Pronounced Decline adolescents reported lower levels of PYD and Contribution at Grade 11. We discuss the finding that youth at initially similar levels of ISR diverged over adolescence, while youth at initially disparate levels converged.

Intentional self-regulation (ISR), which involves the conscious control of goal-directed thought and action, is a fundamental process of human functioning that, due to individual and contextual influences, changes greatly and becomes particularly important for healthy functioning during adolescence (e.g., Gestsdóttir & Lerner, 2008). Given the complexity and diversity among contexts, individual characteristics, and the relationships among individuals and contexts, heterogeneity in the patterns of adolescent ISR development (trajectories) are likely to exist; however, most studies on ISR have taken a variable-centered approach to data analysis, and at least have implicitly assumed sample homogeneity (i.e., the assumption that relationships among variables are invariant across the individuals comprising a sample). In addition, although the family has been identified as a key “developmental asset” (Benson, Scales, Hamilton, & Sesma, 2006) in the ecology of youth and, more specifically, parents have been found to be the most important asset in predicting several positive youth outcomes (e.g., Laursen & Collins, 2009; Lewin-Bizan, Bowers, & Lerner, 2010; Theokas & Lerner, 2006), little research has examined the
relationship between attributes of parenting and ISR development. Finally, most studies have examined the relations between ISR and negative outcomes (e.g., Brody & Ge, 2001). Some research has linked ISR to both positive and negative outcomes in the short-term (e.g., Gestsdóttir & Lerner, 2007), but evidence of the long-term impact of ISR on both positive and negative outcomes for adolescence is sparse.

To determine the nature of the development of ISR, the present study took a person-centered approach and assessed whether any ISR trajectories were predicted by selected familial and parenting characteristics (socioeconomic status, household structure, maternal warmth, parental monitoring, and parental school involvement) and sex. In addition, we assessed whether these trajectories predicted positive outcomes – positive youth development (PYD) and youth contribution – and negative outcomes – substance use, delinquency, and depression. To achieve these goals, we used data from the 4-H Study of PYD, a national longitudinal study of the individual and contextual resources present in the lives of U.S. youth (e.g., Bowers et al., 2010; Lerner et al., 2005).

**Intentional self regulation in adolescence**

Evidence from several fields suggests that intentional self-regulatory, or goal-directed, processes become critical to healthy development during adolescence (e.g., Cunha & Heckman, 2007; Freund & Baltes, 2002; Gestsdóttir & Lerner, 2007, 2008; Zimmerman & Martinez-Pons, 1986). Given the myriad of interconnected physiological, physical, cognitive, emotional, and contextual changes in adolescence (Gardner & Steinberg, 2005; Gestsdóttir & Lerner, 2007, 2008; Raffaelli & Crockett, 2003), a young person must effectively use ISR to maximize the adaptive integration of changes in the self and the context.

ISR may be operationalized in several ways (e.g., Brandstädter & Lerner, 1999). Researchers involved in the 4-H Study of PYD, a longitudinal study of U.S. adolescents, used the selection (S), optimization (O), and compensation (C) or SOC model developed by Baltes, Baltes, and colleagues (Baltes, 1997; Baltes & Baltes, 1990; Freund & Baltes, 2002) to conceptualize ISR, and employ a SOC measure developed to index the individual’s “contribution” to the mutually beneficial person ↔ society context relations that occur across the life span. The SOC measure distinguishes between two kinds of selection, elective selection and loss-based selection. Elective Selection (ES) represents the purposes or goals a young person opts to enact, as well as the construction of a goal hierarchy and the commitment to a set of goals. Loss-based Selection (LBS) involves making an alternative goal choice or restructuring of one’s goal hierarchy when an original goal cannot be attained. Optimization (O) refers to acquisition and investment of goal-relevant resources (time, effort, recruitment of other people, development of strategies) in order to achieve one’s goals. Compensation (C) refers to the use of alternative means to maintain a given level of functioning when specific goal-relevant means are no longer available (Baltes, 1997; Freund & Baltes, 2002). Compensatory actions, while seemingly similarly to the actions of LBS, differ in one critical characteristic. Compensatory actions are still enacted in service to the original goal; LBS changes the original goal in some way.

Past research using data from the 4-H Study of PYD has identified the structure of the SOC measure among adolescents ranging, to date, from fifth to tenth grades (e.g., Gestsdóttir & Lerner, 2007; Gestsdóttir, Lewin-Bizan, von Eye, Lerner, & Lerner, 2009; Gestsdóttir, Bowers, von Eye, Napolitano, & Lerner, 2010). In Grades 5 through 7, the SOC construct exists globally (Gestsdóttir & Lerner, 2007; Zimmerman, Phelps, & Lerner, 2007), as opposed to the adult-like structure of three distinct processes. However, reflective of the orthogenetic principle (Werner, 1957), evidence was found for a tripartite, differentiated structure of SOC beginning in the eighth grade as the individual S, O, and C components identified in older populations (Freund & Baltes, 2002) were found in these younger people (Gestsdóttir et al., 2009). In addition, Gestsdóttir and Lerner (2007) reported that global SOC scores correlated positively with PYD and contribution and negatively with problem behaviors, such as substance use and delinquency. Subsequent studies have found that individual SOC components, as well as a global measure of SOC, exhibited concurrent and predictive relations with measures of both healthy and problematic development in early and middle adolescence (e.g., Gestsdóttir et al., 2009, 2010; Zimmerman et al., 2007, 2008).

The reports to date from the 4-H Study have generally assessed SOC structure over no more than three waves of data, and none have used person-centered analysis to examine the development of SOC. There is a lack of information about the long-term relations between SOC and outcomes across adolescence and little understanding of the possible existence of subgroups that show different patterns of the development of these indicators of ISR. As a consequence, the present study examined the development of SOC over seven years of adolescence (Grades 5 to 11) using a person-centered approach. In undertaking this work, we elected to examine SOC using the global, nine-item SOC score first identified in early adolescence (Grades 5 and 6) by Gestsdóttir and Lerner (2007). Despite the structure of SOC becoming more differentiated as youth progress through adolescence (Gestsdóttir et al., 2009, 2010), the nine-item SOC score was predictive of both positive and negative outcomes in older adolescents as well (Gestsdóttir et al., 2009). In fact, the nine-item measure often accounted for slightly more variance in PYD and risk behavior scores than an eighteen-item SOC measure and almost as much variance as a model that included all three individual SOC components (Gestsdóttir et al., 2009). Therefore, to assess whether varied pathways of SOC development exist from the beginning of early adolescence to the end of middle adolescence, the nine-item global measure was used.

**A person-centered approach to intentional self regulation**

The PYD perspective focuses on the strengths of all youth and on how thriving can be promoted by aligning youth strengths with ecological developmental assets (Benson et al., 2006; Larson, 2000; Lerner, Phelps, Forman, & Bowers, 2009). Although several versions of the PYD perspective exist (see Lerner et al., 2009; Lerner et al., in press, for a review), most
research has examined an instance of PYD rooted in relational developmental systems theory (DST; Overton, 2010) and, as such, emphasizes the role of ISR in the adaptive developmental regulations that drive healthy, positive development.

While intraindividual changes and interindividual differences in these intraindividual changes are identified as the primary focus of research framed within DST (Matschinger, Kilian, & Angermeyer, 2006), even recent research on adolescent ISR has lacked this approach. Rather, these studies have assumed sample homogeneity and taken a variable-centered approach to data analysis (e.g., Gestsdóttir et al., 2010; Keller, 2008; Moilanen, Shaw, & Fitzpatrick, 2010). A problem that may arise with a variable-centered approach, however, is that the relationships and rate of change identified in these studies may not actually apply to any individual within the sample of interest (e.g., von Eye & Bergman, 2003). In addition, generalizing results without showing that the population under study is homogenous comes with increased risk of ecological fallacy (Robinson, 1950). Population parameters will be misestimated because of unobserved or misrepresented heterogeneity.

As biological, cognitive, and contextual changes affect the individual \( \rightarrow \) context relations that characterize development, each adolescent may have different internal and external resources (both observed and unobserved) to manage these changes; these differences, in turn, will ultimately affect his or her growth in intentional self-regulatory abilities. Therefore, person-centered approaches that identify the patterns of development (trajectories) that may exist among individuals or, at least, subgroups in a sample might be more appropriate to answer questions framed within a DST framework. Thus, the first goal of the present study was to identify, through use of growth mixture modeling procedures (Muthén & Muthén, 2000), whether different trajectories of SOC scores existed in adolescence across Grades 5 to 11. As we explained, to address this question, we used an overall (or “global”) score for SOC, one that did not differentiate this construct into its components. Based on the dynamic nature of person \( \rightarrow \) context relations and the resulting complexity and diversity of development, we expected to identify several trajectories of global SOC scores.

**Parenting characteristics and adolescent intentional self regulation**

In addition to identifying the possible different patterns of change within a sample, developmental research should also attempt to determine what characteristics might explain placement in a particular developmental trajectory, such as different ISR trajectory groups. Within a relational DST focus on individual \( \rightarrow \) context relations, trajectories of ISR that are part of adaptive developmental relations involve engagement with the developmental assets (Benson et al., 2006) in the ecology of youth. The key developmental resources present in the ecology of youth are other individuals, and parents represent the instance of this asset that accounts for the most variance in PYD (Lewin-Bizan et al., 2010; Theokas & Lerner, 2006). Moreover, parenting variables such as perceived maternal warmth (behaviors indicating mother’s acceptance, nurturance, and support), parental monitoring (the extent to which parents keep track their child’s behavior and acquaintances), and parental school involvement (the extent to which parents take an active role in their child’s education) are related to an extensive number of youth outcomes (e.g., Baumrind, 1991; Bebiroglu, 2009; Dishion & McMahon, 1998; Lewin-Bizan et al., 2010).

However, relatively little evidence exists about the role of parenting in influencing adolescent ISR (e.g., see Brody & Ge, 2001; Grolnick, Kurowski, Dunlap, & Hevey, 2000; Lewin-Bizan et al., 2010; Moilanen et al., 2010; Patock-Peckham, Cheong, Balhorn, & Nagoshi, 2001). Findings from these studies indicate that, in contrast to arousal-generating conflicted and nonsupportive parent–child relationships that undermine children’s ability to self-regulate, organized and predictable home environments and emotionally positive parent–child relationships provide a context that allows for the development of self-regulatory competencies (e.g., Brody & Ge, 2001).

Overall, these studies also pointed to measures of parenting analogous to warmth, monitoring, and school involvement as key to self-regulation development. Therefore, the second goal of the present study is to examine whether the three indicators of effective parenting we have noted (warmth, monitoring, and school involvement) predict membership in the most optimal trajectories of ISR. Accordingly, we expected that the most favorable instances of ISR trajectories would be found among youth having the highest levels of parental engagement in their lives (e.g., as marked by warmth, monitoring, and school involvement; e.g., Bebiroglu, 2009).

In addition to measures of specific parenting behaviors, there is also evidence that more distal measures of the familial environment such as familial socioeconomic status and household structure (single parent status) are important predictors of adolescent outcomes, including self regulation (Brody & Flor, 1998; Lengua, 2002). However, several theoretical models and substantial empirical evidence indicate that links between these distal factors and youth outcomes are due to parenting processes and parent–child relationships (Bornstein & Bradley, 2003). Therefore, we expected that youth with higher levels of socioeconomic status and from two-parent households would have the most favorable ISR trajectories; however, we also expected that these relationships would not be as strong as those between the parenting characteristics and trajectory membership.

Finally, previous research with the 4-H data set reported differences in outcomes in relation to sex (girls had higher levels of PYD and depressive symptoms, and lower levels of problem behaviors, e.g., Phelps et al., 2007; Zimmerman, Phelps, & Lerner, 2008). We therefore included sex as another predictor of trajectory group membership and expected that girls would be more likely to have the most favorable global SOC trajectories.

**Positive and negative outcomes of adolescent intentional self regulation**

Many of studies that link parenting to adolescent self regulation are grounded in a “deficit-model” approach to adolescence (e.g., Brody & Ge, 2001; Patock-Peckham et al., 2001). In that the present work is framed by the Five Cs model of PYD
(e.g., Lerner et al., in press), we posited that ISR is a youth strength that, when aligned with the resources in their environments (such as parental resources), would lead to positive development. Nevertheless, because of the literature linking adolescent ISR to both positive outcomes, such as PYD and contribution, and negative outcomes such as substance use, delinquency, and depressive symptoms (e.g., Gestsdóttir & Lerner, 2007; Zimmerman et al., 2008), we measured both outcome types.

However, SOC might not be equally-related to both positive and negative outcomes. In fact, Gestsdóttir et al. (2010) found that SOC in early adolescence was more strongly related to indicators of positive development than to problematic behaviors, a finding that is consistent with the idea that SOC skills contribute to successful life management. Therefore, the final goal of this research was to ascertain whether any global SOC trajectories differentially predicted positive and problematic behaviors at the final time of measurement, that is, at Grade 11. We expected that the most favorable instances of global SOC trajectories would be positively related to outcomes such as PYD and contribution and negatively related to outcomes such as substance use, delinquency, and depressive symptoms.

Method

The 4-H Study of PYD began in 2002 with a sample of about 1700 5th grade youth and about 1100 of their parents from 13 states in the United States (Lerner et al., 2005). The study uses a form of cohort sequential longitudinal design (Baltes, Reese, & Nesselroade, 1977; Collins, 2006) and, as such, the sample size increases across successive waves of testing. That is, data from fifth graders were gathered in Wave 1 of the study (the 2002–2003 school year), and these fifth graders were the initial cohort in the study. However, to maintain at least initial levels of power for within-time analyses and to assess the effects of retesting, subsequent waves of the study involved the addition of a “retest control” cohort of youth (and a sample of their parents). Participants in the added “retest control” cohort were then followed longitudinally. In Wave 2, the grade level of the initial cohort was Grade 6. As such, a “retest control” group of sixth graders was added to the study, and these youth became members of the second longitudinal cohort, Cohort 2. Both the original cohort of fifth graders and the added cohort of sixth graders were followed into Grade 7, and a new cohort of seventh graders was added to the sample (along with their parents). In subsequent waves of testing this process was followed.

At this writing, with the beginning of collection of Grade 12 data, the 4-H study includes 6885 youth (about half of whom have been assessed two or more times) and 3153 parents from 41 states. Participants reside in rural, suburban, and urban areas in different parts of the country and represent a diverse array of racial, ethnic, and religious backgrounds and a range of socioeconomic levels.

Attrition and missing data

A majority of the attrition in the 4-H Study is not randomly distributed across schools or youth program sites, the two settings from which participants were recruited. For example, in Wave 2 and Wave 3, some principals withdrew consent for their school to participate, and thus, these students “dropped out” without having had the opportunity to remain in the study. For example, the withdrawal of principal or superintendent permission to continue testing resulted in the loss of 561 participants in Wave 2. However, attrition from Wave 1 to Wave 2 for students who were allowed to be asked to remain in the study was only 10%. Of the 1954 participants tested in Wave 2, 21.5% individually withdrew their participation from Wave 3, whereas 337 (17.1%) dropped out due to site attrition.

In subsequent waves (4, 5, 6 and 7), many of the same schools did not allow us to conduct on-site data collection. Youth in these schools were contacted through mail or phone and asked to complete the survey and mail it back or to go online to complete it.

Our data contained a large amount of missingness (overall rate was 53%, with a range of 20% at Grade 7 to 74% at Grade 11) and we implemented Mplus’ robust weighted least squares algorithm. Robust weighted least squares provides consistent parameter estimates in the presence of missing data when data are missing completely at random after conditioning on important covariates (MARX; Asparouhov & Muthén, 2010) and does not require data imputation. Because missingness was largely due to schools dropping out of our study, we considered the possibility that schools with lower average SES or from different locales (urban, suburban, or rural) may have been more likely to drop out. These variables were selected because both constructs were possibly indicative of fewer resources to support our study. They were also the only explanatory variables available that might index school-level factors. To test whether SES would inform missing data recovery, we examined the correlations between participating families’ average per capita income and all indicators of SOC. Average per capita income did not correlate with any of the SOC items (absolute magnitude of all correlations < 0.20). We conducted a series of ANOVAs to examine whether locale predicted any of the variables of interest. Locale accounted for less than 5% of the variance in all variables, indicating it would not have been an informative covariate. Therefore, taking these findings together, we considered the MARX assumption to be met.

Participants

Participants for the present study were 1574 adolescents sampled through seven waves of data collection, that is, Grades 5 to 11 (63.6% females, mean age in Grade 5 = 10.97 years, SD = 0.53 years). Youth were included only if they had participated in
at least three waves of the study. The average family per capita income over the seven year range was $15,529 and the sample reflected racial and ethnic diversity. A majority of the youth were European American (59.89%), but African-American (6.23%), Latino American (8.90%), and Asian American (2.48%) youth were also represented, among others. On average, mother’s had attended some college (mean maternal education = 14.14 years, SD = 2.38) and twenty percent of youth reporting living in a single parent family.

Procedure

For data collection, teachers or program staff gave each adolescent an envelope to take home to his or her parent/guardian, containing a letter explaining the study and a consent form. For those youth who received parental consent, data collection was conducted either in the school or program by trained researchers or hired assistants for remote locations. Instructions were read by the research assistant or hired assistant before adolescents were permitted to begin the student questionnaire (SQ). Participants were instructed that they were allowed to skip any question(s) too personal or difficult to answer.

An online version of the SQ for participants to take the survey via the Internet was also used beginning in Grade 7. In most cases, schools or after-school programs allocated computers for participants to take the survey online. In cases where computers were not available, students were given a paper copy of the questionnaire to complete. The questionnaires took approximately one and a half to 2 h to complete, and participants were encouraged to take short breaks at their leisure. Students who were not present at their school or 4-H site, in that they were either absent during the day of testing or the school superintendent did not allow testing to occur in the school, received a document with login information for participants to take the survey online or were mailed a paper copy of the survey with a return prepaid envelope.

Measures

Our model included indices of intentional self regulation, parenting, socioeconomic status and household structure, positive youth development, and problem and risk behaviors. As this study is the first attempt to establish relationships among parenting, ISR trajectories, and positive and problematic outcomes, we have decided to include contextual measures only at Grade 5 and outcome measures only at Grade 11 rather than include concurrent measures of these variables at all seven waves.

Intentional self regulation

We used the Selection, Optimization, and Compensation (SOC) questionnaire (Freund & Baltes, 2002) to measure intentional self regulation. Items are administered using a forced-choice format, where each item consists of two statements. One statement for each item describes a behavior reflecting one of the four SOC constructs (Elective Selection, Loss-based Selection, Optimization, and Compensation), while the other describes a non-SOC related behavior. Participants then select which statement is more similar to how they would behave. Higher scores on each subscale indicate higher levels of self-regulatory skills.

As the present study examined the development of SOC over the period of adolescence during which the structure of the construct changes, we used a nine-item version of the SOC questionnaire previously shown to index a global SOC construct and included those items that were relevant across this entire developmental period (e.g., Gestsdóttir & Lerner, 2007; Gestsdóttir et al., 2009).

Previous research has shown low to moderate reliability for both a nine-item (e.g., Cronbach’s $\alpha = .63$; Gestsdóttir et al., 2009) and an eighteen-item composite of SOC (e.g., Cronbach’s $\alpha = .50$; Gestsdóttir et al., 2009). Cronbach’s alpha is a lower bound estimate of reliability when items are not essentially tau-equivalent. Such equivalence exists when all items index the same latent construct in the same units of measurement, but possibly with differences in precision (Novick & Lewis, 1967; Raykov, 1997). Alternative reliability estimates based on factor-analysis have been devised to assess the reliability of measures that may not be essentially tau-equivalent.

Tau-equivalence may not exist for the SOC measure, where dichotomously-scored items pertain to several different components of intentional self regulation. As such, we computed reliability estimates using a factor-analysis based measure, Raykov’s (1997) composite reliability. We found acceptable reliability for the nine-item global SOC measure in all seven waves (average reliability = 0.80, range from 0.76 at Grade 5 to 0.83 at Grade 11). The average global SOC score across the seven waves was 6.32 (range from 6.68 in Grade 5 to 5.94 in Grade 11).

Parental school involvement

An index of parental school involvement was one of the three measures of parenting. We used four items from the Search Institute’s Profiles of Student Life – Attitudes and Behaviors (PSL-AB) questionnaire (Leffert et al., 1998) to create the parental school involvement scale (Theokas et al., 2005). These items all pertained to parental involvement in an adolescent’s education. An example item is “How often does one of your parents ask about your homework?” Each item is measured using a five point Likert-type scale ranging from 0 = never to 4 = always with a higher score reflecting greater parental involvement. These items were measured during Grade 5 and displayed composite reliability = 0.89. On average, youth reported parents were often involved in their education (mean score at Grade 5 = 3.51, SD = 0.69).
Parental warmth

To derive a second measure of parenting, we used the Parental Warmth subscale of the Child’s Report of Parenting Behaviors Inventory (CRPBI; Schludermann & Schludermann, 1970). The CRPBI is a widely used self-report measure of children’s assessment of parenting practices. The instrument has three subscales: Warmth, Behavioral Control, and Psychological Control. Parental Warmth was conceptualized as behaviors that indicate acceptance, nurturance, support, and a feeling of being loved and wanted by the parent (Gray & Steinberg, 1999). Examples of parental warmth items include “My mother speaks to me in a warm and friendly way” and “My mother cheers me up when I am upset.” The same questions were asked about experiences with fathers. The response format ranges from 0 = never to 4 = always. Higher scores indicate higher warmth and nurturance.

The CRPBI has adequate reliability (Cronbach’s alpha = 0.80; Schludermann & Schludermann, 1970). With regard to validity, factor analyses have indicated that Warmth is a replicable factor (Schwarz, Barton-Henry, & Pruzinski, 1985). There is evidence for adequate convergent and discriminant validity, for example, correlations between ratings by siblings were $r = 0.50 \ (p < 0.01)$ for maternal warmth and $r = 0.53 \ (p < 0.01)$ for paternal warmth; correlations between adolescents and parents for warmth were in the 0.4 range (Schwarz et al., 1985). Maternal warmth was administered in Grade 5 of the present study and displayed composite reliability = 0.94. On average, youth reported parents often performed actions that expressed warmth (mean score at Grade 5 = 3.06, SD = 0.99).

Parental monitoring

We also included the eight-item Parental Monitoring Scale (PMS; Small & Kerns, 1993) as a third measure of parenting. This self-report instrument assesses the adolescent’s perception of parental monitoring or the extent to which their parents keep track of their behavior and acquaintances. Example items are “My parent(s) know where I am after school,” “My parent(s) know how I spend my money,” and “My parent(s) know who my friends are.” The response format ranges from 1 = never to 5 = always, with higher scores indicating higher parental monitoring.

The PMS scale has been reported to have adequate reliability (Cronbach’s alpha = 0.87; Schludermann & Schludermann, 1970) and predictive validity (Small & Kerns, 1993). The PMS was administered in Grade 5 of the present study and displayed composite reliability = 0.94. On average, youth reported parents often monitored their behavior (mean score at Grade 5 = 3.53, SD = 0.64).

Maternal education

We used maternal education as an index of socioeconomic status. Parents or guardians of 4-H Study participants reported the highest level of education achieved by the participant’s mother. This variable is a single-item measure ranging from 8 years (eighth grade or less) to 20 years (doctoral degree). On average, mothers had attended some college (mean maternal education = 14.14 years, SD = 2.38).

Household income and structure

At each wave, parents were asked to provide information about household income as another index of socioeconomic status. The autocorrelation for household income between the waves of data collection was highly significant in prior studies ($rs$ ranged from 0.80 to 0.94, $ps < .001$). Therefore, the average household income was computed for each participant on the basis of available data (see also Li & Lerner, 2011). The mean of this composite variable was $15529 \ (SD = 59836)$. We also included a measure of household structure, that is, whether the participant lived in a single-parent household or not (20% of youth lived in single-parent households).

Positive youth development

The approach to PYD used by Lerner et al. (2005) employed several measures to index PYD, which is operationalized through the assessment of the Five Cs—Competence, Confidence, Character, Connection, and Caring. Each “C” comprises a number of well-validated scales designed to assess the essential elements of the definition of the construct. A Grade 11 PYD score for each participant was computed as the mean of Five Cs, with higher scores representing higher levels of the Cs and PYD. PYD scores could range from zero (0) to 100 and had composite reliability = 0.72. The mean PYD score for the current sample at Grade 11 was 69.72 (SD = 12.04). Detailed information regarding the measurement of each of the Cs is presented below. The Five Cs comprising the PYD construct are operationalized as follows:

- **Competence** is a positive view of one’s action in domain-specific areas including the social and academic domains (11 items for Grade 11). Composite reliability for competence was 0.91.
- **Confidence** is an internal sense of overall positive self-worth, identity, and feelings about one’s physical appearance (16 items for Grades 11). Composite reliability for confidence was 0.79.
- **Character** involves respect for societal and cultural rules, possession of standards for correct behaviors, a sense of right and wrong, and integrity (20 items for Grade 11). Composite reliability for character was 0.91.
- **Connection** involves a positive bond with people and institutions that are reflected in healthy, bidirectional exchanges between the individual and peers, family, school, and community in which both parties contribute to the relationship (22 items for Grade 11). Composite reliability for connection was 0.95.
- **Caring** is the degree of sympathy and empathy, that is, the degree to which participants feel sorry for the distress of others (9 items for Grade 11). Composite reliability for caring was 0.56.
Full details about these measures, their construction, and validity and reliability can be found in Lerner et al. (2005) and Bowers et al. (2010).

Contribution

At each grade, participants responded to twelve items which were weighted and summed to create a composite score of contribution. These items were from four subfactors: leadership, service, helping, and ideology. Items from the leadership, service, and helping scales measured the frequency of time youth spent helping others (e.g., friends or neighbors), providing service to their communities, and acting in leadership roles; together, the leadership, service, and helping subfactors comprise an action component of Contribution. The ideology scale measured the extent to which contribution was an important facet of their identities (e.g., “It is important to me to contribute to my community and society”). These items are derived from existing instruments with known psychometric properties and used in large-scale studies of adolescents, that is, the Profiles of Student Life-Attitudes and Behaviors Survey (PSL-AB; Benson, Leffert, Scales, & Blyth, 1998) and the Teen Assessment Project Survey Question Bank (TAP; Small & Rodgers, 1995). The action and ideology components are weighted equally to calculate the Contribution scores. As with the PYD scores, in the present study the Contribution scores range from 0 to 100. Composite reliability for Contribution was 0.72. The mean Contribution score for the current sample at Grade 11 was 59.76 ($SD = 19.65$).

Depressive symptoms

Depressive symptoms were assessed using The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D scale is a 20-item self-report measure of depressive symptomatology. Depression was conceptualized as feelings of frustration, sadness, demoralization, loneliness, and pessimism about the future (Radloff, 1977). Example items include “During the past week I was bothered by things that usually don’t bother me” and “During the past week I felt sad.” The response format ranges from 0 = rarely or none of the time to 3 = most or all of the time to indicate how frequently the respondent experienced symptoms during the previous two weeks. However, our participants reported how often they experienced symptoms during the past week. Adjusted sum scores are used to compute a total score, with a maximum score of 60; higher scores are indicative of higher depressive symptomatology. The mean level of depressive symptoms reported in the current sample at Grade 11 was 12.91 ($SD = 10.28$).

According to past research, the scale has adequate reliability ($a = .85$) and validity (i.e., CES-D correlates significantly with other measures of mood states such as Profile of Mood States—Short Form and Bradburn Positive and Negative Affect Scale) (Conerly, Baker, Dye, Douglas, & Zabora, 2002; Radloff, 1977). The measure has been used extensively with adolescents and youth have established this scale’s validity and reliability with populations in high school and junior high school (Radloff, 1977). Composite reliability for the CES-D in our sample was 0.92.

Risk behaviors

We measured indicators of risk behaviors with questions derived from items included in the Search Institute’s Profiles of Student Life-Attitudes and Behavior (PSL-AB) scale (Leffert et al., 1998) and the Monitoring the Future (2000) questionnaire. Five items assess the frequency of substance use (e.g., smoked cigarettes, drank alcohol, used marijuana or hashish) in the past year. The response format ranges from 0 = never to 3 = regularly. Four items assess the frequency of delinquent behaviors. The response format for these items ranges from 0 = never to 4 = five or more times. A sample delinquency item is “During the last 12 months, how many times have you hit or beat up someone?” Composite reliability for substance abuse and delinquent behaviors was 0.75 and 0.61, respectively. Higher scores indicated more problematic behaviors. The mean risk behaviors score for the current sample at Grade 11 was 1.60 ($SD = 2.60$).

Results

The goals of the current investigation were to examine whether different developmental trajectories of ISR exist among youth in Grades 5 to 11 and to identify the contextual criteria and developmental outcomes that may be related to each trajectory. Therefore, growth mixture modeling was used to identify unobserved differences in global SOC trajectories. Analyses were conducted in several steps.

Initial analyses

To ensure validity of our subsequent growth mixture models, we first examined the longitudinal factor structure of SOC. The longitudinal SOC items were analyzed as a seven-construct panel model with each grade represented by a separate construct. Models were estimated using robust weighted least squares (Mplus’ WLSMV) to accommodate the binary data, and a simplex correlational structure was imposed to facilitate model convergence (see Fig. 1). The initial CFA produced acceptable model fit ($\chi^2(1695) = 2188.51, p < .001$, RMSEA = 0.01, CFI = 0.93, TLI = 0.92), and invariance of the factor loadings was then tested.

Using the method described by Millsap and Yun-Tein (2004), factorial invariance was tested to ensure that the qualitative interpretation of our SOC scale remained stable during adolescence. The resulting model showed acceptable model fit ($\chi^2(1743) = 2278.56, p < 0.001$, RMSEA = 0.01, CFI = 0.92, TLI = 0.91; parameter estimates in Table 1), and supported invariance
Growth mixture modeling examines longitudinal growth using common latent growth curve techniques but allows separate growth trajectories for quantitatively distinct groups. Groups are determined by decomposing a multivariate distribution of observed data into separate multivariate normal components, with the observed distribution assumed to be a mixture (sum) of component multivariate normal distributions. Decomposing an observed multivariate distribution into component multivariate normal distributions can be computationally intense and estimation is facilitated by allowing only certain parameters to vary across groups. In the present analyses we specified a cubic latent growth curve, allowing the mean intercept and mean linear, quadratic, and cubic slopes to vary across groups. To ensure optimal results, mixture models were re-analyzed using 200 sets of random start values and 20 optimization iterations.

Three- through six-group solutions were examined, with the optimal solution determined by comparing each model’s AIC, BIC, entropy, and Lo-Mendell-Rubin \( \chi^2 \) (LMR). AIC and BIC represent each model’s ability to explain the observed data, but penalize less parsimonious models. Smaller values of AIC and BIC represent better model fit. Entropy represents the overall certainty that observations belong to their most probable group and ranges between 0 and 1.0. Higher entropy indicates more certain group assignment. Finally, the LMR provides the probability that the observed data come from a population with exactly one fewer group.

Results indicate that the four-group solution fit the data better than the three-group solution. The five-group solution similarly showed better fit than the four-group solution according to most indices, but the LMR suggested that its fit was not significantly better than that of the four-group solution (see Table 2). The four-group solution was therefore taken as the optimal model.

Results from the four-group solution suggest that self-reported SOC slowly decreases over time for a majority of adolescents (Steady Decline; \( N = 1293 \)), with two groups departing from this trend around age 14 (i.e., Grade 8). After Grade 8, one group of adolescents showed increasing SOC over time (Elevated; \( N = 120 \)), while another group displayed markedly worse SOC over time (Pronounced Decline; \( N = 86 \)). Finally, results suggested a late onset group that showed very low self-reported SOC in earlier grades, but near-average SOC in later grades (Late Onset, \( N = 75 \)). Fig. 2 presents the trajectories.

Table 1

<table>
<thead>
<tr>
<th>Item</th>
<th>Raw Equated</th>
<th>Standardized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade 5</td>
<td>Grade 6</td>
</tr>
<tr>
<td>SOC 3</td>
<td>1.00</td>
<td>0.65</td>
</tr>
<tr>
<td>SOC 5</td>
<td>0.73</td>
<td>0.52</td>
</tr>
<tr>
<td>SOC 7</td>
<td>0.47</td>
<td>0.37</td>
</tr>
<tr>
<td>SOC 8</td>
<td>0.98</td>
<td>0.64</td>
</tr>
<tr>
<td>SOC 10</td>
<td>0.94</td>
<td>0.62</td>
</tr>
<tr>
<td>SOC 13</td>
<td>1.05</td>
<td>0.66</td>
</tr>
<tr>
<td>SOC 15</td>
<td>0.35</td>
<td>0.29</td>
</tr>
<tr>
<td>SOC 17</td>
<td>0.29</td>
<td>0.24</td>
</tr>
<tr>
<td>SOC 18</td>
<td>0.53</td>
<td>0.41</td>
</tr>
<tr>
<td>Latent Variances</td>
<td>0.71</td>
<td>0.34</td>
</tr>
<tr>
<td>Regressed on Previous Grade</td>
<td>–</td>
<td>0.73</td>
</tr>
</tbody>
</table>

Means, standard errors, and latent variances for each mixture’s latent growth parameters may be obtained from the first author upon request.
Group comparisons

We next compared the four groups on important criterion variables, specifically looking at each participant’s sex and at differences in environmental factors (average per capita income across grades, maternal education, and whether or not the child lived in a single-parent household in any of the waves), parenting characteristics at Grade 5 (Parental School Involvement, Parental Monitoring, and Maternal Warmth), and PYD at Grade 11 (Risk, Delinquency, Depression, composite PYD, and Contribution). Because group assignment is not definitive in mixture modeling, differences were compared using posterior probability-based imputations in Mplus. An omnibus chi-square with \( \alpha = 0.05 \) was assessed for each criterion variable separately, with follow-up comparisons controlling the Type I error rate with the Holland and Copenhaver (1987) method.

Omnibus tests indicated significant group differences on Maternal Education, all measures of Parenting, PYD, and Contribution; however, there were no significant differences between the groups on sex, family income, single parent status, or any of the problematic outcomes (see Tables 3 and 4). Results were especially pronounced for the Late Onset and Pronounced Decline groups. The Late Onset group showed significantly lower levels of the parenting characteristics in Grade 5 than the Steady Decline and Elevated groups. The Pronounced Decline group had higher maternal education than the Late Onset and Steady Decline groups and displayed significantly lower PYD and Contribution at Grade 11 than the Steady Decline and Elevated groups. The Late Onset group did not show significant differences from any other group on Grade 11 measures, but the lack of significant differences must be qualified by the fact that very few youth from this group participated in later waves of the study (32%, 21%, and 11% of the Late Onset group was still present in Grades 9, 10, and 11 of the study, respectively; see Table 5 for full details of participation by trajectory group).

To summarize, our results indicated that differences in ISR can be explained by four latent trajectories. The overwhelming majority of youth reported a steady decline in ISR from Grades 5 to 11, but two trajectories departed from this trend at Grade 8; one trajectory displayed increasing global SOC scores while the other reported a marked decline. A fourth trajectory displayed relatively low initial global SOC scores, but rebounded in reported global SOC scores over adolescence. Higher levels of maternal warmth, monitoring and school involvement at Grade 5 and higher levels of PYD and Contribution at Grade 11 were related to membership on the more favorable trajectory of Elevated global SOC scores and the normative trajectory of Steady Decline in global SOC scores.

Discussion

This study examined the development of intentional self regulation across seven years of adolescence in order to ascertain whether variations in the developmental course of ISR, as measured by global SOC (e.g., Freund & Baltes, 2002), existed. If we...
found different trajectories, we sought to determine whether trajectory group membership was related to contextual variables (in particular, familial and parenting characteristics) at the onset of adolescence or to outcomes of positive and negative development in middle adolescence (in Grade 11). The results indicated that across the developmental period spanning Grade 5 to Grade 11, four distinct trajectories of global-SOC development could be identified – Steady Decline, Elevated, Pronounced Decline, and Late Onset. The majority of youth in the sample experienced a steady decline in global SOC. By the fourth wave of data collection (Grade 8 or approximately 14 years of age), a subset of youth experienced a marked decrease in reported global SOC (the Pronounced Decline group) while another group reported an increase in global SOC (Elevated). The fourth trajectory group (Late Onset) initially reported very low global-SOC across the early grades, but reported near-average SOC in later grades. Overall, group comparisons indicated that the Elevated SOC and Steady Decline groups reported higher levels of SOC (the Pronounced Decline group) while another group reported an increase in global SOC (Elevated). The fourth trajectory group (Late Onset) marked by lower levels of PYD and Contribution at Grade 11.

In general, these results were consistent with our hypotheses: youth with the most favorable trajectory (Elevated) were marked by the highest levels of parental engagement at Grade 5 and the highest levels of PYD and Contribution at Grade 11. While we expected trajectory membership to be more strongly related to these variables than to the familial and problematic outcomes, we did not expect that there would be no relationships between trajectory membership and household income, household structure, sex, or any of the problematic outcomes. These anomalous findings highlight the importance of recognizing the principles of multipotentiality, equifinality, and multifinality (Cicchetti & Rogosch, 1996; von Bertalanffy, 1968) when conducting developmental research. That is, initially disparate ISR groups arrived at similar developmental outcomes through different pathways whereas groups who reported similar global SOC levels at the onset of adolescence were significantly different at Grade 11. It is difficult to predict such diverse cascading, specific patterns in advance, given the interrelated nature of normative and non-normative change within the relational developmental system (e.g., see Elder, 1998; Overton, 2010). Nevertheless, such complex cascades are a ubiquitous part of the landscape of human development (e.g., Lewin-Bizan et al., 2010). Future research might delve more deeply into the origins of these diverse trajectories.

As indicated, there are several findings that are consistent with our expectations about the importance of parenting for the development of self-regulatory strategies in adolescence. First, the group that has the highest scores on indicators of positive development (i.e., the Elevated trajectory) was characterized by high levels of maternal warmth, parental monitoring, and parental school involvement and not by noticeably low or high levels of the more distal measure of maternal education, as compared to the other groups. This finding suggests that, for youth from families not marked by risk factors, such as low

Table 3

Omnibus and pairwise comparisons for criterion variables.

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Omnibus: $\chi^2(\text{df}=3)$ (p)</th>
<th>Pairwise comparisons: $\chi^2(\text{df}=3)$ (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EL vs. SD</td>
<td>EL vs. LO</td>
</tr>
<tr>
<td>Sex</td>
<td>2.236 (0.525)</td>
<td>NA</td>
</tr>
<tr>
<td>Income</td>
<td>2.079 (0.556)</td>
<td>NA</td>
</tr>
<tr>
<td>M. Education</td>
<td>15.107 (0.002)</td>
<td>NS</td>
</tr>
<tr>
<td>Single Parent</td>
<td>2.957 (0.398)</td>
<td>NA</td>
</tr>
<tr>
<td>Parent Involv</td>
<td>8.042 (0.045)</td>
<td>NS</td>
</tr>
<tr>
<td>M. Warmth</td>
<td>15.082 (0.002)</td>
<td>NS</td>
</tr>
<tr>
<td>Parent Monitor</td>
<td>10.585 (0.014)</td>
<td>NS</td>
</tr>
<tr>
<td>Substance Use</td>
<td>3.910 (0.271)</td>
<td>NA</td>
</tr>
<tr>
<td>Delinquency</td>
<td>2.472 (0.480)</td>
<td>NA</td>
</tr>
<tr>
<td>Depression</td>
<td>3.349 (0.341)</td>
<td>NA</td>
</tr>
<tr>
<td>PVD</td>
<td>18.193 (&lt;0.001)</td>
<td>7.531 (0.006)</td>
</tr>
<tr>
<td>Contribution</td>
<td>15.549 (0.001)</td>
<td>NS</td>
</tr>
</tbody>
</table>

EL: Elevated; SD: Steady Decline; PD: Pronounced Decline; LO: Late Onset. Significant omnibus tests in bold. NA indicates pairwise comparisons that were not examined due to a non-significant omnibus test.

Table 4

Group means with pairwise comparisons.

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>EL</th>
<th>SD</th>
<th>PD</th>
<th>LO</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Education</td>
<td>14.514</td>
<td>14.068</td>
<td>15.009</td>
<td>13.824</td>
</tr>
<tr>
<td>Parent Involv</td>
<td>3.605</td>
<td>3.543</td>
<td>3.332</td>
<td>3.283</td>
</tr>
<tr>
<td>M. Warmth</td>
<td>3.230</td>
<td>3.119</td>
<td>3.067</td>
<td>2.555</td>
</tr>
<tr>
<td>Parent Monitor</td>
<td>3.676</td>
<td>3.564</td>
<td>3.560</td>
<td>3.236</td>
</tr>
<tr>
<td>PVD</td>
<td>73.411</td>
<td>69.692</td>
<td>64.768</td>
<td>68.674</td>
</tr>
<tr>
<td>Contribution</td>
<td>64.821</td>
<td>59.954</td>
<td>52.762</td>
<td>54.430</td>
</tr>
</tbody>
</table>

EL: Elevated; SD: Steady Decline; PD: Pronounced Decline; LO: Late Onset. Significant differences in italics, higher means in bold.
maternal education, high levels of parental characteristics are related to the use of successful self-regulatory strategies in early adolescence that continue to develop through adolescence. Of course, this interpretation will need to be tested in future research that directly tests this hypothesized interaction effect. Youth in the Steady Decline trajectory, which is by far the largest group, were also characterized by high scores on the parenting measures but, unlike those in the Elevated trajectory, can be distinguished from some of the other groups in terms of reporting lower maternal education. This group of young people showed a decline in ISR strategies across adolescence and a lower level of PYD than the Elevated trajectory (although this difference is not significant). Therefore, ISR behaviors may be best supported in conjunction with supportive parenting and the absence of low levels of maternal education.

Adolescents in the Pronounced Decline trajectory seemed to do noticeably worse on measures of PYD and Contribution. Interestingly, in terms of self-regulatory processes, this group of youth looked similar to the adolescents in the “normative” Steady Decline and “optimal” Elevated trajectories at the beginning at the adolescent period. In addition, this group scored higher on a measure of maternal education than two of the other groups (Steady Decline and Late Onset). These findings may be indicative of the psychosocial difficulties that have been identified in children of affluent parents (e.g., Lutheran & Latendresse, 2005), that is, a high-SES background without positive proximal parenting may be problematic. While youth in this group did not report exceptionally low or high levels of the parenting characteristics, future research should consider other factors related to outcomes in high-SES youth, such as achievement pressures and isolation from parents (Lutheran & Latendresse, 2005). In addition, measures at the peer, school, and community level might be used to help identify what might influence this marked drop-off in ISR.

Finally, the development of self-regulatory strategies among the group of youth who reported the lowest scores on the parenting measures can be labeled as “Late Onset”. This group of adolescents reported low levels of ISR behaviors in early adolescence. This deficit might be expected in the absence of supportive parenting, characterized by the internalization of values, high involvement, and autonomy-support that is needed to promote the development of ISR. This group was also characterized by low levels of maternal education. With these two risk factors, it is interesting that the trajectory group showed an increase later in adolescence, especially in light of our finding that most youth decrease in ISR behavior over this period. From both PYD and resilience perspectives (e.g., Sampson & Laub, 2005; Werner & Smith, 2001) several individual and contextual variables could be associated with this late-onset of ISR. Therefore, future work may profit from incorporating factors at levels beyond the familial context and at multiple time points to account for this “turning point” (Sampson & Laub, 2005).

The authors of the SOC model described how SOC strategies are expected to develop and to become an increasingly large portion of the behavioral repertoire through adolescence and adulthood (Baltes, 1997; Freund & Baltes, 2002). As a consequence, it was surprising that normative development of ISR in our sample was marked by a general decline in self-reported ISR over the course of adolescence. This pattern of change is similar to declines seen in other psychosocial attributes in adolescence such as grades (Simmons & Blyth, 1987), intrinsic motivation (Harter, 1981), self-concepts and self-perceptions (Harter, 1982), and confidence in one’s intellectual abilities (Roeser, Eccles, & Sameroff, 1998). As successful ISR behaviors are contingent on a persons’ sense of future, motivation, and confidence in one’s own abilities, the observed decline in ISR may follow the trajectories of these other qualities, which are expected to increase again as youth move through the adolescent period. Furthermore, today’s youth in Western societies typically engage in an active self-exploration into their thirties (Arnett, 2004). This process means that a stable self-identity, which is needed to guide intentional actions, may not become fully developed until early adulthood. This prolonged period of exploration may result in less developed goal hierarchies and adherence to goals, both of which are central components of ISR. Therefore, fully developed and consistent use of ISR strategies may not emerge until early adulthood. Research using later waves of data from the 4-H Study may clarify the paths of ISR development.

Our findings suggest, then, that high levels of parental warmth, monitoring, and school involvement may be essential to support the “onset” of successful ISR behaviors early in adolescence; the two groups that seemed to develop the most optimally, the Elevated and Steady Decline groups, were characterized by relatively high scores on all three measures of parenting and also the outcomes of PYD and Contribution. Another measure of parenting context, maternal education, did not relate as clearly to trajectory membership, as the group with the highest level of maternal education – the Pronounced Decline group – was also marked by the lowest levels of PYD and Contribution. In contrast, the group that may elicit the most concern in terms of ISR at the onset of adolescence, the Late Onset Group, reported average outcomes on measures of healthy

<table>
<thead>
<tr>
<th>Wave</th>
<th>EL</th>
<th>SD</th>
<th>PD</th>
<th>LO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>0.39</td>
<td>0.50</td>
<td>0.41</td>
<td>0.89</td>
</tr>
<tr>
<td>Wave 2</td>
<td>0.60</td>
<td>0.76</td>
<td>0.62</td>
<td>0.88</td>
</tr>
<tr>
<td>Wave 3</td>
<td>0.68</td>
<td>0.83</td>
<td>0.74</td>
<td>0.82</td>
</tr>
<tr>
<td>Wave 4</td>
<td>0.49</td>
<td>0.68</td>
<td>0.54</td>
<td>0.51</td>
</tr>
<tr>
<td>Wave 5</td>
<td>0.46</td>
<td>0.47</td>
<td>0.46</td>
<td>0.32</td>
</tr>
<tr>
<td>Wave 6</td>
<td>0.55</td>
<td>0.35</td>
<td>0.62</td>
<td>0.21</td>
</tr>
<tr>
<td>Wave 7</td>
<td>1.00</td>
<td>0.16</td>
<td>1.00</td>
<td>0.11</td>
</tr>
</tbody>
</table>

EL: Elevated; SD: Steady Decline; PD: Pronounced Decline; LO: Late Onset.
development at Grade 11. Therefore, as noted earlier in regard to the nature of cascades within the relational developmental system, it is important to take into account the diversity of individual, contextual, and relational variables that may influence the trajectory of development toward singular and multifaceted endpoints.

It is also important to note the lack of significant relationships between the global SOC trajectories and the criterion variables of household income, household structure, and sex as well as the negative youth outcomes. It is interesting that household income was not a significant variable in defining group differences, whereas mother’s education was. While household income and maternal education have been linked to several youth outcomes, there is evidence that the home environment is a stronger mediator for the relations between maternal education and youth outcomes than between household income and outcomes (e.g., Smith, Brooks-Gunn, & Klebanov, 1997). Perhaps maternal education is serving as a proxy for parenting quality and behaviors that provide youth with the guidance and support for self-regulatory behaviors that are not tapped by the measures of household income and structure.

Previous studies based on the 4-H data set have consistently observed sex differences, as girls have scored higher on indicators of positive development (but also on internalizing problems) than boys, and girls have been more likely to be in the most favorable developmental trajectories (see e.g., Lewin-Bizan and Lynch et al., 2010; Phelps et al., 2007). However, the relations between sex and ISR have not been as strong. Previous studies have not found significant main effects of sex on the levels of ISR or change in ISR (Gestsdóttir & Lerner, 2007; Zimmerman et al., 2007). In the present study, girls and boys were equally likely to be in the four ISR trajectories. Therefore, the results of the current investigation are consistent with previous findings (Gestsdóttir & Lerner, 2007; Zimmerman et al., 2007) that, in spite of the sex differences on various indicators of positive and problematic development, there appears to be few sex differences in the way that girls and boys develop ISR in adolescence, the extent to which they use ISR behaviors, and the implications that ISR skills have for functioning in other domains.

The lack of relationships between the global SOC trajectories and the outcomes of substance use, delinquency, and depressive symptoms is also consistent with previous publications suggesting that SOC is a model of adaptive life management (Freund & Baltes, 2002; Gestsdóttir et al., 2010). In the present study, global SOC scores were more strongly linked to indicators of adaptive development than to indicators of problematic development. This difference may mean that ISR behaviors can equally be successfully (or unsuccessfully) used in regard to problem behaviors, but not in regard to positive outcomes, as only those who have successful ISR behaviors will attain the most positive outcomes.

These differential relations could be understood in light of the limited engagement of the present sample in risk behaviors. As the physical and contextual characteristics of youth change at later ages, and opportunities to engage in riskier activities become more likely, perhaps the relevance of SOC related behaviors will become more prominent. These findings are supportive of the idea that relationships among positive and negative development are more nuanced than expected in early conceptualizations of the PYD model (e.g., Benson, Mannes, Pittman, & Ferber, 2004; Pittman, Irby, & Ferber, 2001). Data from the 4-H Study show that complex patterns of positive and negative developmental trajectories exist and they are not simply inversely related (Lewin-Bizan and Lynch et al., 2010; Phelps et al., 2007).

Limitations

While the present research has provided useful findings in regard to the study of ISR development among adolescents, there are several limitations that should temper enthusiasm about this work. All trajectories in this research need cross-validation within independent samples. Moreover, some of the observed trajectories of ISR were underrepresented at later grades, most noticeably the Late Onset trajectory, which limits the generalizability of the findings. Again, further research with other samples is needed to examine whether this trajectory represents a significant portion of adolescents.

The present research also only included factors at the familial and parental level at one time point. From a PYD perspective, variables at the individual, family, peer, school, and community levels also influence development to different degrees at different developmental periods. Therefore, future studies will need to include ecological assets as well as additional individual strengths (e.g., youth hopes for the future; Schmid et al., 2011) in order to assess what variables might explain trajectory membership. In addition, further examination of the variables at later time points that might differentiate the non-normative groups that experience a marked drop-off or late-onset of ISR could also prove beneficial to intervention work. As ISR has consistently been linked to both positive and negative indicators of youth development, identifying the indicators of these variations in ISR development could enhance practice within youth development programs or prevention programs seeking to reduce problems such as drug use, adolescent pregnancy, and violence.

Conclusions

The present research provides support for the existence of complex relationships among parenting at a specific point in early adolescence (Grade 5), trajectories of intentional self regulation across Grades 5 to 11, and outcomes in Grade 11 of positive and problematic development. The findings provide evidence for the plasticity of development, at least in regard to the course of ISR across seven years of the adolescent period.


