Change in Protective Factors Across Adolescent Development

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Abstract

Understanding the developmental changes in protective factors that lead to healthy youth development provides important information on the appropriate timing and targets for community-based prevention. This study used a control sample of 2,002 individuals from 7 states to examine the normative development of protective factors. Data come from the Community Youth Development Study, a community-randomized trial of Communities That Care. Multilevel models estimated the change in protective factors from 5th to 12th grade, controlling for individual characteristics. Gender difference and school transitions were examined. Findings suggest that most protective factors decline through middle school but start increasing during high school, with some declining at slower rates than in middle school. Although females reported higher levels of protective factors than males, the transitional point did not differ by gender. Community initiatives that seek to bolster protective factors should start early and continue through high school.

Keywords

Protective factors; Community intervention; Social development model; Adolescent development; School transition; Gender

Adolescence is a time of social, emotional, physical, and cognitive changes, a time during which changes occur much more drastically than at any other stage in life aside from infancy (Steinberg, 1999). With increasing independence and expanding social domains of influence (i.e., peers, schools, communities), adolescents experiment with various risky behaviors, including substance use and delinquency (Arnett, 1999). Studies have shown that early development of these behaviors puts young people at greater risk for future chronic smoking and crime as well as other mental, physical, and behavioral health problems (Buchmann et al., 2013; Catalano et al., 2012; DeLisi, Neppl, Lohman, Vaughn, & Shook, 2013; Kendler, Myers, Damaj, & Chen, 2013; Sampson & Laub, 2003; Sawyer et al., 2012).

The emerging science of prevention (Coie et al., 1993) emphasizes the importance of identifying and targeting precursors that predict the likelihood of adolescent problem behaviors, namely risk and protective factors (Catalano et al., 2012; Coie et al., 1993; Fraser, 2004), to effectively prevent the occurrence of these behaviors (Hawkins, Catalano, & Miller, 1992) before they become less amenable to change. As empirical evidence verified a range of risk factors for problem behaviors, preventive interventions were developed that successfully reduce risk and prevent problem behaviors (Fraser, 2004; Hawkins et al., 1992; Welsh & Farrington, 2007). In the context of adolescent development, researchers argued that reducing risk is an effective strategy to prevent problem behaviors (Farrington, 2000; Welsh & Farrington, 2007), noting that risk exposure increases during adolescence (Catalano et al., 2012; Masten & Cicchetti, 2010). However, despite the growing research evidence demonstrating that protective factors mitigate the development of problem behaviors (Bowers et al., 2011; Hartman, Turner, Daigle, Exum, & Cullen, 2009; Hawkins et al., 1992; Lösel & Farrington, 2012; O'Donnell, Hawkins, & Abbott, 1995), little is known about how protective factors change as youth develop (Fraser, 2004; Van Der Put et al., 2011). Understanding whether adolescents experience an increase or decrease in protective factors can provide important information about how and when to increase protection during adolescence to prevent problem behaviors and promote healthy behaviors. This study uses longitudinal data to examine the developmental changes in a theoretically driven set of protective factors across adolescence.

Conceptualizing Protective Factors: The Social Development Model

In the last two decades, researchers and practitioners have become increasingly interested in understanding protective factors (Fraser, 2004). However, researchers have used various terms, such as promotive factors (Sameroff, 2006; Zimmerman et al., 2013) or assets (Mannes, Roehlkepartain, & Benson, 2004) to identify their positive function and role in youth development. For simplicity, in this paper we will use the term protective factors to refer to factors that decrease the likelihood of problem behaviors and increase the likelihood of positive behaviors (Catalano et al., 2012). To conceptualize and identify protective factors, we use the social development model (SDM) that outlines a causal relationship of how protective factors work to prevent problem behaviors.

The SDM (Catalano & Hawkins, 1996; Hawkins & Weis, 1985) is an integrated theory of social control theory, social learning theory, and differential association theory, that explains the development of pro- and antisocial behaviors by specifying predictive relationships and processes across developmental contexts and stages (Catalano & Hawkins, 1996). In the antisocial path, the SDM hypothesizes that antisocial behaviors develop as a result of antisocial opportunities, involvement or interaction with antisocial others, and rewards for involvement with antisocial others, as well as in some cases through bonding to antisocial others, and in some cases through belief in antisocial values.

Similarly, on the prosocial path, the SDM hypothesizes that providing individuals with opportunities for involvement or interaction with prosocial others, teaching the skills to participate in prosocial activities, and recognizing or reinforcing individuals for skillful participation in prosocial activities will lead to the development of social bonds between the

individual and the socializing unit providing the prosocial opportunities, skills, and recognition. If these social bonds are well established and the standards for prosocial behavior of the socializing unit(s) are clear, it is expected that the youth will engage in prosocial behaviors as a result, which in turn contributes to prosocial development in the next developmental phase. These opportunities for involvement or interaction, skills, recognition, bonding, and beliefs are protective factors. They are hypothesized to operate in a similar manner in different socializing units (e.g., peers, family, school, community) with greater exposure to protection across multiple social units expected to predict greater likelihood of prosocial behaviors. To illustrate, when families provide opportunities for children to contribute to family life and reward children for their skillful participation, children are expected to become bonded to their families and to be more likely to adopt the behavioral standards of their families. If the families communicate prosocial standards and norms, bonded children are likely to adopt these norms and to engage in prosocial behaviors and avoid behavioral health problems.

Tests of the SDM hypotheses have shown great utility in understanding the causal processes and correlates of many youth outcomes, such as child problem behaviors (Catalano, Oxford, Harachi, Abbott, & Haggerty, 1999; Fleming, Catalano, Oxford, & Harachi, 2002; Kosterman, Haggerty, Spoth, & Redmond, 2004; Laundra, Kiger, & Bahr, 2002; Sullivan & Hirschfield, 2011), as well as prosocial learning (Duerden & Witt, 2010), civic engagement (da Silva, Sanson, Smart, & Toumbourou, 2004), and positive adult social engagement (Kosterman et al., 2014). Furthermore, several studies have validated the theoretical constructs as well as the developmental risk and protective processes of the SDM with diverse populations (Catalano et al., 1999; Fleming et al., 2002; Roosa et al., 2011; Sullivan & Hirschfield, 2011). However, no study to date has empirically tested all social development constructs among all social domains across more than two developmental periods.

A strong theoretical framework that explains human development is important because developmental theories lay a strong foundation for prevention (Coie et al., 1993). In fact, prevention programs with a theoretical basis are shown to be more effective than those simply based on common sense (Ammerman, Lindquist, Lohr, & Hersey, 2002; Legler et al., 2002; Noar, Benac, & Harris, 2007). By explaining how human behaviors develop, developmental theories provide a foundation for how behaviors can be changed (Glanz & Bishop, 2010). This informs prevention programs on what influential factors to target and when these programs will have maximal impact (Nation et al., 2003).

The SDM is explicitly developmental in its explication of onset, escalation, maintenance, and desistance of both problem and healthy behaviors. The theory addresses developmental specific submodels using major transitions in the environment, namely school transitions, and integrates salient socialization units of the individual to explain etiological processes across the developmental phases (Catalano & Hawkins, 1996). As children develop, the importance of these socializing contexts as well as each SDM construct change. The SDM asserts that the socialization process from an earlier developmental period influences the later socialization process. For example, opportunities and recognition from earlier development can influence the level of involvement and bonding later. By examining these

SDM constructs separately across development can unveil the developmental salience of each construct. These developmentally specific social context and SDM constructs are potential focus of intervention.

The SDM has theoretically guided the development and implementation of many prevention programs that aim to reduce problem behaviors and increase healthy behaviors (e.g., Seattle Social Development Project, Raising Healthy Children, Guiding Good Choices, Staying Connected with Your Teen, and Communities That Care). These programs have sought to increase prosocial opportunities, involvement or interaction, and recognition for children in communities, families, schools, and among peers, and enhance skills to participate in prosocial activities so that recognition is more likely. The increase in prosocial opportunities, recognition, and skills is expected to increase bonding with prosocial others from whom children adopt prosocial beliefs, and lead them to behave in a prosocial manner. The constructs and processes on the prosocial path comprise the social development strategy (Catalano & Hawkins, 1996). Evaluations of quasi or experimental trials of SDM-driven interventions demonstrated that these interventions had positive effects on the SDM constructs as well as later behavioral outcomes such as substance use, delinquency, and mental health (Abbott et al., 1998; Catalano, Kosterman, Haggerty, Hawkins, & Spoth, 1998; Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Mason, Kosterman, Hawkins, Haggerty, & Spoth, 2003).

The SDM, thus, provides a useful framework for understanding risk and protective factors and how risk and protective processes contribute to adolescent development over time across multiple socializing units. The developmental trajectories of protective factors specified by the SDM can provide empirical evidence for understanding various components of the development of prosocial behaviors. Practically, this can provide important information for the timing of preventive interventions across youth development. For example, preventive programs can target reducing risk and increasing protection early in a child's life to decrease the harm of accumulated risk (Masten, 2001), but also counter increasing levels of risk exposure and problem behaviors in adolescence by building protection during adolescence (Catalano et al., 2012; Toumbourou & Catalano, 2005). In this paper we seek to answer two questions: 1) How do protective factors develop in the context of school transitions? and 2) Do these developmental trajectories vary by gender?

Developmental turning point: Transitions across adolescence

Youth encounter new social and environmental contexts (e.g., family, peer, school, community) as they develop, and need to adapt to multiple transitions that occur across and within these different contexts – one of which is school transitions (Benner & Graham, 2009; Eccles, 2004; Eccles et al., 1993; Roeser, Eccles, & Sameroff, 2000). School transitions during adolescence are naturally occurring transitions for most U.S. students who receive public education as they transition from the home to elementary school, from elementary to middle school, and from middle to high school, although there are some differences in these transition patterns. As individuals are introduced to new settings, new rules, new peers, and new teachers, the mismatch between social settings and individual development (Eccles et al., 1993) can create distress (Benner, 2011). Thus, transitions across

these social settings can provide important opportunities for behavioral continuity or change (Elder, 1998), especially during adolescence.

The SDM, using the life course perspective, identifies four developmental phases based on school transitions as the naturally occurring contextual changes: birth to school entry, elementary, middle, and high school (Catalano & Hawkins, 1996). Change from elementary school where students are taught all day by one teacher in company of the same 25 to 35 kids to middle school where students spend 50 minutes a day with six or seven different teachers and generally over 100 other students would naturally lead to less opportunity to get to know teachers or individual peers. This would likely result in a decrease in perceived opportunities for involvement or interaction with peers and teachers, less recognition for involvement, and lower bonding to teachers or schools. Children may also become exposed to more antisocial opportunities, such as using illegal substances, missing school, or bullying. In the context of transitioning from elementary school to middle school, given the increased risk for antisocial behaviors, protective factors in the peer and individual domains would decrease. Furthermore, adolescence is a period of heightened child-parent conflict (Arnett, 1999), which may result in fewer opportunities and recognition for positive involvement and decreased attachment with the family.

Many studies have focused on the negative effects of the transition from elementary to middle school, such as decline in academic motivation and achievement (Benner, 2011; Eccles, 2004; Simmons & Blyth, 1987; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). Less is known about how the transition to high school affects developmental trajectories during middle to late adolescence. The studies conducted are mostly short-term longitudinal or cross sectional in nature (Benner & Graham, 2009; Witherspoon & Ennett, 2011). Although some studies have suggested a continuing decline in academic achievement, school belonging, and activity participation following the transition to high school (Akos & Galassi, 2004; Benner & Graham, 2009; Gifford & Dean, 1990; Roderick, 2003), other studies have indicated an increase in school bonding past 10th grade (Stanley, Comello, Edwards, & Marquart, 2008). Benner (2011) conducted a longitudinal study of high school transition from 7th to 10th grade across eight waves (two waves of data collected each academic year). The study found that even adolescents who were doing well in middle school experienced academic and psychological disruptions following the transition to high school and continued to struggle during high school. Moreover, academic success and school belonging declined, despite an increase in school engagement.

The transition from middle school to high school might be less drastic than the transition from elementary to middle school in terms of the class environment, but students become exposed to a larger school environment with greater possibilities for both antisocial and prosocial behaviors. This could potentially lead to an increase in interactions with both prosocial as well as antisocial peers. Furthermore, given the increased availability of extracurricular activities during high school (e.g., sports, clubs, community volunteering), the SDM would suggest that protective factors in the community, school, individual, and peer domains could possibly increase. As students become older, there is increased mobility and independence (e.g., driving a car), and students are likely to spend more time outside of their homes compared to middle and elementary school periods. This may result in

decreased levels of family protective factors simply because students would have less time or opportunities to engage in family activities.

Gender

Examining the developmental trajectories of individual, peer, family, community, and school-related protective factors across school transitions provides a relevant context for understanding the social transitions as well as normative developmental changes adolescents experience during this time. Furthermore, as gender identity becomes more pronounced during adolescence (Galambos, Berenbaum, & McHale, 2009; Hill & Lynch, 1983), exploring possible gender differences in the development of protective factors is important. Bussey and Bandura's (1999) social cognitive theory of gender development suggests that complex social subsystems as well as cognitive processes influence gender development. They argue that boys and girls encounter different kinds of modeling and receive different feedback from their peers, families, and teachers based on their gender during their development.

The SDM would also suggest that protective factors may develop differently for boys and girls because their families, peers, and school systems may provide them with different kinds of opportunities and recognition for different kinds of behavior based on their gender. For example, adults in the family, school, and community may provide less recognition to females who engage in prosocial behaviors because, as research suggests, females are more prone to prosocial behaviors compared to their male counterparts (Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006), whereas males, who are less expected to engage in prosocial behaviors, may receive more recognition for prosocial behaviors. Also, parental supervision is reported to be stricter for females (Fagan, Van Horn, Antaramian, & Hawkins, 2011), thus, females may perceive fewer opportunities to be involved in community activities compared to males who might be able to stay out in the community or neighborhood more freely than females. These differences may provide valuable insight for prevention as to what protective factors to target and when across male and female development. Although females fare better in terms of academic outcomes (Witherspoon & Ennett, 2011), few studies have examined gender differences in the development of protective factors from childhood to adolescence (Galambos et al., 2009). This study examines the developmental trajectories of prevalence of protective factors across individual, peer, family, school, and community domains in middle school and high school for males and females.

Methods

Sample

Data come from the Community Youth Development Study (CYDS), a multi-site community-randomized trial of the Communities That Care (CTC) prevention system involving 24 communities in seven states. CYDS communities are small- to moderate-sized incorporated towns with their own governmental, educational, and law enforcement structures, ranging in population size from 1,500 to 41,000 residents (See Table 1 for community characteristics).

Annual surveys of a panel of public school students were conducted beginning in the 2003 – 2004 academic year when students were in fifth grade. The first wave of data was collected in the spring of 2004, when the panel was in Grade 5, and served as the pre-intervention baseline assessment. The second wave of data was collected in Grade 6 and included recruitment of additional eligible students who were not surveyed in Grade 5 (an accretion sample). The final longitudinal panel included 4,407 students (2,405 from CTC communities and 2,002 from control communities) who completed a Wave 1 and/or Wave 2 survey. Students who remained in the communities for at least one semester were followed and surveyed for each subsequent wave of data collection, even if they left the community. The seventh wave of data collected in the spring of 2011, when students in the panel were in the 12th grade, was completed by 92.5% of the sample students in the longitudinal panel (91.6% in the control and 93.3% in the experimental condition). Since we are interested in understanding the normative developmental trajectories of protective factors without the influence of the CTC intervention, we use the 2,002 students in the control sample for this paper. Also, in this data, transition from middle school to high school occurred at the end of eighth grade, with the exception of one school that transitioned at the end of ninth grade.

Measures

Protective factors—Opportunities, skills, recognition, attachment/commitment, and beliefs across multiple domains are all important for healthy social development (Fleming et al., 2002; Roosa et al., 2011; Sullivan & Hirschfield, 2011). Fifteen protective factors measuring these SDM constructs are assessed using scales consisting of two to six items each. These items are from the Communities That Care Youth Survey (CTCYS) that has demonstrated adequate psychometric properties across gender and racial groups (Glaser, Van Horn, Arthur, Hawkins, & Catalano, 2005). These protective factors are divided into five domains – individual, peer, family, school, and community (See Table 2). Protective factors measured in this study include opportunities for prosocial involvement in each domain, social skills of individual youths, reward or reinforcement for prosocial involvement in each domain, attachment to the family and the community, commitment to school, and healthy beliefs and clear standards for behavior. Academic failure and low commitment to school have previously been used as risk factors for delinquent behavior and drug use (Maguin & Loeber, 1996). However, because good grades are theorized in the SDM to be an indicator of reinforcement for prosocial behavior, and high commitment to school is conceptualized as an indicator of prosocial bonding in the school domain, these constructs were included in the present analyses as protective factors. Although the social skills and healthy beliefs measures have lower Cronbach's alpha values, Schmitt (1996) has suggested that if a "measure has … meaningful content coverage of some domain and reasonable unidimensionality, [] low reliability may not be a major impediment to its use" (p. 352). These measures have demonstrated unidimensional qualities in measurement models and have also shown high negative correlations with problem behaviors (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002). To calculate protective factor scores, scale items were standardized and then averaged at each wave. To allow comparison of protective factor scores across time, scale scores were standardized across all six waves of data from Grade 5 through Grade 12.

Student characteristics—Variables measuring student characteristics that could affect levels of protection are included as covariates in analyses. Student characteristics include student's age at sixth-grade survey; gender (1= male, 0 = female); race (1 = White, 0 = other); whether the student is Latino(a) (1 = yes, 0 = no); parental education level (ranging from 1 = grade school or less to 6 = graduate or professional degree); religious attendance in Grade 5 (0 = never to 4 = about once a week or more); and rebelliousness, which consisted of the mean of three items: I like to see how much I can get away with; I ignore rules that get in my way; and I do the opposite of what people tell me, just to get them mad (1 = very false to 4 = very true). Religious attendance and rebelliousness reported in the CTCYS were included as covariates because theoretical and empirical evidence suggests a fairly strong association between these two variables and other protective factors. For example, individuals who identify themselves to be religious tend to have more opportunities to be involved in various clubs and volunteer activities (Saroglou, Pichon, Trompette, Verschueren, & Dernelle, 2005). Individuals with rebellious tendencies are less likely to follow the norms and boundaries of social institutions, such as family, school, and community, which will affect the way in which they interact with these social institutions (Arthur et al., 2002; Nurco & Lerner, 1999).

Missing Data

Among the 2,002 students in the longitudinal panel within the control sample, 26.5% did not complete the survey in the first wave because they were part of the accretion sample in Grade 6. Only a small percentage of students in the control sample (8.5%) were not available for a follow-up interview in Grade 12. To ensure validity of students' self-report, students' data at each wave were excluded from analyses if they reported being honest only "some of the time" or less, having used a fictitious drug, or having used two of three drugs on 40 or more occasions in the past month at that data collection point (1.1% excluded in Grade 5; 0.6% excluded in Grade 6; 1.0% excluded in Grade 7; 1.5% excluded in Grade 8, 2.0% excluded in Grade 9, 1.4% excluded in Grade 10; and 1.8% excluded in Grade 12). Missing data were imputed using multiple imputation methods to obtain unbiased estimates of model parameters and their standard errors, assuming that data are missing at random (Schafer & Graham, 2002). Using NORM version 2.03 (Schafer, 2000), 40 separate data sets including data from all seven waves from Grade 5 through Grade 12 were imputed (Graham, Taylor, Olchowski, & Cumsille, 2006). To facilitate imputation, the number of variables in the imputation model was imputed within domain. Protective factors in family, school, and community domains were imputed separately and individual and peer domains were imputed together. Imputation models included student and community characteristics, protective factors within a domain across all seven waves, and community membership. Imputed datasets were combined and analyses were averaged across the 40 imputed datasets using Rubin's rules (Rubin, 1987).

Analysis

We used three-level hierarchical modeling (Raudenbush & Bryk, 2002) to address the nested nature of the data. We estimated the average trajectories of protective factors over time (Level 1), accounting for variation across individuals (Level 2) and communities (Level 3) (See Equation 1). Based on the observed patterns of the trajectories, we examined both

quadratic and piecewise models. We considered conceptual as well as practical implications for prevention to choose piecewise growth modeling with two time phases: elementary through middle school for Phase 1, and high school for Phase 2. The piecewise approach effectively represents trajectories across individuals' development within the context of transitioning from middle school to high school.

Equation 1. Hierarchical linear growth model predicting the slope across two phases

$$\underline{\text{LEVEL 1}}$$
$$Y = \pi_0 + \pi_1(\text{PHASE 1}) + \pi_2(\text{PHASE 2}) + e$$
$$\underline{\text{LEVEL 2}}$$
$$\pi_0 = \beta_{00} + \beta_{01}(\text{AGE}) + \beta_{02}(\text{GENDER}) + \beta_{03}(\text{WHITE}) + \beta_{04}(\text{HISPANIC}) + \beta_{05}(\text{PARENTAL EDUCATION})$$
$$+ \beta_{06}(\text{G5 RELIGIOUS ATTENDANCE}) + \beta_{07}(\text{G5 REBELLIOUSNESS}) + \gamma_0$$
$$\pi_1 = \beta_{10} + \beta_{11}(\text{GENDER})$$
$$\pi_3 = \beta_{20} + \beta_{21}(\text{GENDER})$$
$$\underline{\text{LEVEL 3}}$$
$$\beta_{00} = \gamma_{000} + u_{00}$$
$$\beta_{01} = \gamma_{010}$$
$$\dots$$
$$\beta_{21} = \gamma_{210}$$

We also used empirical data to identify the specific grade at which to begin the high school trajectory for each protective factor. Depending on the trajectory observed in the raw data, for each protective factor we considered eighth grade or ninth grade as a transitional point from middle school to high school. We included individual characteristics (i.e., age, gender, race/ethnicity, parental education, religious attendance, and rebelliousness) as time-invariant covariates in Level 2 to account for possible intercept differences based on these characteristics. To estimate the difference in trajectories for males and females, we allowed the time slopes in Level 1 to vary across gender in Level 2. All analyses were conducted using HLM version 6.0 (Raudenbush, Bryk, & Congdon, 2004).

Fifteen growth models were estimated to examine how each protective factor conceptualized in the SDM develops differentially during the middle school period versus during the high school period.

Results

Community Domain

Figure 1 shows the developmental patterns of protective factors in the community domain for males and females. Males reported significantly lower levels of opportunities for prosocial involvement than females across all grades (See Table 3) with the exception of Grade 12 (B = −0.05, p = 0.34). Males initially reported significantly lower levels of recognition for prosocial involvement in the elementary school years (See Table 3), but starting in eighth grade the level differences between males and females were not statistically significant. Males also reported significantly higher levels of community

attachment than females starting in ninth grade. The level differences between males and females were not statistically significant in other grades.

Both males and females experienced a decrease in levels of community protective factors from fifth through ninth grade (Phase 1), but females experienced a steeper decline than males, with the difference in the rates of decline for recognition (males B = −0.159, females B = −.209, p < 0.001, ES[1] = 0.31) and attachment (males B = −0.02, females B = −0.05, p < 0.05, ES = 0.25) reaching statistical significance. The coefficients for males and females indicate the rate of change in protective factors each year. For example, males reported a 0.159 standardized units decline in recognition each year while females reported a 0.209 units decline. As individuals transitioned from middle to high school (Phase 2), both males and females experienced an increase in the levels of opportunities and recognition for prosocial involvement. These increases were not significantly different across gender. The mean level of attachment to community declined further during high school and at similar rates for both males and females (See Table 4).

Family Domain

Figure 2 shows the developmental patterns of protective factors in the family domain for males and females. The levels of family protective factors were not significantly different between males and females at any year, with the exception of family attachment during sixth through eighth grade. For example, males reported significantly higher levels of attachment to family than females in Grade 7 (See Table 3). Both males and females reported a decline in all family protective factors over the elementary and middle school periods (Phase 1). This decline was significantly different only for family recognition, for which females experienced a faster decrease than males during this time (males B = −0.195, females B = −0.223, p < 0.05, ES = 0.19). In high school, all family protective factors trended positively for females. In contrast, levels of family protective factors continued to decline for males in high school (Phase 2), though at a slower rate than prior to entering high school in ninth grade. The slopes during high school were significantly different by gender for recognition for prosocial involvement (males B = −0.019, females B = 0.022, p < 0.05, ES = 0.21) and attachment to family (males B = −0.03, females B = 0.03, p < 0.01, ES = 0.34).

School Domain

Figure 3 shows the developmental patterns of protective factors in the school domain for males and females. Males reported significantly lower levels of opportunities for prosocial involvement and academic success than females across all years, with the exception of levels of opportunities in Grade 12 (See Table 3). In 12th grade, males continued to report lower levels of opportunities for prosocial involvement than females, but the difference was not statistically significant. In Grades 5 through 7, males reported significantly lower levels of recognition for prosocial involvement and commitment to school than females. Level differences by gender were not statistically significant in other years.

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[1]The standardized Effect Size (ES) for difference in mean trajectories was calculated based on the gender difference in slopes divided by the population standard deviation of the slope (See Equation 13 in Raudenbush & Xiao-Feng's, 2001, article).

Both females and males experienced a decrease in levels of all school protective factors in the elementary and middle school periods (Phase 1), ending in either eighth or ninth grade. The difference in the rate of decline between males and females was statistically significant only for recognition, where females experienced a faster decline (males B = −0.188, females B = −0.237, p < 0.001, ES = 0.30; See Table 4). While school commitment continued to decline – showing a linear decline across the entire period from Grade 5 through Grade 12, opportunities, recognition, and academic success showed an increase in levels during the high school period (Phase 2), starting in either eighth or ninth grade, for both males and females. Differences in the slopes between males and females did not reach statistical significance.

Peer Domain

Figure 4 shows the developmental patterns of protective factors in the peer domain for males and females. Males and females reported significantly different levels of protective factors in this domain. Males reported significantly lower levels of interaction with prosocial peers and recognition for prosocial involvement compared to females across all years (See Table 3), with the exception of levels of interaction with prosocial peers in Grade 12 (Grade 12 B = −0.086, p = 0.07).

During the elementary and middle school periods (Phase 1), males and females reported similar rates of decline in their interaction with prosocial peers (males B = −0.124, females B = −0.118, p = 0.69) as well as the rates of decline in recognition for prosocial involvement (males B = −262, females B = −0.226, p = 0.07). In the high school period (Phase 2), males reported a slight increase in their interaction with prosocial peers, while females continued to report a decrease in interaction with prosocial peers, and this difference in rates was statistically significant (males B = 0.03, females B = −0.04, p < 0.001, ES = 0.44). During the high school period, respondents reported increasing recognition from peers for prosocial involvement, but the rates of increase were not significantly different between males and females.

Individual Domain

Figure 5 shows the developmental patterns of protective factors in the individual domain for males and females. In this domain, across all years, males reported significantly lower levels of all protective factors, including prosocial involvement, refusal skills, and healthy beliefs, compared to females. Males and females both experienced a decline in prosocial involvement through 9th grade (Phase 1) and became increasingly more involved in prosocial activities from 9th through 12th grade (Phase 2).

Both males and females reported a decline in prosocial involvement, refusal skills, and healthy beliefs during the elementary and middle school periods (Phase 1). The rates of decline for prosocial involvement and healthy beliefs did not significantly vary by gender, but males experienced a decline in refusal skills at a significantly faster rate than females (males B = −0.258, females B = −0.179, p < 0.001, ES = 0.33). During the high school period (Phase 2), prosocial involvement and refusal skills increased in prevalence for both males and females and the rates of incline did not differ significantly by gender. Healthy

beliefs continued to decline for males but increased for females during this time, and the difference in average prevalence of healthy beliefs by gender was statistically significant (males B = −0.04, females B = 0.01, p < 0.001, ES = 0.33).

Discussion

This is among the first of studies to examine the developmental changes in protective factors across adolescent development using a longitudinal design. The goal of this study was to understand how theoretically specified protective factors develop over time and the extent to which levels and growth trajectories of protective factors differ between males and females.

Some of the findings of this paper are consistent with current literature that suggests that the stressful nature of adolescents' transition to high school results in declines in school belonging (Akos & Galassi, 2004; Benner & Graham, 2007, 2009; Reyes, Gillock, Kobus, & Sanchez, 2000; Weiss & Bearman, 2007). Commitment to school declined consistently over time in this sample. However, a distinct turning point in the development of some protective factors emerged as adolescents transitioned from middle school to high school. As hypothesized, while the levels of all SDM protective constructs of opportunities, recognition, skills, and belief declined during the middle school period, they either decreased at a significantly slower rate or began to increase after the transition to high school. In contrast to many studies that suggest negative experiences following the transition to high school (Benner, 2011; Cillessen & Mayeux, 2007; Karriker-Jaffe, Foshee, Ennett, & Suchindran, 2008; Stanley et al., 2008), the findings here suggest that levels of many protective factors increase following the transition to high school (e.g., community opportunities and recognition; school opportunities, recognition, and academic success; prosocial involvement; and interaction with prosocial peers).

Given the sharp decrease in protective factors during the middle school years, it may be useful to provide middle school youth with greater opportunities for involvement in community-based prosocial activities, to encourage families to strengthen opportunities and recognition for family involvement, and to ensure that youth have ample opportunities to interact with prosocial peers. Perhaps these strategies could change the negative trajectory observed during middle school to a positive trajectory earlier than during high school.

Interestingly, in spite of reported increases in opportunities, skills, and recognition in school and opportunities and recognition in the community during high school, this sample reported continued declines in school commitment and community attachment during high school. This finding is inconsistent with the SDM, which hypothesizes that increasing opportunities, skills, and recognition in school and community domains will result in increased bonds of commitment and attachment to those domains. This may indicate that bonding trajectories of commitment and attachment are established earlier in development and are not easily changed by changes in opportunities, skills, and recognition during high school (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Lonczak et al., 2001). It is also possible that the changes in opportunities, skills, and recognition were not of sufficient magnitude to affect bonding trajectories. Regardless, the current data do not support the SDM hypothesis that changes in the prevalence of opportunities, skills, and recognition during high school

will result in changes in bonding trajectories of commitment to school and attachment to community during this developmental period. In contrast, family protective factors followed the trajectories hypothesized by the SDM. Regardless of gender, trajectories for attachment closely paralleled the trajectories for opportunities and recognition in the family. It is not clear why links between opportunities, recognition, and bonding are observed in the trajectories of protective factors in the family but not in the school or community domains. Future studies should focus on testing the prosocial pathways of the SDM during the high school period to better understand the predictors of trajectories of bonding to school and community during this period.

Consistent with other study findings that report higher levels of prosocial behaviors and greater academic success in schools among females than males (Carlo, Crockett, Randall, & Roesch, 2007; Eccles et al., 1993; Witherspoon & Ennett, 2011), females in our sample experienced higher levels of protective factors than males in individual, peer, and school domains. In the family domain, males and females reported little difference in levels of protective factors from elementary through high school. In the community domain, except for opportunities for prosocial involvement, males reported higher levels of community protective factors than females as they transitioned into high school. The gender differences in average levels of protection in school, peer, and individual domains suggest that males may benefit more than females from preventive interventions seeking to strengthen protection in these domains. For example, in general, males might benefit more than females from increased opportunities for prosocial involvement with peers and in school as well as from acquisition of refusal skills in school. Programs that focus on acquisition of social, self-regulation, and refusal skills, such as Life Skills Training (Botvin, 1979–1996) and PATHS (Greenberg & Kusche, 2006) can increase social and emotional skills and facilitate prosocial peer norms among males (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004)

We hypothesized that protective factors would continue to decline during high school in the family domain. Males reported a continued decline in high school but at a much slower rate than in middle school, while females reported a slight increase during high school. Female adolescents experienced significantly steeper declines than their male counterparts in the amount of recognition they received in the family, community, and school domains. Although females were provided with more prosocial opportunities to be involved and were more likely than males to be prosocially involved, females were less likely than males to report being recognized for their involvement. Prevention programs implemented during middle and high school in communities, schools, and families should pay particular attention to enhancing recognition for females across family, school, and community to encourage their active participation in prosocial contexts. For example, programs implemented in school and family domains like the Seattle Social Development Project (Catalano et al., 2004) could seek to ensure that teachers and parents provide recognition to females for effort, improvement, and achievement.

Although the study found statistically significant differences between males and females in terms of the levels and rates of decline or increase in protective factors, the effect sizes were small to moderate. Furthermore, the trajectories of protective factors among males and females indicated the same tipping point that defined the transitional period from middle to

high school. These data provide no evidence to suggest that prevention programs need to be implemented in different developmental periods for males and females; both females and males would benefit from early prevention programming that could slow the rate of decline in protective factors during elementary and middle school. In fact, a recent evaluation of Communities That Care, a science-based prevention system using community coalitions, found that a comprehensive effort that engaged communities, schools, families, and youth in evidence based prevention programs beginning in sixth grade successfully enhanced protective factors by the end of eighth grade (Kim, Gloppen, Rhew, Oesterle, & Hawkins, 2014).

This study has limitations. The study is based on self-reported data from a sample of youth from small incorporated towns, and thus the findings may not be generalizable to a large urban context. In addition, having 11th-grade data would have provided further clarity in understanding the trajectories of protection during high school. Despite these limitations, this study provides a reliable understanding of developmental changes in self-reported exposure to protective factors during middle and high school from ages 10 to 18 in a sample of youth from small towns across seven states. These data are potentially useful for informing community efforts to promote healthy youth development.

Acknowledgments

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Highlights

- We examined the change in protective factors across adolescence

- Protective factors specified in the Social Development Model decline during middle school

- Most protective factors either slow in decline or increase during high school

- Females reported higher levels of protective factors

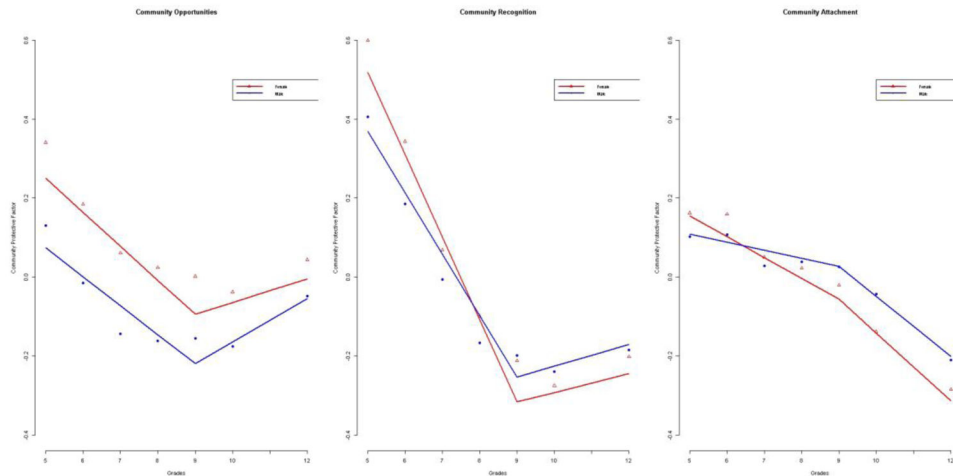- Developmental trajectories do not differ by gender

Figure 1.
Adjusted[a] rates of change and unadjusted mean levels of community protective factors for males and females: Grades 5 through 12

[a]Three-level hierarchical modeling using a piecewise approach estimated average trajectories of protective factors over time (Level 1), accounting for variation across individuals (Level 2) and communities (Level 3). Age, race, gender, parental education, Grade 5 religious attendance, and Grade 5 rebelliousness were included as covariates.

Figure 2.
Adjusted[a] rates of change and unadjusted mean levels of family protective factors for males and females: Grades 5 through 12

[a]Three-level hierarchical modeling using a piecewise approach estimated average trajectories of protective factors over time (Level 1), accounting for variation across individuals (Level 2) and communities (Level 3). Age, race, gender, parental education, Grade 5 religious attendance, and Grade 5 rebelliousness were included as covariates.
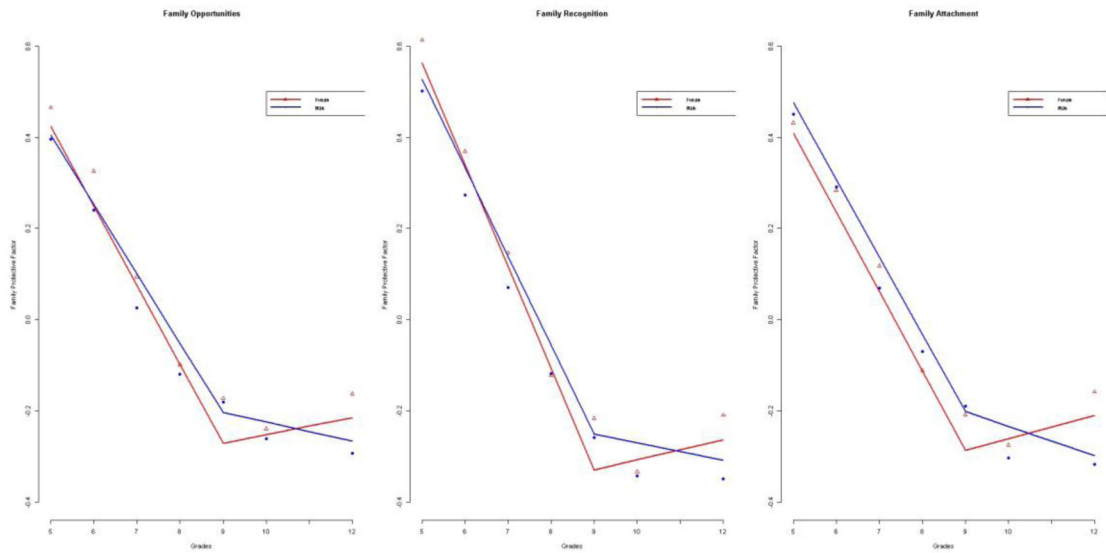
Figure 3.
Adjusted[a] rates of change and unadjusted mean levels of school protective factors for males and females: Grades 5 through 12

[a]Three-level hierarchical modeling using a piecewise approach estimated average trajectories of protective factors over time (Level 1), accounting for variation across individuals (Level 2) and communities (Level 3). Age, race, gender, parental education, Grade 5 religious attendance, and Grade 5 rebelliousness were included as covariates.
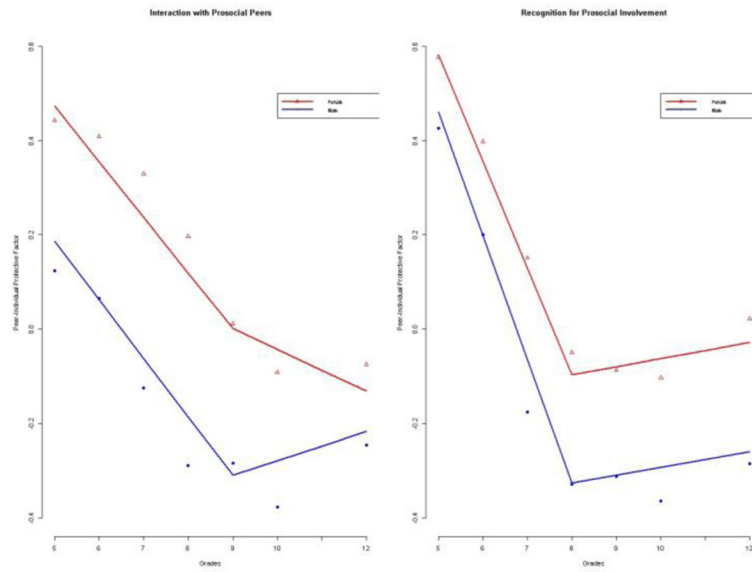
Figure 4.
Adjusted[a] rates of change and unadjusted mean levels of peer protective factors for males and females: Grades 5 through 12

[a]Three-level hierarchical modeling using a piecewise approach estimated average trajectories of protective factors over time (Level 1), accounting for variation across individuals (Level 2) and communities (Level 3). Age, race, gender, parental education, Grade 5 religious attendance, and Grade 5 rebelliousness were included as covariates.
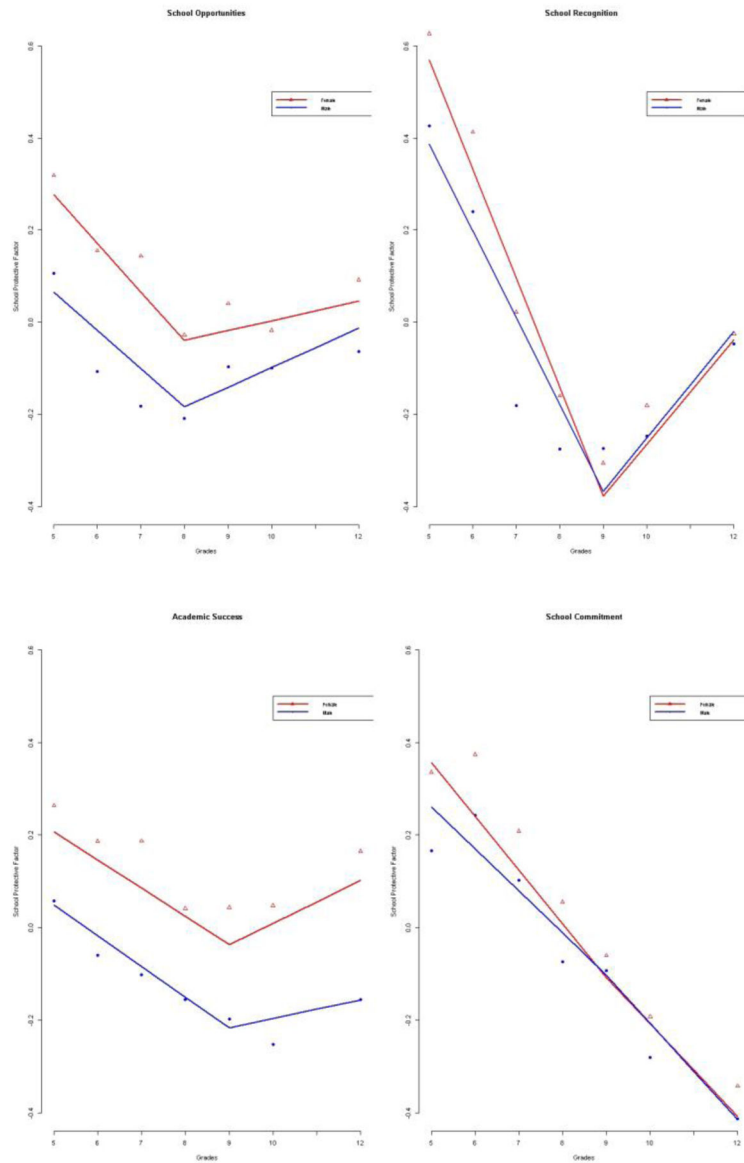
Figure 5.
Adjusted[a] rates of change and unadjusted mean levels of individual protective factors for males and females: Grades 5 through12
[a]Three-level hierarchical modeling using a piecewise approach estimated average trajectories of protective factors over time (Level 1), accounting for variation across individuals (Level 2) and communities (Level 3). Age, race, gender, parental education, Grade 5 religious attendance, and Grade 5 rebelliousness were included as covariates.
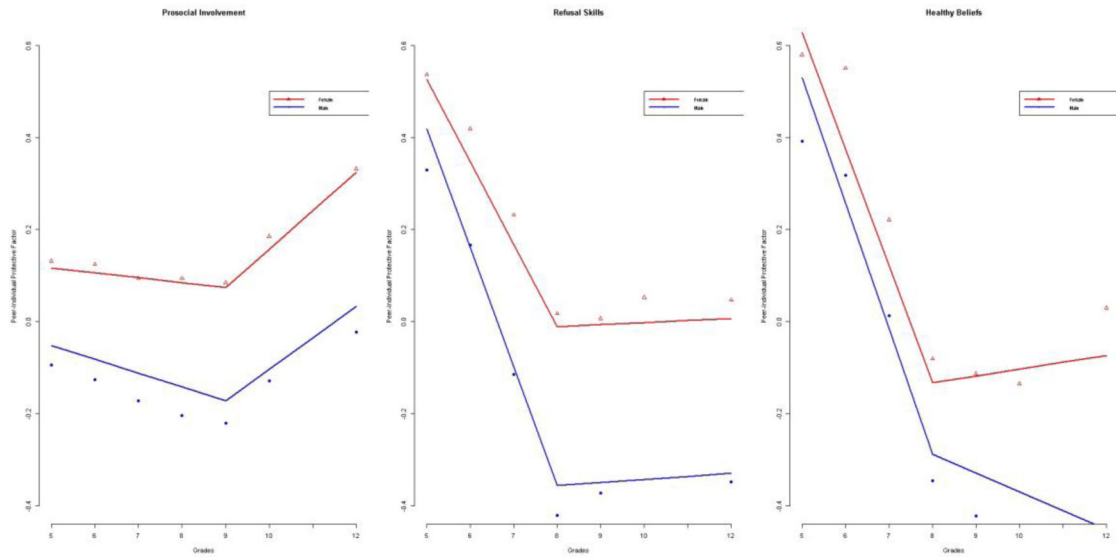
Table 1

Youth[a] Demographic Characteristics of 24 CYDS Communities

	Control Communities (n = 12)			CTC Communities (n =12)		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum
Total Population [b]	3,960	559	11,001	4,014	458	9,455
Race/Ethnicity, % [b]						
European American	85.1	63.7	97.1	85.4	57.6	96.1
Hispanic Origin	13.1	0.9	54.7	13.1	1.0	76.4
African American	2.5	0.0	20.3	2.6	0.0	21.1
Eligible for Free/Reduced-Price Lunch, % [c]	38.2	20.6	63.0	34.9	20.7	65.9

[a] Youth under the age of 18

[b] (U.S. Census Bureau, 2000)

[c] (National Center for Education Statistics, 2002–2003)

Table 2

Protective Factors Assessed in the Youth Development Survey

Scales (4-point scale)	# of items (α)	Sample item	Response options
Community			
Opportunities for prosocial involvement	2 (0.80)	There are lots of adults in my neighborhood I can talk to about something important	NO! (1) ~ YES! (4)
Recognition for prosocial involvement	3 (0.91)	My neighbors notice when I'm doing a good job and let me know about it	NO! (1) ~ YES! (4)
High neighborhood attachment	3 (0.81)	I like my neighborhood	NO! (1) ~ YES! (4)
Family			
Opportunities for prosocial involvement	3 (0.82)	My parents ask me what I think before most family decisions affecting me are made	NO! (1) ~ YES! (4)
Recognition for prosocial involvement	4 (0.76)	My parents notice when I'm doing a good job and let me know about it	Never or Almost Never (1) ~ All the time (4)
Attachment	4 (0.77)	Do you feel very close to your mother?	NO! (1) ~ YES! (4)
School			
Opportunities for prosocial involvement	5 (0.70)	There are lots of chances to be part of class discussions or activities	NO! (1) ~ YES! (4)
Recognition for prosocial involvement	4 (0.75)	My teachers notice when I'm doing a good job and let me know about it	NO! (1) ~ YES! (4)
High commitment to school	6 (0.77)	Now thinking back over the past year in school, how often did you try to do your best work in school?	Never (1) ~ Almost Always (5)
Academic success	2 (0.76)	Putting them all together, what were your grades like last year? (e.g. A's B's)	Very Poor (1.75) ~ Very Good (4)
Peer			
Interaction with prosocial peers	5 (0.74)	In the past year (12 months), how many of your best friends have participated in clubs, organizations or activities at school?	None of my friends (0) ~ 4 of my friends (4)
Recognition for prosocial involvement	4 (0.84)	What are the chances you would be seen as cool if you worked hard at school?	No or very little chance (1) ~ Very good chance (5)
Individual			
Prosocial involvement	3 (0.70)	How many times in the past year (12 months) have you participated in clubs, organizations, or activities at school?	Never (1) ~ 40+ (8)
Refusal skills	4 (0.64)	You're at a store with friend. Your friend steals a magazine…What would you do now?	Grab a magazine and leave the store (1) ~ Act like it's a joke, and ask her to put the magazine back (4)
Healthy beliefs and clear standards	4 (0.69)	It is important to be honest with your parents, even if they become upset or you get punished	NO! (1) ~ YES! (4)

Table 3

Adjusted[a] Gender Differences[b] in Protective Factors: Grade 5 Through Grade 12

Dependent Variables	Gender (Male=1) Difference: β						
	5th	6th	7th	8th	9th	10th	12th
Community							
Opportunities	−0.176***	−0.163***	−0.151***	−0.138***	−0.125**	−0.100**	−0.050
Recognition	−0.150**	−0.097**	−0.043	0.010	0.063	0.066	0.073
Attachment	−0.046	−0.014	0.019	0.051	0.083*	0.093**	0.113
Family							
Opportunities	−0.019	0.003	0.024	0.046	0.068	0.028	−0.052
Recognition	−0.036	−0.007	0.022	0.050	0.079	0.037	−0.046
Attachment	0.067	0.071*	0.076*	0.081*	0.085	0.027	−0.088
School							
Opportunities	−0.212	−0.189	−0.167	−0.144	−0.121	−0.100	−0.060
Recognition	−0.183	−0.135	−0.086	−0.038	0.011	0.013	0.017
Academic success	−0.159***	−0.164***	−0.169***	−0.175***	−0.180***	−0.206***	−0.258***
Commitment	−0.096	−0.071	−0.169	−0.021	0.005	0.000	−0.008
Peer							
Interaction	−0.287***	−0.293***	−0.299***	−0.305***	−0.311***	−0.236***	−0.086
Recognition	−0.123**	−0.159***	−0.195***	−0.231***	−0.232***	−0.233***	−0.234***
Individual							
Involvement	−0.168***	−0.187***	−0.207***	−0.226***	−0.246***	−0.261***	−0.291***
Social skills	−0.107**	−0.186***	−0.266***	−0.345***	−0.342***	−0.339***	−0.335***
Healthy beliefs	−0.099**	−0.118***	−0.136***	−0.155**	−0.207***	−0.264***	−0.379***

[a] Age, race, parental education, Grade 5 religious attendance, and Grade 5 rebelliousness were included as covariates.

[b] Reported numbers are the beta coefficients of the gender variable from multilevel models centered in each grade.

*
p < 0.05.

**
p < 0.01.

***
$p < 0.001$

Table 4

Adjusted[a] Rates of Change in Protective Factors[b] During Phases 1 and 2[c]

	Community Attachment			Family Opportunities for Prosocial Involvement			School Recognition for Prosocial Involvement		
	B	**SE**	**p**	**B**	**SE**	**p**	**B**	**SE**	**p**
Intercept	-0.314	0.057	<0.001	-0.215	0.046	0.001	-0.038	0.058	0.525
Gender[d]	0.113	0.056	0.046	-0.052	0.056	0.361	0.017	0.046	0.711
Phase 1	-0.053	0.012	<0.001	-0.174	0.009	0.000	-0.237	0.010	<0.001
Phase 2	-0.086	0.017	<0.001	0.019	0.013	0.151	0.113	0.013	<0.001
Gender X Phase 1	0.032	0.015	0.031	0.022	0.013	0.108	0.048	0.014	0.001
Gender X Phase 2	0.010	0.023	0.663	-0.040	0.021	0.061	0.002	0.019	0.911
				Intra Class Correlation					
Between Students	0.26			0.59			0.31		
Between Communities	0.01			0.02			0.03		

[a] Age, race, parental education, Grade 5 religious attendance, and Grade 5 rebelliousness were included as covariates in a 3-level model with protective factor levels centered in Grade 12.

[b] Three protective factors that represent the three differing developmental patterns across adolescence were selected for this table: community attachment continued to decrease in Phase 2; the rate of decline in family opportunities decreased(?) in Phase 2; and school recognition began to increase in Phase 2.

[c] Phase 1 is late elementary to middle school and Phase 2 is high school.

[d] Male =1; Female = 0