



Published in final edited form as:

J Adolesc Health. 2011 August ; 49(2): 180–186. doi:10.1016/j.jadohealth.2010.11.244.

Positive Childhood Experiences and Positive Adult Functioning: Prosocial Continuity and the Role of Adolescent Substance Use

Rick Kosterman, Ph.D.,

Social Development Research Group, University of Washington

W. Alex Mason, Ph.D.,

National Research Institute, Boys Town

Kevin P. Haggerty, MSW,

Social Development Research Group, University of Washington

J. David Hawkins, Ph.D.,

Social Development Research Group, University of Washington

Richard Spoth, Ph.D., and

Partnerships in Prevention Science Institute, Iowa State University

Cleve Redmond, Ph.D.

Partnerships in Prevention Science Institute, Iowa State University

Abstract

Purpose—To examine positive childhood experiences as predictors of positive adult functioning, including civic involvement, productivity and responsibility, interpersonal connection, and physical exercise; and to examine adolescent substance use as a mediator of prosocial continuity.

Methods—Four hundred and twenty-nine rural participants were interviewed across 7 waves from age 11 to 22. Structural equation models examined the relationship between positive childhood experiences and adult functioning, with adolescent substance use added to each model as a possible mediating mechanism.

Results—Positive childhood experiences predicted significantly better adult functioning for each model, even after accounting for adolescent substance use. Positive childhood experiences also consistently predicted significantly less adolescent substance use. In turn, adolescent substance use predicted significantly less civic involvement and less productivity and responsibility, but was not associated with interpersonal connection or physical exercise when accounting for childhood experiences. Results were largely consistent across gender and levels of family income.

Conclusions—Findings show the enduring importance of positive childhood experiences in predicting positive functioning in early adulthood. Although adolescent substance use increased risk for poorer functioning in important domains of adult life, results suggest that positive experiences in late childhood continued to have a significant prosocial effect into young adulthood. The study also highlights the late elementary grades as a time when parents, teachers,

Correspondence concerning this article should be addressed to Rick Kosterman, Social Development Research Group, University of Washington, 9725 3rd Avenue N. E., Suite 401, Seattle, WA 98115; electronic mail to rickk@u.washington.edu; office 206-543-4546.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

and others can potentially have a large influence in proactively providing prosocial opportunities for children.

Keywords

adult functioning; childhood experiences; substance use; positive behavior

The transition from adolescence to early adulthood is a challenging time for many young people. While avoiding problem behaviors remains important during this period [1,2], a number of recent studies have stressed the importance of positive development and prosocial outcomes [3,4]. Research has shown that positive functioning is conceptually and empirically distinct from problem behaviors and not simply the “opposite of” or absence of problems [3,5,6]. Most recently, an in-depth report from the National Research Council and Institute of Medicine [5] has called for a broad conceptual shift in the prevention of emotional and behavioral disorders to include the promotion of competencies and healthy functioning. The link between positive experiences in childhood and positive functioning in early adulthood, and the possible role of adolescent substance use as a mediator of this link, is the focus of the present investigation.

We examine four domains of positive functioning that have been identified as important indicators of healthy young adult development: civic involvement [3,7], productivity and responsibility [3,8,9], interpersonal connection [3,10,11], and physical exercise [12]. In childhood, we identify experiences in family, school, and other social settings that correspond to these adult outcomes, such as doing volunteer work or sports with a parent, studying hard at school, and spending time with prosocial friends. In general, prior research suggests moderately positive associations between corresponding childhood and adult outcomes [13]. Few studies, however, have examined the continuity of positive functioning from childhood to adulthood. One exception is the work of Eisenberg and her colleagues, who found significant associations between a prosocial orientation in childhood and a similar orientation in early adulthood. Positive childhood experiences appeared to contribute to this consistency [14,15].

An important consideration is the possible mediating influence of problem behaviors in adolescence. Social developmental theory [16,17] proposes that problem behaviors such as substance use that are normative during the teen years [18,19] may have enduring consequences if youth are diverted to an antisocial “pathway” that reinforces further health-risk behavior. Alternatively, positive childhood experiences may promote a prosocial developmental pathway that reinforces positive behavior and helps to keep adolescents from diverting to an antisocial pathway despite experimentation with risky behaviors [16,17]. This study considers the role of adolescent substance use in prosocial continuity given its relatively high prevalence and potential for escalation to abuse and dependence. We examine the extent to which substance use during adolescence serves as an antisocial pathway which significantly mediates the link between positive childhood experiences and positive adult functioning within diverse domains of development.

There has been extensive research on the effects of aversive childhood experiences (e.g., family conflict, social maladjustment) on adolescent substance use, as well as on the effects of adolescent substance use on adult problem outcomes [20,21]. In contrast, relatively few longitudinal studies have focused specifically on the role of positive childhood experiences in protecting against adolescent substance use, or on possible substance use effects during adolescence on later positive outcomes. Notable exceptions include findings of negative consequences of adolescent substance use on young adult autonomy, perceived competence, and involvement in positive activities (sports, volunteer work, etc.) [22], as well as on

college attendance and completion, job stability, and a general measure of young adult wellbeing [20,23,24]. This study extends these findings by looking at additional positive adult outcomes, and by examining the role of adolescent substance use in the context of positive childhood experiences.

Possible moderating effects on the role of adolescent substance use are also considered. Research suggests that the consequences of substance use may be less serious for males, or for middle or upper income individuals versus those from poverty, perhaps because they are less subject to social stigmas regarding substance use [25,26]. We also have an opportunity in this study to examine the effects of a preventive drug-use intervention found previously to weaken the link between substance use in early adolescence and subsequent progression of use [27]. This study includes examination of gender, income, and intervention status as possible moderators.

The study was conducted with a rural sample well suited to this investigation. The rural settings provided prosocial community groups for children (e.g., 4-H, scouts), relatively small school and class sizes with opportunities for constructive class participation, a high proportion of intact dual-parent families that can increase opportunities for parent-child connection [28,29], and, for some, open spaces and farming responsibilities that encourage physical activity. Yet, rates of tobacco and alcohol use in rural communities are often high [30] and in this study were similar to or somewhat higher than corresponding national rates [19].

This study examines three questions, applied to four different outcomes: civic involvement, productivity and responsibility, interpersonal connection, and physical exercise. First, what is the relationship between positive childhood experiences and positive adult functioning with respect to these outcomes? Based on related developmental research [13–15], we hypothesize moderate but significant positive associations. Second, to what extent does adolescent substance use mediate the link between positive childhood experiences and positive adult functioning? Previous studies suggest that family, school, and other social experiences in childhood are likely to be predictive of substance use, which in turn is expected to adversely affect positive outcomes, thus mediating prosocial continuity [20–24]. Third, potential moderating factors are considered. Do these relationships differ with respect to gender, family income, or intervention status? Research suggests less severe consequences of substance use for males, for those from middle or upper income families, and for those assigned to preventive intervention [25–27].

Method

Sample

In 1993, the study was initiated among families of sixth graders enrolled in rural schools in a Midwestern state. Schools were in districts which served small communities (population less than 8,500) and in which 15% or more of families were eligible for a school lunch program for families near or below the federal poverty level. Twenty-two schools were available for study.¹ Of all families with sixth-grade children in these schools ($N = 883$), 49% (429) completed the initial survey. This initial recruitment rate is comparable to rates reported for similar studies [31]. A prospective participation factor survey was conducted with a 90% response rate providing support for the representativeness of the sample. Examining a range

¹The research project involved two embedded program evaluation trials, one of which (involving 22 schools) was to be conducted as a collaboration between Iowa State University (ISU) and the University of Washington – the one forming the basis of the current investigation – and the other (involving 11 additional schools) to be conducted as a collaboration between ISU and another university (not part of the current investigation).

of family characteristics, only parent education was found to be significantly associated with participation, with participating parents reporting 0.7 years more education on average than nonparticipating parents [32,33].

When the study began, target children averaged 11.35 years of age; 52% were female; and 98% were White. Families had an average of 2.99 children, 85% of families were dual-parent, and mothers and fathers averaged 36.91 and 39.57 years of age, respectively. Median annual household income was \$32,000 (compared with the national median for married-couple households in 1993 of \$43,129), and 56% of mothers and 52% of fathers reported having some post-high school education.

Since the initial survey the sample has participated in six waves of follow-up, approximately at ages 12, 13, 14, 16, 18, and 22. The retention rate at age 22 was 73% ($N = 313$), and retention rates averaged 73% in the intervening waves. Extensive attrition analyses have been conducted comparing assessment dropouts versus completers across a range of sociodemographic, psychosocial, and outcome variables. Other than parent education, no differences in overall attrition have been observed [32,34]. At each assessment, informed consent of participants and approval of the Human Subjects Review Committee at Iowa State University was obtained.

Following the initial assessment, half of the sample was included in a 5-week preventive intervention, Preparing for the Drug Free Years (PDFY; now called Guiding Good Choices). PDFY is a family competency training program to reduce children's risk of early substance initiation by enhancing protective parent-child interactions and children's peer resistance skills. The intervention has shown positive long-term effects on targeted outcomes, including reduced substance use (for further description, see [27,32]).

Measures

With the exception of physical exercise, latent variables were modeled for each construct in the analyses, with three manifest indicators for each latent construct. The mean of standardized self-report items was calculated for most indicators, with exceptions noted below. Higher scores correspond to more of the behavior consistent with the construct label. Wording of items used in analyses is available from the first author.

Civic involvement—At age 22, the three indicators of the civic involvement latent construct consisted of (a) an item assessing involvement in community groups, (b) an item assessing time spent volunteering in the past year [3], and (c) a three-item Mokken scale [35] assessing political involvement (registered to vote, voting, attendance at meetings or rallies). Positive childhood experiences were assessed with a corresponding latent construct for civic involvement at age 11, indicated by (a) involvement with a parent in community groups (scouts, 4-H, etc.), (b) volunteering in the community with a parent, and (c) discussing news or current events with a parent (all single-item indicators).

Productivity and responsibility—Adult productivity and responsibility was indicated by (a) constructive engagement in school or work (summing the average time spent in class, homework, and paid employment in the past year) [3], (b) a summative index of success in school and/or work (self-reported grades, job performance and retention), and (c) responsibility (seven items assessing completion of assignments, effort, attendance, and financial prudence; $\alpha = .65$). A corresponding latent construct at age 11 was indicated by (a) school engagement (four items assessing participation, ease of learning, studying, and class confidence; $\alpha = .73$), (b) grades, and (c) an item about degree of planning for future goals.

Interpersonal connection—These constructs were intended to represent the closest relationships across different domains, rather than the quantity of relationships, by using the highest connection score within each respective domain of relationships. The first indicator at age 22 (a) used the greater of the mean prosocial connection with close friends or with romantic partner or spouse (e.g., happy, satisfied, depend on relationship) [3]. In order to code this measure for *positive* interpersonal connection it was adjusted for problem behavior attributed to friends or partner/spouse such that more problem behavior (including violence, crime, and substance abuse) attenuated the connection score; that is, the connection scores were multiplied by the inverse of the friends' or partner's problem behavior score. This method ensured that these connection scores were low to the extent friends or partners engaged in antisocial behavior [36]. Six items assessed connection with friends, and three items assessed connection with partner (mean $\alpha = .77$). Other adult indicators included (b) connection with mother or father, taking the greater mean score (seven items each: e.g., feel close, share thoughts, loyal; mean $\alpha = .88$), and (c) connection with other students or with prosocial coworkers, taking the greater score (three items each: like other students/coworkers, spend time together, talk often; mean $\alpha = .64$).

Corresponding indicators at age 11 included (a) connection with friends (five items; $\alpha = .81$), (b) connection with parent (28 items each for mother and father, mostly concerning involvement with the parent in specific activities; mean $\alpha = .94$), and (c) connection with others (taking the greater of belonging at school or closeness to at least one teacher), each adjusted for friends', parents', or others' problem behavior.

Physical exercise—Two items assessing frequency and intensity of exercise at age 22 were combined multiplicatively into a manifest outcome variable measuring physical exercise. One child-report item was available that assessed active involvement with a parent in sports or exercise and was included as a corresponding measure of physical activity at age 11.

Adolescent substance use—Our focus was on overall use across all substances assessed at different points in adolescence. We sought to capture this use in a parsimonious summary scale to provide a relatively straightforward test of mediation across multiple models of prosocial continuity. Indicators were created by taking the mean logged and standardized frequency of substance use reported at ages 13 through 18, including (a) tobacco use ($\alpha = .77$), (b) alcohol use ($\alpha = .69$), and (c) marijuana and other drug use ($\alpha = .85$). Log transformation reduced skewness while preserving continuous frequency distributions, and standardization weighted items in the scales more equally without giving too much weight to certain ages or to more commonly used substances. During adolescence, 58% of the sample reported using tobacco, 79% reported using alcohol, and 21% reported using other drugs.

Analyses

A schematic of the analysis model is shown in Figure 1. First, prosocial continuity was examined in four separate models predicting each domain of positive adult functioning from the corresponding measure of positive childhood experiences. Next, adolescent substance use was added to each model as a possible mediating mechanism. Analyses included all participants with baseline data ($N = 429$) using Mplus [37] with maximum likelihood estimation to compute full-information maximum likelihood (FIML) estimates with incomplete data. Prior analyses have found very few between-school differences, indicating the appropriateness of family-level analysis [32].

Results

As described above, we sought to create latent constructs reflecting a priori domains of positive functioning identified in the literature from indicator variables assessing specific facets of life (school, work, parents, peers, etc.). This approach resulted in consistently significant factor loadings (all $p < .01$) for each of the four models described above, and significant correlations among the indicators of each construct (see Table 1). Model fit ranged from a CFI of .900 to .987, and an RMSEA of .067 to .029. Though adequate, intra-factor correlations and model fit were of moderate magnitude in some cases due to the need for consistency in approach across models and with prior studies.

To address our first research question, the first step in analyses of structural relationships was to examine the direct path from positive childhood experiences to positive adult functioning (before adding adolescent substance use to the model), shown in the first column of coefficients in Table 2. This path was positive and significant for each model.

The next column of Table 2 shows that, in Step 2, these direct, longitudinal paths from positive childhood experiences to positive adult functioning remained significant for each model even after accounting for the possible effects of adolescent substance use. In most cases, the magnitude of the path coefficient was diminished only minimally.

Analyses for each model also found a significant path from positive childhood experiences predicting less adolescent substance use (third column in Table 2). In turn, the path from adolescent substance use to adult functioning varied in significance (fourth column). Civic involvement and productivity and responsibility in adulthood were significantly related to less substance use in adolescence. However, neither interpersonal connection nor physical exercise in adulthood were significantly associated with adolescent substance use after taking into account related childhood experiences. In line with these results, the indirect effect of childhood experiences on adult functioning was significant for civic involvement and productivity and responsibility ($\beta = .05$ and $.09$, respectively, both $p < .05$), but not for interpersonal connection or physical exercise ($\beta = .02$ and $.02$, respectively, both $p > .15$). Notably, all adult outcomes were significantly correlated at the zero-order level with adolescent substance use (r 's were $-.32$, $-.42$, $-.30$, and $-.15$, for the correlation of substance use with civic involvement, productivity and responsibility, interpersonal connection, and physical exercise, respectively, all $p < .05$).

Gender, Family Income, and Intervention

Possible differences in the relationships shown in Table 2 by gender, family income, and intervention status were examined for each of the four models by constraining parameter estimates to be equal across groups and comparing fit to parallel unconstrained models [37,38]. These analyses revealed no significant differences by gender, and only one significant difference in one model when comparing below-median-income families ($< \$32,000$ in 1993) with median- or above-median-income families: Childhood interpersonal connection was related to significantly less adolescent substance use for those from relatively low-income families ($B = -.75$, $SE = .20$, $p < .001$), but not for those from median or higher income families ($B = -.18$, $SE = .13$, $p = .17$) (the decrement in fit for the constrained model was $\Delta\chi^2(4) = 13.50$, $p < .01$). In comparing intervention and control groups, two differences were found: Adolescent substance use was associated with significantly less adult productivity and responsibility among controls ($B = -.34$, $SE = .13$, $p < .01$), but not among intervention participants ($B = -.10$, $SE = .06$, $p < .08$) ($\Delta\chi^2(3) = 9.22$, $p < .05$), whereas childhood interpersonal connection was significantly related to less adolescent substance use among intervention participants ($B = -.95$, $SE = .23$, $p < .001$), but not among controls ($B = -.24$, $SE = .14$, $p < .08$) ($\Delta\chi^2(4) = 12.99$, $p < .05$). Overall, only 3

of 36 structural paths examined were significantly different across groups. Additionally, when household income or intervention status was added to the models to control for their effects, the pattern of results shown in Table 2 was unchanged.

Discussion

Results stress the enduring importance of positive experiences in childhood through adolescence and into early adulthood. The findings are consistent with the research of Eisenberg and her colleagues [14,15] on the childhood origins of stable prosocial dispositions. Eisenberg et al. [15] found greater stability for early prosocial behaviors that were more other-oriented (e.g., spontaneous sharing), compared with those that appeared less altruistic (e.g., compliant helping). Similarly, although we examined substantially different constructs from Eisenberg, our social measures of positive functioning (civic involvement and interpersonal connection) demonstrated greater bivariate stability than less explicitly social measures (productivity and responsibility and physical exercise). The magnitude of the prosocial continuity coefficients also were similar to those found by Eisenberg and colleagues [14,15], with correlations mostly in the .35 to .55 range.

Notably, findings suggest that childhood experiences may have an enduring influence into early adulthood across multiple domains of positive functioning even in the presence of potentially problematic substance use in adolescence. Adolescent substance use mediated some of the continuity in civic involvement and productivity and responsibility, but not in interpersonal connection and physical exercise, and all direct paths from childhood experiences to adult functioning remained significant with adolescent substance use in the models.

The differential effects of adolescent substance use across models suggest that there may be important qualitative differences in the outcomes examined. Behaviors such as community involvement or productive engagement in school or work may be more easily derailed by substance use in adolescence, while more intimate interpersonal connections or individual exercise habits may be less vulnerable to adolescent substance use if childhood experiences in these domains generally promote a prosocial developmental pathway [16,17]. One possible explanation for this is that opportunities for involvement in conventional community or school activities may be diminished by adolescent substance use, reducing later positive opportunities in these domains, while other interpersonal or individual opportunities are less affected.

Although research suggests female gender and poverty may increase risks associated with the use of substances in adolescence [25,26], there was little evidence here for consistent gender or income differences in the models. Two moderating effects of the preventive intervention in childhood were found, suggesting that the intervention increased the protective effects of positive interpersonal connection on adolescent substance use, and decreased the negative effects of substance use on adult productivity and responsibility.

Limitations of the study include an ethnically homogeneous, rural sample, possibly restricting the generalizability of the findings if positive experiences or adolescent substance use have different effects in different settings. The study also was limited to self-reported data, with the possibility of differential underreporting or overreporting of behaviors. However, research has indicated that self-report surveys administered privately and confidentially, as in this study, provide reliable and valid data [39]. Finally, due to the need for consistency in approach across models and with prior studies, some fit indices and intra-factor correlations were adequate but moderate in magnitude. Further development of

measures of positive development and prosocial outcomes may be important foci for future studies.

The findings of this study are timely given the latest recommendations of the National Research Council and Institute of Medicine [5] stressing the promotion of positive development as a key component of public health programs. While much research has focused on reducing developmental risk factors, this study bolsters the promise of programs and policies that target the promotion of prosocial involvement of children in families, school, and communities. Findings suggest that such positive childhood experiences are not only likely to be protective against adolescent substance use, but may also promote healthy, engaged, and productive functioning into young adulthood. Results also highlight the late elementary grades as a time when parents, teachers, and others can potentially have a large influence in proactively providing prosocial opportunities for children. Compared with earlier or later ages, late childhood is likely to be an especially opportune time developmentally to implement universal family interventions through the schools because nearly all children in the U.S. are attending elementary school and parents remain relatively involved in their socialization [40].

Acknowledgments

This research was supported by grant #9 R01 AA14702-13 from the National Institute on Alcohol Abuse and Alcoholism and #DA 070 29-01A1 from the National Institute on Drug Abuse. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding agencies. This article is one of a number of papers from Project Family. Some descriptions of the project used in this article are similar to those used in studies published previously by the authors.

References

- Schulenberg, JE.; O'Malley, PM.; Bachman, JG.; Johnston, LD. Early adult transitions and their relation to well-being and substance use. In: Settersten, RA., Jr; Furstenberg, FF., Jr; Rumbaut, RG., editors. *On the frontier of adulthood: Theory, research, and public policy*. Chicago: University of Chicago Press; 2005. p. 417-53.
- Sampson RJ, Laub JH. Life-course desisters? Trajectories of crime among delinquent boys followed to age 70. *Criminol*. 2003; 41:555–92.
- Kosterman R, Hawkins JD, Abbott RD, et al. Measures of positive adult behavior and their relationship to crime and substance use. *Prev Sci*. 2005; 6:21–33. [PubMed: 15766003]
- Seligman MEP, Steen TA, Park N, Peterson C. Positive psychology progress: Empirical validation of interventions. *Am Psychol*. 2005; 60:410–21. [PubMed: 16045394]
- National Research Council and Institute of Medicine. *Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities*. Washington, DC: The National Academies Press; 2009.
- Snyder, CR.; Lopez, SJ.; Edwards, LM., et al. Measuring and labeling the positive and the negative. In: Lopez, SJ.; Snyder, CR., editors. *Positive psychological assessment: A handbook of models and measures*. Washington, DC: American Psychological Association; 2003. p. 21-39.
- Settersten, RA, Jr. Social policy and the transition to adulthood: Toward strong institutions and individual capacities. In: Settersten, RA., Jr; Furstenberg, FF., Jr; Rumbaut, RG., editors. *On the frontier of adulthood: Theory, research, and public policy*. Chicago: University of Chicago; 2005. p. 256-91.
- Kerckhoff, AC. From student to worker. In: Mortimer, JT.; Shanahan, MJ., editors. *Handbook of the life course*. New York: Kluwer Academic/Plenum; 2003. p. 251-67.
- Mouw, T. Sequences of early adult transitions: A look at variability and consequences. In: Settersten, RA., Jr; Furstenberg, FF., Jr; Rumbaut, RG., editors. *On the frontier of adulthood: Theory, research, and public policy*. Chicago: University of Chicago; 2005. p. 256-91.
- Diehl M, Elnick AB, Bourbeau LS, Labouvie-Vief G. Adult attachment styles: Their relations to family context and personality. *J Pers Soc Psychol*. 1998; 74:1656–69. [PubMed: 9654764]

11. Eccles, J.; Janice, T.; Barber, B.; Stone, M. Adolescence and emerging adulthood: The critical passage ways to adulthood. In: Bornstein, MH.; Davidson, L.; Keyes, CLM.; Moore, KA., editors. Well-being: Positive development across the life course. Mahwah, NJ: Lawrence Erlbaum Associates; 2003. p. 383-406.
12. Schneider, EL.; Davidson, L. Physical health and adult well-being. In: Bornstein, MH.; Davidson, L.; Keyes, CLM.; Moore, KA., editors. Well-being: Positive development across the life course. Mahwah, NJ: Lawrence Erlbaum Associates; 2003. p. 407-23.
13. McLeod, JD.; Elbert, PA. Connections between childhood and adulthood. In: Mortimer, JT.; Shanahan, MJ., editors. Handbook of the life course. New York: Kluwer Academic/Plenum; 2003. p. 391-411.
14. Eisenberg N, Guthrie IK, Cumberland A, et al. Prosocial development in early adulthood: A longitudinal study. *J Pers Soc Psychol.* 2002; 82:993–1006. [PubMed: 12051585]
15. Eisenberg N, Guthrie IK, Murphy BC, et al. Consistency and development of prosocial dispositions: A longitudinal study. *Child Dev.* 1999; 70:1360–72. [PubMed: 10621961]
16. Catalano, RF.; Hawkins, JD. The social development model: A theory of antisocial behavior. In: Hawkins, JD., editor. Delinquency and crime: Current theories. New York: Cambridge University Press; 1996. p. 149-97.
17. Catalano, RF.; Park, J.; Harachi, TW., et al. Mediating the effects of poverty, gender, individual characteristics, and external constraints on antisocial behavior: A test of the social development model and implications for developmental life-course theory. In: Farrington, DP., editor. Advances in criminological theory: Integrated developmental and life-course theories of offending. Vol. 14. New Brunswick, NJ: Transaction; 2005. p. 93-123.
18. Bongers IL, Koot HM, van der Ende J, Verhulst FC. The normative development of child and adolescent problem behavior. *J Abnorm Psychol.* 2003; 112:179–92. [PubMed: 12784827]
19. Johnston, LD.; O'Malley, PM.; Bachman, JG. Monitoring the Future national survey results on drug use, 1975–2000. Volume I: Secondary school students (NIH Publication No. 01-4924). Bethesda, MD: National Institute on Drug Abuse; 2001.
20. Newcomb, MD.; Bentler, PM. Consequences of adolescent drug use: Impact on the lives of young adults. Newbury Park, CA: Sage; 1988.
21. Maggs JL, Patrick ME, Feinstein L. Childhood and adolescent predictors of alcohol use and problems in adolescence and adulthood in the National Child Development Study. *Addiction.* 2008; 103:7–22. [PubMed: 18426537]
22. Chassin L, Pitts SC, DeLucia C. The relation of adolescent substance use to young adult autonomy, positive activity involvement, and perceived competence. *Dev Psychopathol.* 1999; 11:915–32. [PubMed: 10624732]
23. Schulenberg JE, Merline AC, Johnston LD, et al. Trajectories of marijuana use during the transition to adulthood: The big picture based on national panel data. *J Drug Issues.* 2005; 35:255–80. [PubMed: 16534532]
24. King KM, Meehan BT, Trim RS, Chassin L. Marker or mediator? The effects of adolescent substance use on young adult educational attainment. *Addiction.* 2006; 101:1730–40. [PubMed: 17156172]
25. Brady KT, Randall CL. Gender differences in substance use disorders. *Psychiatr Clin N Am.* 1999; 22:241–52.
26. Room R. Stigma, social inequality and alcohol and drug use. *Drug Alcohol Rev.* 2005; 24:143–55. [PubMed: 16076584]
27. Spoth R, Reyes ML, Redmond C, Shin C. Assessing a public health approach to delay onset and progression of adolescent substance use: Latent transition and log-linear analyses of longitudinal family preventive intervention outcomes. *J Consult Clin Psychol.* 1999; 67:619–30. [PubMed: 10535229]
28. Amato PR. The impact of family formation change on the cognitive, social, and emotional well-being of the next generation. *Future Child Fall.* 2005; 15:75–96.
29. Kosterman R, Haggerty KP, Spoth R, Redmond C. Unique influence of mothers and fathers on their children's antisocial behavior. *J Marr Fam.* 2004; 66:762–78.

30. Spoth R, Goldberg C, Nepl T, Trudeau L, Ramisetty-Mikler S. Rural-urban differences in the distribution of parent-reported risk factors for substance use among young adolescents. *J Subst Abuse*. 2001; 13:609–23. [PubMed: 11775086]
31. Spoth R, Redmond C. Effective recruitment of parents into family-focused prevention research: A comparison of two strategies. *Psychol Health*. 1994; 9:353–70.
32. Spoth R, Redmond C, Shin C. Direct and indirect latent-variable parenting outcomes of two universal family-focused preventive interventions: Extending a public health-oriented research base. *J Consult Clin Psychol*. 1998; 66:385–99. [PubMed: 9583342]
33. Spoth R, Redmond C, Kahn JH, Shin C. A prospective validation study of inclination, belief, and context predictors of family-focused prevention involvement. *Fam Process*. 1997; 36:403–29. [PubMed: 9543661]
34. Mason WA, Kosterman R, Haggerty KP, et al. Dimensions of adolescent alcohol involvement as predictors of young adult major depression. *J Stud Alcohol*. 2008; 69:275–85.
35. Mokken RJ, Lewis C. A non parametric approach to the analysis of dichotomous item responses. *Appl Psychol Mes*. 1982; 6:417–30.
36. Hawkins JD, Doueck HJ, Lishner DM. Changing teaching practices in mainstream classrooms to improve bonding and behavior of low achievers. *Am Educ Res J*. 1988; 25:31–50.
37. Muthén, LK.; Muthén, BO. Mplus user's guide. 4. Los Angeles, CA: Muthén & Muthén; 1998–2007.
38. Muthén B. Multiple-group structural modeling with non-normal continuous-variables. *Br J Math Stat Psychol*. 1989; 42:55–62.
39. Hindelang, MJ.; Hirschi, T.; Weis, JG. Measuring delinquency. Beverly Hills: Sage; 1981.
40. Hawkins JD, Kosterman R, Catalano RF, Hill KG, Abbott RD. Effects of social development intervention in childhood fifteen years later. *Arch Pediatr Adolesc Med*. 2008; 162:1133–41. [PubMed: 19047540]

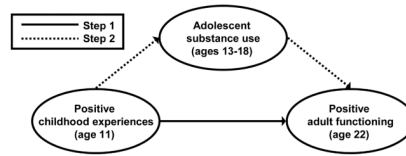


Figure 1.

Analysis model. First, prosocial continuity was examined in four separate models predicting each domain of positive adult functioning from the corresponding measure of positive childhood experiences. Next, adolescent substance use was added to each model as a possible mediating mechanism.

Table 1

Correlations among Indicator Variables Used in Analyses

Construct (age)	Civ. inv. (11)			Civ. inv. (22)			Sub. use (13-18)			Pro./res. (11)			Pro./res. (22)			Sub. use (13-18)				
	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	
Civ. inv. (11)																				
(a) ^a	.40*	.33*	.16*	.14*	.21*	-.11*	-.12*	-.04	.46*	.27*	.14*	.15*	.23*	-.16*	-.07	-.24*				
(b)		.36*	.09	.11*	.12*	-.09	-.14*	-.06		.14*	.24*	.13*	.07	-.21*	-.01	-.12*				
(c)			.25*	.19*	.24*	-.07	-.04	-.01			.04	.05	.05	-.12*	-.07	-.06				
Civ. inv. (22)																				
(a)			.42*	.24*	-.11	-.13*	-.07				.18*	.13*	-.15*	.07	.01					
(b)				.30*	-.21*	-.15*	-.06				.41*	-.17*	-.14*	-.27*						
(c)					-.12*	-.13*	-.15*					-.10	-.19*	-.29*						
Int. con. (11)																				
(a)			.28*	.31*	.17*	.18*	.09	-.22*	-.08	-.28*		.21*		-.12*	-.09	-.11*				
(b)				.16*	.10	.34*	.24*	-.17*	-.15*	-.12*				-.11	-.04	-.18*				
(c)					-.01	.13*	.02	-.19*	-.11*	-.25*										
Int. con. (22)																				
(a)					.14*	.13*	-.09	-.12*	-.08					.53*	.42*					
(b)						.27*	-.10	-.03	-.12*						.39*					
(c)							-.12	-.11	-.06											

Note. civ. inv. = civic involvement; pro./res. = productivity and responsibility; int. con. = interpersonal connection; phys. exe. = physical exercise; sub. = substance.

*
p < .05.

^aLetters correspond to indicators described in the text.

Table 2

Effects of Adolescent Substance Use on the Relationship between Positive Childhood Experiences and Positive Adult Functioning within Each Domain

Model: Domain of positive functioning	Model path coefficients ^a (95% confidence interval)						Model fit ^b		
	Step 1		Step 2				χ^2 (df)	CFI	RMSEA
	Childhood experiences → Adult functioning (w/o adol. sub. use)	Childhood experiences → Adult functioning (w/ adol. sub. use)	Childhood experiences → Adolescent sub. use.	Adolescent sub. use → Adolescent sub. use.	Adolescent sub. use → Adult functioning				
Civic involvement	.47*** (.30 to .63)	.41*** (.23 to .58)	-.20* (-.36 to -.05)	-.23* (-.41 to -.06)	32.59 (24)	.982	.029		
Productivity and responsibility	.35* (.18 to .51)	.26* (.09 to .44)	-.26** (-.42 to -.11)	-.35* (-.53 to -.17)	70.50*** (24)	.900	.067		
Interpersonal connection	.55* (.31 to .78)	.55* (.24 to .85)	-.49*** (-.65 to -.33)	-.03 (-.32 to .26)	45.54*** (23)	.940	.048		
Physical exercise	.22*** (.11 to .32)	.20*** (.09 to .30)	-.16* (-.28 to -.03)	-.12 (-.26 to .02)	6.75 (4)	.987	.040		

Note. adol. = adolescent; sub. = substance.

* $p < .05$;

** $p < .01$;

*** $p < .001$.

^a Entries are standardized path coefficients with 95% confidence intervals in parentheses.

^b Model fit indices are based on the final models including adolescent substance use. $N = 429$ for all models.