

Regular Article

Cascade effects of a parenting-focused program for divorced families on three health-related outcomes in emerging adulthood

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Abstract

Using data from a 15-year longitudinal follow-up of a randomized controlled trial of a parenting-focused preventive intervention for divorced families ($N = 240$) with children aged 9–12, the current study examined alternative cascading pathways through which the intervention led to improvements in offspring's perceived health problems, BMI, and cigarette smoking in emerging adulthood. It was hypothesized that the program would lead to improvements in these health-related outcomes during emerging adulthood through progressive associations between program-induced changes in parenting and offspring outcomes, including mental health problems, substance use, and competencies. Intervention-induced improvements in positive parenting at posttest led to improvements in mental health problems in late childhood/early adolescence, which led to lower levels of mental health and substance use problems as well as higher levels of competencies in adolescence, which led to improvements in the health-related outcomes. Academic performance predicted all three health-related outcomes and other aspects of adolescent functioning showed different relations across outcomes. Results highlight the potential for intervention effects of preventive parenting interventions in childhood to cascade over time to affect health-related outcomes in emerging adulthood.

Keywords: cascade effects; divorce; emerging adulthood; health-related outcomes; parenting intervention

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Introduction

There is compelling evidence that prevention programs that target improvements in parenting have long-term effects on offspring's health-related behaviors, such as the use of alcohol, cannabis, illicit substances, and non-prescribed narcotics as well as their engagement in risky sexual behavior (e.g., Brody et al., 2010; DeGarmo et al., 2009; Spoth et al., 2017; 2022; Zhou et al., 2008). However, these specific behaviors represent only a subset of potential health-related outcomes. Very few researchers have examined the effects of parenting-focused programs on other health-related behaviors.

Four studies that focused on other health-related outcomes investigated the effects of parenting-focused programs on body mass index (BMI) or obesity. Studying an adaptation of the Incredible Years Program and Parent Corps for preschoolers, Brotman et al. (2012) found program-induced reductions in BMI, blood pressure, and odds of obesity an average of five years after participation. In a sample of at-risk toddlers, Smith et al. (2015) found that the Family Check-Up (FCU) led to a less steep increase in BMI scores and prevented children from progressing to overweight or obese status in early to late childhood. Van Ryzin and Nowicka (2013) found indirect effects of the FCU for high-risk adolescents on obesity in young adulthood. Brody et al. (2019) found that participation in Strong African American Families in

early adolescence reduced BMI for females eight to 14 years after participation. Only two research groups have examined the effect of prevention programs that target parenting on cigarette smoking. Spoth and his colleagues found that the Strengthening Families Program as well as this program combined with Life Skills Training when provided to youth between 10 and 14 years of age reduced cigarette use in both late adolescence (Spoth et al., 2008) and young adulthood (Spoth et al., 2016; 2022). Examining the effects of Linking the Interests of Families and Teachers, DeGarmo et al. (2009) found that children who participated in the program during fifth grade had less tobacco use in grade 12. Only one study has examined the impact of a preventive parenting intervention on perceptions of physical health. In a sample of children aged 5 to 11 from families involved with the child welfare system, Lanier et al. (2018) found that compared to services-as-usual, the Triple P Parenting intervention did not improve the physical health component of a measure of health-related quality of life.

The current study provides a rare opportunity to expand this limited literature by examining whether a parenting-focused prevention program delivered in late childhood/early adolescence, which did *not* explicitly target improvements in health, led to improvements in health-related outcomes in emerging adulthood. More specifically, it examines direct as well as cascade effects models of the effects of the New Beginnings Program, a parenting-focused program for divorced parents that was delivered when the offspring were in late childhood to early adolescence, on three health-related outcomes in emerging adulthood: perceived health problems, Body Mass Index (BMI), and cigarette smoking. Below, we discuss the prevalence of parental divorce and its effects on

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health-related outcomes and describe the New Beginnings Program. We then discuss the cascade effects model as well as empirical support and possible mechanisms for the theorized pathways through which program-induced improvements in offspring's internalizing and externalizing problems, substance use and competencies in adolescence may affect the physical health-related outcomes that were examined. We then describe the current study.

Prevalence and effects of parental divorce on development of physical health-related outcomes

In 2020, there were 18.6 million children living with a single, divorced parent in the United States (Statista, 2022). Compelling evidence demonstrates that parental divorce confers risk for multiple physical health problems. Relative to their counterparts in two-parent families, children from divorced families have poorer self-rated health (Thuen et al., 2015), more accidental injuries (O'Connor et al. 2000), greater rates of asthma (Thompson et al., 2020), and higher BMI index and increased risk for obesity (Kyler et al., 2021).

Adults with a history of parental divorce report poorer self-rated health (e.g., Thomas & Högnäs, 2015) and health practices (Larson & Halfon, 2013), such as increased likelihood of cigarette smoking (e.g., Amiri et al., 2021), and are more likely to have obesity (Font & Maguire-Jack, 2016). They also demonstrate increased chronic (e.g., Maier & Lachman, 2000) and acute health problems (e.g., Maier & Lachman, 2000), including increased inflammation (Lacey et al., 2013), diabetes (Varis et al., 2022), and heart attacks (Monnat & Chandler, 2015), as well as increased mortality risk (Larson & Halfon, 2013). The high prevalence of divorce and its broad, lasting effects mean that the impact of parental divorce on population rates of physical health problems is substantial and that interventions that mitigate its effects could significantly reduce its public health burden.

Effects of the New Beginnings Program

Based on a risk and protective factor model of the development of problem outcomes and person–environment frameworks (Cicchetti & Schneider-Rosen, 1986; Sameroff, 1975), the New Beginnings Program targeted the four risk and protective factors that were most strongly associated with children's outcomes in correlational studies of children in divorced families in the research available at the time the program was developed: parent-child relationship quality, effective discipline, exposure to interparental conflict, and father-child contact. From the perspective of a developmental cascade model (e.g., Cicchetti & Sroufe, 2000), program-induced changes in these processes at posttest are theorized to decrease offspring's problem outcomes and increase their competencies in subsequent periods of development through their effect on short-term reductions in internalizing and externalizing problems (Wolchik et al., 2007). The majority of the program focused on improving positive parenting, defined as high-quality parent-child relationships and effective discipline.

Three randomized controlled trials involving over 1,500 children found positive short-term effects of the New Beginnings Program on children's internalizing and externalizing problems (Sandler et al., 2018, 2021; Tein et al., 2018; Wolchik et al., 1993, 2000). For one of the samples (Wolchik et al., 2000), 6-year and 15-year follow-ups were conducted. These follow-ups found program effects, including reductions in diagnoses of mental disorders, substance use disorders, and time in jail, as well as improvements in self-esteem and grade

point average (GPA), with effect sizes at the 6- and 15-year follow-ups ranging from .20 to .67 (mean = .44) and .40 to .61 (mean = .51), respectively (Herman et al., 2015; Sandler et al., 2021; Wolchik et al., 2007). Several studies showed that the program-induced effects to improve positive parenting mediated the effects of the New Beginnings Program on multiple outcomes at posttest and the six-month and six-year follow-ups (Tein et al., 2004; Vélez et al., 2011; Wolchik et al., 2000; Zhou et al., 2008). To understand the long-term fiscal impact of the program, a rigorous cost-benefit analysis was performed that examined the individual and societal costs associated with mothers' and emerging adult offspring's mental health service use and prescription drug use as well as offspring's encounters with the adult justice system. Using service use data for the *one-year* period before the 15-year follow-up, analyses showed a \$1,600 savings per family in the New Beginnings Program compared to the control condition (Herman et al., 2015).

Developmental cascade models

A central scientific goal of developmental psychopathology is to unravel the developmental pathways that lead to positive and negative adaptation outcomes (e.g., Cicchetti & Sroufe, 2000). One approach to studying these pathways is to model cascading effects, or the progressive associations among various domains of functioning over time (Masten & Cicchetti, 2010; Rutter & Sroufe, 2000). In these models, change in a particular area of functioning is viewed as initiating a domino effect of consequences, impacting both the initial area of adaptation and other areas of adaptation in subsequent developmental stages (Sameroff, 2000). Studies with the New Beginnings Program data set found support for cascade effects models in which program-induced improvements in positive parenting led to decreases in offspring's internalizing and externalizing problems in late childhood/early adolescence, which then led to lower mental health and substance use problems and higher work, academic, and peer competencies in adolescence, which in turn led to more adaptive functioning in emerging adulthood (Wolchik et al., 2016; 2021). The current study tests a direct effects model and as well as cascade effects models of the links between program-induced improvements in positive parenting in late childhood/early adolescence, internalizing problems and externalizing problems in late childhood/early adolescence; internalizing problems and externalizing problems, alcohol/marijuana use, adaptive coping, self-esteem and grade point average (GPA) in adolescence that were affected either directly or indirectly by the New Beginnings Program and three health-related outcomes in emerging adulthood: perceived health problems, BMI and cigarette smoking.

Support for pathways between adolescent functioning and health-related outcomes in emerging adulthood

There is a theoretical basis and empirical support for six domains of functioning in adolescence predicting health-related outcomes in adulthood: internalizing problems, externalizing problems, alcohol/marijuana use, GPA, adaptive coping, and self-esteem.

Internalizing problems. Researchers have found that internalizing problems in adolescence predict subsequent adverse health outcomes, including perceived health problems and general physical health (e.g., Hoyt et al., 2012; Keenan-Miller et al., 2007; Naicker et al., 2013; Patton et al., 1998), cigarette smoking (e.g., Dierker et al., 2015; McKenzie et al., 2010) and BMI (e.g., Hasler et al., 2005; Roberts and Duong, 2013). For example, Keenan-Miller et al. (2007) found that depression at age 15 was

associated with poorer interviewer-rated health, poorer self-perceived general health, higher healthcare utilization, and increased work impairment due to physical health problems at age 20. Internalizing problems in adolescence may lead to adverse health behaviors through several mechanisms. Correlates of depression, such as unhealthy eating (e.g., Huang et al., 2017) and infrequent exercise (Roshanaei-Moghaddam, 2009) could contribute to adverse health-related behaviors. Other possible mechanisms include the compounding bidirectional effects of chronic stress and rumination, which are common features of both physical and internalizing problems, as well as inflammatory responses triggered by stress, rumination, and heightened fear responses associated with internalizing problems (van de Pavert et al., 2017).

Externalizing problems. Studies have found that externalizing problems in adolescence predict smoking (e.g., Alaie et al., 2023; Fergusson et al., 2007; Jester et al., 2019) and higher BMI (e.g., Slane et al., 2010) in adulthood. To our knowledge, the relations between externalizing in adolescence and perceived health problems in emerging adulthood have not been examined. One plausible explanation for the association between externalizing problems and smoking involves deviance theories. Deviance theories view various deviant behaviors as reflecting a unified syndrome characterized by alternate manifestations of a propensity to violate normative standards of behavior that remains cohesive into adulthood (Donovan et al., 1988). Another possibility, which is based on the Self-Medication Theory (Khantzian, 1997), is that individuals with high levels of externalizing problems smoke to reduce the frequency of their anger experiences (Jamner et al., 1999), improve attentional problems, or both (e.g., McClernon & Kollins, 2008; Van Amsterdam et al., 2018). Affective lability and impulsivity, which are associated with externalizing problems, may contribute to cigarette smoking as well as overeating that is associated with higher BMI. It is possible that externalizing problems could affect perceived health problems through exposure to high-risk environments, which could promote behaviors that lead to poor health-related outcomes.

Alcohol/Marijuana use. Research has shown positive associations between both alcohol use (e.g., Paavola et al., 2004; Riala et al., 2004) and cannabis use (e.g., Patton et al., 2005; Taylor et al., 2017) in adolescence and cigarette smoking in adulthood. For example, cannabis use in non-cigarette-smokers in adolescence has been found to predict cigarette smoking initiation in young adulthood (e.g., Coffey & Patton, 2016). Cannabis use in adolescence has also been shown to relate to poorer self-reports of overall physical health in adulthood (Terry-McElrath et al., 2017). Alcohol use in adolescence has been related to greater health problems (Oesterle et al., 2004) as well as better self-reported health status (French & Zavala, 2007). The research on the relations between cannabis use in adolescence and BMI in early adulthood is inconsistent. Some researchers have found non-significant relations (e.g., Capaldi et al., 2022), others have found positive relations (e.g., Ellickson et al., 2004; Huang et al., 2013) and others have found inverse relations (e.g., Meier et al., 2019). The research examining alcohol use in adolescence and BMI in emerging adulthood is also inconsistent (e.g., Huang et al., 2013; Oesterle et al., 2004; Pajari et al., 2010). Plausible mechanisms for the positive association between adolescent alcohol and cannabis use and later problematic health-related outcomes include its association with the development of detrimental lifestyles, such as unhealthy diet, which may heighten the risk of obesity (Pasch et al., 2012) and continued exposure to high-risk environments that could promote behaviors that could lead to more health problems, higher BMI, and smoking.

Possible mechanisms for the inverse relations between cannabis use and BMI may occur because cannabis increases one's metabolism and raises the amount of fat the body burns (Huang et al., 2013) by reducing the number and signaling efficiency of cannabinoid receptors that play a role in the regulation of food intake and energy expenditure (Meier et al., 2019). It has been suggested that the inverse relations between alcohol use and BMI may be due to a positive relation between moderate alcohol use and physically active lifestyles (Smothers & Bertolucci, 2001), such that the energy intake through alcohol is offset by the extra energy consumed through physical activity (French et al., 2009).

Academic performance. Higher academic performance has been shown to predict smoking (e.g., Crane et al., 2021; White et al., 2002), BMI (e.g., Alatupa et al., 2010; Sobol-Goldberg & Rabinowitz, 2016) and perceived health problems (e.g., Herd, 2010; Maggs et al., 1997). For example, Sobol-Goldberg and Rabinowitz (2016) found that poorer academic achievement in adolescence predicted higher BMI in early adulthood. Academic performance in adolescence may affect health-related behaviors in emerging adulthood through several mechanisms. It may increase the probability of obtaining higher paying jobs, which may make healthy foods more affordable (Drewnowski, 2010), facilitate access to preventive health care, promote healthier lifestyles as well as reduce economic stress that can lead to smoking and emotional eating (Tan & Chow, 2014). Academic success may also be associated with "learned effectiveness" (Mirowsky & Ross, 2005), which can lead to perceptions that a healthy lifestyle is within one's control and increased knowledge about behaviors that promote healthy choices. In addition, higher academic performance may increase access to health-related information, increase the ability to comprehend and act on the information, allow a clearer understanding of the risk related to behaviors like smoking (Clausen, 1991) and provide knowledge and skills that increase personal control and agency that lead to healthy behaviors and a healthy lifestyle (Herd, 2010; Hitlin & Kirkpatrick Johnson, 2015; Mirowsky & Ross, 2007). Further, if youth are highly involved in academic and school-related activities, they may have fewer potential opportunities to experiment with tobacco, and may derive more a positive view of themselves, which in itself may be protective (e.g., Kaplan et al., 1987).

Adaptive coping. Research has provided support for inverse relations between adaptive coping and perceived health problems (e.g. Park & Alder, 2003; Schreuder et al., 2012) and cigarette smoking (e.g., Carvajal & Granillo, 2006; Steiner et al., 2002). Avoidant coping has been shown to be related to unhealthy eating behaviors (Martyn-Nemeth et al., 2009), which could increase BMI. Also, an increase in stress has been associated with an increase in the consumption of high calorie foods (O'Connor & O'Connor, 2011) and stress-related eating has been positively related to BMI (Jääskeläinen et al., 2014). In a sample of medical students, Park and Adler (2003) found that the use of adaptive coping strategies, such as planful problem solving and positive reappraisal, was prospectively associated with better physical health (Steiner et al., 2002). Adaptive coping may promote the effective management of negative affect, potentially preventing behaviors like smoking and overeating (Herren et al., 2021) which, in turn, could lead to worsened perceived health problems. It is also possible that adolescents with higher levels of adaptive coping experience less stress, which could affect their perceived health problems, cigarette smoking and eating habits.

Self-esteem. It is well documented that self-esteem in adolescence is inversely, longitudinally related to cigarette smoking (e.g., Boden et al., 2008), obesity (e.g., Park, 2003; Trzesniewski

et al., 2006) and perceived health problems (e.g., Arsandaux et al., 2019; Jafflin et al., 2019; Trzesniewski et al., 2006). For example, Trzesniewski et al. (2006) found that adolescents with low self-esteem were more likely to have poor cardiorespiratory health, high waist-to hip ratios, and poor self-perceived health 11 years later than those with high self-esteem, controlling for gender, SES, adolescent depression, and childhood BMI. Higher self-esteem may increase opportunities for mastery and enable individuals to make better choices, including adopting healthy behaviors (Kliewer & Sandler, 1992), which could affect health-related outcomes. It is also possible that higher self-esteem regulates responses to the threat of rejection in a manner that can benefit health or help individuals recover from stress more quickly (Stinson & Fisher, 2020). Higher self-esteem may also increase the use of adaptive coping strategies, reduce exposure to stressors, or both (Lo, 2002), which could affect health-related outcomes.

Contributions of the current study and hypotheses

Assessing the cascade effects of the New Beginnings Program on health-related outcomes in emerging adulthood is particularly important because physical health and lifestyle factors in this developmental stage have important implications for health problems later in life. For example, having an unhealthy weight in emerging adulthood has significant physical health implications, such as increased risk of hypertension, diabetes, cardiovascular disease, and higher mortality (Cheng et al., 2016; Guo et al., 2016; Hirko et al., 2015). Also, interventions with parents that are intended to trigger positive and progressive effects over time offer compelling experimental tests of predictions of cascade models that are based on developmental systems theory as well as resilience theory (Masten & Cicchetti, 2010). Two features of this study increase the rigor of these tests. First, the longitudinal design provides temporal precedence between the proposed antecedents, mediational processes, and the outcomes, which allows one to rule out interpreting significant paths in the model as being due to a reverse order of causation (Cole & Maxwell, 2003; Kraemer et al., 2002). Second, the current study examined multiple mediators and tested the impact of each pathway while controlling for other potential pathways.

Based on past research, intervention-induced improvements in positive parenting were expected to lead to improvements in internalizing problems and externalizing problems in late childhood/early adolescence, which were expected to relate to improvements in internalizing problems and externalizing problems, alcohol/marijuana use, adaptive coping, self-esteem and GPA in adolescence, which were expected to be associated with lower perceived health problems, lower BMI and less cigarette smoking. Internalizing problems and externalizing problems were expected to be related to higher perceived health problems, BMI and cigarette smoking. Higher adaptive coping, self-esteem and GPA were expected to be related to lower perceived health problems, BMI, and cigarette smoking. Alcohol/marijuana use was predicted to be associated with higher cigarette smoking and lower perceived health problems. Based on past research that has shown inconsistent relations between alcohol/marijuana use and BMI, a directional hypothesis was not made.

Method

Participants

The sample included 240 offspring of divorced parents who participated in a randomized controlled trial of the New Beginnings Program in late childhood/early adolescence (9–12 years old).

Potential participants were identified primarily through court records of divorce decrees in a large Southwestern metropolitan county; 20% were recruited by media advertisements or word of mouth. Eligibility criteria are provided in Wolchik et al. (2000). In families with multiple children in the age range, one was randomly selected as the target child for assessments to ensure independence of responses.

Families were randomly assigned to: (a) a mother-only program (MP, $n = 81$ families), (b) a mother-plus-child program (MPCP; separate, concurrent groups for mothers and children, $n = 83$ families), or (c) a literature control condition (LC, $n = 76$ families). Given the lack of differences between the MP and MPCP programs on almost all of the variables at each of the six assessments (tests included all mediators and outcome variables in this study), these conditions were combined and labeled as the New Beginnings Program.

At pretest, children averaged 10.4 years old ($SD = 1.1$; range = 9–12); 49% were girls. Mothers' mean age was 37.3 years ($SD = 4.8$); 98% had at least a high school education. Mothers' ethnicity was 88% non-Hispanic White, 8% Hispanic, 2% Black, 1% Asian or Pacific Islander, and 1% other. Parents had been separated and divorced an average of 2.2 years ($SD = 1.4$) and 1.0 year ($SD = 0.5$), respectively, before program entry. The average age of the offspring was 16.9 at the six-year follow-up ($SD = 1.1$, range = 15.1–19.1) and 25.6 at the 15-year follow-up ($SD = 1.2$, range = 24–28). Educational attainment at the 15-year follow-up was: Less than high school – 2.6%; High school – 22.1%; Some college – 45.4%; College graduate – 29.4%; Postgraduate – 3.1%. Fifty-one percent were married or living as if married. Median annual income was \$30,000 (\$5,000 categories ranging from $\leq \$5,000$ to $\geq \$200,000$).

Intervention conditions

The mother program consisted of 11 group sessions (1.75 hours) and two individual sessions that focused on improving mother-child relationship quality and effective discipline, decreasing barriers to father-child contact, and reducing children's exposure to interparental conflict. Based on social learning and cognitive behavioral theories, the highly structured program used active learning methods, videotaped modeling, and roleplays in the sessions, and parents were assigned practice of the program skills.

In the mother-plus-child program, mothers participated in the mother program and children participated in a concurrently run 11-session group program. The child program targeted active coping, avoidant coping, threat appraisals of divorce stressors, and mother-child relationship quality. Didactic presentations, videotapes, leader modeling, role plays, and games were used to teach the program skills; homework to practice the program skills was assigned. For more information about the programs, see (Wolchik et al., 2000, 2007).

In the literature control, mothers and children received three books about children's divorce adjustment over a three-month interval. Mothers and children reported reading about half of the books.

Procedure

Families were interviewed at: pretest (T1), posttest (T2), and 3-month (T3), 6-month (T4), 6-year (T5), and 15-year (T6) follow-ups. Participation at the offspring level was 100% at T1, 98.3% at T2 and T3, 97.5% at T4, 90.8% at T5, and 80.8% at T6. The cascade effects models used data from all waves. Trained staff

conducted separate interviews with parents and offspring. Confidentiality was explained, and the parent and offspring signed consent/assent forms. Families received \$45 at T1 to T4; parents and offspring each received \$100 at T5. At T6, offspring received \$225; parents received \$50. Study procedures were approved by the Arizona State University Institutional Review Board.

Measures

We describe the measures and Cronbach alphas (α 's), when applicable, by the developmental period in which they were administered. Nearly all measures used the timeframe of the last month; exceptions are noted. We report reliability coefficients of the measures at the assessments used in this study.

Late childhood/early adolescence (T1, 2, 3, 4)

Demographics and pretest risk

At the pretest, mothers completed information on demographic variables (e.g., ethnicity, age, length of divorce). Because several studies have shown that the New Beginnings Program had stronger effects for youth who had higher risk at pretest (Dawson-McClure et al., 2004; Wolchik et al., 2007, 2021), we included a measure of pretest risk as a covariate for all mediators and outcomes and tested whether it moderated the intervention effect on the mediators and outcomes. The risk score was a composite of (a) environmental stressors (i.e., composite of interparental conflict, negative life events that occurred to the child, capita annual income) and (b) mother and child reports of child externalizing problems at pretest as described below.

Positive parenting

T1 and T2 positive parenting was a composite of mother and child reports of mother-child relationship quality and effective discipline on several measures. Zhou et al. (2008) used confirmatory factor analysis to examine the two-factor parenting constructs (mother-child relationship quality, effective discipline) at T1 and T2 and showed adequate fit of the models. The two constructs were strongly related ($r = .70$ at T1; $r = .69$ at T2 (see Zhou et al., 2008)).

Mother-child relationship quality

Mothers and children completed shortened (10-item) versions of Teleki et al.'s (1982) adaptation of the Child Report of Parenting Behavior Inventory (CRPBI; Schaefer, 1965) Acceptance and Rejection subscales; α 's at T1 and T2 were .78 and .81, respectively for mother reports and .84 and .89 child reports. Mothers and children completed the 10-item Open Family Communication subscale of the Parent-Adolescent Communication Scale (Barnes & Olson, 1982); α 's were .72 and .75 for mother reports and .82 and .87 for child reports at T1 and T2, respectively. Mothers completed a 7-item adaptation of the Family Routines Inventory (Jensen et al., 1983) that assessed mother-child dyadic interactions (T1 $\alpha = .67$, T2 $\alpha = .63$). These scales have adequate reliability and validity (e.g., Barnes & Olson, 1985; Capaldi, 1991; Cohen et al., 2000; Demo et al., 1987; Fogas et al., 1987; Schaefer, 1965; Wolchik et al., 2000). Consistent with other studies on the New Beginnings Program, mother and child report scales were standardized and averaged to create a composite. The weighted α 's (Rozeboom, 1969) of the composite were .88 (T1) and .90 (T2).

Effective discipline

Mothers and children completed the 8-item Inconsistent Discipline subscale of CRPBI (Schaefer, 1965); α 's were .81 and

.80 for mother reports at T1 and T2, and .72 and .73 for child reports at T1 and T2, respectively. Mothers also completed the 14-item appropriate/inappropriate discipline subscale (T1 $\alpha = .70$, T2 $\alpha = .71$) and the 11-item follow-through subscale (T1 $\alpha = .80$, T2 $\alpha = .76$) of the Oregon Discipline Scale (Oregon Social Learning Center, 1991). These scales have adequate reliability and validity (e.g., Fogas et al., 1987; Schaefer, 1965). These scales were standardized and averaged to create a composite. The weighted α 's were .84 and .89 at T1 and T2.

Internalizing and externalizing problems

At T1, T3, and T4, mothers completed the 31-item internalizing and 33-item externalizing subscales of the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983). Adequate reliability and validity have been reported (Achenbach, 1991). The α 's for internalizing problems were between .85 and .88; the α 's for the externalizing problems were all .87.

Child report of depression during the last two weeks was measured with the 27-item Child Depression Inventory (CDI; Kovacs, 1981; α 's ranged from .76 to .80). The CDI has adequate reliability and validity (e.g., Saylor et al., 1984). Child report of anxiety was assessed with the 28-item Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978; α 's ranged from .88 to .91). The RCMAS has adequate reliability and validity (e.g., Reynolds & Paget, 1981). A composite of the mean of the standardized scores of the CDI and RCMAS ($r = .58-.67$ across assessments) was used.

Child externalizing problems were assessed with the 30-item aggression and delinquency subscales of the Youth Self Report (YSR; Achenbach, 1991; α 's ranged from .86 to .88). Reliability and validity of these subscales have been demonstrated (Achenbach, 1991).

Given the short interval between T3 and T4, scores at these assessments were averaged. The correlations of mother and child reports across assessments were .26-.32 for internalizing problems and .25-.34 for externalizing problems. Composite scores of internalizing and externalizing problems, separately, were constructed by averaging the standardized scores of mother and child reports.

Adolescence (T5)

Except for self-esteem and adaptive coping, all adolescent measures were administered only at T5.

Externalizing and internalizing problems

Adolescents' mental health problems were assessed by symptoms of externalizing and internalizing disorders endorsed by either the parent or adolescent over the past year on the Diagnostic Interview Schedule for Children (DIS-C; Shaffer et al., 2000). Scores were computed separately for internalizing disorders (i.e., agoraphobia, generalized anxiety disorder, obsessive-compulsive disorder, panic disorder, post-traumatic stress disorder, social phobia, specific phobia, eating disorders, and major depression) and externalizing disorders (i.e., conduct disorder, oppositional defiant disorder, and attention-deficit/hyperactivity disorder) using symptom scores endorsed by either the parent or adolescent. The DIS has been validated against the WHO Schedules for Clinical Assessment in Neuropsychiatry (Wing, 1990).

Alcohol and cannabis use

Cannabis use and alcohol use in the past year were assessed using the Monitoring the Future Scale (Bachman et al., 1993). This scale

has adequate reliability and validity (e.g., Bachman et al., 1993). The mean of the frequency of cannabis and alcohol use was used.

Self-esteem

The six-item global self-worth subscale of Harter's (1985) Self-Perception Profile for Children was used to assess global self-esteem at T5 ($\alpha = 0.86$) and T1 ($\alpha = 0.71$). This measure has adequate reliability and validity (e.g., Muris et al., 2003).

Adaptive coping

Adaptive coping was assessed with the 24-item active coping subscale of the Children's Coping Strategies Checklist-Revised (Ayers et al., 1996; T1 $\alpha = .88$, T5 $\alpha = .92$) and 7-item Coping Efficacy Scale (Sandler et al., 2000; T1 $\alpha = .71$, T5 $\alpha = .82$). These measures have adequate reliability and validity (e.g., Sandler et al., 1994, 2000). The correlation between active coping and coping efficacy was .53 at T1 and .55 at T5, so these measures were standardized and averaged.

Grade point average (GPA)

High school cumulative GPA (unweighted based on 4.0 scale) was obtained for all participants regardless of current school enrollment. GPA has been shown to predict college grades (e.g., Westrick et al., 2015) as well as educational attainment and earnings in adulthood (e.g., French et al., 2015).

Emerging adulthood (T6)

All of the emerging adulthood measures were administered only at T6.

Perceived health problems

Perceived health problems were assessed with a multidimensional latent construct comprised of the following measures: the 12-item Somatization subscale from Symptom Checklist-90R ($\alpha = .82$; Derogatis & Spitz, 1994), which assessed distress arising from perceptions of bodily dysfunction in the last 7 days, and three subscales from the Short Form Health Survey (SF-36; Ware & Sherbourne, 1992): general health perception (6 items; $\alpha = .76$), limitations in usual role activities because of physical health problems (4 items; $\alpha = .80$), and bodily pain (2 items; $\alpha = .71$). These measures have adequate reliability and validity (e.g., Brazier et al., 1992). A confirmatory factor analysis showed that a one-dimension factor fit the data well [χ^2 (df = 2) = .776, CFI = 1.00, root-mean-square error of approximation (RMSEA) = 0]. The latent construct was used in the model. The standardized factor loadings ranged from .52 to .78. Higher scores indicate more perceived health problems.

Body Mass Index (BMI)

During the in-home interviews, weight was measured by trained interviewers using a standard scale and height was measured using a tape measure. BMI was calculated based on weight and height using the standard formula (i.e., weight (kg) / [height (m)]²). BMI in young adulthood has been shown to predict premature mortality later in life (Hirko et al., 2015; Park et al., 2012).

Cigarette smoking

Number of days on which cigarettes were smoked in the past 30 days was assessed using the Tobacco subscale from the Youth Risk Behavior Survey (Centers for Disease Control and Prevention, 2008). Higher rates of smoking have been shown to relate wide array of health problems including cancer, stroke, coronary heart

disease, and diminished overall health (U.S. Department of Health and Human Services, 2014).

Statistical analysis

This is a secondary data analysis using data from a multi-wave longitudinal study to examine the direct effects of the New Beginnings Program and the cascade mediation processes from the New Beginnings Program on promoting positive parenting in late childhood/early adolescence (T2) to outcomes in late childhood/early adolescence (T3, T4) to outcomes in adolescence (T5) to health-related outcomes in emerging adulthood (T6). We first applied multiple regression to test the overall intervention effects on the health-related outcomes 15 years after the intervention, including whether the intervention effects were modified by pretest risk or offspring gender. We then conducted the mediation models to test the hypothesis that the effects of the New Beginnings Program on posttest (T2) positive parenting would lead to fewer internalizing and externalizing problems three and six months after the intervention (T3 & T4), which would lead to fewer internalizing and externalizing symptoms, less substance use, as well as higher adaptive coping, self-esteem, and GPA six years following the intervention (T5), which in turn, would affect health-related outcomes fifteen years following the intervention (T6). The variables administered at the same assessment point were correlated with each other. We examined each 15-year outcome separately to reduce the number of parameter estimates with the limited sample size. In general, for a model having more than one outcome in a model, the effects on one outcome have little effect on another outcome.

For each post-intervention late childhood/early adolescent, adolescent, and emerging adulthood mediator and outcome measure, we included direct paths from intervention condition to test direct intervention effects as well as pretest risk, and the intervention condition \times risk interaction to examine possible moderated intervention effects by risk. In addition, we added the pretest positive parenting \times intervention interaction in predicting posttest positive parenting given that Wolchik et al. (2000) showed that the program effect on parenting was stronger for families with lower pretest parenting scores. We also included pretest internalizing problems and self-esteem as covariates for all health-related outcomes given that Wolchik et al. (2013) found participants in the 15-year follow-up had higher internalizing problems and lower self-esteem at pretest than non-participants. We controlled for T1 covariates of the same or similar measure if available. For each health-related outcome, we included a proxy variable at T5 as a covariate. We included mother report of the somatic complaints subscale of CBCL ($\alpha = .63$; Achenbach & Edelbrock, 1983) as the covariate for perceived health problems, the overweight item from CBCL as the covariate for BMI, and an item about frequency of smoking cigarettes in the past month from the Monitoring the Future Scale (Bachman et al., 1993) as the covariate for smoking. Further, we included offspring gender as a covariate for each mediator and outcome.

The cascade mediation models were tested using structural equation modeling with Mplus 8 (Muthén & Muthén, 1998). Full information maximum likelihood method was applied to handle missing data. We examined mediation effects using the bias-corrected bootstrapping method, which has been shown to have good statistical power and excellent control of Type I error rates for 2-path or 3-path mediated effects (MacKinnon et al., 2002; Taylor et al., 2008). Power for 4-path mediated effects is

Table 1. Correlations and descriptive statistics of study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Group	1												
2. T2 Parenting	.09	1											
3. T3 + 4 Internalizing Problems	-.02	-.41**	1										
4. T3 + 4 Externalizing Problems	-.01	-.45**	.60**	1									
5. T5 Internalizing Symptoms	-.01	-.24**	.47**	.36**	1								
6. T5 Externalizing Symptoms	.01	-.27**	.33**	.47**	.52**	1							
7. T5 Substance Use	.05	-.04	.07	.22**	-.02	.15*	1						
8. T5 Self-esteem	.004	.16*	-.41**	-.26**	-.44**	-.40**	-.08	1					
9. T5 Adaptive Coping	-.05	.14	-.21**	-.19*	-.24**	-.31**	-.07	.54**	1				
10. T5 GPA	.12	.29**	-.20**	-.41**	-.28**	-.44**	-.13	.26**	.24**	1			
11. T6 Health	-.03	.01	.11	.14	.29**	.10	.06	-.12	-.14	-.22**	1		
12. T6 BMI	.02	-.12	.06	.12	.15*	.03	-.22**	-.14	-.19*	-.34**	.05	1	
13. T6 Smoking	-.03	-.09	.06	.12	.17*	.39**	.17*	-.17*	-.17*	-.43**	.001	.002	1
Mean	0.68	0.3	-0.62	-0.37	1.04	3.77	3.53	-0.19	0.64	2.85	-0.001	26.08	2.49
SD	0.46	0.56	0.59	0.67	0.77	2.43	1.72	0.61	0.98	0.68	2.09	6.04	2.54

Note: Group was coded such that 0=Literature Control and 1=New Beginnings Program.

smaller than power for 2-path or 3-path mediated effects. If zero were not included in the 90 or 95% confidence interval (CI), it was assumed that the mediated effect was statistically significant.

Results

The correlations among the study variables and their means and standard deviations are included in Table 1.

Direct effects

Multiple regression analyses showed that the main effects of intervention condition (New Beginnings Program vs. LC) on perceived health problems, BMI, and smoking at the 15-year follow-up were not significant. However, there was a significant interaction of condition \times gender on BMI (standardized) $\beta = 0.27$; $b = 3.40$, $SE = 1.52$, $z = 2.24$, $p = .03$), which favored females in the intervention program. Post-hoc probing analysis showed that there was a marginally significant improvement on BMI for females ($\beta = -.16$; $b = -2.02$, $SE = 1.04$, $z = 1.94$, $p = .053$; Cohen's $d = .38$) but not for males ($\beta = .11$; $b = 1.38$, $SE = 1.09$, $z = 1.27$, $p = .20$).

Cascade effects

Figures 1–3 show the cascade models for a) perceived health problems, b) BMI, and c) cigarette smoking. The figures present standardized regression coefficients for the paths along the mediation pathway that were significant (i.e., excluding the significant paths from the covariates to the mediators and outcomes). The size of these significant effects, including the interactions, were mostly between small to medium range ($M = .28$, range = .13–.53; where $\beta_{\text{small}} = .14$, $\beta_{\text{medium}} = .39$, and $\beta_{\text{large}} = .59$; Fritz & MacKinnon, 2007). Omitted from the figures were correlations of the variables administered at the same assessment point. The complete list of the path coefficients is

provided in Table 2 in the Supplementary Material. All models fit the data adequately (e.g., comparative fit index (CFI) $\geq .95$, RMSEA $\leq .05$; Standardized root-mean-square residual $\leq .05$; Hu & Bentler, 1999).

Childhood to adolescent mediators

The parameter estimates of the pathways from intervention condition to posttest and short-term follow-up (i.e., late childhood/early adolescence) variables to 6-year follow-up (i.e., adolescence) variables were mostly consistent across outcomes; the slight differences were due to using maximum likelihood method with models that had different outcome variables.

As expected, the pathways from the New Beginnings Program to positive parenting and internalizing problems and externalizing problems in late childhood/early adolescence and to internalizing and externalizing, substance use, self-esteem, active coping, and GPA in adolescence were consistent with the findings of the pathways in Wolchik et al.'s (2016, 2021) studies. Specifically, the New Beginnings Program increased positive parenting at posttest; this increase was greater for families with lower pretest scores. Posttest positive parenting was associated with fewer internalizing problems and externalizing problems at short-term (three- and six-month) follow-up. Internalizing problems and externalizing problems in late childhood/early adolescence were significantly related to internalizing symptoms and externalizing symptoms in adolescence, respectively. In addition, internalizing problems in late childhood/early adolescence were significantly related to lower self-esteem in adolescence and externalizing problems in late childhood/early adolescence were significantly related to higher substance use and lower GPA in adolescence. There were also significant moderated (by pretest risk) intervention effects on internalizing symptoms, externalizing symptoms, substance use, self-esteem, and adaptive coping, and GPA in adolescence. For each moderated effect, the New Beginnings Program had larger effects for those with higher pretest risk.

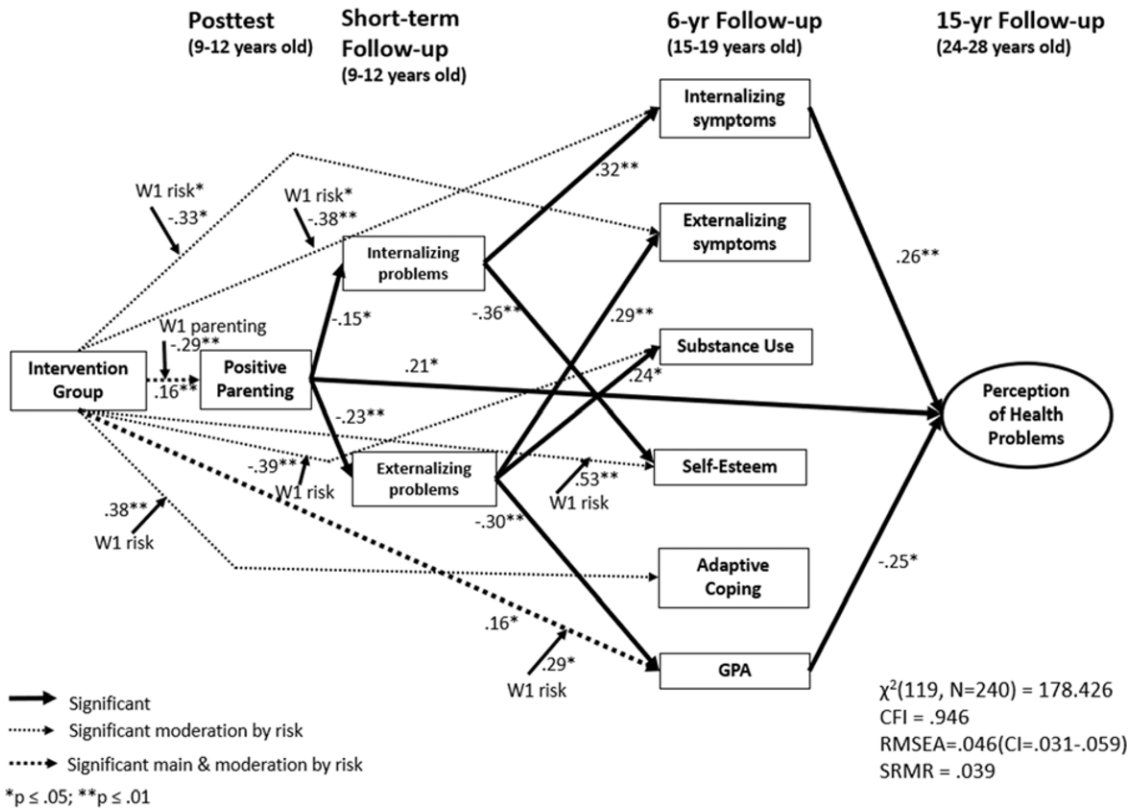


Figure 1. Cascade effects of adolescent mental health problems, substance use, and competencies on perception of health problems in emerging adulthood.

Adolescent mediators to health-related outcomes in emerging adulthood

Figure 1 presents the cascade mediation model for perceived health problems. Higher internalizing symptoms in adolescence were related to higher perceived health problems ($\beta = 0.26$; $b = 0.08$, $SE = 0.03$, $z = 2.43$, $p = .02$) and higher GPA was associated with lower problems ($\beta = -0.25$; $b = -0.09$, $SE = 0.04$, $z = -2.25$, $p = .02$). After controlling for the covariates and all the mediators in adolescence, positive parenting was positively related to perceived health problems ($\beta = 0.21$; $b = 0.09$, $SE = 0.04$, $z = 2.03$, $p = .04$). Testing the mediation effects showed three significant mediation pathways to perceived health problems in emerging adulthood in the expected direction: 1) intervention to posttest positive parenting to internalizing problems in late childhood/early adolescence to internalizing symptoms in adolescence to perceived health problems ([unstandardized] mediation effect = -0.001 , 90% CI = $[-0.004, -0.001]$), 2) intervention to positive parenting at posttest to externalizing problems in late childhood/early adolescence to GPA in adolescence to perceived health problems (mediation effect = -0.001 , 90% CI = $[-0.005, -0.001]$), and 3) intervention directly to GPA in adolescence to perceived health problems (mediation effect = -0.021 , 95% CI = $[-0.064, -0.002]$) for youth who had high pretest risk scores. The significant mediation effect from intervention to positive parenting at posttest to perceived health problems (mediation effect = $.017$, 95% CI = $[0.001, 0.040]$) was in the unexpected direction. Follow-up analyses suggested that this unexpected effect might reflect suppression effects or multicollinearity due to the linear or non-linear correlations of the parenting variable with the other predictors or covariates of perceived health problems. For example,

the correlations of posttest positive parenting and the four indicators of perceived health problems were not significant (i.e., $r_{mean} = -0.005$) and the regression coefficient from posttest positive parenting to perceived health problems was not significant in the model that included only posttest positive parenting ($\beta = 0.03$) and intervention condition ($\beta = -0.03$) as predictors of perceived health problems. Yet, when adding certain sets (e.g., adding all T5 mediators except T5 adaptive coping or except T5 self-esteem) but not other sets (e.g., adding all T5 mediators except T5 GPA or except T5 internalizing problems) of covariates and/or mediators as predictors, beyond posttest positive parenting and intervention condition, the path from posttest positive parenting to perceived health problems became marginal or significant in a positive direction.

Figure 2 presents the cascade mediation model for BMI. Substance use was negatively associated with BMI ($\beta = -0.19$; $b = -0.69$, $SE = 0.23$, $z = -3.06$, $p = .002$). In addition, higher adaptive coping ($\beta = -0.13$; $b = -0.81$, $SE = 0.38$, $z = -2.15$, $p = .03$) and higher GPA ($\beta = -0.27$; $b = -2.37$, $SE = 0.65$, $z = -3.63$, $p < .001$) were significantly associated with lower BMI. There were two significant mediation effects to BMI in emerging adulthood through posttest positive parenting: 1) intervention to positive parenting at posttest to externalizing problems in late childhood/early adolescence to substance use in adolescence to BMI (mediation effect = 0.021 , 95% CI = $[0.003, 0.075]$), and 2) intervention to positive parenting at posttest to externalizing problems in late childhood/early adolescence to GPA in adolescence to BMI (mediation effect = -0.039 , 95% CI = $[-0.137, -0.010]$) and three through direct intervention effects on adolescent mediators for those with high pretest risk scores

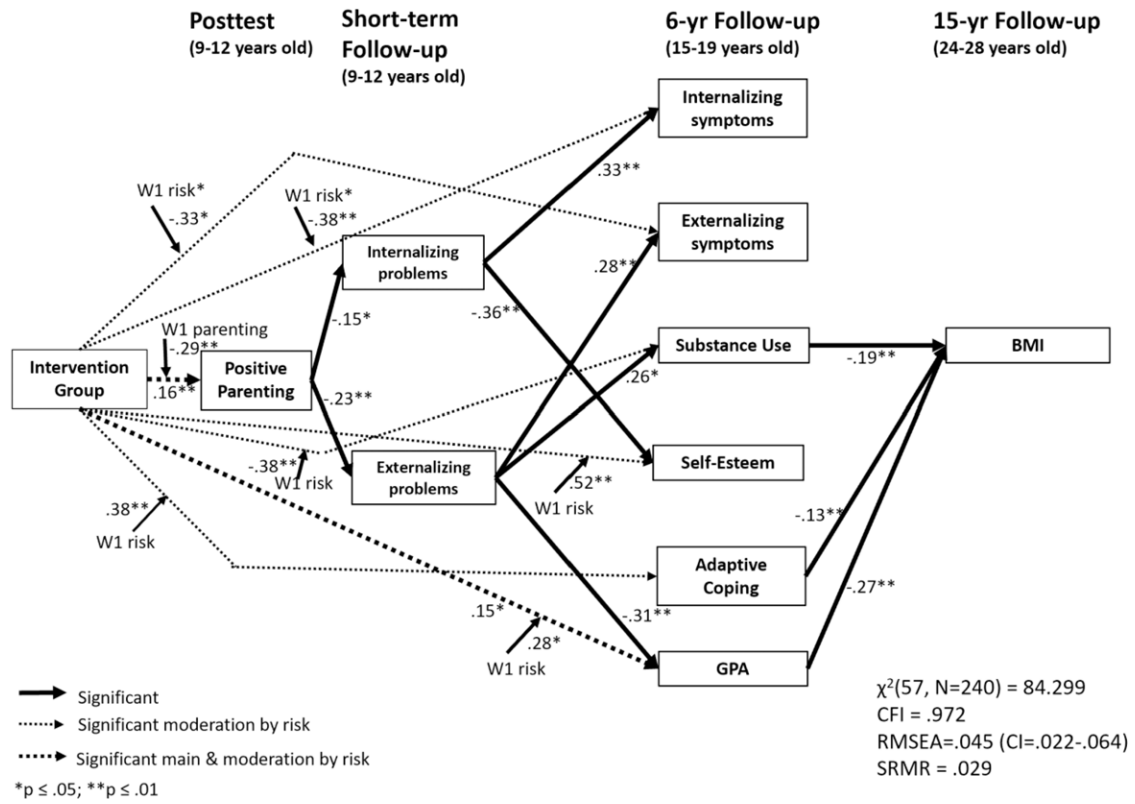


Figure 2. Cascade effects of adolescent mental health problems, substance use, and competencies on BMI in emerging adulthood.

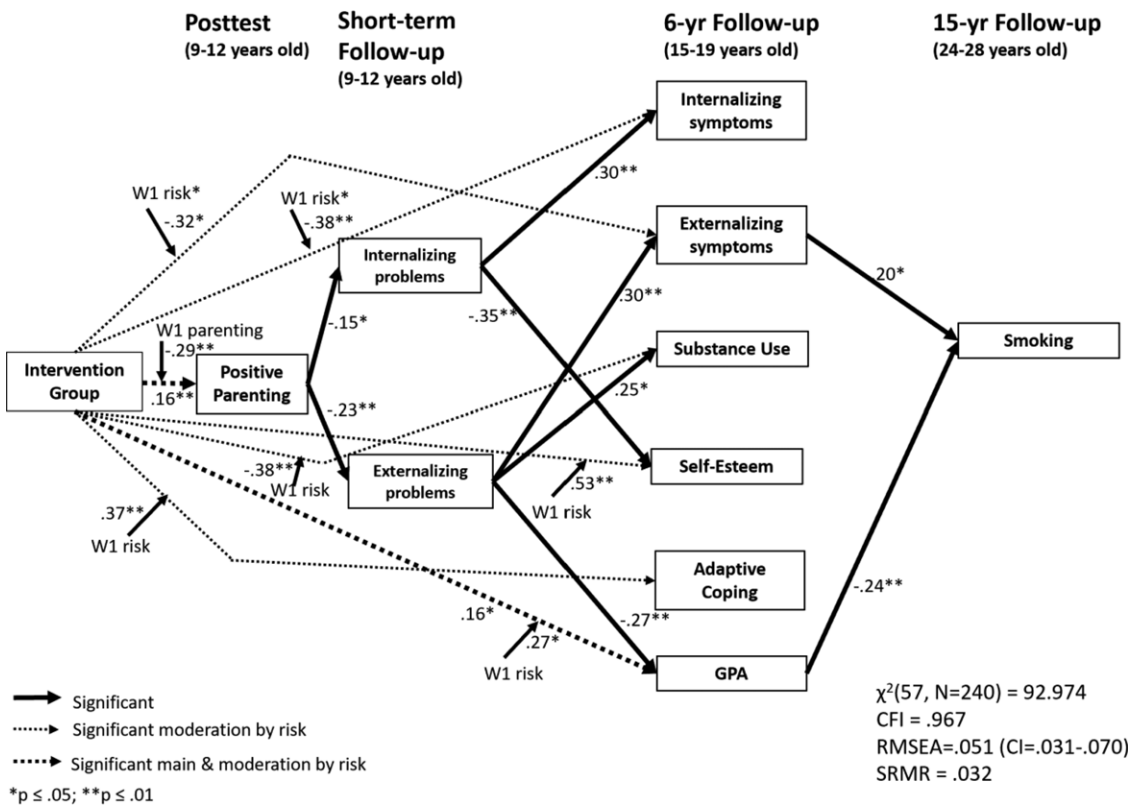


Figure 3. Cascade effects of adolescent mental health problems, substance use, and competencies on smoking cigarettes in emerging adulthood.

(i.e., at +1SD of risk score): 1) intervention to substance use in adolescence to BMI (mediation effect = 0.685, 95% CI = [0.067, 1.838]), 2) intervention to adaptive coping in adolescence to BMI (mediation effect = -0.335, 95% CI = [-0.973, -0.12]), and 3) intervention to GPA in adolescence to BMI (mediation effect = -1.079, 95% CI = [-2.329, -0.262]).

Figure 3 presents the cascade mediation model for cigarette smoking. Adolescents with higher externalizing symptoms smoked cigarettes more often ($\beta = 0.20$; $b = 0.20$, $SE = 0.10$, $z = 2.04$, $p = .04$) and adolescents with higher GPA smoked fewer cigarettes ($\beta = -0.24$; $b = -0.89$, $SE = 0.30$, $z = -2.96$, $p = .003$). There were three significant mediation pathways to smoking in emerging adulthood: 1) intervention to positive parenting at posttest to externalizing problems in late childhood/early adolescence to externalizing symptoms in adolescence to smoking (mediation effect = -0.011, 95% CI = [-0.038, -0.001]), 2) intervention to positive parenting at posttest to externalizing problems in late childhood/early adolescence to GPA in adolescence to smoking (mediation effect = -0.013, 95% CI = [-0.042, -0.003]), and 3) intervention directly to GPA in adolescence to smoking (mediation effect = -0.397, 95% CI = [-0.937, -0.093]) for youth who had high pretest risk scores.

Discussion

This study expands upon the research that has examined the effects of parenting-focused preventive interventions delivered during late childhood/early adolescence on three understudied health-related outcomes in emerging adulthood: perceived health problems, BMI, and cigarette smoking. Cascade effects of the New Beginnings Program from positive parenting at posttest led to lower internalizing problems and externalizing problems in late childhood/early adolescence, which led to lower levels of internalizing problems, externalizing problems and substance use as well as higher levels of competencies in adolescence. Several adolescent outcomes mediated the effects of intervention-induced improvements in positive parenting on the health-related outcomes. Although the pathways associated with each health-related outcome differed, academic performance predicted all three outcomes. Below, we discuss how these findings relate to those of other research, the unique contributions of the study, its limitations, and directions for future work.

Direct and indirect effects on health-related outcomes

Perceived health problems

To our knowledge, this is the first study to show direct or indirect effects of a parenting-focused program delivered in childhood or adolescence on perceived health problems in emerging adulthood. This finding has important public health implications given findings that measures of perceived health problems similar to the current one have been related to seeking medical care, increased doctor visits, and health-related quality of life (Barsky et al., 2005).

The indirect effect of internalizing symptoms in adolescence on perceived health problems in emerging adulthood is consistent with those of studies that found internalizing problems in adolescence predicted perceived health problems, overall poor health, asthma, and diabetes in adolescent and young adult populations (e.g., Bardone et al., 1998; Hoyt et al., 2012; Naicker et al., 2013). GPA was also a significant mediator of the effects of

the New Beginnings Program on perceived health problems. This finding is consistent with that of other research that found GPA in adolescence predicted perceived health problems later in development (e.g., Herd, 2010; Maggs et al., 1997).

After the cascade effects of the intervention-induced improvements in parenting were accounted for, the path from positive parenting to perceived health problems was significant in an unexpected direction. In contrast to findings that show a positive relation between positive parenting in adolescence and physical health in young adulthood (e.g., Beach et al., 2015; Doom et al., 2016), emerging adults in this study who experienced more positive parenting in childhood/early adolescence reported more health problems. As discussed in the results section, follow-up analyses suggested that this finding may be explained by suppression effects due to certain combinations of T1 covariates and/or predictors. It is also possible the significant effect occurred by chance or was due to unmeasured confounders that were related to both parenting and perceived health problems or other mediators between parenting and perceived health problems that were not included in the study.

BMI

The current findings augment those of two other studies that have shown that parenting-focused prevention programs delivered in early adolescence reduced BMI in emerging adulthood (Brody et al., 2019; Van Ryzin & Nowicka, 2013). It is important to note that, like these two programs, the New Beginnings Program did *not* include components related to nutrition, physical activity, or physical health.

In their evaluation of the indirect effects of the FCU, Van Ryzin and Nowicka (2013) found that effects of parent-youth relationship quality on the likelihood of obesity, as measured by BMI, were mediated through maladaptive eating attitudes. In the current study, the effect of the New Beginnings Program on BMI was mediated through an increase in adaptive coping for adolescents in the high-risk group. These findings are consistent with those of an earlier study with this sample that found that adaptive coping in adolescence was inversely related to binge eating in emerging adulthood (Wolchik et al., 2016). GPA was also a significant mediator of the effects of the New Beginnings Program to lower BMI for those in the high-risk group.

Substance use was inversely related to BMI for those at high-risk. Previous research has found non-significant associations, positive associations and negative associations between substance use and BMI. It is possible that variability in terms of the assessment of use (e.g., amount, frequency, trajectory of use) and sample (e.g., size, representativeness, age) as well as moderators that have not yet been identified may explain these conflicting results. Additional research is needed to understand the inconsistencies in the findings.

Cigarette smoking

To our knowledge, this is the fourth parenting-focused prevention program delivered in childhood or adolescence to show effects on cigarette smoking in emerging adulthood. The New Beginnings Program had indirect effects on reducing cigarette smoking through GPA and externalizing problems. According to the Center for Disease Control and Prevention (2008), from 2000 to 2004, cigarette smoking and exposure to tobacco smoke resulted in at least 443,000 premature deaths, about 5.1 million years of potential

life lost, and \$96.8 billion in productivity losses annually in the United States. Given the association between smoking and various diseases (Amiri et al., 2021), including rheumatoid arthritis (Di Giuseppe et al., 2014), heart failure (Aune et al., 2019), erectile dysfunction (Cao et al., 2013) and infertility in women (Augood et al., 1998), widespread implementation of prevention programs that increase academic performance and decrease externalizing problems in adolescence could help to reduce the public health burden of cigarette smoking. Findings of a recent meta-analysis that showed that parental divorce increased smoking in adulthood by 45% (Amiri et al., 2021) indicate that the public health benefits for offspring in divorced families participating in these programs could be substantial.

Contributions

This is the third in a series of tests of the cascade effects of the New Beginnings Program, which was delivered in late childhood/early adolescence, on outcomes in emerging adulthood. The other studies focused on the domains of mental health problems and substance use (Wolchik et al., 2016) and competence (Wolchik et al., 2021). In these studies, strengthening parenting led to improvements in internalizing problems and externalizing problems, which had radiating pathways to multiple outcomes in adolescence, including externalizing problems, internalizing problems, GPA, substance use, adaptive coping and self-esteem, which in turn were linked to multiple mental health, competence, and health-related outcomes in emerging adulthood. For all three domains of functioning assessed in emerging adulthood, lower levels of externalizing problems, higher GPA, and higher levels of adaptive coping in adolescence were significantly, uniquely associated with two or more positive outcomes in emerging adulthood. Further, higher GPA was significantly related to multiple outcomes across domains of functioning; it predicted internalizing problems, externalizing problems, cigarette smoking, perceived health problems and BMI as well as work competence and academic competence in emerging adulthood. These findings highlight the importance of examining the long-term effects of intervention-induced improvements in academic performance in high school on multiple domains of functioning in later stages of development and identifying the mechanisms through which these effects occur. They also indicate that including a focus on increasing school performance in parent-focused prevention programs could lead to reductions in the public health burden of both mental health and physical health problems.

This study extends the large body of cross-sectional and longitudinal research that has identified positive parenting as a key resilience resource (e.g., Masten & Palmer, 2019; Roisman et al., 2004; Sandler et al., 2015) by its use of a randomized experimental design that provides a much more rigorous examination of this protective resource by disentangling the effects of positive parenting from variables that are naturally correlated in nonexperimental studies (e.g., maternal personality, shared genes, preexisting economic stress).

This study also contributes to the literature on the long-term effects of prevention programs by examining the direct and indirect effects of the New Beginnings Program on three understudied health-related outcomes in emerging adulthood. In the context of a growing body of studies that have demonstrated long-term effects of parenting-focused programs on a wide range of outcomes not specifically targeted by the programs (Doty et al., 2017), these findings highlight the importance of broad assessments

of these programs. As Masten (2015) notes, prevention scientists are interested in interventions that will set in motion cascade effects with broad and lasting effects on development that may account for significant return-on-investment. Given the emphasis on containing costs and return-on-investment of prevention programs (National Academies of Sciences, Engineering, and Medicine, 2019; O'Connell et al., 2009) demonstrating positive effects of parenting programs on multiple domains of functioning can provide support for funding such programs.

The findings also further our knowledge about the developmental processes that explain the long-term effects of prevention programs on health-related outcomes. Using a cascade effects model, the current study found that intervention-induced improvements in positive parenting led to a progression of improvements in multiple aspects of children's and adolescent's functioning, which led to improvements in three health-related outcomes in emerging adulthood. This model is similar to Smith and his colleagues' (2018) developmental cascade model for pediatric obesity that includes risk and protective factors over several developmental stages and highlights the role of parental influences and family management practices in escalating or inhibiting the cascading effects.

This study contributes to research on the effects of parental divorce in two ways. To our knowledge, this is only the second study to show that a program for divorced families affected health-related problems. The other study found that a child-focused, school-based intervention reduced visits to the school health office (Pedro-Carroll et al., 1999). Also, these findings extend research on the long-term effects on the New Beginnings Program that has shown direct and indirect program effects on mental health problems and disorders, substance use and disorders, competence, involvement with the criminal justice system, mental health service utilization in emerging adulthood, and attitudes toward parenting (Herman et al., 2015; Wolchik et al., 2013, 2016, 2021).

Limitations and directions for future research

There are several limitations of this study that need to be noted. First, the sample was almost exclusively non-Hispanic White. Second, the families were enrolled in a trial of a preventive intervention for divorced families. Third, at the assessment in adolescence, we did not use the same measure as was used in the assessment in emerging adulthood for two of the three health-related outcomes. Fourth, the sample was relatively modest, which limited the power to detect direct and indirect effects of the program as well as interactive effects.

There are several areas that could advance our understanding of the interplay between positive parenting, competencies, mental health problems, substance use and health-related outcomes over development. First, replicating the current findings with larger, community-based samples that are more diverse would be important. Second, examining cascade effects models of parenting programs for other at-risk groups would be a key step in generalizing our understanding of the long-term effects of these programs. Third, it would be important to examine intrapersonal and interpersonal processes that account for the relations between internalizing problems, externalizing problems, substance use, academic performance, adaptive coping, and self-esteem and subsequent health-related problems. Finally, studies that assess the indirect effects of parenting-focused programs on health-related outcomes in later developmental stages would be valuable.

Summary

The New Beginnings Program, a parenting-focused intervention for divorced parents, led to improvements on three health-related outcomes (BMI, perceived health problems, and cigarette smoking) in emerging adulthood. Improvements in positive parenting in late childhood/early adolescence led to reductions in internalizing problems and externalizing problems in childhood/early adolescence, which led to improvements in several aspects of adolescent functioning, which then led to improvements in health-related outcomes in emerging adulthood. Academic performance in adolescence predicted all three health-related outcomes. These findings underscore the radiating effects of improvements in positive parenting and highlight the importance of examining the developmental cascades that lead to long-term effects of parenting-focused prevention programs.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S0954579424000889>

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