

The Impact of Parenting Strategies on Child Smoking Behavior: The Role of Child Self-Esteem Trajectory

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Yang, Zhiyong and Charles M. Schaninger (2010), "The Impact of Parenting Strategies on Child Smoking Behavior: The Role of Child Self-Esteem Trajectory," *Journal of Public Policy & Marketing*, 29(2), 232–247. <https://doi.org/10.1509/jppm.29.2.232>

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Abstract:

Multidisciplinary research has documented that parenting strategies influence children's cigarette use. Extending the extant literature, this article develops an integrative model that examines the effect of parenting strategies on children's smoking progression, in which children's self-esteem plays the role of mediator. The authors validate this model using longitudinal panel data from parents and children ages 10–17. The primary findings are that parenting strategies influence children's smoking development and that the impact of these strategies is mediated by the child's self-esteem trajectory, particularly for the rate of increase in smoking. Parental responsiveness decreases children's smoking development by enhancing the child's initial self-esteem and reducing the natural rate of deterioration in self-esteem, while psychological control increases smoking development both directly and indirectly by reducing initial self-esteem. Targeting parents through multimedia ad campaigns to bring about changes in parenting strategies to reduce or avoid teen smoking offers a fruitful complementary tool to targeting teens themselves. Such campaigns should also emphasize avoiding parental psychological control as a strategy and begin reaching parents well before their children approach late grade school.

Keywords: parental responsiveness | parental psychological control | child smoking progression | latent growth modeling | self-esteem trajectories | mediation

Article:

Adolescent smoking has long been recognized as an important topic in consumer psychology and public policy. Smith, Olshavsky, and Smith (1979) viewed adolescent smoking adoption and growth from the perspective of diffusion theory, a view that complements the health policy epidemiological approach. The results of such an approach lead to antismoking strategies based on inhibiting or reversing adoption and diffusion processes. Studies have examined influences on teen smoking parallel to those of the adoption literature, such as antismoking advertising, packaging effects, peer influences, and the impact of tobacco advertising and different advertising themes on adolescents (Kelly, Slater, and Karan 2002; Pechmann et al. 2005). Social marketers have focused on determining the factors that influence teenage smoking and on developing countermarketing strategies and programs to reduce those influences and inhibit or

deter smoking. The variables that have been associated with teen smoking include peer and parental smoking, peer pressure, normative attitudes, and exposure to pro- and antismoking advertising campaigns. Various studies have also examined the interactive nature of these variables with measures of effectiveness of antismoking campaigns, including attitudes toward smoking, recall of antismoking advertising, perceptions of peers who smoke, smoking beliefs, and intentions to quit (Andrews et al. 2004; Block et al. 2002; Pechmann and Knight 2002; Pechmann and Ratneshwar 1994; Tangari et al. 2007). Several studies, which we discuss in more detail subsequently, have examined the effectiveness of different child-targeted “platforms” or advertising themes.

These studies yield intriguing findings, with practical public policy implications. For example, much is now known about how to target teens with different types of advertising themes, how to increase their resistance to peer or parent role modeling, how to influence their perceptions of those who smoke, and how social and health risks are associated with smoking. It is also known that teens can be segmented and that the effectiveness of different antismoking advertising themes varies by segment. However, in consumer research, little attention has been given to antismoking policies based on the important roles of parents. Although their influence as role models has been identified, the focus remains primarily on children-oriented prevention strategies. Yet, in the broader sense, parent–child interactions can also affect children's smoking development (Bogensneider et al. 1998; Mayhew, Flay, and Mott 2000). The purpose of this study is to extend and complement the extant approach and to focus on how parenting strategies influence teen smoking initiation and progression longitudinally.

Despite this relative dearth in the literature, parenting is recognized as an influence on children's use of cigarettes and illegal drugs in the psychology and public health areas. The National Youth Anti-Drug Media Campaign has developed a national ad campaign supported by an effective, multifaceted Web site that targets parents and focuses on parental monitoring and intervention (www.theantidrug.com). The Campaign for Tobacco-Free Kids (2009a, b, d, e, f, g, h) has targeted parents with advertising and Web sites (www.tobaccofreekids.org) that emphasize modifying parental behaviors and developing more open communication and discussions with their teens. In response to the Tobacco Master Settlement Agreement (see <http://www.naag.org/backpages/naag/tobacco/msa/>), Phillip Morris USA also targeted parents with advertising and Web sites that provided advice on how to change their behaviors to reduce teen smoking (Phillip Morris USA Parent Resource Center 2009a–e), though the Campaign for Tobacco-Free Kids (2009c) has questioned the sincerity and effectiveness of this campaign. In public policy and marketing, a key parenting strategy—parental responsiveness—is viewed as an influence on risky teen sexual behavior (Tanner et al. 2008). These parent-oriented antismoking campaigns challenge the conventional wisdom that parents exert little influence on children's behavior after they enter adolescence (Youniss and Smollar 1985).

Although parent-oriented antismoking campaigns have been employed, from a theoretical perspective, little is known about how parenting strategies affect teen smoking. Cross-disciplinary research has shown that parenting has a strong impact on children's consumption-related behaviors. For example, consumer researchers have shown that parenting style influences children's independent decision making and ability to process and evaluate marketer-sponsored information (Carlson and Grossbart 1988; Carlson, Grossbart, and Walsh 1990; Rose 1999).

Research in psychology and public health has indicated that parenting strategies influence cigarette use cross-sectionally (Bogenschneider et al. 1998) and longitudinally (Audrain-McGovern et al. 2004). These studies focus on the direct effects of parenting on smoking. The underlying mechanism by which parenting affects smoking remains under-explored—a nontrivial oversight because it can provide insights into the sustained effects of parenting strategies on child smoking development and possibly yield marketing public policy strategies that impede it.

This research addresses the gap in prior research by introducing the child's self-esteem trajectory as the critical mediating mechanism through which parenting influences smoking initiation and progression. We focus on self-esteem for three reasons. First, adolescence is a critical stage in the formation of self-identity. At this internally precarious time, self-esteem plays an important role in determining adolescents' psychological development and consumption-related attitudes and behaviors. Second, self-esteem reflects a person's overall feelings of worthiness and competence (Marsh 1988), which is correlated with an array of variables that have been related to smoking or other forms of substance use. For example, as a reflection of a person's overall social well-being, self-esteem serves as a sociometer of the person's social anxiety, loneliness, and susceptibility to peer influence (Leary 1999). As a reflection of personal characteristics, self-esteem is often highly correlated with depression, emotional disorder, impulsivity, competency, self-efficacy, self-control, and self-regulation (Kaplan 1982). All these variables are potential drivers or inhibitors of child smoking. Third, self-esteem deteriorates over time during adolescent years (Hirsch and Rapkin 1987; Simmons, Carlton-Ford, and Blyth 1987), which provides a platform for us to examine how parenting strategies may affect child smoking by alleviating or aggravating the child self-esteem deterioration.

Our purpose is to develop and test an integrative model that specifies parenting as the driver of self-esteem trajectories (initial level as well as rate of deterioration), which in turn drive smoking trajectories (initial level and rate of increase). Our overarching hypothesis is that parents influence or inhibit smoking development by influencing self-esteem trajectories. We test this hypothesis by first explicitly modeling the developmental curves of self-esteem and smoking over a period of eight years (the time of transition from primary to high school). Then, we examine how self-esteem trajectories mediate the effects of two key parenting strategies—parental responsiveness and parental psychological control—on smoking trajectories. In the rest of the article, we review the parenting literature and its implications for influencing or inhibiting smoking development. We then develop several hypotheses related to these two parenting strategies, followed by our multilevel modeling approach and results. Finally, we interpret our findings and develop public policy marketing implications related to influencing parenting to reduce or avoid the decline in self-esteem and curb teen smoking.

Conceptual Framework

Parenting Strategies

Parenting strategies are specific parental behaviors used in the child-rearing process (Darling and Steinberg 1993). Previous researchers (Barber 1996; Barber, Olsen, and Shagle 1994; Steinberg 1990) have identified three key parenting strategies: parental responsiveness, parental

psychological control, and parental monitoring (i.e., parental behavioral control). This framework is an extension of the two-strategy paradigm (parental responsiveness and demandingness) that Baumrind (1971) and Maccoby and Martin (1983) proposed. Separating parental psychological control from parental monitoring advances our understanding of the forms of parental control that constitute demandingness (Barber 1996). “At the heart of this distinction is the notion that monitoring reflects parents’ efforts to adapt and regulate children's behavior through guidance and supervision, whereas psychological control emanates from parents’ motivations to inhibit the child's developing psychological autonomy, to keep the child dependent on the parent, and to help retain power in the relationship” (Pettit and Laird 2002, p. 100).

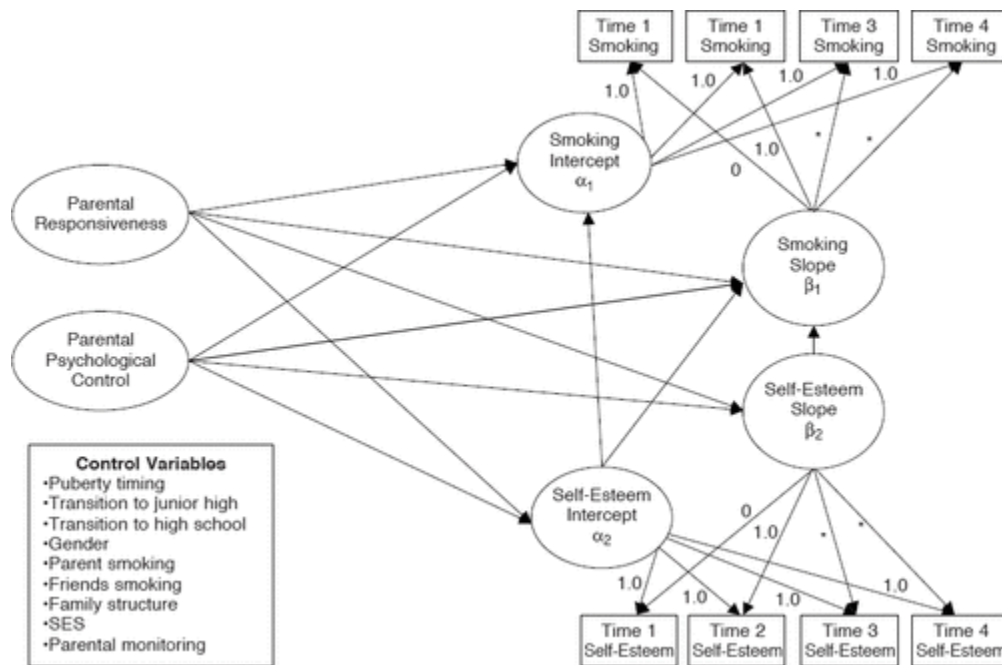


Figure 1. A Conceptual Model of the Effect of Parenting Strategies on Smoking Trajectories

Parental responsiveness is the extent to which parents show affective warmth, acceptance, involvement, nurturance, and support. It is associated with positive outcomes among children/teens, including less substance abuse, higher grades, fewer behavior problems, better mental health, greater social competence, and positive self-esteem (Peterson and Hann 1999). Parental psychological control reflects psychological manipulation aimed at obedience and conformity, accompanied by specific parental behaviors such as threats, physical discipline, withdrawal of love, and guilt induction. It has been associated with weak self-image/self-esteem, depression, suicide, eating disorders, and failure to achieve emotional autonomy in adulthood (Barber and Harmon 2002). Parental monitoring or behavioral control is the degree to which parents monitor, set, and enforce limits on their child's activities and behaviors (Baumrind 1971). Previous research has consistently shown that parental monitoring inhibits younger children's tobacco use but loses its impact by the teenage years (for a review, see Bogenschneider et al. 1998). Emotional connectedness with parents plays a more important role in guiding the behaviors of adolescents than rules and supervision (Youniss and Smollar 1985). Furthermore, it is unclear whether monitoring directly affects self-esteem because high responsiveness and younger child age confound the few studies that have found an association (e.g., Jackson et al.

1997; Simons-Morton 2002). For these reasons, previous studies (e.g., Bogenschneider et al. 1998; Soenens et al. 2005) have treated parental monitoring as a control variable when studying the effect of parental responsiveness on teenagers' self-concept or smoking behaviors. We follow this precedent, focusing on responsiveness and psychological control to develop hypotheses, treating parental monitoring as a control variable. We present our conceptual framework in Figure 1.

Direct Effects of Parenting on Smoking Trajectories

Previous studies have examined the effect of parenting on tobacco use, but they have not explicitly examined its impact on the components of smoking trajectories (e.g., intercept, slope). We anticipate that parental responsiveness reduces the initial level and slope of smoking during the transition to high school and adolescence. This stage is associated with considerable stresses due to pubertal, psychological, and social-environmental changes, which are associated with emotional disorder, depression, and lower self-esteem (Simmons, Carlton-Ford, and Blyth 1987), often the major causes of substance use. Changing schools disrupts peer relationships and reduces peer support. Heavier homework and parental demands for mature behaviors further exacerbate these stresses. We expect responsive parenting to immunize the child against these impacts and thus negatively affect smoking intercept and slope. Responsive parenting creates a supportive home environment and positive relationships between parents and children (Peterson and Hann 1999), encouraging children to share their problems and experiences with their parents. This helps children better adjust to the dramatic changes of adolescence and leads children to identify with parents and incorporate their attitudes, values, and role expectations (Henry, Wilson, and Peterson 1989). Even if children have begun to experiment with smoking, they are more likely to discuss it with their parents, evaluate whether to continue, question peers' attitudes and behaviors, and avoid those who smoke. Thus:

H₁: Parental responsiveness is negatively related to (a) the initial level and (b) the slope of smoking.

Conversely, parental psychological control should lead to an increase in the initial level and growth of smoking. Psychologically controlling parenting is often associated with verbally and physically abusive attempts to obtain adolescents' conformity and obedience (Barber and Harmon 2002). This causes greater anxiety and depression, lower self-esteem, and greater susceptibility to negative peer influence, all of which are powerful drivers of substance use. In addition, psychological control tends to create inter-generational hostility and resistance to parental influence; as a result, children of such parents feel disconnected and exhibit defiant behaviors (Peterson and Hann 1999). Low family cohesion and poor functioning lead to increased use of cigarettes and other maladaptive behaviors among teens (Doherty and Allen 1994). This aggravates depression and emotional disorder related to the transition and should cause greater initial levels as well as growth rates of smoking.

H₂: Parental psychological control is positively related to (a) the initial level and (b) the slope of smoking.

Indirect Effects of Parenting on Smoking Development through Self-Esteem Trajectory

The combined forces of transition to high school, puberty, lack of support, and self-identity development converge and increase, producing a negative slope for self-esteem over most of adolescence (Hirsch and Rapkin 1987; Simmons, Carlton-Ford, and Blyth 1987). This deterioration is especially marked in Grades 8 and 9 and continues until late adolescence before recovering, exhibiting a nonlinear curve. Parenting strategies play a major role in protecting, delaying, or reducing this natural deterioration. The child's self-esteem trajectory should mediate the impact of parental responsiveness and psychological control on his or her smoking trajectory. Although parenting has been related to self-esteem and psychological well-being, its impact on self-esteem trajectory has not been examined. Determining the impact of parenting strategies on self-esteem trajectory and demonstrating that the latter is the key to understand child smoking development and rate of progression (i.e., the slope) is one of our major contributions.

Impact of Parenting on Self-Esteem Trajectory Intercept

Positive parent-child interactions and the perception of parental support resulting from parental responsiveness delay or reduce the onset and severity of initial self-esteem deterioration, resulting in higher levels of child self-esteem. Thus, there should be a positive relationship between parental responsiveness and initial self-esteem, just as there is a negative one between parental responsiveness and childhood depression and anxiety (Audrain-McGovern et al. 2004). Unlike responsiveness, psychological control affects self-esteem negatively because coercive and abusive behavior conveys rejection and lack of respect (Barber and Harmon 2002; Peterson and Hann 1999), leading to lower self-esteem.

H₃: (a) Parental responsiveness is positively related to the initial level of self-esteem, and (b) parental psychological control is negatively related to it.

Impact of Parenting on Self-Esteem Trajectory Slope

A seemingly natural progression from the preceding rationale would anticipate a similar pattern on the effects of parental responsiveness and psychological control on the self-esteem slope. High responsiveness should result in a lower rate of decline in self-esteem because of the mediating effects of a positive relationship with parents and the impact of parental reassurance and support. In contrast, high psychological control impairs the development of a child's identity and autonomy (Barber and Harmon 2002) and is likely to aggravate transitional effects on the child and lead to a steeper decline. Thus, the natural extension of H_{3a} and H_{3b} is that parental responsiveness should be positively related to the self-esteem slope, while psychological control should be negatively related to it:

H₄: (a) Parental responsiveness is positively related to the self-esteem slope, and (b) parental psychological control is negatively related to it.

Implicit in the rationale of H_{4a} and H_{4b} is the assumption that a positive correlation exists between self-esteem intercept and slope. This assumption is unlikely to hold, and despite the intuitively appealing nature of this rationale, under analogous theoretical and empirical

circumstances, a positive relationship to intercept, but a negative relationship to slope, of a dependent variable such as self-esteem is common (Muthén 2005). This is due in part to “ceiling or floor”/“regression to the mean” effects, such that if a child starts high, he or she has more room to drop, while those who start low do not (Raudenbush and Bryk 2002). This can lead to a negative correlation between the intercept and the slope (as Figure 2 illustrates) and to a reversal in sign for the impact of both responsiveness and psychological control on the self-esteem slope as opposed to that on the intercept. Thus, we would expect a negative relationship between responsiveness and self-esteem slope and a positive relationship between psychological control and self-esteem slope. However, the effect is unlikely for psychological control because the rebelliousness it causes is difficult to reverse for teens and will only exacerbate or maintain the initial effect.¹ Taken together, we pose alternative, competing hypotheses to those that parenting theory suggests:

H₅: (a) Parental responsiveness is negatively related to the self-esteem slope, and (b) parental psychological control has no effect on it.

Impact of Self-Esteem Trajectories on Smoking Trajectories

Previous research has shown that a typical trajectory for smoking, as with other addictive substances, starts low and has a positive slope over time, with smoking frequency increasing (linearly) with age among adolescents (Audrain-McGovern et al. 2004). This progression is due in part to the increase in social and psychological pressures on teens, coupled with the ongoing deterioration of self-esteem through age 15. Individual differences in self-esteem affect behavior problems, depression, anxiety, and other adjustment factors (Marsh 1988). Teens who have low self-esteem strive to gain the approval of others by agreeing with or copying friends’ behaviors (Leary 1999), major motives of smoking development. Thus, there should be negative relationships between self-esteem and smoking trajectory components. Higher initial and less deterioration in self-esteem should lead to lower initial rates and smaller increases in smoking, and vice versa:

H₆: (a) The intercept of the self-esteem trajectory is negatively related to that of smoking, (b) the intercept of the self-esteem trajectory is negatively related to the slope of the smoking trajectory, and (c) the slope of the self-esteem trajectory is negatively related to that of the smoking trajectory.

Mediating Role of Self-Esteem

We anticipate that self-esteem will mediate the impact of parenting on smoking. Thus, when we add its trajectory to the parenting–smoking model, the direct impact of responsiveness and psychological control on the trajectory of smoking will decline or become nonsignificant, while the indirect path from parenting to the trajectory of smoking through self-esteem will become significant. Furthermore, we expect not only that this indirect effect will manifest through intercept-to-intercept and slope-to-slope effects but also that the initial level of self-esteem will negatively influence smoking slope, thus capturing additional indirect effects. Teens higher in self-esteem should be less likely to smoke and exhibit lower initial levels, and they should be

¹ We thank an anonymous reviewer for this point.

more likely to experiment only or to maintain a lower level or lower rate of smoking increase. Although we note all the links in our conceptual model in H₁–H₆, to formally test the mediating effects, we develop the following hypothesis:

H₇: The self-esteem trajectory mediates the impact of (a) parental responsiveness and (b) parental psychological control on the smoking trajectory.

Control Variables

We take a different approach from that of previous studies by demonstrating that self-esteem trajectories mediate the relationships between parenting and smoking progression, with other recognized sociocontextual factors treated as control variables, including puberty timing, transition to junior high and high school, gender, parent and friends' smoking, family structure and socioeconomic status (SES), and parental monitoring.

Puberty Timing

Puberty timing refers to the degree to which an adolescent physically matures earlier or later than his or her peers. Early pubertal timing leads to such psychological difficulties as impulsivity and lower grades. Although adolescents who mature later are better adjusted than those who mature earlier, substantially delayed maturation among boys may be associated with greater feelings of isolation and insecurity and, thus, lower self-esteem (Graber et al. 1997).

Transition to Junior High and to High School

The transitions from grade to junior high and from junior high to high school bring about changes in social settings, disruption of friendships, and more impersonal school environments, and students must adjust to these changing circumstances. Thus, they are challenged to establish a supportive peer group in this new environment.

Gender

Hirsch and Rapkin (1987) report that girls tend to have a greater increase in depression and hostility when adjusting to junior high school than boys. Simmons, Carlton-Ford, and Blyth (1987) find a decline in self-esteem and self-image among girls who are more physically mature and begin to date earlier during the transition than their classmates.

Parent Smoking

Numerous studies have found positive relationships between parents' tobacco use and that of their children, particularly smoking initiation. Parent smoking is influential across levels of adolescent cigarette experimentation and regular use. Mayhew, Flay, and Mott (2000) find that parent smoking is important in predicting the transition both from nonsmoking to experimentation and from experimentation to more regular smoking among adolescents. It may also increase perceived accessibility to cigarettes among adolescents. Overall, children of parents who smoke are much more likely to begin to smoke and to continue beyond experimentation.

Friends' Smoking

Many researchers suggest that smoking is affected by role modeling and by imitation of peers, as well as perceptions of peers who smoke. Friends' smoking is likely to reflect peer influence, a known important driver of adolescent smoking. In addition, peer tobacco use has a greater influence on adolescents than parent tobacco use (Tyas and Pederson 1998).

Family SES

Children from low-income families suffer substantially more emotional, cognitive, and misconduct-related problems than children from higher-income families. Tyas and Pederson (1998) find that parental social class and paternal education are inversely related to smoking.

Family Structure

Children living in single-parent and blended families are at a significant disadvantage cognitively, emotionally, and behaviorally compared with children in two-parent households. They also have higher rates of smoking (Flewelling and Bauman 1990).

Parental Monitoring

Insufficient parental monitoring deprives children of adequate supervision and places them at risk of developmental difficulties (Barber 1996). However, the impact of parental monitoring appears to decline as children enter adolescence (for a review, see Bogenschneider et al. 1998).

Method

The Sample and Longitudinal Waves

The analyses for this study used longitudinal data from four cycles of the National Longitudinal Survey of Children and Youth (NLSCY), collected by Statistics Canada and Human Resources Development Canada. The first cycle was conducted from December 1994 to April 1995, the second was collected from December 1996 to April 1997, the third was collected from October 1998 to June 1999, and the fourth was collected from October 2000 to June 2001. The primary objective was to develop a national database on the characteristics and life experiences of children from infancy to adulthood. The secondary objective was to determine the prevalence of various biological, social, and economic characteristics and risk factors among children/youth and to monitor their impact and that of life events and protective factors on their development until they reach age 25.

The NLSCY used a stratified, multistage probability sample based on area frames with dwellings as sampling units. Because the purpose was to track developmental changes in children over time and to study their environmental influence, the target population for the first wave (1994–1995) consisted of Canadian children newborn to age 11. These children made up the first longitudinal cohort sample and were followed at two-year intervals until they reached age 25. Sample sizes

for stratification were allocated by age group and then by province to ensure sufficient sample sizes for smaller provinces. The sampling process continued down to the city block level, with dwellings chosen from blocks selected. This required sufficient sample sizes to reliably measure characteristics with a national representation of 4% of each age group after five survey cycles.

Because our study focuses on the transition to high school, we selected children who were in the preadolescent stage during the collection of Cycle 1 so that their biological and social development could be tracked through Cycles 2, 3, and 4. Thus, children ages 10 and 11 in Cycle 1 were the longitudinal sample for this study. Children were ages 12–13, ages 14–15, and ages 16–17, in Cycles 2, 3, and 4, respectively. Thus, the transitions covered include late childhood to early adolescence, early to mid-adolescence, and mid- to late adolescence. For the first NLSCY wave in 1994–1995, 3434 children ages 10–11 across the ten provinces completed a self-report. In Cycle 2 (1996–1997), the same sample, then ages 12–13, fell to 2249. In Cycle 3 (1998–1999), the number of children then ages 14–15 fell slightly to 2086. In Cycle 4 (2000–2001), the sample, then ages 16–17, fell to 1414.

We followed Statistics Canada's recommendation and used a child's longitudinal weight in Cycle 4 for NLSYC longitudinal estimates. We used a working weight for complex statistical analyses, such as the latent growth models used in our study.

Measurement of Variables

Smoking Frequency

Two items measured smoking frequency in each cycle: (1) “Have you ever tried cigarette smoking, even just a few puffs?” (1 = yes, 0 = no), and (2) “If you do smoke, how often do you smoke cigarettes? (0 = “I don't smoke any more,” 1 = “a few times a year,” 2 = “about once or twice a month,” 3 = “about once or twice a week,” 4 = “about 3 to 5 times a week,” and 5 = “every day”).

Parenting Strategies

Parenting strategies were based on child-reported responsiveness and psychological control in Cycle 1 using Lempers, Clark-Lempers, and Simons's (1989) parent practices scale. Parental responsiveness was assessed with five items, anchored at “never” (1) and “very often” (4). Children were asked to rate how often their parents smiled at them, praised them, made sure that they knew they were appreciated, spoke of the good things they did, and seemed proud of the things they did. Sum scores ($\alpha = .77$) ranged from 0 to 15, with higher scores reflecting more responsive parenting levels. Six similarly scaled items made up the psychological control measure. Children rated how often their parents soon forgot a rule they had made, nagged them about little things, only kept rules when it suited them, threatened punishment more often than they used it, enforced a rule or did not enforced a rule depending on their mood, and hit them or threatened to do so. Summed scores ($\alpha = .65$) ranged from 0 to 18, with a higher score indicating more psychological control.

Self-Esteem

The widely accepted general-self scale of Marsh's (1988) self-description questionnaire was used to measure self-esteem in each cycle. Four items were included. Children rated whether they liked the way they were, whether they had a lot to be proud of, whether lots of things about them were good, and whether they did things well. Scores varied from 0 to 16 (α ranged from .73 to .78).

Puberty Timing

Puberty timing was measured by whether a child had physically matured early or late relative to his or her peers. Responses to three gendered maturation questions in Cycle 2 were used (ages 12–13), the age when many children begin to experience physical changes associated with puberty. For girls, questions pertaining to body hair growth, breast development, and menarche were used. For boys, questions about body hair growth, deepening of voice, and facial hair were used. With the exception of the question pertaining to menarche, each item's response categories were 1 = "has not started yet," 2 = "has barely started," 3 = "definitely underway," and 4 = "seems complete." The question on menarche was coded as 4 if answered "yes" or 1 if "no." Puberty timing scores were based on summed the three characteristics appropriate to gender. Respondents were classified with scores of 7 to 12 as early developers (0) and those with scores from 3 to 6 as late developers (1).

Transitions to Junior High and High School

Because respondents in Cycle 1 were ages 10–11, two items from Cycle 2's and Cycle 3's self-completed questionnaire were used to identify whether a transition to junior high or to high school had occurred. Respondents who had changed from elementary to junior high in Cycle 2 or from junior high to high school in Cycle 3 were coded as 1, while "no" or "not applicable" responses were coded as 0.

Gender

Child gender was a dummy variable. Male students were coded as 0, and female students were coded as 1.

Parent Smoking

Parent smoking was based on parent responses to two questions in Cycle 1: (1) "Have you ever tried cigarette smoking, even just a few puffs?" ("yes/no"), and (2) "If you do smoke, how often do you smoke cigarettes?" (1 = "a few times a year," 2 = "about once or twice a month," 3 = "about once or twice a week," 4 = "about 3 to 5 times a week," and 5 = "every day"). If one parent smoked "about 3 to 5 times a week" or more, parent smoking was coded as 1, with nonsmokers and very light smokers treated as the reference group.

Friends' Smoking

Friends' smoking was a dummy variable based on students' responses to the question, "How many of your friends have tried smoking?" Those with smoking friends were coded as 1.

Family Structure

Family structure was classified as (1) single parent, (2) two parent, and (3) blended. Family structure is assumed to be time invariant because the great majority remained the same over the four cycles, and thus we based this on Cycle 1 parent responses. Single-parent families were those with a child living with one parent only, two-parent families were those (married or common-law) in which all children were natural or adopted offspring of both parents, and blended families included married or common-law couples with two or more children who did not share the same natural and/or adoptive parents. Two-parent families were the reference category, with dummy variables for single-parent and blended families.

Family SES

Information on family SES was from Cycle 1 because it is relatively time invariant, with correlations among the four cycles all above .70 ($p < .001$). Family SES was categorized into five ordinal categories based on raw income and family size to reflect income adequacy group, following the procedures of Statistics Canada. The lowest-income-adequacy category (1) included families with one to four people and an income of less than \$10,000 or those earning less than \$15,000 with five or more people. The highest-income-adequacy category (5) included households that had one or two people and an income of \$60,000 or more or households with three or more people and an income of \$80,000 or more (in Cycle 1, 1996 Canadian dollars). The three middle ordinal categories followed this general approach.

Parental Monitoring

Children rated how often their parents wanted to know exactly where they were and what they were doing, told them what time to be home when they went out, told them what they could watch on television, made sure they did their homework, and found out about their misbehaviors. Children responded to each item using four-point scales anchored at "never" (1) and "very often" (4). Sum scores ($\alpha = .55$) ranged from 0 to 16, with higher scores reflecting greater parental monitoring levels.

Analytical Approach: Latent Growth Curve Model

For the data analyses, we focus on both intra- and interperson variation by using the latent growth curve (LGC) modeling technique. This technique is useful for developmental studies because the Level 1 model focuses on trajectories of change in individual-level stages or traits over time. These individual growth parameters are expressed in the Level 2 model as functions of a set of individual and contextual variables. Detailed descriptions of the LGC models used in our study are in the Appendix. In the analysis, we first fit the data with a linear function for both smoking and self-esteem. Then, we relaxed the assumption of linearity to determine empirically whether they were linear. Consistent with Audrain-McGovern and colleagues (2004), the smoking curve was linear. The unconditional LGC linear model for the four repeated smoking

frequency measures resulted in overall fit indexes indicative of a close fit (comparative fit index [CFI] = .96, root mean square error of approximation [RMSEA] = .041). Respecifying the model to be nonlinear did not improve the model fit. However, the self-esteem curve was nonlinear, declining from Cycle 1 to Cycle 3 (ages 14–15) but increasing from Cycle 3 to Cycle 4 (ages 16–17), consistent with the findings of Hirsch and Rapkin (1987) and Simmons, Carlton-Ford, and Blyth (1987). A quadratic function best captured this pattern (CFI = 1.00, RMSEA = .027). We further specified a conditional model linking the predicting variables to the components of self-esteem trajectories. The results show that neither parenting variable was significantly related to the quadratic component, with only two significant coefficients for the control variables. Thus, although we modeled self-esteem as a quadratic function in our analysis, in the next section, we report results only of the linear components.

Analyses and Results

As we indicated previously, the average smoking frequency from Cycle 1 (ages 10–11) to Cycle 4 (ages 16–17) increased linearly. Before testing H_1 – H_7 with Mplus (Muthén and Muthén 2007), we tested whether systematic intra- and interperson variance existed in the criterion by estimating a null model of smoking trajectories that contained no predictors. If no interperson variance exists in the criterion variable, a multilevel longitudinal analysis is not appropriate, because there is only within-subject variance to explain (i.e., there is only one level of analysis). The results show that the variance of the intercept of the smoking trajectory was .146 ($t = 7.62, p < .001$) and that of the slope was .415 ($t = 11.14, p < .001$), indicating that significant interperson variance exists in the data. Therefore, multilevel modeling is appropriate for providing insights that lead to a better understanding of the causes of the observed variances in smoking trajectories. The estimated mean of the slope was .47 ($t = 21.07, p < .001$), revealing that the mean level of smoking progressed approximately 47% of a level every two years on the six-level measure of smoking frequency. Next, we estimated the conditional model of the effects of control variables as well as the focal parenting strategies (responsiveness and psychological control) on individual differences in smoking frequency at Cycle 1 (intercept) and on progression in smoking frequency (slope).

Effects of Control Variables

To explain individual variations in smoking trajectories, while controlling for known sociodemographic influences, we first added all control variables to the null model to form a conditional LGC model. The model fits the data well (CFI = .95, RMSEA = .032). As we show in the first two columns of Table 1, children living in higher-SES households had lower initial levels of smoking. Compared with adolescents in two-parent families, those in single-parent families had significantly higher initial levels and rates of increase in smoking, as did those in blended families for rates of increase. Having friends who smoked had a positive effect on both initial levels and rate of smoking increase, as did parent smoking. The transition to high school was not significantly related to smoking, perhaps because most made this progression together. Although early and late-maturing adolescents had similar initial smoking levels, late-maturing adolescents had lower rates of increase. Male and female students did not differ in their initial smoking levels, but female students had higher rates of increase. In addition, parental monitoring reduced initial level of smoking. These results are largely consistent with the prior research

findings. The control variables jointly explained 27.4% of the variance in intercept of smoking and 12.0% of its slope.

Table 1. Results of Direct and Mediation Models Using Child-Reported Data

Intercept Variables	Direct Model		Mediation Model			
	Smoking Intercept	Smoking Slope	Self-Esteem Intercept	Self-Esteem Slope	Smoking Intercept	Smoking Slope
Control Variables						
Puberty timing	-.035	-.141***	-.020	-.042	-.041	-.152***
Transition to junior high	.052	.015	-.018	-.042	.021	.002
Transition to high school	-.013	.034	-.045	.012	-.022	.029
Gender	-.007	.071*	-.076**	-.270***	-.023	.000
Parent smoking	.079***	.176***	-.023	-.082*	.074**	.156***
Friends' smoking	.477***	.099**	-.078**	.033	.463***	.096**
Single-parent households	.047*	.095**	-.090***	.101**	.028	.108***
Blended households	.004	.134***	-.068**	.029	-.010	.131***
SES	-.074**	-.009	-.025	.088*	-.080**	.007
Parental monitoring	-.057*	.008	-.012	.070	-.061*	.023
Focal Parenting Strategies^a						
Responsiveness	-.067**	-.020	.552***	-.276***	.044	-.015
Psychological control	.113***	.002	-.210***	.065	.071**	-.013
Self-Esteem Trajectory						
Self-esteem intercept	N.A.	N.A.	N.A.	N.A.	-.205***	-.124*
Self-esteem slope	N.A.	N.A.	N.A.	N.A.	N.A.	-.233***
Variance Explained	31.7%	12.2%	43.7%	18.7%	34.4%	17.4%
Fit Indexes	$\chi^2 = 57.2$, d.f. = 27; χ^2 /d.f. = 2.14, $p = .001$; CFI = .95; RMSEA = .032			$\chi^2 = 135.3$, d.f. = 68; χ^2 /d.f. = 1.99, $p = .001$; CFI = .97; RMSEA = .024		
Results						
<ul style="list-style-type: none"> • H_{1a} was supported. • H_{1b} was not supported by the direct path, but was supported by the indirect ones. • H_{2a} was supported. • H_{2b} was not supported by the direct path, but was supported by the indirect ones. • H_{3a} and H_{3b} were supported. • H_{4a} and H_{4b} were not supported. • H_{5a} and H_{5b} were supported. • H_{6a}–H_{6c} were supported. • H_{7a} and H_{7b} were supported. 						

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

^a In the NLSCY data set, child-reported parental responsiveness and psychological control were labeled as “parental nurturance” and “parental rejection,” respectively.

Notes: N.A. = not applicable.

Testing H_{1a}–H_{2b} (Direct Effects of Parenting on Smoking Trajectories)

As Buri (1991) recommends, we tested our hypotheses primarily with children's responses because it is their own perceptions of parenting style (rather than their parents') that should have the greatest effect on their self-esteem. To increase the certainty of our findings and to provide a multimethod validation and triangulation, we also used parents' measures to verify our primary results from the child data.

To test H_1 and H_2 , we added the two focal parenting strategies to the conditional LGC model, a model we call the “direct effect model.” As we expected, the correlation between responsiveness and psychological control in Cycle 1 was negative ($r = -.275, p < .001$). As we show in Table 1, the direct effect model exhibits an adequate fit ($\chi^2 = 57.2, d.f. = 27, p = .001$; CFI = .95; RMSEA = .032). Consistent with H_{1a} and H_{2a} , parental responsiveness and psychological control were negatively ($b = -.067, p < .01$) and positively ($b = .113, p < .001$) related to initial smoking levels. The results did not support H_{1b} and H_{2b} , though their coefficients were in the expected direction. After we introduced parental responsiveness and psychological control into the model, 31.7% of the variance in smoking intercept was explained. Thus, the two focal parenting variables explained an additional of 16.7% of the variance in smoking intercept $[(.317 - .274)/.274 = .167]$, indicating a significant improvement in the model's predictive power. However, little additional variance of the smoking slope is explained after we added these variables (12.0% versus 12.2%). Thus, the direct effect model indicates that Cycle 1 parental responsiveness and psychological control explain individual differences in the initial level but not the rate of progression (slope) in smoking. However, as we show next, the indirect paths through self-esteem trajectories do explain a greater percentage of the rate of progression in smoking.

Testing H_{3a} – H_{6c} (Indirect Effects of Parenting on Smoking Trajectories)

H_{3a} – H_{6c} predicted indirect effects of parenting on smoking trajectories through self-esteem trajectories. To test these hypotheses, we included the LGCs of both self-esteem and smoking in the same model (see Figure 1). The dual-growth model showed good overall fit ($\chi^2 = 135.3, d.f. = 68, p = .001$; CFI = .97; RMSEA = .024). As Columns 3 and 5 of Table 1 show, both responsiveness ($b = .552, t = 20.51, p < .001$) and psychological control ($b = -.210, t = -8.60, p < .001$) were significantly related to the initial level of self-esteem, verifying H_{3a} and H_{3b} . However, the results did not support H_{4a} and H_{4b} , which were based on parenting theory. Instead, responsiveness was negatively related to self-esteem slope ($b = -.276, t = -6.35, p < .001$), in support of H_{5a} . Consistent with H_{5b} , the coefficient between psychological control and self-esteem slope was positive, but it did not reach statistical significance ($p < .05$). Taken together, these results lend support for the “ceiling or floor effect” expectation. In support of H_{6a} and H_{6c} , the coefficient between the intercepts of self-esteem and smoking was $-.205$ ($p < .001$), and that between slopes was $-.233$ ($p < .001$). The significant, negative coefficient between the intercept of self-esteem and slope of smoking ($b = -.124, t = -2.12, p < .05$) supports H_{6b} .

Testing H_{7a} and H_{7b} (Mediating Effects of Self-Esteem Trajectories)

Following Baron and Kenny (1986), we performed a series of analyses to examine whether self-esteem trajectories mediate the relationship between parenting and smoking trajectories. Three models are required to test mediation using Baron and Kenny's procedures: (1) a parenting–smoking model that examines the direct effects of parenting on smoking trajectory variables, (2) a parenting–esteem model that examines the effects of parenting on self-esteem trajectory variables, and (3) a model that examines the effects of parenting on both self-esteem and smoking trajectory variables. Significant effects in the expected direction for Models 1 and 2 and

significant effects of self-esteem strategies on smoking trajectories in Model 3 would provide evidence of mediation.

These analyses yielded the following: (1) significant effects for responsiveness ($-.067, p < .01$) and psychological control ($.113, p < .001$) on the smoking intercept, (2) significant effects of responsiveness ($.552, p < .001$) and psychological control ($-.210, p < .001$) on the self-esteem intercept and a significant effect of responsiveness ($-.276, p < .001$) on the self-esteem slope, and (3) significant effects of the self-esteem intercept and slope on the smoking intercept and slope. A follow-up comparison between the direct model and the mediation model shows that when we add self-esteem, the effect of responsiveness on smoking intercept becomes nonsignificant, whereas that of psychological control remains significant ($.071, p < .01$), indicating that self-esteem fully mediates the effect of responsiveness but partially mediates the effect of psychological control on smoking trajectories (Baron and Kenny 1986). Thus, the results support H_{7a} and H_{7b} .

After we modeled the self-esteem trajectory as a mediator, 34.4% of the variance in intercept and 17.4% of that in slope of smoking were explained. In other words, incorporating the self-esteem curve as a mediator explained an additional of 8.5% [$(.344 - .317)/.317$] and 42.6% [$(.174 - .122)/.122$] of the variance in smoking intercept and slope, respectively. In addition, these two focal parenting strategies alone (after we controlled for the effects of all covariates) explained 37.1% of the variance in self-esteem intercept and 5.7% of the variance in self-esteem slope. Thus, parenting strategies affect smoking trajectories (particularly the slope) primarily indirectly, by influencing the child's self-esteem. This is an important new incremental finding.

Triangulating with Parent-Reported Parenting Data

As we stated previously, our analyses are based on children-reported parenting measures. To triangulate the results, we reran our models with parenting measures from the parent most knowledgeable about the child. In the parent survey, parental responsiveness was assessed with five items, anchored at “never” (1) and “very often” (5). Parents were asked to rate how often they praised their child, talked or played with him or her, laughed together with him or her, did something special with the child that he or she enjoyed, and played sports or games and engaged in hobbies with him or her. Sum scores ($\alpha = .73$) ranged from 0 to 20, with higher scores reflecting more responsive parenting. Parental psychological control was measured with six items: (1) “How often do you get annoyed with your child for saying or doing something he/she is not supposed to?” (2) “Of all the times that you talk to him or her about his or her behavior, what proportion is disapproval?” (3) “How often do you get angry when you punish your child?” (4) “How often do you think that the kind of punishment you give your child depends on your mood?” (5) “How often do you feel you are having problems managing him or her in general?” and (6) “How often do you have to discipline him or her repeatedly for the same thing?” Sum scores ($\alpha = .71$) ranged from 0 to 24, with higher scores reflecting more psychological control.

As we show in Table 2, in the direct effect model, although the effects of parental responsiveness on smoking intercept and slope were both in the expected direction, neither of the estimates reached statistical significance ($p < .05$); therefore, parent-reported data did not support H_{1a} and H_{1b} . Psychological control was significantly related to both smoking intercept ($b = .106, p < .05$)

and slope ($b = .162, p < .01$), in support of H_{2a} and H_{2b}. In the mediation model, both responsiveness ($b = .211, p < .001$) and psychological control ($b = -.348, p < .001$) were significantly related to self-esteem intercept, verifying H_{3a} and H_{3b}. Neither responsiveness nor psychological control was significantly related to self-esteem slope; these results support H_{5b} but not H_{4a}, H_{4b}, and H_{5a}. The smoking intercept was significantly related to the self-esteem intercept ($b = -.213, p < .001$), whereas the smoking slope was significantly affected by both the self-esteem intercept ($b = -.091, p < .05$) and the slope ($b = -.217, p < .001$), in support of H_{6a}, H_{6b}, and H_{6c}. We followed a similar procedure to test H_{7a} and H_{7b} using parent-reported data. The results were consistent with the anticipated mediational role of self-esteem, in support of H_{7a} and H_{7b}.

Table 2. The Results of Direct and Mediation Models Using Parent-Reported Data

Intercept Variables	Direct Model		Mediation Model			
	Smoking Intercept	Smoking Slope	Self-Esteem Intercept	Self-Esteem Slop	Smoking Intercept	Smoking Slope
Control Variables						
Puberty timing	-.032	-.137***	-.019	-.050	-.040	-.149***
Gender	-.202	.074**	-.017	-.321***	-.025	.005
Transition to junior high	.024	.013	-.023	-.041	.019	.002
Transition to high school	-.011	.036	-.071	.024	-.025	.033
Parent smoking	.079***	.172***	-.017	-.088*	.075**	.153***
Friends' smoking	.482***	.094**	-.130***	.053	.468***	.093**
Single-parent households	.052*	.092**	-.110***	.112**	.029	.107***
Blended households	.013	.134***	-.125***	.053	-.013	.133***
SES	-.077**	-.006	.001	.084*	-.077***	.011
Parental monitoring	-.056*	.004	-.013	.071	-.062*	.017
Focal Parenting Strategies^a						
Responsiveness	-.004	-.020	.211***	-.055	.041	.032
Psychological control	.106*	.162**	-.348***	.058	.060	.131**
Self-Esteem Trajectory						
Self-esteem intercept	N.A.	N.A.	N.A.	N.A.	-.213***	-.091*
Self-esteem slope	N.A.	N.A.	N.A.	N.A.	N.A.	-.217***
Variance Explained						
Fit Indexes						
$\chi^2 = 63.7, d.f. = 27;$			$\chi^2 = 144.5, d.f. = 68;$			
$\chi^2/d.f. = 2.36, p = .001;$			$\chi^2/d.f. = 2.13, p = .001;$			
CFI = .94; RMSEA = .033			CFI = .96; RMSEA = .026			
Results						
<ul style="list-style-type: none"> • H_{1a} and H_{1b} were not supported by the direct path but were supported by the indirect ones. • H_{2a} was supported. • H_{2b} was supported. • H_{3a} and H_{3b} were supported. • H_{4a} and H_{4b} were not supported. • H_{5a} was not supported. • H_{5b} was supported. • H_{6a}–H_{6c} were supported. • H_{7a} and H_{7b} were supported. 						

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

^a In the NLSCY data set, parent-reported parental responsiveness and psychological control were labeled as “positive interaction” and “hostile ineffective parenting,” respectively.

Notes: N.A. = not applicable.

In short, the results from the parent-reported data largely replicated those from the child-reported data. The differences between parent- and child-reported data lie mainly in the direct versus indirect effects of parenting on smoking slope. Parenting strategies, as related by the parent most knowledgeable about the child, affect smoking slope primarily through a direct effect, as is evident by the significant link from psychological control ($b = .162, p < .01$) to smoking slope. However, parenting strategies, as reported by children, affect smoking slope mainly through self-esteem trajectories, without direct effects on smoking slope ($p > .15$). This is also reflected by the differences in variance explained in self-esteem trajectory variables. The two parent-reported parenting strategies alone (after we control for the effects of all control variables) explained only 5.2% and .2% of the variance in the self-esteem intercept and slope, respectively, which is much lower than the corresponding numbers (37.1% for self-esteem intercept and 5.7% for the slope) when we used child-reported parenting strategies. These results are consistent with Buri's (1991) argument that the child's (rather than the parent's) perception of parental behaviors is likely to have the greatest effect on the child's self-esteem. Despite these differences between parent- and child-reported data, the overall pattern of triangulation findings attests to the convergent validity of our model.

General Discussion and Further Research

Researchers and practitioners in other disciplines have recognized the importance of parenting as an influence on smoking, substance use, and other risky behaviors. However, little is known about the mechanisms through which parenting affects teen smoking, a better understanding of which can provide insight into sustained effects of parenting strategies on child smoking development. Extending the literature, we develop and test a theory-based integrative model of child smoking behavior over time that incorporates parenting strategies as the primary drivers and self-esteem trajectory as the critical mediator of smoking progression. Our study is among the first to demonstrate that self-esteem is the mediating mechanism by which parenting influences or inhibits initiation and progression of smoking. Our examination of the impact of the slope of self-esteem, rather than only its initial level, on the initial level and slope of smoking is also unique. We validate our model using longitudinal data collected from children ages 10–17 and triangulate it with parent-reported parenting measures. We examine trajectory-to-trajectory influences of self-esteem on smoking and show that the indirect effects of parenting, through self-esteem, are stronger and more insightful than the direct effects to explain smoking progression. Increases in parental responsiveness bring about increases in a child's self-esteem and decreases in smoking. Increases in psychological control have opposite effects. Both indirectly affect the rate of increase in smoking through their influence on initial self-esteem, which is inversely related to smoking slope. Parental psychological control also retains a direct effect on initial level of smoking in addition to its indirect effects.

Transformative and Public Policy Implications

Recognition of the harmful effects of smoking and of the critical importance of reducing smoking among youth received a major impetus with the enactment of the Family Smoking Prevention and Control Act (United States Congress 2009). This law finds that tobacco companies deliberately target youth with advertising and promotions, while deceptively

“pretending” to support antiyouth smoking programs, supporting the view taken by Campaign for Tobacco-Free Kids (2009c). The law found that reducing tobacco consumption 50% among youth would prevent more than 10 million adolescents from becoming smokers and more than 3 million from dying of a tobacco-related disease. It also recognizes that price increases would reduce youth smoking, that new and tighter restrictions on child-targeted advertising are needed, and that more education (of children) about tobacco use is needed. The law gave new powers to the Food and Drug Administration to regulate and restrict tobacco advertising and promotion, to enforce those restrictions, to regulate labeling, to enforce retail sales restrictions, to study raising the minimum purchase age, and to study the progress and effectiveness of restrictions and proactive measures taken to reduce child and teen smoking.

Our findings support a different orientation in intervention strategies than studies that mainly focus on children/teens themselves. Similar to Tanner and colleagues’ (2008) recent study on reducing risky premarital sexual behavior, our research supports targeting parents. Yet this policy venue does not appear in the Family Smoking Prevention and Control Act. Current advertising and Web sites targeting parents, such as the Campaign for Tobacco-Free Kids (2009a–h) and the Centers for Disease Control (2009a–d) Web sites, focus on encouraging the parents of teens to develop positive relationships and open communication and discussions. Others, including Phillip Morris USA (Phillip Morris USA Parent Resource Center 2009a–e) and the National Youth Anti-Drug Media Campaign (2009), also emphasize parental monitoring. Thus, two parental strategies, responsiveness and parental monitoring, are emphasized, but the importance of avoiding psychological control is ignored, which we believe is a critical oversight.

We suggest a different approach from the current policy—one that emphasizes the detrimental impact of psychological control in parent-targeted integrated media and Web site campaigns. Furthermore, parents should be targeted before their child reaches late grade school. Communication campaigns targeting the parents of grade-schoolers should highlight that positive relationships must be established early and that psychological control has long-lasting negative effects on a child's self-esteem and makes him or her more vulnerable to the risks of smoking. By the time a child reaches late grade school, damage to his or her self-esteem and to the parent–child relationship has been done, and it may be too late to reverse. Early avoidance or decreases in psychological control are necessary to avoid carryover effects into mid-adolescence. Parents of teens must avoid increasing psychological control and decreasing responsiveness as reactions to adolescent misbehavior, especially early on, because such (in)actions are likely to lead to further loss of self-esteem and escalating rebellious behavior, including smoking. These are previously unrecognized direct transformative implications for public policy and antismoking marketers.

Demographically, targeted areas should have heavier concentrations of single-parent and blended families, low education and low SES, deviant peers, more violent neighborhoods, and at-risk cultural backgrounds in which parent and peer smoking is both common and accepted because psychologically controlling parenting strategies are more likely to be used by such families and in such neighborhoods. Parent-targeted campaigns could use spot television advertising to reach these at-risk areas. Blending this segmentation approach with community-targeted interventions and media campaigns, with local variation and input and longitudinal surveys to fine-tune messages and local media (Kelly, Comello, and Slater 2006), may be particularly effective.

Community-based parent-targeted intervention/education programs may be especially effective for low-SES neighborhoods with more broken households and parents who smoke. Such parents may be less likely to go to antismoking Web sites and less likely to be motivated to process the information.

For the existing Web sites with parent-oriented antismoking campaigns, we advocate that the effects of each parenting strategy be evaluated experimentally, as well as by real-world follow-ups of existing Web site users and parents exposed to their advertising when relevant. We also recommend that “best practices” that yield changes in parenting strategies, as perceived by the children, and that result in greater resistance to peer pressures and reduced levels of smoking trial and rate of progression be incorporated into future social marketing campaigns, with ongoing performance evaluation and testing to further refine the approaches. Methodologically sound tracking and field research paradigms, such as those used or advocated by Comello, Slater, and Kelly (2007), Hornik (2002), and Pechmann and Andrews (2010), should be employed, along with effective copy-testing research of actual advertisements reported by Foley and Pechmann (2004).

Our findings also suggest that social marketers could benefit from targeting parents of preteens with themes that emphasize the impact of their behavior on their child's self-esteem, which the National Youth Anti-Drug Campaign did indirectly (see Worden and Slater 2004). The middle-school-targeted national ad campaign focused on the negative aspects of using “pot,” such as losing support of parents and friends, “messing up your life,” and “making yourself look stupid.” All these themes tie in to self-esteem. The message for parents emphasized the personal efficacy that parents could have on their own child's drug use and on parental monitoring in particular, though the strategic process also recognized involvement and responsiveness. We suspect that the overemphasis on monitoring was misplaced. Research should determine whether to use strong fear appeals to target the parents of teenagers, to stress the negative effect of parental psychological control, or to focus on the negative effects of decreasing responsiveness and increasing psychological control. Because adolescents become more peer oriented and less parent oriented, it is important to establish “the inoculation” effect of positive parenting early on and to focus on immunizing children against the negative peer influence they are about to experience.

Research Limitations and Future Research Directions

Despite the robust nature of the longitudinal data set, there were several limitations. The first limitation is the relatively outdated data sets, which had been collected longitudinally over a period from 1994 to 2001. Although the age of data is usually not a serious issue for longitudinal studies, reexamining the model with more recent data would provide additional evidence of the external validity of our framework. Another caveat is that we only used one type of indicator to measure level of smoking (i.e., smoking frequency). Despite these caveats, the data set was a major accomplishment, resulting in a large, nationally representative, multistage longitudinal sample, with many variables of interest developed by leading researchers across multiple disciplines. However, it did not examine such important variables as susceptibility to negative and positive peer influence, parent-child conflict, and attitudes toward smoking and other maladaptive behaviors or toward peers who exhibit or discourage such behaviors. Future studies

should develop customized long-term longitudinal data sets that measure these and other types of psychosocial variables likely to influence adoption and progression of such behaviors. Susceptibility to advertising themes beyond peer influence, or “being cool,” such as self-esteem, as used in recent antidrug advertisements, should also be examined, as should teen media usage, in terms of how this affects adolescents’ lifestyle and various behavior patterns.

Further research should also expand the types of maladaptive behaviors examined to include others of important societal and individual health interest, including alcohol, marijuana, and drug use; drinking and driving; risky sexual behaviors; binge eating; and adolescent eating habits related to juvenile obesity, diabetes, and so forth. With the NLSCY data, it was not feasible to simultaneously examine multiple “maladaptive” consumption behaviors (e.g., alcohol, marijuana, other drugs, drinking and driving), because the sample percentages of respondents who were engaging in some of the latter activities were too small for comprehensive models to be tested. Exploratory bivariate correlations suggest that the behaviors are clustered and that smoking is likely a first step on the path to other behaviors. In addition, similar relationships of parenting strategies and self-esteem to those behaviors seem to hold. Thus, the NLSCY data will allow future researchers to examine the interconnections of these maladaptive behaviors but will not allow more complex models, such as the one used in this study, to simultaneously study their growth patterns.

There is also a need to examine the interactive effects of marketing activities, parenting strategies, and peer influence on smoking and the development and avoidance of other maladaptive behaviors. Different direct advertising themes might be effective in influencing children of responsive parents not to smoke by emphasizing that it is “not cool,” “not fun,” and “risk taking” and that it “does not really show that you are independent.” These same issues may prove to be effective points for responsive parents to communicate to their children, who Pierce and colleagues (2002) believe “Big Tobacco” explicitly targets with such themes. Further research, building from the work of Zhao and Pechmann (2007), that adds parenting strategies as interactive control factors could add insight into the effectiveness of different themes and framing on advertisements that target at-risk teens not to smoke.

Appendix: Latent Growth Models Used in the Study

We build the LGC model in two steps. First, we fit the unconditional model for the criterion variable (smoking, self-esteem) over the four cycles. We first specified and tested a linear function and then tested nonlinear competing models to determine what best fit the trajectory. The results indicated that the smoking trajectory is best represented by a linear function:

$$Y_{it} = \pi_{0i} + \pi_{1i}a_{ti} + e_{ti}$$

where the intercept π_{0i} is child i 's smoking frequency when $a_{ti} = 0$ (Cycle 1); the linear coefficient, π_{1i} , is the growth rate for child i over the four cycles; a_{ti} represents consecutive time points at which the measurements are taken; and e_{ti} represents the modeling residual for an individual.

However, the “growth” of self-esteem is best captured by a quadratic model:

$$Y_{it} = \pi_{0i} + \pi_{1i}a_{ti} + \pi_{2i}a_{ti}^2 + e_{ti}$$

where the intercept π_{0i} is child i 's self-esteem when $a_{ti} = 0$ (Cycle 1); the linear coefficient, π_{1i} , is the instantaneous growth rate for child i at $a_{ti} = 0$ (Cycle 1); and π_{2i} , the quadratic coefficient, represents the rate of acceleration of self-esteem change.

In these formulations, the intercept π_{0i} , slope π_{1i} , and the quadratic component π_{2i} are random variables, which can be represented by the grand mean intercept (μ_{00}), grand mean slope (μ_{10}), and grand mean acceleration (μ_{20}) plus individual variation. In other words, the Level 2 unconditional growth model assumes that the individual growth trajectory parameter is a function of the grand mean and individual variations. It also assumes that no predictors are involved to account for variation of trajectory parameters and thus takes the following form:

$$\begin{aligned}\pi_{0i} &= \mu_{00} + \zeta_{0i}, \\ \pi_{1i} &= \mu_{10} + \zeta_{1i}, \text{ and} \\ \pi_{2i} &= \mu_{20} + \zeta_{2i}.\end{aligned}$$

The second step fits conditional models for the outcome variable. Conditional models test for predictors (e.g., gender, SES) that may explain the variation in growth trajectory parameters. We can construct a conditional Level 2 (interperson) model as follows:

$$\begin{aligned}\pi_{0i} &= \mu_{00} + \sum_{q=1}^{Q_0} \mu_{0q} X_{qi} + \zeta_{0i}, \\ \pi_{1i} &= \mu_{10} + \sum_{q=1}^{Q_1} \mu_{1q} X_{qi} + \zeta_{1i}, \text{ and} \\ \pi_{2i} &= \mu_{20} + \sum_{q=1}^{Q_2} \mu_{2q} X_{qi} + \zeta_{2i}\end{aligned}$$

where X_{qi} are predictor variables that may affect the individual growth trajectory parameters and μ_{0q} , μ_{1q} , and μ_{2q} represent the effect of X_q on the growth trajectory's intercept, slope, and curvature, respectively.

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