Parental Optimism About Children's Risk of Future Tobacco Use and Excessive Weight Gain

Olivier Drouin, MDCM, MSc, MPH; Jonathan P. Winickoff, MD, MPH; Anne N. Thorndike, MD, MPH

From the Division of General Academic Pediatrics (O Drouin and JP Winickoff), Division of General Internal Medicine, Department of Medicine (AN Thorndike), Massachusetts General Hospital; Harvard-wide Pediatric Health Services Research Fellowship (O Drouin); Harvard Medical School (JP Winickoff and AN Thorndike), Boston, Mass; and Julius B. Richmond Center of Excellence, American Academy of Pediatrics (JP Winickoff), Itasca, Ill

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Address correspondence to Olivier Drouin, Division of General Pediatrics, CHU Sainte-Justine, 3175, chemin de la Côte-Sainte-Catherine, 7e étage, bloc 9, Montréal, Québec, Canada H3T 1C5 (e-mail: o.drouin@UMontreal.ca).

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Abstract

Background: Adults tend to underestimate their personal risk of disease, but little is known about parents' perceptions of children's risk.

Methods: In total, 648 parents of children 0 to 18 years old attending 2 pediatric practices were surveyed about their children's exposure to smoking; 344 parents with children ≥2 years old also were asked about their children's sugar-sweetened beverage (SSB) consumption and physical activity. Children were categorized as "at risk" or "not at risk" for each factor. Parents estimated the risk of their child becoming a smoker or gaining excessive weight and were categorized as "optimistic" if they believed their children were less likely than others to use tobacco or gain weight.

Results: Overall, 92% of parents thought their children were at lower risk than average for tobacco use, and 86% believed their children were at lower risk for excessive weight gain. A high frequency of optimistic bias occurred even among parents with "at-risk" children, including parents with children exposed to tobacco use (70.4%), SSB consumption (77.6%), >2 hours of screen time (82.1%), and low physical activity (84.1%). In multivariable analyses, parents with children exposed to tobacco smoke (odds ratio = 0.21, 95% confidence interval, 0.09−0.51); or who consumed SSBs daily (odds ratio = 0.44, 95% confidence interval 0.20−0.97) were less likely to be optimistic about their child's future tobacco use and excessive weight gain, respectively.

Conclusions: Most parents believed their children were at lower risk than average for tobacco use or excessive weight gain. Eliciting parents' optimistic biases might facilitate behavior change counseling in pediatric settings.

Keywords: behavioral economics; counseling; optimistic bias; obesity; over-optimism; risk perception; smoking; sugar-sweetened beverages; susceptibility; tobacco-smoke exposure; vulnerability

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What's New

Most parents believed their child was at lower risk than average of smoking initiation or excessive weight gain, even when the child's risk was greater due to related risk factors, such as having a household smoker or consuming sugar-sweetened beverages.

There is strong evidence that lifestyle factors established during childhood are contributors to the development of noncommunicable diseases over the lifespan.[1] Major contributing factors include childhood exposure to tobacco use, unhealthy diet, screen time, and lack of physical activity.[2] For example, children with tobacco-smoke exposure are 4 times as likely to become smokers themselves by age 18 years compared with children who are not exposed.[3] Physicians have an important role to play in identifying those lifestyle factors and working with patients and families to adopt healthier ones.[4] However, pediatricians often have low confidence in their ability to provide effective counseling to create positive behavior change in children and their parents.[5]

An individual's perceived risk of disease is central to many behavior change models.[6] However, a growing body of research demonstrates that many patients rely on incomplete or erroneous information, as well as mental shortcuts, to evaluate their risk of disease, which can lead to distorted risk perception.[7] For example, adults often underestimate their own risk of disease (known as "optimistic bias") for several adverse health outcomes, including drug addiction and diabetes.[8] Even when compared with validated, individualized risk scores, adults underestimate their risk of cardiovascular disease and breast cancer.[9,10] Interestingly, this optimistic bias seems to be greater when the risk factors are perceived to be controllable (eg, smoking or weight gain) as opposed to uncontrollable or random (eg, developing cancer).[11] Although optimism has been linked to long-

term positive psychological and physical outcomes,[12,13] optimistic bias about the risk of disease can reduce incentives to engage in healthy behaviors and increase the risk of adverse health outcomes.[14,15] Therefore, interventions that acknowledge and address patients' optimistic bias might lead to better engagement and increase motivation to adopt healthy behaviors.[14,15] Optimistic bias has been shown to be an effective target for intervention in adults at risk for stroke and cancer, including lung cancer among smokers.[9,16]

Parents' risk perception has been studied previously with regard to childhood vaccinations, teenager alcohol consumption, as well as perinatal decision-making, but little is known about parents' risk perception with regard to lifestyle factors, such as smoking, diet, and physical activity. Although one study showed that parents of children with obesity estimate greater future risk of weight-related health conditions for their child than parents of healthy-weight children,[17] another study found that a majority of parents believed their child was at lower risk of childhood obesity−related disease than the "average" child.[18]

In this study, we surveyed parents bringing their children to pediatric primary care to identify the presence of unhealthy lifestyle factors. We chose factors that are influenced by parent behavior, are recommended for screening by national organizations,[19] and are strongly associated with the development of tobacco smoking and obesity.[3,20] We sought to determine whether parents' risk perception about their children's future tobacco use and weight gain was associated with the children's actual exposure to tobacco smoke in the home, regular consumption of sugar-sweetened beverages (SSBs), lack of physical activity, and extended screen time. In this study, based on studies of risk perception in adults, we hypothesized that most parents would perceive their children to be at lower risk than the average child for becoming a smoker or gaining excessive weight (ie, "optimistic bias") and this bias would be present both in parents whose children were at risk as well as those whose children were not at risk.

PATIENTS AND METHODS

STUDY DESIGN AND POPULATION

This is a secondary analysis of data collected from a cross-sectional study on preappointment screening for risk factors in pediatrics.[21] The study population included parents or legal guardians of children aged 0 to 18 years old seen in 2 university-affiliated pediatric practices in Boston, Massachusetts, between October 2016 and January 2017. To be eligible, parents needed to be bringing in their children for a scheduled appointment with their regular primary care physician and speak English. Parents were eligible to complete the survey only once.

PROCEDURE

Study staff approached parents in the waiting room after their child's medical appointment was completed. After screening for eligibility and obtaining informed consent, the study staff conducted a 10-minute verbal survey with a questionnaire. Participants received a $5 gift card for their participation.

EXPOSURES

TOBACCO RISK

Parents were asked, "Tobacco products can come in several forms. These include products that can be smoked such as cigarettes, cigars, hookah, or pipe. Does any member of your child's household smoke tobacco?" A child of any age was labeled as being "at risk" if any member of the child's household smoked tobacco.[22]

FACTORS INFLUENCING OBESITY RISK

Parents of children ≥ 2 years old were asked about lifestyle factors that increase risk of obesity. Parents were asked about their children's SSB consumption: "During the past month, how often did your child drink regular soda or pop that contains sugar?" with a choice of answers: 1) Once a day or more; 2) Once a week or more; 3) Once a month or more; or 4) "My child did not drink regular soda or pop in the last month." Participants who answered 1), 2), or 3) were then asked how many times a day (or week or month, respectively) their child drank soda or pop. Participants were then asked similar questions for juice, as well as for non-soda SSBs. Parents also were asked about their children's physical activity and screen time: "During the last 7 days, on how many days did your child do physical activity?" and "In the past week, on average, how many hours per day did your child spend watching TV shows, DVDs, videos, or movies on a typical weekday? On weekends? Please include those watched on a TV, computer, or handheld device like an iPad." Similar questions were asked about video games, as well as Internet and social media. Children were categorized "at risk" based on guidelines from the American Academy of Pediatrics: SSB consumption once a day or more, < 60 minutes of moderate-to-vigorous physical activity daily, and > 2 hours of screen time daily.[4]

OUTCOMES

The primary outcomes were parents' perceived risk of their children developing tobacco use before the age of 18 years and excessive weight gain in the next 12 months. Specifically, all parents were asked: "Compared to other children his/her age, how likely is your child to start smoking before the age of 18?" Parents bringing in a child ≥ 2 years old were also asked: "Compared to other children his/her age, how likely is your child to gain an unhealthy amount of weight in the next 12 months?" Similar to other studies on this topic, parents' perceived risk was rated on a 5-point Likert scale, from "much less likely" to "much more likely."[8] Parents were then labeled as optimistic if they believed their child was "less likely"

or "much less likely" than the average to develop each outcome. Conversely, they were considered "not optimistic" if they thought their child was "as likely" or "more likely" than other children to develop each outcome. Other covariates included age and sex of both the parent and the child, and the parent's race/ethnicity, education, smoking status, type of insurance, and "difficulty in making ends meet," using the single items recommended by the American Academy of Pediatrics.[23]

Analysis Plan/Statistical Methods

We used the Fisher exact test to compare perceived risk between parents with children at risk and those with children not at risk for each lifestyle factor. For all analyses, we used the standard threshold of $P < .05$ for statistical significance. To control for sociodemographic characteristics and the possible presence of multiple risk factors in the same child, we built multivariate logistic regression models using optimism as the dichotomous outcome of interest and each lifestyle factor as the predictors. In an exploratory analysis, we also examined whether any of the covariates was significantly associated with the related outcome. We also tested whether the use of categorical, rather than binary, exposures for SSB consumption, physical activity, and screen time influenced the relationship between these risk factors and the outcome. All statistical analyses used SAS 9.4 (SAS Institute Inc, Cary, NC). This research study was approved by the Partners Institutional Review Board on June 5, 2016.

Results

A total of 1174 parents were approached to participate in the study over 3 months, and 526 (44.8%) did not meet inclusion criteria: 394 (33.6%) were not seeing the child's regular physician, 52 (4.4%) were unable to answer the survey in English, and 80 (6.8%) were excluded for another reason (child >18 and adult present was not the parent or primary caregiver). Consequently, 648 parents completed the exit interview and represent the total sample for this study; of these, 344 (53%) were bringing in a child age ≥2 years.

Parent and child characteristics by each risk factor (smoker in the house, consumption of SSBs, low physical activity, and high screen time) are presented in Table 1. Among all parents (n = 648), 54 (8%) reported that a member of the household smoked tobacco. Among parents of children aged ≥2 years old (n = 344), 145 (42%) reported their child consumed SSBs once a day or more, 170 (49.4%) reported their child did not get 60 minutes of physical activity daily, and 195 (57%) reported their child had >2 hours per day of screen time. Among children ≥2 years old, 131 (38%) had 2 risk factors for excessive weight gain and 44 (13%) had all 3 risk factors. Details of the distribution of SSB consumption, physical activity, and screen time can be found in Appendix 1 online.

Overall, most parents believed their child was less likely or much less likely than other children to become a smoker before age 18 years (91.5% of all parents) or to gain excessive weight in the next 12 months (86.3% of parents with children ≥2 years old). In univariate analysis, parents who reported a smoker in the house were less frequently optimistic that their child would not start smoking before the age of 18 years compared with parents who reported that there was no household smoker (70.4% vs 93.5%, $P < .001$) (Figure). Parents of children who consumed SSBs once a day or more or children who had screen time of >2 hours a day were less likely to be optimistic about their child gaining excessive weight in the next 12 months compared with parents of children without these risk factors; SSB: (77.6% vs 91.2%, $P < .001$) and screen time: (82.1% vs 91.8%, $P = .01$). However, there was no difference in the proportion of parents who were optimistic about their child gaining excessive weight between those whose children were meeting physical activity guidelines compared with those who were not (84.1% vs 88.3%, $P = .28$) (Figure).

Table 2 shows the results of multivariable analyses of parental optimism about their children becoming a smoker or gaining excessive weight. After adjusting for sociodemographic characteristics, we found that parents of children exposed to tobacco smoke remained less likely to be optimistic for smoking initiation (odds ratio = 0.21; 95% confidence interval, 0.09−0.51). Given the overlap in the risk factors for excessive weight gain, the multivariable analysis measured the effect of each risk factor (SSB, physical activity, and screen time), holding the 2 other factors constant. Using this technique, we found that only SSB consumption was a significant predictor of low parental optimism (OR = 0.44; 95% CI, 0.20−0.97), whereas insufficient physical activity or high screen time were not statistically significant predictors (Table 2). None of the demographic covariates were predictive of parental optimism about the child not becoming a smoker (Table 2). For excessive weight gain, only being insured by Medicaid (vs private/health maintenance organization) was associated with a reduced likelihood of parental optimism (Table 2). Using categorical, rather than binary, variables for SSB consumption, we found that the average number of days with physical activity and average number of hours of screen time per day did not change the relationship between those risk factors and parental optimism about their child gaining excessive weight, except that SSB consumption became a nonstatistically significant predictor of parental optimism (Appendix 2 online).

Discussion

In this study, we found that a majority of parents visiting pediatric primary care practices believed their children were at lower risk than the average child of starting to smoke before the age of 18 years or of gaining excessive weight in the upcoming year.

Table 1. Child and Parent Sample Characteristics by Risk Factor*

	Total Sample n = 648	Smoker in the House n = 54/648	Child who Drinks ≥ 1 SSB/d† n = 145/344	Child With Physical Activity < 60 min/d, 7 d/wk† n = 170/344	Child With Screen Time > 2 h/d† n = 195/344
Child's characteristics					
Child age, mean (SD), y	4.4 (5.1)	6.1 (5.3)	8.6 (4.5)	9.5 (4.8)	9.7 (4.7)
Parent's characteristics					
Parent age, mean (SD), y	37.6 (7.8)	38.4 (11.2)	40.3 (8.7)	42.6 (8.5)	42.2 (8.7)
Female	504 (78)	48 (89)	110 (81)	141 (83)	162 (83)
College graduate	439 (70)	11 (20)	55 (42)	98 (60)	91 (48)
Self-reported "race"/ethnicity					
Black/African American	81 (14)	10 (19)	24 (20)	22 (15)	31 (18)
Hispanic/Latino	51 (9)	4 (7)	13 (11)	11 (7)	20 (11)
White	355 (60)	33 (61)	59 (50)	83 (56)	96 (55)
Other	105 (18)	7 (13)	22 (19)	32 (22)	29 (16)
Insurance					
Medicaid	118 (19)	25 (47)	46 (35)	35 (22)	53 (28)
Private	483 (78)	27 (51)	79 (61)	123 (76)	131 (69)
Other	20 (3)	1 (2)	5 (4)	4 (2)	6 (3)
Have difficulty making ends meet	73 (12)	20 (38)	33 (25)	28 (17)	37 (19)
Risk factors					
Smoker in the house	54 (8)	–	24 (18)	14 (8)	31 (16)
Participant is the smoker		31 (57)	16 (67)	5 (36)	17 (56)
Child drinking SSBs ≥ 1×/day (incl. juice)†	145 (42)	24 (63)	–	61 (36)	94 (48)
Child has < 60 min/d, 7 d/wk of physical activity†	170 (49)	14 (37)	61 (45)	–	108 (55)
Child screen time ≥ 2 h/d†	195 (57)	31 (82)	94 (69)	108 (64)	–
Child with 2 risk factors for excessive weight gain		N/A	131 (38)		
Child with 3 risk factors for excessive weight gain		N/A	44 (13)		

SSB indicates sugar-sweetened beverages; SD, standard deviation; N/A, not available.

*Unless indicated, data are expressed as number (percentage) of patients. Percentages have been rounded and may not sum to 100.

†Among children ≥ 2 years old.

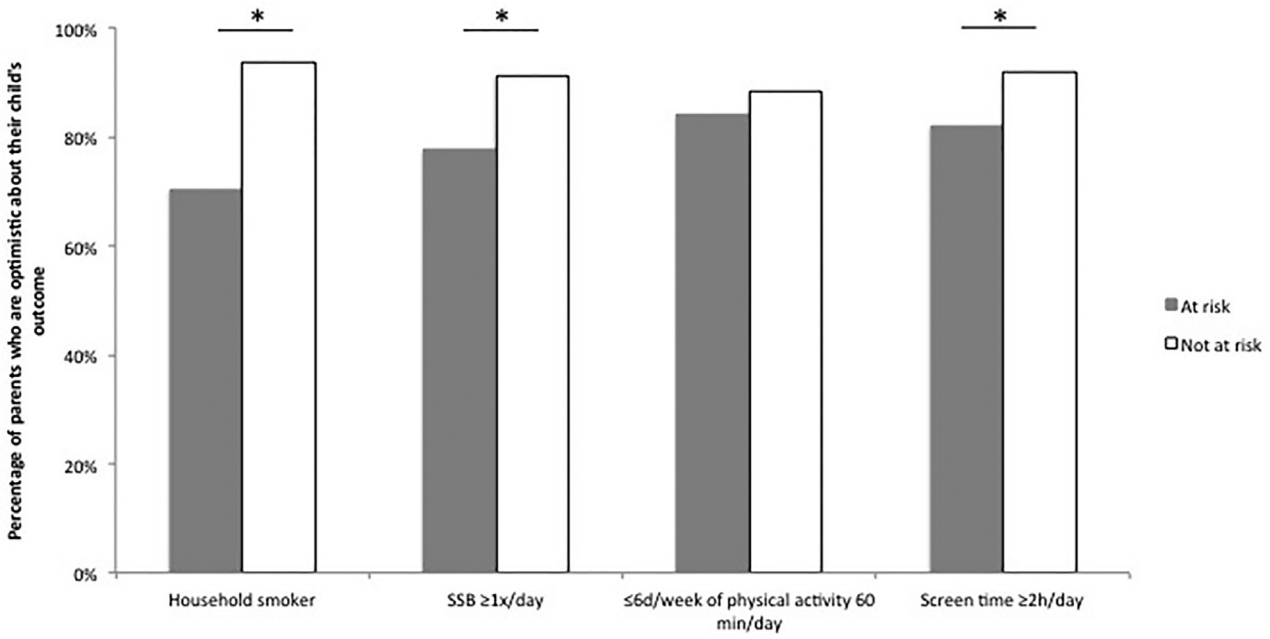

Figure. *Parental optimism for child smoking before age 18 years and excessive weight gain in next 12 months, by risk factor status.* *P ≤ .01. *SSB indicates sugar-sweetened beverages.*

Although optimism was high among all parents, it was lower in parents whose children were exposed to smoking in the house and who consumed SSBs once a day or more. Conversely, optimism was more prevalent among parents of children at risk for weight gain on the basis of low physical activity and excess screen time.

Parents' "optimistic bias" about children's risk of unhealthy behaviors is common and if unrecognized could hinder pediatricians' efforts to promote healthier family behaviors. In the future, addressing optimistic bias among parents, particularly parents of young children, could lead to more effective long-term strategies for motivating parents to engage in healthier family behaviors.[8,11,15,24] Previous studies have shown that adults who smoke perceive their risk of tobacco-related diseases to be greater than nonsmokers but lower than other "average" smokers.[15] In our sample, parents who smoked tended to be less optimistic than nonsmokers about their child's risk of initiating

Table 2. Multivariable Analysis: Parental Optimism for Child Smoking Before Age 18 Years and Excessive Weight Gain in the Next 12 Months (Reference: Parents of Children "Not at Risk")*

	Smoking Odds ratio (95% CI)	Excessive Weight Gain† Odds ratio (95% CI)
Risk factors		
Household smoker	0.21 (0.09–0.51)‡	–
SSB ≥1×/d	–	0.44 (0.20–0.97)‡
≤6 d/wk of physical activity 60 min/d	–	0.60 (0.28–1.30)
Screen time >2 h/d	–	0.65 (0.27–1.55)
Sociodemographic characteristics		
Mother (vs father)	0.60 (0.24–1.51)	1.10 (0.42–2.87)
Girl (vs boy)	1.13 (0.60–2.12)	1.32 (0.62–2.80)
Medicaid (vs private/HMO)	1.62 (0.66–3.97)	0.28 (0.12–0.66)‡
Difficulty making ends meet (vs not)	0.53 (0.21–1.33)	1.20 (0.42–3.39)
College education (vs not)	2.05 (0.87–4.85)	0.43 (0.16–1.11)
"Race"/ethnicity		
Black (vs white)	1.76 (0.64–4.91)	0.53 (0.20–1.39)
Hispanic (vs white)	1.28 (0.44–3.72)	0.48 (0.15–1.53)
Other (vs white)	1.07 (0.44–2.61)	1.17 (0.40–3.42)
Age of the child (by 1-y increment)	1.10 (1.00–1.22)	0.91 (0.81–1.01)
Age of the parent (by 1-y increment)	1.03 (0.97–1.09)	1.07 (1.00–1.14)

CI indicates confidence interval; SSB, sugar-sweetened beverages; HMO, health maintenance organization.

*Models were adjusted for the sex of the parent and the child, insurance status, difficulty in making ends meet, parental education achievement, race/ethnicity, age of the child, and age of the parent.

†Among children ≥2 years old.

‡$P < .05$.

smoking. This belief may be due in part to changing social norms and public health awareness of the negative aspects of smoking on children's health.[25,26] However, a child's actual odds of becoming a smoker is estimated to be up to 4 times greater if a parent smokes, and therefore the rate of optimism of 70% in our study for parents who smoke is still relatively high.[3]

Our results indicate that some parents acknowledge the risk of excessive weight gain due to their child's SSB consumption. However, fewer parents acknowledge the risk that low physical activity and high screen time contribute to excessive weight gain. Previous research in adults has shown mixed evidence about the presence of optimistic bias for weight gain and metabolic disease risk.[8,14,27] For example, in one study of 296 adults recruited in a community sample, participants demonstrated optimistic bias in evaluating their risk of diabetes but not weight gain.[8] Interestingly, previous research has shown that parents believe nutrition is one of the most significant contributors to child health, and parental knowledge about the contribution of "healthy" diet to prevent overweight tends to be greater than their knowledge of the role of an active lifestyle.[28,29] Also, children's screen time often is not perceived by parents as being linked to overweight or obesity.[29] Similar to tobacco, the rates of parental optimism about weight gain, even for parents of children with 1 or more risk factors, are high.

This study has several limitations. First, lifestyle factors in this study were collected by self-report and therefore may be under-reported due to recall and social desirability bias, particularly for tobacco use. However, this phenomenon would not affect the level of optimism found in the overall sample. It is possible that families who were truly at risk were labeled as not at risk. We attempted to limit the possibility of mislabeling by using validated and/or previously published questions to assess lifestyle factors.[22,30-32] Any misclassification would have biased our study toward the null hypothesis, with the "true" optimistic bias being even greater than reported here. Second, in this small study, we were unable to use objective measures of risk, such as cotinine testing, or accelerometers. We cannot eliminate the possibility that some parents correctly estimated that their child was at lower risk than other children for reasons not captured in the study questionnaire, such as genetic predisposition or protective behavioral factors. In the aggregate, however, those variations in risk should average out, such that the risk for the sample is approximately average to that of the population.[8,33] In addition, previous studies have shown that even when compared with objective personalized risk assessment, adults still displayed optimistic bias.[9,34] Because the baseline risk for the outcomes chosen may differ by sociodemographic characteristics, we also created multivariable regression models to control for known covariates that could have influenced these risks. Finally, this survey was conducted among parents bringing their children to primary care visits in an urban, university-affiliated health care setting, and findings may not be generalizable to other pediatric clinic settings.

In the future, pediatric interventions to promote healthier lifestyle behaviors might integrate strategies to address parents' optimistic biases. These strategies might include providing parents with accurate, objective information about the child's risk coupled with encouraging and actionable advice to help and support the parent's efforts to reduce the child's risk. For example, motivational interviewing techniques that elicit parental perceptions and that use reflective listening to create change could potentially be used to tackle optimistic bias. Previous research suggests that simply giving "cold hard facts" to participants may be one reason for the lack of effect seen in some previous intervention trials.[9] There is evidence that when individuals are presented with information contrary to their previous beliefs, they may feel threatened and dismiss the information.[35]

A child's illness and contact with the health care system may create a window of realism to correct parents' health misperceptions.[15] Health care providers could use these teachable moments to provide information about realistic risks of unhealthy behaviors, taking into consideration the context of family lifestyle factors, an approach that has already shown effective with parental smoking-cessation programs.[22] Use of a preappointment screening tool to ask concomitantly about several lifestyle factors and level of optimism toward adverse health outcomes might allow for an integrated and timely intervention.[21] A successful model could therefore be providing counseling and treatment for smoking cessation for a parent who smokes while communicating that the child is at risk.[22]

It is important to acknowledge that there are health benefits to optimism.[12,13] Thus, rather than eliminating it, clinicians could attempt to elicit and enhance the parent's motivation or "optimism" to make a change. Emphasizing the potential for early, simple positive lifestyle changes to influence a lifelong health trajectory for the child could fulfill this objective.[1]

CONCLUSIONS

Most parents believed their child was at lower risk than the average child of initiating smoking or gaining excessive weight. Addressing parental optimistic bias about tobacco use and excessive weight gain of their children could improve the long-term effectiveness of tobacco and obesity-prevention efforts in pediatrics.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi:10.1016/j.acap.2018.09.008.

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