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Brief Report

Parental monitoring at age 11 and smoking initiation up to age 17 among Blacks and Whites: A prospective investigation

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Abstract

Introduction: Parental monitoring has been identified as a predictor of adolescent smoking initiation. However, it is uncertain if the association is uniform across different racial groups.

Methods: Random samples of low birth-weight and normal birth-weight children were drawn from newborn discharge lists (1983–1985) of two major hospitals in southeast Michigan, one serving an inner city and the other serving suburbs. Assessments occurred at ages 6, 11, and 17 years. Statistical analysis was conducted on children with data on parent monitoring at age 11 and tobacco use at age 17 who had never smoked a cigarette up to age 11 ($n = 572$). Multiple logistic regression was used to examine the association between parent monitoring and children's smoking initiation. Two-way interactions were tested.

Results: The relationship between parent monitoring at age 11 and child smoking initiation from ages 11 to 17 varied by race. Among White children, an increase of 1 point on the parent monitoring scale signaled an 11% reduction in the odds of initiating smoking by age 17. In contrast, parent monitoring was not significantly associated with smoking initiation among Black children.

Discussion: The results suggest a differential influence of parent monitoring on adolescent smoking between White and Black children. Future research would benefit from close attention to parental goals and concerns and to extra-familial factors that shape smoking behavior across racially and socially disparate communities.

Introduction

Longitudinal studies have documented an inverse association between parent monitoring and children's smoking (Chilcoat & Anthony, 1996; Chilcoat, Dishion, & Anthony, 1995; Cohen, Richardson, & LaBree, 1994; Forrester, Biglan, Severson, & Smolkowski, 2007). Despite the empirical evidence and a well-articulated conceptual framework (Dishion & McMahon, 1998) linking parent monitoring to child smoking initiation, gaps in the literature remain. It is uncertain if the association is uniform across socioeconomic or ethnic/racial subgroups. Several cross-sectional studies have found that *parenting practices* are associated with lower smoking in Blacks but not in Whites (Clark, Scarisbrick-Hauser, Gautam, & Wirk, 1999; Griesler & Kandel, 1998). In contrast, longitudinal studies have reported that *parenting practices* are a stronger predictor of cigarette use in Whites than in Blacks (Griesler, Kandel, & Davies, 2002; Nowlin & Colder, 2007). The relationship of monitoring, as a distinct aspect of parenting practices, with adolescents' smoking was not compared between racial groups.

Previous studies have not considered important covariates, namely, maternal smoking during pregnancy and peer smoking. Maternal smoking has been shown to predict adolescent smoking (e.g., Al Mamum et al., 2006). There is evidence that mothers who smoke during pregnancy confer an even greater risk (Lieb, Schreier, Pfister, & Wittchen, 2003). Having friends who smoke has been found consistently to predict smoking during adolescence (e.g., Bricker et al., 2006).

Using a representative sample of children from a large Midwest metropolitan area, we examine prospectively the relationship of parent monitoring with smoking initiation. Our analysis addresses gaps in the literature in three ways. (a) We test whether the association between monitoring and smoking initiation varies between Blacks and Whites. (b) We assess the influence of parent monitoring in preadolescence on the cumulative incidence of smoking initiation up to late adolescence. The age period we cover is the period in which patterns of smoking behavior develop (Scragg, Wellman, Laugesen, & DiFranza,

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Table 1. Description of the Black and White samples on variables used in the analysis (n = 572)

	Total ($n = 572$)	White ($n = 316$)	Black ($n = 256$)
Initiated smoking from age 11 to 17 years (%)	41.3	45.6	35.9
Parent monitoring score (*M*, *SD*)	36.2 (3.8)	36.4 (3.3)	36.0 (4.4)
Urban (%)	50.5	15.5	93.8
Low birth-weight (%)	56.3	51.3	62.5
Male (%)	43.9	45.6	41.8
Mothers' education			
Less than high school (%)	14.3	7.0	23.4
High school (%)	26.0	26.6	25.4
Some college (%)	38.6	37.7	39.8
College (%)	21.0	28.8	11.3
Single mother (%)	30.6	8.9	57.4
Maternal smoking history			
Nonsmoker (%)	61.4	69.0	52.0
Smoked during pregnancy (%)	27.6	23.7	32.4
Smoked, not during pregnancy (%)	11.0	7.3	15.6
Friend smoked (%)	24.7	22.5	27.3
Friend drank (%)	16.6	11.1	23.4

2008). (c) The investigation takes into account important covariates, including peer smoking and maternal smoking during pregnancy.

Methods

Participants

Data are from a longitudinal study of neuropsychiatric sequelae of low birth-weight. Random samples were drawn from the 1983 to 1985 newborn discharge lists of two major hospitals in southeast Michigan, one serving a disadvantaged inner-city community and the other serving a suburban middle-class community. Baseline data were gathered from mothers and children when children were 6 years of age; follow-up data were gathered at 11 and 17 years of age. Of 1,095 eligible children, 823 (75.2%) completed the baseline assessment at age 6; 87.1% ($n = 717$) of the initial sample participated at age 11 and 713 participated at age 17 (86.6%). Six hundred and fifty-seven children completed both follow-up assessments. Institutional review boards of the participating institutions approved the study. More detailed information on the population, sampling, and assessment is available elsewhere (Breslau, Johnson, & Lucia, 2001; Breslau, Paneth, & Lucia, 2004; Breslau et al., 1996).

Measures

Parent monitoring. Information on parent monitoring was elicited from the children at age 11 via a 10-item scale (Chilcoat, 1992; Chilcoat & Anthony, 1996; Chilcoat et al., 1995). The 10 items cover child supervision and tracking of child's activities outside the school environment. Children responded on a 5-point scale ranging from *all of the time* (1) to *never* (5) on seven items; on two items, responses were either *clear* (1) or *unclear* (2); and on a single item, the responses were coded *yes* (1) or *no* (2) (Table 1). To construct the parent monitoring score, the coding on the questions were reversed and the 10 items were summed. Possible scores range from 10 to 41, with higher scores representing higher levels of parent monitoring.

Tobacco initiation, ages 11–17 years. The cumulative incidence of smoking initiation was assessed at age 17, using a standard questionnaire about tobacco use (Breslau et al., 1996) and was coded as a binary variable, 0 for never smoked or 1 for smoked at least part of a cigarette. Data gathered from children at age 11 were used to identify children who had initiated smoking by age 11 and were therefore no longer at risk for smoking initiation.

Maternal smoking history. Data on maternal smoking were obtained at baseline in two separate parts of the interview. Smoking during pregnancy was measured by asking mothers if they smoked daily for 2 months or longer during pregnancy with the index child. A separate part of the baseline interview, administered before the inquiry about perinatal history, included a section on smoking history. Mothers were classified as smokers if they had ever smoked daily for 1 month or more up to the time of the interview. Using data from both parts of the interview, we classified mothers into three mutually exclusive categories: never smoked, smoked during pregnancy (with or without history of smoking at any other time), and smoked but not during pregnancy.

Other covariates. Sex, race, maternal education, and maternal marital status were assessed at baseline. Data on smoking and alcohol use by peers were obtained from the children when they were 11 years of age via two *Yes* or *No* questions: "Do you have any friends around your age who ever smoke tobacco cigarettes?" and "Do you have any friends around your age who ever drink alcohol?"

Statistical analysis

We used multiple logistic regression to estimate the association between parent monitoring and children's smoking initiation. A significant interaction was detected between race and parent monitoring ($p = .048$). No other two-way interactions were detected. The equation for the final multiple logistic regression estimating the log odds of smoking initiation from age 11 to 17 years is as follows:

$$\text{logit } p(x) = \alpha + \beta_1\,(\text{parent monitoring}) + \beta_2\,(\text{race}) + \beta_3\,(\text{race} \times \text{parent monitoring}) + \beta_{4\text{–}14}\,(\text{other covariates}),$$

where parent monitoring is a continuous variable and race equals 1 if Black and 0 if White. The other covariates are shown in Table 2. The interaction term, β_3, measures the differential association of parental monitoring with smoking initiation by Blacks versus Whites. The coefficient β_1 estimates the association between parent monitoring and smoking initiation among White children, and $\beta_1 + \beta_3$ is the corresponding estimate for Black children. Adjusted odds ratios (*AOR*s) and 95% *CI*s were calculated from the partial regression coefficients (β) using the logit link and lincom functions. All analyses were conducted using Stata 10.1.

Table 2. Parent monitoring and smoking initiation up to age 17, results from single model with interaction (n = 572)

	Adjusted β regression coefficients (95% *CI*)	*p* Value	*AOR*s (95% *CI*)[a]	
			White	Black
Parent monitoring	−0.11 (−0.19 to 0.04)	.003	0.89 (0.83 to 0.96)	0.98 (0.93 to 1.04)
Black (vs. White)	−4.49 (−8.02 to 0.95)	.013	–	
Black × Parent monitoring	0.10 (0.001 to 0.19)	.048	–	
Urban (vs. suburban)	0.15 (−0.43 to 0.74)	.604	1.17 (0.65 to 2.10)	
LBW (vs. NBW)	0.05 (−0.32 to 0.41)	.808	1.05 (0.72 to 1.51)	
Male (vs. female)	0.29 (−0.07 to 0.65)	.114	1.34 (0.93 to 1.92)	
Mothers' education				
Less than high school	−0.44 (−1.14 to 0.25)	.211	0.64 (0.32 to 1.29)	
High school	0.17 (−0.37 to 0.71)	.545	1.18 (0.69 to 2.03)	
Some college	0.06 (−0.43 to 0.56)	.801	1.07 (0.65 to 1.75)	
College	REF	–	REF	
Single mother (vs. married)	0.76 (0.27 to 1.26)	.003	2.15 (1.31 to 3.53)	
Maternal smoking history[b]				
Nonsmoker	REF	–	REF	
Smoked during pregnancy	0.43 (−0.01 to 0.87)	.055	1.54 (0.99 to 2.38)	
Smoked not during pregnancy	0.48 (−0.11 to 1.06)	.114	1.61 (0.89 to 2.90)	
Had a friend who smoked (vs. did not)[c]	0.56 (0.13 to 0.99)	.011	1.75 (1.14 to 2.69)	
Had a friend who drank (vs. did not)[c]	0.22 (−0.29 to 0.74)	.389	1.25 (0.75 to 2.09)	

Note. *AOR*s = adjusted odds ratios; LBW = low birth-weight; NBW = normal birth-weight.

[a]Separate *AOR*s are shown for Whites and Blacks for parent monitoring.

[b]Maternal smoking during pregnancy combines mothers who smoked both during pregnancy and not during pregnancy ($n = 136$) and mothers who smoked only during pregnancy ($n = 22$).

[c]Information obtained at age 11.

Results

Representativeness of the subset with complete data

Complete follow-up data were available on 657 of the initial sample of 823 children. Tests of proportions indicated that the initial sample and subset with complete follow-up data did not differ significantly on any variable; *p* values ranged from .30 to .90, except for % Black ($p = .08$).

Description of the sample

Of the 657 children with complete data at ages 11 and 17 years, 9 had missing baseline information on maternal smoking history. Children who reported that they had smoked at any time up to age 11 ($n = 76$) were not at risk for smoking initiation during the follow-up period. The analysis was conducted on 572 children.

Means and *SD*s of parent monitoring were similar in Black and White children (Table 1). Smoking initiation was higher in Whites than in Blacks (45.6% vs. 36.0%, respectively). Blacks and Whites differed markedly with respect to community, maternal education, and percentage of households with single mothers. A higher percentage of Black than White mothers had smoked. (The overall high proportion of mothers who smoked during pregnancy is due to the overselection of low birth-weight children.) The percentage of adolescents who had friends who smoked at age 11 was slightly higher in Blacks. In contrast, the percentage of adolescents who had friends who drank alcohol was markedly higher in Blacks.

Parent monitoring at age 11 and the odds of subsequent smoking initiation

A significant interaction was detected between parent monitoring and race, indicating that the association of parent monitoring with smoking initiation differed between Whites and Blacks (Table 2). For Whites, a statistically robust inverse association was found (β = −0.11; *AOR* = 0.89; 95% *CI* = 0.83–0.96). The negative association between parent monitoring and smoking initiation for Blacks was smaller and nonsignificant (β = −0.11 + .10 = −0.01; *AOR* = 0.98; 95% *CI* = 0.93–1.04).

The analysis in Table 2 yielded other findings of interest. Maternal history of smoking during pregnancy was associated with offspring's smoking initiation compared with maternal history of never smoking. Although not reaching the threshold of statistical significance, the point estimate for maternal smoking at any time but not during pregnancy was similar to that of maternal smoking during pregnancy. These two estimates were not statistically different from one another in a postestimation test ($p = .92$). Children with friends who smoked had increased odds of initiating smoking.

In a separate model (data not shown), we tested the impact of parent monitoring on the progression to daily smoking among children who had initiated smoking between ages 11 and 17 ($n = 236$). We detected no evidence that parent monitoring

predicted progression to daily smoking (in either Whites or Blacks) among children who had initiated smoking (*AOR* = 0.99; 95% *CI* = 0.92–1.06; $p = .685$).

Discussion

The relationship between parent monitoring and offspring's smoking initiation varied by race. Among Whites, an increase of one point in parent monitoring at age 11 was associated with an 11% reduction in the odds of initiating cigarette smoking by age 17. In contrast, a smaller nonsignificant inverse association was observed for Black children. There was no evidence to suggest that parent monitoring influenced the progression to daily smoking among either Blacks or Whites who had initiated smoking.

The finding that higher levels of parent monitoring predicted lower odds of smoking initiation *only* in Whites is foreshadowed by previous studies that have found racial differences in the relationship between *parenting practices* and adolescent smoking. One study reported that parenting practices were a stronger predictor of cigarette use in Whites (Nowlin & Colder, 2007). Another found that low scores on a measure that combined maternal–child closeness and monitoring predicted smoking initiation only among White adolescents (Griesler et al., 2002). In addition, a study in a predominantly Black, urban sample of children aged 14–18 years found no significant association between parent monitoring and current smoking (Ramchand, Ialongo, & Chilcoat, 2007).

Consistent with evidence from previous studies, smoking during pregnancy increased the odds of offspring's smoking initiation (e.g., Al Mamum et al., 2006). However, our findings differ from those of previous studies that have shown that mothers who smoke during pregnancy confer an even greater risk of smoking to their offspring than mothers who currently smoke but did not during pregnancy (e.g., Lieb et al., 2003). Similar to findings from prior studies having a friend who smoked was also associated with smoking initiation (e.g., Bricker et al., 2006).

Several potential limitations should be considered. First, the apparent long-term benefits of early parent monitoring might reflect stability of parenting behavior over time rather than an investment that pays off later on. Second, although there were no differences on key characteristics between the initial sample and the sample with complete data, the possibility remains that attrition influenced the observed results. Third, as in all observational studies, causal interpretations of the data should be cautioned.

This longitudinal study lends considerable support to the possibility of a beneficial impact of parental monitoring in deterring adolescent smoking. At least as important is our finding that the impact of parental monitoring on adolescents' smoking initiation might depend upon racial and socioeconomic characteristics of the community. Adolescents who have grown-up in a disadvantaged racial minority community (among whom factors that are not well understood have kept smoking rates lower than those of middle-class White adolescents) have not shown the same response to parental monitoring as expected based on previous findings in general population samples and our findings among Whites. Future research on parent monitoring and adolescents' smoking would benefit from close attention to parental goals and concerns and to extra-familial factors that shape smoking behavior across racially and socially disparate communities.

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Declaration of Interests

None declared.

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