Original Investigation

Continued Importance of Family Factors in Youth Smoking Behavior

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Abstract

Introduction: Although it is known that levels of family factors (FF) such as parental monitoring and parent–adolescent connectedness vary during adolescence, it is unknown which factors remain protective, preventing smoking initiation, in youth of differing racial/ethnic groups. Using a longitudinal, nationally representative sample, we examined which FF protect against smoking initiation in White, Black, and Hispanic youth.

Methods: A total of 3,473 parent-nonsmoking youth dyads from Round 1 (T1) of the National Survey of Parents and Youth were followed to Round 3 (T2). Youth smoking status at T2 was assessed as the primary outcome. We examined changes in FF (T2 – T1) and the protection afforded by these factors at T1 and T2 for smoking initiation, both by race/ethnicity and overall.

Results: There were statistically significant decreases in levels of protective FF from T1 to T2 across all racial/ethnic groups; however, FF levels were higher in never-smokers compared with smoking initiators at both T1 and T2 ($p < .05$). Separate models by race/ethnicity showed the protective effect of increased perceived punishment in all racial/ethnic groups and protection against initiation by increased parental monitoring in Black and Hispanic youth. Overall, higher parental monitoring at T1 was associated with decreased odds of smoking initiation (33%); decreased parental monitoring and perceived punishment from T1 to T2 were associated with increased odds of smoking initiation (55% and 17%, respectively).

Conclusions: Smoking prevention interventions should encourage parents to both enforce consistent consequences of smoking behavior, and continue monitoring, especially in minority groups.

Introduction

In order to reduce the staggering health and financial toll related to smoking-related illnesses and premature death, it is imperative

to prevent youth from starting to smoke so that they do not become our next generation of addicted smokers (Prokhorov et al., 2006). Recent research supports the premise that efforts to prevent smoking should be evident in the home since it is recognized that parents represent important authority figures for their children prior to initiating smoking (Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003; Jackson, 2002; Jackson & Dickinson, 2003; Stanton et al., 2004). Higher levels of protective family factors (FF) such as parental monitoring, parent–adolescent connectedness, and the presence of rules and consequences for smoking are associated with lower rates of smoking initiation (Harakeh, Scholte, de Vries, & Engels, 2005; Henriksen & Jackson, 1998; Kodl & Mermelstein, 2004; B. Simons-Morton, Chen, Abroms, & Haynie, 2004; B. G. Simons-Morton, 2004).

Important gaps in our knowledge about how FF protect against smoking remain. While it is known that patterns of smoking initiation differ by race/ethnicity with White youth initiating smoking at higher rates compared with Hispanic and Black youth (Ellickson, Orlando, Tucker, & Klein, 2004; Griesler & Kandel, 1998; Kandel, Kiros, Schaffran, & Hu, 2004), the literature is unclear on whether these initiation patterns are differentially associated with FF by race/ethnicity. Such information may help explain the racial/ethnic differences in smoking initiation patterns and would help inform the development of smoking prevention interventions for youth of different racial/ethnic groups. A review of the literature uncovered research gaps in the following three areas. (a) Lack of clarity on whether FF are uniformly protective or ethnic specific. For example, while some researchers report that the presence of strong FF such as parental monitoring, consistent discipline, and parent–adolescent closeness uniformly protect against smoking initiation in youth of all racial/ethnic groups (Chilcoat, Dishion, & Anthony, 1995; Griesler, Kandel, & Davies, 2002; Headen, Bauman, Deane, & Koch, 1991; Johnson & Hoffmann, 2000; Kandel et al., 2004; Li et al., 2002), others have shown racial/ethnic differences in the protection against smoking afforded by certain FF in minority youth. Specifically, some have found that strong communication, strong parental rules,

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and parental respect confer stronger protection against smoking initiation in minority youth in comparison with White youth (Clark, Scarisbrick-Hauser, Gautam, & Wirk, 1999; Ellickson et al., 2004; Ellickson, Perlman, & Klein, 2003; Gittelsohn, Roche, Alexander, & Tassler, 2001; Griesler & Kandel, 1998; Headen et al., 1991; Hunter, Croft, Vizeberg, & Berenson, 1987; Mermelstein, 1999); Additionally, while it is clear that the prosmoking influences such as peer smoking is a strong predictor of initiation in youth of different racial/ethnic groups (Griesler et al., 2002; Kandel et al., 2004), it is unclear if there are ethnic-specific FF that remain protective in preventing smoking initiation in the presence of such influences; (b) Lack of data on which FF are protective in preventing initiation at different time points during adolescence; and (c) Lack of data on which FF continue to remain protective or emerge as important in protecting against youth smoking as adolescents mature. These last two areas are important to understand because while it is clear that parents retain their roles as important determinants of adolescent risk behavior (Stanton et al., 2000, 2002, 2004; Steinberg, Fletcher, & Darling, 1994), it is also known that as adolescents age, many parents decrease the intensity and type of supervision and monitoring of their child's behavior (Larson, Richards, Moneta, Holmbeck, & Duckett, 1996; McGue, Elkins, Walden, & Iacono, 2005; Shanahan, McHale, Crouter, & Osgood, 2007). A better understanding of whether certain FF should remain constant or strong during adolescence is important in preventing smoking initiation in youth.

In order to develop recommendations for researchers interested in preventing smoking initiation, we examined a nationally representative sample of White, Black, and Hispanic youth from the National Survey of Parents and Youth (NSPY). We conducted an examination of the models of the progression of smoking behavior in adolescent never-smokers at Round 1 (T1) that were followed into later adolescence at Round 3 (T2). Since smoking initiation rates vary by racial/ethnic groups but it is unclear if levels of protective levels of FF also vary by racial/ethnic group, the primary purpose of this study was to describe and compare changes in specific FF between T1 and T2 on smoking initiation with respect to race/ethnicity. Our two *a priori* hypotheses were that (a) high levels of FF will be protective against smoking initiation in all racial/ethnic groups and (b) levels of FF will decrease over time, as smoking prevalence increases. Our analysis addresses gaps in the literature in the three ways: (a) we examine the influence of FF, some of which have not been described in the literature, in youth from three different racial/ethnic groups; (b) we assess the influence of these FF, at two different time points, on youth smoking behaviors; and (c) we assess how changes in these FF are associated with smoking initiation.

Methods

Sample and Measures

Sample

Data are from the Restricted Use Files (RUF) of Round 1 (T1, November 1999 to June 2001) and Round 3 (T2, July 2002 to June 2003) of the NSPY, a longitudinal, nationally representative household-based survey of adolescent and parent dyads that used a multistage sampling design was used to provide a

representative cross-section of United States' 9- to 18-year-old youth. One parent was chosen from each eligible household. Detailed information about NSPY's sampling and survey methodology can be found elsewhere (Westat, 2003, 2006). Dyads were recruited for the study, interviewed during T1, and tracked and recontacted for interview in follow-up rounds. The weighting procedure took the sampling strategy into account. We analyzed data from T1 and T2 in order to evaluate smoking initiation patterns in youth as they progressed from early to middle adolescence.

Inclusion criteria for our sample were (a) youth 9–18 years of age in the T1 sample who reported that they had “Never smoked” and had a parent/guardian who answered the T1 survey ($n = 6,012$); (b) youth who were self-identified as White/non-Hispanic ($n = 3,916$), Black/non-Hispanic ($n = 961$), or Hispanic ($n = 906$); (c) dyads who answered the query regarding their smoking status at T2 ($n = 4,379$); and (d) dyads with no missing responses to the family influence and antismoking parenting measures evaluated for this study in T1 and T2 ($n = 3,473$). The analysis sample represents 53% of the 6,012 youth aged 9–18 years old interviewed in T2. The youth sample was 53.2% male, 68.0% White, 15.9% Black, 16.1% Hispanic, 49.2% 9- to 13-year olds, and 50.8% aged 14–18 years (weighted percentages). NSPY included responses from either mothers or fathers (34% male respondents at T1 and T2); respondents were consistent over the time period of this study.

Assessment

The NSPY questions were chosen to resemble questions from Monitoring the Future, National Household Education Survey, and the National Survey on Drug Use and Health (Thomas & Perera, 2006). Questions were available in English or Spanish. Parental consent and youth assent to conduct the interviews were obtained. Data analysis activities were approved by our institutional review board.

Measures

Outcome Variable

The outcome variable of interest was smoking status at T2. Responses to the NSPY questions regarding smoking behavior were originally combined to create an index of tobacco use broadly based on the categories used by Bernat, Erickson, Widome, Perry, and Forster (2008) and Leatherdale (2008). The categories were then redefined as (a) never-smoker (80.4%): someone who has never smoked or (b) smoking initiators (19.6%): the combined smoking initiator category was created to include both ever-smokers (14.4%) and current smokers (6.1%) due to the low frequency of current smokers in some racial/ethnic groups. Ever-smokers were defined as someone who smoked some or regularly but not in the last 30 days, and current smokers were defined as someone who reported any smoking in the last 30 days.

Socioeconomic Variables

Race/ethnicity was defined by self-report on the adolescent questionnaire. For the analyses, youth were categorized as Black/non-Hispanic, White/non-Hispanic, and Hispanic. Adolescent age was derived from the respondent's date of birth. Gender was noted by the interviewer. Highest parent education level, annual family income, and family structure (defined as 1- vs. 2-parent household) were obtained by parent self-report.

Tobacco Variables

Parental ever-smoking status was determined by asking the parent: "Have you ever smoked a cigarette?" Peer smoking influence was assessed by asking: "How many times have you spent with friends who smoke cigarettes in the last 7 days?" This was further categorized as never (0 days) and ever (at least once) for analysis.

Family Influences and Antismoking Parenting Measures

Measures of family influence and antismoking parenting (referred to collectively as FF from now herein) are described in detail in Table 1. FF were evaluated and composite scores for each factor; parent (P) or youth (Y) were created based on construction by NSPY (Hornik et al., 2003; Orwin et al., 2005): connectedness (P, Y), activities (P, Y), monitoring (P, Y), intention to monitor (P), and attitudes toward monitoring (P). Antismoking parenting measures were perceived punishment for smoking in parents and youth 13–18 years old (T). Internal consistency was checked for constructed measures with more than one question per measure (Cronbach's alpha range for T1: 0.78–0.9 and T2: 0.81–0.9).

Statistical Methods

The initial categorization of individuals into never-smokers and smoking initiators and initial examination of the distribution of the FF were addressed using the raw data. All analyses were based on using weighted data sampling techniques. The use of weighted sample data in our analysis takes into account the disproportionate representation of certain subgroups in the raw

sample and accounts for varying selection probabilities (Westat, 2006). In addition, all of the weights included have been adjusted for differential response rates and have been calibrated (poststratified) to independent estimates of population counts. These adjustments are designed to compensate for differences between the weighted sample distributions and the corresponding population distributions that result from differential nonresponse and undercoverage (Hornik et al., 2003; Orwin et al., 2005). These adjustments are taken into account in the sample weights provided in the NSPY–RUF dataset.

We estimated the associations of FF with never-smokers versus smoking initiators. SUDAAN software was used for all analyses, and to account for the complex survey design and weighting, we used the Jackknife method as suggested by NSPY. Chi-square and analysis of variance was used, as appropriate, to examine bivariate differences across groups for demographics and McNemar's test and *t* test used to assess changes in variables of interest from T1 to T2. The means and 95% CI for each FF at T1 and T2 were estimated. The relationship of each FF to smoking initiation was examined in relation to its value at T1, T2, and also at T2 minus T1 ($T2 - T1$) to capture change in that variable over time. The first approach to modeling was to examine the interaction of racial/ethnic group by FF on the dependent variable of smoking initiation at T2. These interactions were not statistically significant. However, as the study objective was to determine differences in race/ethnicity, we examined models separately by racial/ethnic group. Adjusted bivariate logistic regression was used to examine the associations between smoking

Table 1. Family Influence Variables to Be Assessed Within the NSPY Database

	Youth/parent report	Sample questions	Number of questions	Cronbach's alpha
Family influences				
Parent–adolescent connectedness	Y	In the last 30 days, I really enjoyed being with my parents/caregivers	3	.80
Parent–adolescent connectedness	P	In the last 30 days, I really enjoyed being with my child	3	.78
Parent–adolescent activities	P	In the past week, did you do any projects or activities with your child at home?	2	.88
Parental monitoring	Y	How often does at least one of your parents know what you are doing when you are away from home?	2	.78
Parental monitoring	P	How often do you know what your child is doing when they are away from home?	5	.80
Parent intention to monitor	P	How likely is it that you will: limit the time that (child) spends with other children without adult supervision, in the next 6 months?	5	.83
Attitudes toward monitoring	P	Closely monitoring (child's) daily activities is: extremely good, pleasant, and important	3	.90
Antismoking parenting				
Perceived parental punishment	T	If one of your parents knew that you used tobacco or alcohol, how likely is it that he or she would punish you in some way?	1	N/A
Perceived parental punishment	P	If you knew that (child) used tobacco or alcohol, how likely is it that you would discipline (child) or provide some type of consequence?	1	N/A

Note. NSPY = National Survey of Parents and Youth; P = as reported by the parent; Y = as reported by the youth (age 9–18 years); T = as reported by the teens (age 14–18 years); N/A = not applicable—only one question per variable.

initiation and FF. Factors significant at $p < .10$ at either T2 or T2 – T1 were entered into the final multiple logistic regression model to look at the combined effect of FF; the never-smoking group was used as the reference group. For completeness, we analyzed a final model including all racial/ethnic groups. The covariates controlled in all modeling were youth age, youth gender, parental education, parental smoking status, annual family income and family structure all at T1, and peer smoking at T2, as these were considered clinically important covariates (Ellickson et al., 2004; Griesler & Kandel, 1998), a priori. Adolescent age in years was entered in the model as a continuous variable.

Results

Sociodemographics and Other Correlates of Youth Smoking by Race/Ethnicity

Table 2 shows the comparison of sociodemographics and covariates from T1 and T2 by race/ethnicity. Of those youth who were never-smokers at T1, the overall incidence of smoking at T2 was 20.5% in Whites, 19.0% in Black, and 21.6% in Hispanics, showing no significant difference in smoking initiation from T1 to T2 between racial/ethnic groups. No significant race/ethnicity differences appeared among any of the covariate distributions from T1 to T2 except for an increase in peer smoking influences. This measure was approximately equal by race/ethnicity at T1, but at T2, these proportions went up in all three racial/ethnic groups ($p < .05$ in all three groups). This change was higher in Whites compared with Blacks and Hispanics ($p < .05$). Parental gender was not associated with smoking initiation and was not included as a covariate in the model.

Distribution of Youth Concurrent Smoking Status and FF by Race/Ethnicity

Shown in Supplementary Table 1 are the unadjusted means and 95% CI for each FF variable at T1 and T2 for the overall sample,

continued never-smoking status, and smoking initiation by racial/ethnic group at T2. Examination of the overall means and 95% CI shows some racial/ethnic variability in perception of FF by both parents and youth. Our findings support our first hypothesis that higher levels of FF at T1 and T2 are protective against smoking initiation in all racial/ethnic groups. Consistent differences are observed between never-smokers and smoking initiators at both T1 and T2, with higher mean levels of FF consistently noted in never-smokers at both time points, except perceived parental punishment (T, P) for Hispanic youth at T1. Differences that were not statistically significant at T1 were connectedness (P) for Black youth, activities (P) for Black and Hispanic, monitoring (Y, P) for Black, attitude toward monitoring for Black and Hispanic, and perceived punishment (T, P) for Black and Hispanic. Differences that were not statistically significant at T2 were connectedness (Y, P) for Black youth, activities (P) for Black, and perceived punishment (P) for Hispanic. The mean scores for all FF variables decreased over time for all three racial/ethnic groups, except for intention to monitor (P) in Hispanic youth and perceived punishment (P) in Black and Hispanic never-smokers, and attitude to monitor (P) for Hispanic youth smoking initiators. The variables not statistically significant for never-smokers were connectedness (P) for Black and Hispanic youth, activities (P) for Hispanic, monitoring (Y, P) for all race/ethnicities, intention to monitor (P) for Hispanic, attitude to monitor for Black and Hispanic, and perceived punishment (Y, P) for all race/ethnicities. The variables not statistically significant for smoking initiators were connectedness (Y) for Black and Hispanic youth, connectedness (P) for White and Hispanic, activities for Black and Hispanic, monitoring (P) for Black and Hispanic, attitude toward monitoring (P) for White and Hispanic, and punishment (P) for Hispanic. It should be noted these differences were adjusted for the multiple testing.

In Supplementary Table 1, odds ratios (ORs) from the multiple logistic regression were adjusted for age, gender, highest parent education, annual family income, family structure all at T1, parental smoking status at T1, and peer smoking at T2,

Table 2. Demographics and Covariates by Racial/Ethnic Group Among 9- to 18-Year Olds Taken From NSPY–RUF^a Data, Round 1 (T1) and Round 3 (T2)

	White <i>N</i> = 2,481 (68)		Black <i>N</i> = 496 (15.9)		Hispanic <i>N</i> = 496 (16.1)	
	1,329 (53.2)		245 (48.1)		259 (53.8)	
Gender (male)	T1	T2	T1	T2	T1	T2
Smoking incidence, %		20.5		19		21.6
Age (mean years [SE])	12.3 (0.05)	14.6 (0.03)	12.5 (0.1)	14.7 (0.1)	12.4 (0.12)	14.6 (0.1)
Parent education (college or higher)	1,560 (63.6)	1,619 (64.7)	213 (44)	237 (45.2)	154 (31.9)	156 (30.7)
Family structure (two parents)	2,020 (82.6)	2,007 (81.6)	194 (43.7)	208 (43.7)	350 (72.5)	358 (73.3)
Annual income (\$ mean [SE])	60,703 (989.9)	63,713 (1,006.5)	34,876 (1,756.2)	37,070 (1,899)	34,578 (1,450.7)	37,880 (1,463.3)
Parental smoking history						
Never-smoker	594 (23.6)	592 (23.5)	187 (40.9)	202 (41.7)	243 (51.2)	245 (51.5)
Ever-smoker	1,337 (54.5)	1,338 (53.7)	196 (36.1)	180 (36.5)	163 (31.4)	171 (31.7)
Current smoker	547 (21.9)	551 (22.3)	112 (23.0)	114 (23.5)	89 (17.4)	80 (14.6)
Peer smoking ^b	297 (13.2)	813 (35.2)	60 (13.6)	145 (30.1)	56 (13)	143 (30.6)

Notes. NSPY–RUF = National Survey of Parents and Youth and Restricted Use Files.

^a Data presented as raw *N* and weighted percentage.

^b McNemar's test showed peer smoking had changed significantly from T1 to T2 among all three racial/ethnic groups ($p < .005$).

we see the protection afforded by the FF for measures cross-sectional at T1 and T2. In Whites, we found that lower levels of the following FF were associated with increased odds of smoking initiation connectedness (Y, P) at both T1 and T2, activities at T1 (P), monitoring (Y, P) at T1 and T2, parent attitudes toward monitoring (P) at T1 and T2, and perceived punishment at T1 (T) and T2 (P, T). In Blacks, we found that lower level of the following FF was associated with increased odds of smoking initiation: monitoring (Y, P) at T2, parent attitudes to monitoring (P) at T2, and perceived punishment (P) at T2. In Hispanics, we found that lower level of the following FF was associated with increased odds of smoking initiation: connectedness (Y) at T1 and at T2 (Y, P), monitoring (Y, P) at T1 and at T2 (Y), intention to monitor (P) at T2, and attitudes toward monitoring (P) at T2.

In the T2 – T1 data, Supplementary Table 1, we see the association of change in FF with respect to smoking initiation. We found that decreased level of the following FF from T1 to T2 was associated with increasing odds of smoking initiation: connectedness (P), monitoring (P) in Black youth, and perceived punishment in White (P, T), Black (P), and Hispanic (T) youth.

Correlations between FF measured in both youth and parent were as follows: monitoring, $r = .24$ (T1) and $r = .30$ (T2); connectedness, $r = .26$ (T1) and $r = .25$ (T2); and perceived punishment, $r = .09$ (T1) and $r = .18$ (T2). Parental factors encompassing monitoring were also correlated: monitoring versus intention to monitor, $r = .39$ (T1) and $r = .47$ (T2), and monitoring versus attitudes toward monitoring, $r = .33$ (T1) and $r = .38$ (T2).

Regression of Multiple FF and Smoking Initiation by Race/Ethnicity

The multiple logistic regression analyses by separate racial/ethnic group and over all racial/ethnic groups shown in Table 3 initially included FF that were significant in the adjusted analysis (at $p < .10$) as seen in Supplementary Table 1, and the same covariates as previously defined, the final model only included FF significant at $p < .05$. When we examined models separately by racial/ethnic group, we found that the decrease in perceived punishment both P and T from T1 to T2 were the FF that were independently most influential for increasing the odds of smoking initiation for Whites. Decreases in perceived punishment were associated with 26%–28% increased odds of smoking initiation for each one-point reduction in perceived punishment in this group. In Black youth, higher perceived parental punishment (P) at T2 was associated with increased protection against smoking initiation; 40% lower odds of initiation for a one-point increase in this FF. In addition, there was a 59% increased odds of smoking initiation for each one-point reduction in the parental monitoring (P) score in Blacks. For Hispanics, lower parental monitoring (Y) at T1 was associated with 31% higher odds of smoking initiation, while decrease in perceived parental punishment (T) from T1 to T2 increased the odds of initiation 34% in this group.

Over all racial/ethnic groups, higher parental education of college or above at T1 was associated with decreased odds of smoking initiation of 37%, and peer smoking at T2 was associated with over a fivefold increased odds of smoking initiation. Higher parental monitoring at T1 as perceived by youth was

Table 3. Multiple Logistic Regression Analysis: OR and 95% CI for Family Influence at T1, T2, and Change in Family Influence (T2 – T1) Associated With Smoking Initiation at T2^a

Variable	OR	95% CI
Models by racial/ethnic group		
Race = White		
Parent punishment (P) T2 – T1	1.28	1.05–1.58
Parent punishment (T) T2 – T1	1.26	1.11–1.43
Race = Black variable		
Parent punishment (P) T2	0.6	0.43–0.83
Parent monitoring (P) T2 – T1	1.59	1.15–2.2
Race = Hispanic variable		
Parent monitoring (Y) T1	0.69	0.49–0.98
Parent punishment (T) T2 – T1	1.34	1.03–1.75
Overall model for entire study sample variable		
Parental education T1		
Less than college	1	
College or higher	0.63	0.42–0.92
Peer smoking T2		
Never	1	
Ever	5.41	3.75–7.79
Parental monitoring (Y) T1	0.67	0.52–0.87
Parental monitoring (P) T2 – T1	1.55	1.21–1.99
Punishment (T) T2 – T1	1.17	1.01–1.36

Note. OR = odds ratio. All analyses were controlled for age, gender, highest parent education (T1), annual family income (T1), family structure (T1), parental smoking status (T1), and peer smoking (T2), and mutual adjustment for the other variables is listed as P = as reported by the parent, Y = as reported by the youth (age 9–18 years), and T = as reported by the teens (age 14–18 years).

associated with decreased odds of smoking initiation (33%); decreased parental monitoring from T1 to T2 and decreased perceived punishment were associated with increased odds of smoking initiation of 55% and 17%, respectively.

Discussion

Research has demonstrated that strong parenting practices are associated with decreased youth risk-taking behavior (Borawski et al., 2003; Jackson, 2002; Li, Feigelman, & Stanton, 2000; Stanton et al., 2002). However, as adolescents mature and gain independence, parents often change their parenting practices to give their teens more independence (Borawski et al., 2003; McGue et al., 2005; Shanahan et al., 2007). Our study points to the importance of encouraging parents to continue to maintain high levels of FF such as connectedness, monitoring, and the establishment of consequences for smoking behavior in their adolescents. Higher levels of these FF in both younger and older adolescents were associated with decreased smoking initiation rates. We examined the influence of a range of FF on smoking behavior in a triethnic longitudinal sample of youth who were never-smokers at baseline (T1). The youth sample of never-smokers at T1 that we analyzed had no racial/ethnic differences in smoking initiation by T2. Consistent with the literature, we did find that as adolescents age, the prosmoking

influence of peer smoking also increases (Bricker et al., 2006; Ennett et al., 2008; Hoffman, Sussman, Unger, & Valente, 2006; Kim, Fleming, & Catalano, 2009) and was associated with increased rates of smoking initiation across all racial/ethnic groups. However, we did not find support for the role of parental smoking on youth smoking initiation which others have reported (Bauman, Carver, & Gleiter, 2001; Bricker, Peterson, Sarason, Andersen, & Rajan, 2007; Bricker et al., 2006; Hill, Hawkins, Catalano, Abbott, & Guo, 2005; Kim et al., 2009; Skinner, Haggerty, & Catalano, 2009). In our sample, parental smoking rates did not vary with time nor was it associated with smoking initiation. These findings support prior research that suggests that even parental smokers can be assured that their youth do not have to smoke even if they do (Hu, Davies, & Kandel, 2006; Jackson & Dickinson, 2003, 2006; Sargent & Dalton, 2001).

We examined the association of race/ethnicity on smoking initiation in two ways: (a) differences in the mean levels of family influences at T1 and T2 and (b) differences in the ORs for smoking initiation at T2 based on levels of family influences at either T1, T2, or change from T1 to T2. We did not find differences in the incidence of smoking initiation by race/ethnicity and our examination of differences in mean levels of family influences confirmed our first hypothesis that higher levels of FF at T1 and T2 are protective against smoking initiation in all racial/ethnic groups. We found that FF, except for perceived parental punishment (P and Y) for Hispanics at T1, was consistently higher in never-smokers compared with smoking initiators. With few exceptions, these differences were statistically significant at T2. Since the mean age of adolescents at T2 was 14, it appears that parents of nonsmoking youth are providing stronger protective influences not only in early adolescence but also in middle adolescence compared with parents of youth who initiated smoking. The maintenance of strong protective factors potentially serves as a disincentive for youth contemplating smoking.

Similar to previous studies (De Goede, Branje, & Meeus, 2009; Larson et al., 1996; McGue et al., 2005; Shanahan et al., 2007), our examination of differences in risk and protective factors in smoking initiation showed decreased levels of FF from T1 to T2, and this decrease is associated with increasing odds of smoking initiation. These FF differed somewhat by race/ethnicity. We found that continued high levels of FF such as connectedness, monitoring, perceived punishment, and attitudes toward monitoring were protective against smoking initiation in Whites. Although parents may believe that they cannot punish their older adolescent for undesirable behavior such as smoking, we found that lower perceived parental punishment at T2, as well as decreased perceived punishment from T1 to T2, conferred increased odds of smoking initiation in older Whites. In the Black youth, we see decreased parental monitoring at T2, and this decrease from T1 to T2 increased the odds of smoking initiation. For both Whites and Blacks, lower perceived parental punishment (by the parent) at T2 and the decrease from T1 to T2 are associated with increased odds of smoking initiation among youth. In Hispanics, lower levels of perceived punishment at T2 and a decrease in levels of perceived punishment from T1 to T2 were associated with increased odds of smoking initiation, from the perspective of the youth. Our results may need to be considered carefully because, as we noted, parents

and youth do not always agree about the presence of certain FF, such as parental monitoring and perceived punishment. For example, while perceived punishment as reported by the parent was protective against initiation in Blacks, it was not protective as reported by teens, and the opposite was true for the Hispanic youth. However in the White population, perceived punishment was protective in the opinion of both youth and parents. These differences can be due to different perceptions of FF by parent and youth.

Our final model combining all racial/ethnic groups suggests that parental monitoring and perceived punishment are the most influential FF in protection for smoking initiation. However, it is interesting to note that although there appears to have been differences in responses by youth and parents to the same questions, as evidenced by correlations of less than or equal to .30, the FF found to be most protective against smoking initiation are more likely to be those perceived by youth. So, in this study, we were able to determine that monitoring and perceived punishment remain protective in preventing smoking initiation even in light of other sociodemographic factors known to be associated with initiation such as lower income and parental education and prosmoking influences of parental and peer smoking (Bricker et al., 2006; Ennett et al., 2008; Griesler et al., 2002; Hoffman et al., 2006; Hu et al., 2006; Kandel et al., 2004; Kim et al., 2009).

The study was limited by smaller subsample sizes among minority youth compared with Whites, which may account for the greater number of significant risk and protective factors found for White youth compared with minority youth. Additionally, other important FF that may be protective against smoking initiation such as parental supportiveness, parental acceptance, behavioral control, or frequency and quality of antismoking messages were not included in the NSPY dataset. This study focused on the unique contributions of specific FF in predicting the risk of smoking initiation. However, it is not possible to determine if our finding of protection by perceived parental punishment referred exclusively to smoking, as this NSPY question queried youth about the likelihood that their parent would punish them for smoking cigarettes or drinking alcohol. Despite these limitations, our study adds to the literature by identifying specific FF that were protective against initiation in a triethnic sample of youth. Several of these factors such as intention to monitor and attitudes toward monitoring have not been evaluated in longitudinal samples including minority groups. In addition, the strengths of the present study are that it includes both parent and youth reports, is a longitudinal design that allows examination of two time points and thus the change in smoking behavior between these time points, and also has a large sample size.

Findings from this study have important implications for pediatric practitioners and for researchers interested in youth smoking prevention. First, our findings of uniform levels of smoking initiation in all racial/ethnic groups of youth suggest that there must be consistent, protective influences in non-smoking youth, which we found to be the presence of certain FF. Parents should be made aware that when there are high levels of FF such as connectedness, monitoring, and consequences for smoking behavior, that their teens are also aware of these parenting practices, and that these practices can translate into

lower levels of smoking initiation in their teenagers. Further research is needed to determine how to best incorporate these practices into preventative interventions in ways that are palatable to parents and understood by youth. Second, our finding that lower levels of protective factors were present in smoking initiators, even prior to initiation, suggests that parents are differentially providing less strong parenting practices to youth not only when they have already started smoking but also prior to smoking onset. Regardless of the timing of these parenting practices, we found that a decrease in perceived punishment in all youth and decreases in connectedness and monitoring in minority youth were associated with increased initiation. These findings are consistent with the concept that these parenting practices should be kept strong even as youth get older and are exposed to outside influences.

Supplementary Material

Supplementary Table 1 can be found online at <http://www.ntr.oxfordjournals.org/>.

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Declaration of Interests

The authors declare that they have no competing interests related to this research.

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