

Images of Smokers and Willingness to Smoke Among African American Pre-adolescents: An Application of the Prototype/Willingness Model of Adolescent Health Risk Behavior to Smoking Initiation

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Objective This study used the prototype/willingness model of adolescent health risk behavior to examine factors related to onset of smoking. **Methods** Two waves of data were collected from a panel of 742 African American children (mean age = 10.5 at Wave 1) and their primary caregivers. Measures included cognitions outlined by the prototype model as well as self-reports of smoking by the parent and child. **Results** Structural equation modeling revealed a pattern consistent with expectations generated by the prototype model. The relation between contextual, familial, and dispositional factors—including neighborhood risk, parental smoking, and children’s academic orientation—and the initiation of smoking at Wave 2, two years later, was mediated by the children’s cognitions. Primary among these cognitions were the children’s images of smokers and children’s willingness to smoke. **Conclusions** Smoking cognitions mediate the impact of important distal factors (such as context, family environment, and disposition) on the onset of smoking in children. Perhaps more important, it is possible to predict onset of smoking in African American children as young as age 10 by assessing the cognitive factors suggested by the prototype model.

Key words prototypes; willingness; smoking initiation; African American; pre-adolescents.

More than two decades of research on the initiation of smoking has shown that adolescents’ images of smokers have an important impact on their decisions to smoke. Early studies in this area demonstrated that adolescents have clear images of the type of person who smokes and that the favorability of these images predicts their subsequent smoking (Barton, Chassin, Presson, & Sherman, 1982; Chassin, Presson, Sherman, Corty, & Olshavsky, 1981; Chassin, Presson, Sherman, & Margolis, 1988). Much of this early research was based on the assumption that these images represent a type of goal state for adolescents. For example, Leventhal and Cleary (1980) suggested that aspects of the image of the typical adolescent smoker (e.g., tough, sophisticated, independent) are exciting and

enticing to adolescents. Thus, one reason they begin to smoke is to acquire some of these desired characteristics.

Images of smokers have changed considerably since this early research was conducted, however (Johnston, O’Malley, & Bachman, 2003; Lloyd, Lucas, Holland, McGrellis, & Arnold, 1998). A recent comparison of adolescents’ attitudes and beliefs about smoking in the early 1980s with those reported by adolescents who lived in the same community in 2001 revealed that these attitudes had become significantly more negative (Chassin, Presson, Sherman, & Kim, 2003). More specifically, nonsmokers in 2001 were more likely to report that smoking had negative *social* consequences (i.e., losing friends and “feeling left out of the group”) than were nonsmokers

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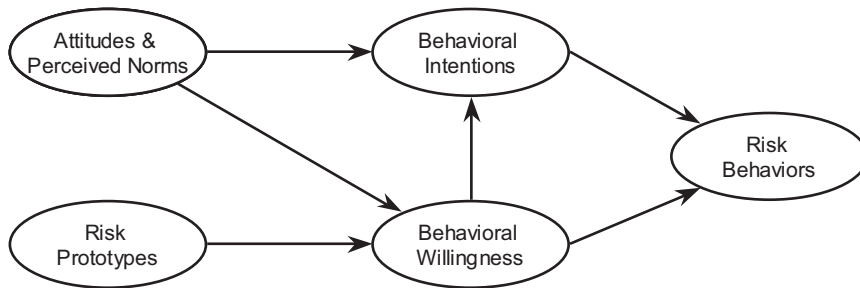


Figure 1. The Prototype/Willingness Model

in the 1980s cohort. In addition, changes in these beliefs about smokers and smoking mediated the relation between cohort and smoking behavior.

In fact, adolescents' current images of smokers are generally more negative than positive. Smokers are not only seen as having less common sense than nonsmokers, but are also thought to be less interesting, likable, intelligent, and mature (Gibbons & Gerrard, 1995; Pechmann & Ratneshwar, 1994). This evolution of the smoker image is reflected in a new generation of research that suggests that for most adolescents, acquiring the (negative) characteristics associated with behaviors such as smoking is no longer a goal that promotes their risk behavior. Instead, images and awareness of negative social consequences are seen as inhibiting, more than facilitating, risk behaviors such as smoking. This assumption is reflected in the prototype model of adolescent risk behavior used in the current study (see Gibbons & Gerrard, 1997; Gibbons, Gerrard, & Lane, 2003, for reviews of the model).

The Prototype/Willingness Model

The prototype model is a modified *dual-processing* model of health behavior (see Chaiken & Trope, 1999, for a discussion of other dual-processing theories in social cognition). The basic assumption of the model is that much initial adolescent risk behavior, although volitional, is not intended or planned; rather, it is a response to circumstances that are risk conducive. The model differs from other models of health behavior in that it maintains that there are two pathways and two proximal antecedents to health behavior rather than one. The first path, called the *reasoned path*, reflects the fact that some risk behavior is intentional even among young adolescents (Webb, Baer, Getz, & McKelvey, 1996). This path has been described in expectancy-value theories—such as the theory of reasoned action and the theory of planned behavior—as originating in positive attitudes toward performing the behavior and supportive subjective norms. It proceeds through intentions, or *plans* to engage in the

behavior, to action (cf. Ajzen, 1985; Fishbein & Ajzen, 1975). This approach views adolescent risk behavior, just like any other social behavior, as the result of a reasoned and thoughtful (though not necessarily rational) process.

Behavioral Willingness

Generally speaking, however, the relation between intention and behavior is *relatively* low in adolescence—a time when many risk behaviors are initiated—and then it increases with age (Albarracín, Johnson, Fishbein, & Muellerleile, 2001). Thus, it seems worthwhile to explore other predictors of risk behavior among younger children. The prototype model accomplishes this by proposing that there is a second path to health risk behavior that involves neither planning nor intentions: the *social reaction path*. The model suggests that adolescents often find themselves in situations that facilitate (but do not demand) risky behaviors, such as drinking, smoking, or unprotected sex. Once in these situations, for many adolescents, it is not their intentions, but their *willingness* to take a risk that determines behavior (see Figure 1 for an abbreviated version of the model).¹ Thus, behavioral willingness is a reflection of a person's openness to opportunity, i.e., a willingness to engage in risky behavior in circumstances that are conducive to that behavior. Unlike intentions, willingness involves little precontemplation of the behavior, and, in fact, is often associated with avoidance of thinking about its potential negative consequences (Gerrard, Gibbons, Reis-Bergan, et al., 2002; Gibbons, Gerrard, Ouellette, & Burzette, 1998). Expressing willingness, therefore, is an acknowledgment that under certain circumstances, one might engage in a risk behavior that was previously not intended or considered. Willingness has been shown to predict a variety of risk behaviors and to do so independently of behavioral

¹Although adults' behavior is more likely to be intentional than adolescents', many adult risk behaviors are opportunistic, and thus are willingness based, such as drinking more than intended or taking advantage of an accounting error by your bank or the IRS.

intention (Gibbons, Gerrard, Ouellette et al., 1998; Gibbons, Gerrard, Blanton, & Russell, 1998).

Prototypes

The second major tenet of the model is that willingness is associated with adolescents' *images* of the type of person who engages in a specific risk behavior (e.g., the "typical" smoker or drinker). Adolescence is a period during which people tend to be preoccupied with their social images (Erikson, 1950; Manning & Allen, 1987) and are also very sensitive to the impact that their behavior has on those images. Adolescents, for example, have clear images of what drinkers are like (Snortum, Kremer, & Berger, 1987) and realize that if they drink (in public or with peers), they will acquire the image associated with drinking, or aspects of it. Thus, although being seen as a drinker may not be the reason that adolescents begin to drink, they are aware that drinking has social consequences in that it may alter others' perceptions of them. The more negative the image, the less willing they will be to drink or smoke when given the opportunity. In fact, a number of studies have demonstrated that relatively *unfavorable* risk images are associated with less willingness to engage in a number of risky behaviors, including unprotected sex (Gibbons & Gerrard, 1995), drinking (Gerrard, Gibbons, Reis-Bergan, et al., 2002), smoking (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997), and driving under the influence (Gibbons, Lane, Gerrard, Pomery, & Lautrup, 2002; see Gibbons, Gerrard, & Lane, 2003).

Summary

The prototype model departs from previous models of health behavior in that it does not assume that these behaviors are always intentional. Instead, it is suggested that adolescents frequently find themselves in situations that facilitate or encourage risky behavior; once they are in these situations, it is their willingness to be identified by their peers as a "drinker" or "smoker" that determines their behavior.² Because these images and willing-

²A third assumption of the prototype model is that prototypes of risk influence behavior through a process of social comparison, i.e., prototypes have more impact on the behavior of adolescents who have a tendency to compare themselves with their peers (Gibbons & Gerrard, 1995, 1997). Thus, in the model for this study (Figure 2), the path from smoking image to willingness should be stronger for children who are high in social comparison. However, the social comparison scale used in previous studies (Gibbons & Buunk, 1999) was not included in the two waves of data collection for this study, and so this assumption is not examined in the current analyses.

ness begin to form early, perhaps as young as age 10—before intentions to engage in many risk behaviors have formed (Bowen, Dahl, Mann, & Peterson, 1991)—one advantage of the prototype model over other approaches is that it affords an opportunity to assess a *predisposition* or *pre-intentional* tendency to engage in risky behaviors. Also, because images and willingness are malleable, the model has a number of implications for preventive intervention (see below).

Smoking

A series of studies with adult smokers has demonstrated that smoking images predict smoking. Specifically, smokers with negative images of (other) smokers are more likely to be successful at quitting (Gerrard, Gibbons, & Lane, in press; Gibbons & Eggleston, 1996; Gibbons, Gerrard, Lando, & McGovern, 1991). Only two studies have specifically applied the prototype model to adolescent smoking, however. The first of these demonstrated a relation between smoker images and changes in smoking among college freshmen (Gibbons & Gerrard, 1995). The second study examined prototypes and willingness as predictors of changes in smoking among white rural adolescents between the ages of 15 and 18 (Blanton et al., 1997). This study demonstrated that prototype favorability predicted willingness, which in turn predicted increases in smoking 1 year later. Neither of these studies examined the onset of smoking, however (most smokers start smoking before age 18). Also, although these studies demonstrated the importance of smoker images, in both cases the participants were too old to allow for an examination of the antecedents of the adolescents' images or their willingness. The current study examined four such antecedents suggested by previous research.

Antecedents to Smoker Images

Academic Orientation

Outside of the home, the most important institution for most children is their school. A number of studies have demonstrated that students who feel attached, connected, and/or committed to their school are less likely to use substances (Samdal, Wold, Klepp, & Kannas, 2000). This effect is especially strong for initiation of smoking and drinking (Abdelrahman, Rodriquez, Ryan, French, & Weinbaum, 1998) and is independent of community context (Dornbusch, Erickson, Laird, & Wong, 2001). Once again, although this relation has been demonstrated a number of times, few studies have examined

the cognitions that mediate the relation between academic focus and substance use.

Risk-Taking Tendency

Recent biobehavioral models of smoking have suggested that heritable temperaments also have both direct and indirect effects on adolescent smoking (Lerman, Patterson, & Shields, 2003). In fact, risk taking, a personality characteristic that is grounded in early temperament, is one of the most reliable predictors of adolescents' substance use in general (Shen, Locke-Wellman, & Hill, 2001; Wills et al., 2001; Wills, Windle, & Cleary, 1998). It is not surprising that this tendency is also associated with adolescent smoking (Kopstein, Crum, Celentano, & Martin, 2001). In addition, Cleveland, Gibbons, Gerrard, Pomery, and Brody (2004) found a relation between risk-taking tendencies and adolescents' images of substance users (in general), using the same sample as this study. The same relation was anticipated with smoker images.

Parenting

Parenting style also has been shown to influence children's health behavior. For example, adolescents raised by parents who are heavily involved in their lives (e.g., who *monitor* their behavior) are less likely to use substances (Leventhal & Brooks-Gunn, 2000; Li, Stanton, & Feigelman, 2000). Similarly, provision of *warmth and support* by parents is associated with less adolescent use (Barnes, Reifman, Farrell, & Dintcheff, 2000; Barnow, Schuckit, Lucht, John, & Freyberger, 2002). There is also some evidence (albeit mixed) that parent-child *communication* about substances and substance use is associated with reduced risk of early-onset use (Chassin, Presson, Todd, Rose, & Sherman, 1998; Jackson & Henriksen, 1997). Thus, it was expected that parents with an effective parenting style (high monitoring and communication, plus warmth) would have children with less favorable risk images and, in turn, less likelihood of smoking.

Context

The current study is part of a larger project, the Family and Community Health Study (FACHS), which is examining the impact of environmental factors on the physical and mental health of African American families. FACHS is a reflection of a growing interest among psychologists and sociologists in the impact of context (e.g., neighborhood risk) on children's health (Leventhal & Brooks-Gunn, 2000), and, in particular, factors that mediate these effects (Chen, Matthews, & Boyce, 2002). This research has demonstrated that adolescents who live in more disadvantaged (high-risk) neighborhoods are

more likely to perform worse academically (Gonzales, Cauce, Friedman, & Mason, 1996), affiliate with deviant peers (Brody et al., 2003), and use substances (Blount & Dembo, 1984; Robert, 1999; Smart, Adlaf, & Walsh, 1994). The current study focuses on cognitive factors that mediate the effect of context on smoking initiation, namely risk images and willingness. In addition, because theory and research suggest that affiliation with peers who use substances mediates the impact of context on adolescent problem behaviors (Furstenberg, 1993), the role of friends' tobacco use was also included in the study.

Control Measures

These predicted relations were anticipated controlling for gender, parental smoking, and socioeconomic status (SES).

The Current Study

The FACHS sample was used to examine factors suggested by the prototype model as being antecedent to smoking initiation. Using structural equation modeling (SEM), adolescents' smoker images and willingness were examined as (cognitive) mediators of the relations between context/family/child's disposition and his/her onset of smoking. The following specific hypotheses were examined:

- H1: Pre-adolescents have unfavorable images of the typical smoker their age; more specifically, these images are less favorable than their self-images.
- H2: Context (neighborhood risk), academic orientation, parenting style, and risk-taking tendency are antecedents to these images.
- H3: These negative smoker images inhibit willingness to smoke in smoking-conducive situations; this reduced willingness, in turn, is associated with decreased likelihood of subsequent smoking.

Method

Sampling Strategy, Recruitment, and Interview Procedures

Families were recruited for FACHS from multiple sites that varied considerably on demographic characteristics, such as racial composition and economic level. Sites included rural farm communities, suburban areas, and small metropolitan areas; there were no inner-city regions. Particular attention was paid to sampling families from neighborhoods with varying racial composition (e.g., percentage African American) and economic level (percentage of families with children living below the poverty line). Potential participants were chosen randomly

from lists of families living in neighborhoods with at least 10% African American population. The lists, compiled by community liaisons around Athens, Georgia, and school officials in Des Moines and Waterloo, Iowa, included all families with a 10-year-old or fifth-grade African American child. The families received an introductory letter, followed by a recruitment phone call and then a personal visit requesting that the target child and his or her primary caregiver (parent) participate in the study. In case a telephone was not available, the letter included a toll-free number for the family to call if they were interested in participating. Complete data were gathered from 72% of the families on the recruitment lists. The majority who declined to participate cited the amount of time the interview took as the reason—up to 2 hours for each of two visits at each wave (see Brody et al., 2001; Cutrona, Russell, Hessling, Brown, & Murry, 2000; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Simons et al., 2002; and Wills, Gibbons, Gerrard, & Brody, 2000, for further description of the FACHS sample and its recruitment). In general, the sample was representative of the African American populations in the communities from which they were selected.

All interviewers were African American and had received extensive training. The interview required two separate visits with two interviewers. Visits typically lasted about 90 minutes. Each session included a computer-assisted personal interview, in which the questions appeared on the computer screen and were read aloud to the participant. Parents received \$100 and children received \$70 for their participation at each wave of data collection.

Participants

The initial (T1) FACHS sample included 897 families (475 in Iowa, 422 in Georgia) that each had a child between the ages of 10 and 12 ($M = 10.5$). The child and his/her parent, defined as a person living in the same house who was primarily responsible for the pre-adolescent's care, were interviewed simultaneously but separately. Parents had the following characteristics: M age = 37 (range = 23–80), 93% were female, 84% were the child's biological mothers, 92% identified themselves as African American, 44% as single parents. Their educational backgrounds were diverse, ranging from less than a high school diploma (19%) to a bachelor's or advanced degree (9%). Of the 897 families, 775 remained in the panel at T2 (M age = 12.2), approximately 20 months later (retention rate = 86%). The current analyses included the 742 children who completed the T1 and T2 measures pertaining to the hypotheses and reported at T1

that they attended either private or public school.³ Because we were interested in predicting the *initiation* of smoking behavior, targets who reported at T1 that they had ever smoked a cigarette ($N = 14$) were also excluded from the current study. Independent-sample t tests indicated that compared with children who remained in the study at T2, attriters reported higher levels of willingness to smoke at T1 ($p < .05$). There were no other significant differences between the groups.

Measures

There were four groups of constructs in the SEM: (1) antecedents to the smoker prototype and willingness, (2) prototypes, (3) control variables (e.g., SES), and (4) the outcome measures (T1 willingness and T2 smoking).

Image Antecedents

The children reported on three aspects of their parents' parenting styles: monitoring, communication, and warmth. Monitoring was assessed with five items (e.g., "How often does your parent know what you do after school?"), each followed by a 4-point scale, from *never* to *always*. The communication subscale contained three items that assessed adolescents' perceptions of the extent to which their parents communicated with them about using drugs, drinking alcohol, and smoking cigarettes, each followed by a 4-point scale, from *never* to *many times*. The parental-warmth measure included nine items, such as "How often in the last 12 months did your [caregiver] let you know [she] really cares about you?" each followed by a 4-point scale, from *never* to *always* (overall $\alpha = .81$). These three measures were used as indicators of the latent parenting construct. The children also completed a six-item neighborhood risk scale, which assessed the frequency of events such as gang fights and violent arguments in their neighborhoods, along with substance availability (e.g., people selling drugs). The response format for the items was a 3-point scale: *often*, *sometimes*, or *never*, which was coded so that high values indicated a high-risk neighborhood ($\alpha = .75$). The items were parceled into three indicators of the latent construct (see Little, Cunningham, Shahar, & Widaman, 2002, for a discussion of parceling).

Academic orientation was assessed using seven items, such as "In general, you . . . like school a lot . . . try hard at school . . . do not feel like you really belong at school [reversed]," each followed by a 4-point scale

³Fourteen children who were home-schooled were excluded because the academic orientation measure, which was a central construct in the model, did not apply to them.

ranging from *strongly agree* to *strongly disagree* ($\alpha = .65$). These seven items were parceled into three indicators of the latent construct. The risk-taking scale was adapted from Eysenck and Eysenck's (1977) inventory and included six items, such as "You enjoy taking risks" and "You would enjoy fast driving," each followed by a 3-point scale, from *not at all true* to *very true* ($\alpha = .57$). The six items were parceled into three indicators of the latent construct. Friends' tobacco use was assessed by asking, "During the past 12 months, how many of your close friends have used tobacco (cigarettes, smokeless tobacco, etc.)," followed by three response choices, from *none of them* to *all of them*.

Smoker Images

The children were presented with a general definition of a prototype and then asked to think about the type of person their age who smokes cigarettes.⁴ They were then asked to rate the favorability of the smoker image using seven adjectives: popular, smart, cool, good-looking, childish, careless, and dull/boring (reversed), each followed by a 4-point scale ranging from *not at all* to *very* ($\alpha = .66$). The adjectives "childish" and "careless" had to be dropped because of low reliability (due to comprehension problems). This resulted in a five-item construct with an α of .69, which was parceled into three indicators of the latent construct. Participants also rated their self-image on the same five adjectives ($\alpha = .49$), which also produced a latent construct with three indicators.

Outcome Variables

Willingness was assessed, as it usually is, by first describing a risk-conducive situation to the children: "Suppose you were with a group of friends and some of them were smoking. There are some extra cigarettes there that you could have if you wanted." Participants were then

⁴The full wording of the prototype measure was: "Some of the questions below are about 'images.' Images are pictures we have in our mind about people and groups. For example, we all have ideas about what the type of kid who plays basketball is like. We might say that the typical basketball player is tall and skinny or that the typical movie star is rich and good looking. We are not saying that all of these people are alike, only that some of them are similar in some ways. In these questions, you will be asked to think about different images you have." This was followed by the first image, which was the smoker image and this wording: "A number of young people smoke. I want to know what you think about them. Take a moment and think about the type of kid your age who smokes. I am not thinking about anyone in particular, just your image of kids who smoke." This was followed by the adjective descriptors (e.g., "popular").

asked two questions about how they would react in this hypothetical situation: "How willing would you be to . . . take one and smoke it?" and ". . . smoke more than one cigarette?" Responses were recorded on 3-point scales, from *not at all willing* to *very willing* ($\alpha = .65$). Smoking was measured at T2 by asking, "Thinking about your whole life, have you ever smoked cigarettes?" with a yes/no response.

Control Measures

Parental tobacco use was assessed at T1 by asking "Did you use tobacco (cigars, cigarettes, pipe, or chewing tobacco) during the last 12 months?" with a yes/no response. In addition, SES was assessed via a measure of the family's annual income (coded on a 10-point scale based on 10 percentile groups) and the parents' level of education (on a 10-point scale, from less than a high school diploma to an advanced degree). The two items were combined into an overall measure ($\alpha = .61$).

Results

H1: Smoker Prototype Favorability

As expected, within-subject comparisons of ratings of the self and the smoker prototype revealed that the smoker image was significantly less positive than the children's ratings of their own characteristics; *M* image favorability = 1.64 vs. 3.12; $t(741) = 48.51, p < .001$.

H2–H3: Model Testing

Mplus for Windows (Muthén & Muthén, 2001) allows for the estimation of latent variable models with dichotomous outcome variables; therefore, Mplus with the mean and variance-adjusted weighted least squares method was used to test Hypotheses 2 and 3. Table I presents the means, standard deviations, and correlations between measures used as input for the Mplus program. The proportion of "ones" observed for the three dichotomous variables are also reported in Table I. Thirty-seven percent of the parents reported tobacco use at T2, whereas 9.2% of the targets reported ever smoking cigarettes at T2.

Measurement Model

SES, friends' tobacco use, and both parent and child smoking were specified as manifest variables, represented by single items; all other constructs were specified as latent. Confirmatory factor analysis indicated that the measurement model fit the data well, $\chi^2(92, N = 742) = 204.4, p < .001$, Tucker-Lewis index (TLI) = .92, comparative fit index (CFI) = .91, root mean square error of approximation

Table I. Correlations, Means, Standard Deviations, and Standardized Factor Loadings for the Measurement Model

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
|--------------------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| 1 Par T1 use | – | | | | | | | | | | | | | | | | | | | | | | |
| 2 SES | -.19 | – | | | | | | | | | | | | | | | | | | | | | |
| 3 Comm | .05 | -.03 | – | | | | | | | | | | | | | | | | | | | | |
| 4 Mont | .02 | .06 | .15 | – | | | | | | | | | | | | | | | | | | | |
| 5 Warm | -.06 | .03 | .22 | .43 | – | | | | | | | | | | | | | | | | | | |
| 6 Nghd 1 | .00 | -.14 | .03 | -.14 | -.09 | – | | | | | | | | | | | | | | | | | |
| 7 Nghd 2 | .11 | -.23 | .07 | -.15 | -.05 | .49 | – | | | | | | | | | | | | | | | | |
| 8 Nghd 3 | .11 | -.14 | .04 | -.11 | -.05 | .52 | .44 | – | | | | | | | | | | | | | | | |
| 9 Acad 1 | -.09 | .18 | .03 | .20 | .23 | -.18 | -.15 | -.11 | – | | | | | | | | | | | | | | |
| 10 Acad 2 | .00 | -.01 | .08 | .26 | .32 | -.02 | -.04 | -.02 | .43 | – | | | | | | | | | | | | | |
| 11 Acad 3 | .00 | .08 | .11 | .22 | .17 | -.09 | -.14 | -.08 | .40 | .37 | – | | | | | | | | | | | | |
| 12 Risk 1 | -.03 | .10 | .00 | -.21 | -.14 | .10 | .09 | .05 | -.09 | -.15 | -.09 | – | | | | | | | | | | | |
| 13 Risk 2 | .04 | -.03 | .02 | -.19 | -.10 | .17 | .12 | .14 | -.16 | -.08 | -.05 | .31 | – | | | | | | | | | | |
| 14 Risk 3 | -.04 | .00 | -.03 | -.17 | -.16 | .07 | .05 | .02 | -.04 | -.14 | -.06 | .35 | .25 | – | | | | | | | | | |
| 15 Gender | .02 | .01 | .18 | .09 | -.04 | -.02 | .01 | .00 | .09 | .03 | .05 | -.14 | -.10 | -.04 | – | | | | | | | | |
| 16 Fr use | .01 | -.09 | -.01 | -.14 | -.14 | .23 | .18 | .10 | -.18 | -.12 | -.07 | .09 | .08 | .11 | -.09 | – | | | | | | | |
| 17 Proto 1 | .01 | -.02 | -.04 | -.10 | -.11 | .10 | .04 | -.01 | -.09 | -.09 | -.07 | .05 | .09 | .14 | -.02 | .06 | – | | | | | | |
| 18 Proto 2 | -.14 | -.06 | -.07 | -.10 | -.09 | .11 | .05 | -.01 | -.12 | -.10 | -.16 | .04 | .08 | .09 | -.02 | .04 | .43 | – | | | | | |
| 19 Proto 3 | .06 | .00 | -.07 | -.11 | -.14 | .13 | .05 | .03 | -.11 | -.13 | -.13 | .13 | .13 | .14 | .03 | .11 | .58 | .38 | – | | | | |
| 20 Will 1 | -.01 | -.05 | -.04 | -.22 | -.18 | -.03 | .05 | -.07 | -.10 | -.13 | -.08 | .10 | .05 | .13 | .02 | .10 | .14 | .15 | .15 | – | | | |
| 21 Will 2 | .00 | -.08 | -.01 | -.15 | -.16 | .03 | .02 | -.02 | -.14 | -.15 | -.06 | .11 | .09 | .08 | .02 | .12 | .12 | .07 | .12 | .49 | – | | |
| 22 T2 smoke | .19 | .01 | -.01 | -.14 | -.11 | .10 | .09 | .06 | -.04 | -.07 | -.10 | .15 | .04 | .08 | .15 | .14 | .12 | .00 | .13 | .06 | .01 | – | |
| Means ^a | 0.37 | 4.14 | 2.76 | 3.41 | 3.44 | 1.27 | 1.62 | 1.32 | 3.47 | 3.29 | 3.00 | 1.52 | 1.49 | 1.42 | 0.53 | 1.18 | 1.50 | 1.70 | 1.66 | 1.05 | 1.04 | 0.09 | |
| SD | – | 1.97 | 1.15 | 0.54 | 0.53 | 0.49 | 0.60 | 0.49 | 0.46 | 0.62 | 0.65 | 0.53 | 0.57 | 0.50 | – | 0.41 | 0.88 | 0.79 | 0.76 | 0.22 | 0.21 | – | |
| Loading | 1.00 | 1.00 | 0.19 | 0.71 | 0.65 | 0.81 | 0.68 | 0.60 | 0.68 | 0.66 | 0.56 | 0.59 | 0.52 | 0.54 | 1.00 | 1.00 | 0.69 | 0.56 | 0.78 | 0.73 | 0.66 | 1.00 | |
| (t value) | – | – | – | 3.65 | 3.69 | – | 8.98 | 9.52 | – | 10.42 | 9.65 | – | 7.02 | 7.64 | – | – | – | 7.33 | 8.22 | – | 7.12 | – | |

Note. N = 742. All variables coded so that high scores indicate more of the construct. PAR T1 Use = self-report of parent smoking, 1 indicates yes; SES = socioeconomic status, parent report of education and income; Comm, Mont, Warm = communication with parents, parental monitoring, parental warmth; Nghd 1 = first parcel of targets' reports of neighborhood risk; Acad 1 = first parcel of targets' report of academic orientation; Risk 1 = first parcel of risk taking; Fr use = targets' reports of friends' tobacco use; Gender = 0 refers to male, 1 refers to female; Proto 1 = first parcel of risk image of cigarette user; Will 1 = targets' self-report of willingness to smoke 1 cigarette; Will 2 = targets' self-report of willingness to smoke >1 cigarette. T2 smoke = self-report of targets' lifetime smoking, 1 indicates yes. ^aMeans of dichotomous variables are replaced by proportions of "ones" observed. All printed t values are significant ($p < .001$). All correlations $\geq .08$, $p < .05$; $\geq .10$, $p < .01$; $\geq .12$, $p < .001$.

(RMSEA) < .05. All factor loadings for the hypothesized relations between the observed variables and latent factors were significant, and all but one of the standardized loadings (communication with parenting) was greater than or equal to .52 (see Table I).

Correlations

Zero-order correlations among the latent constructs indicated that neighborhood risk was positively correlated with friends' tobacco use and risk taking and that all three of these constructs were negatively correlated with academic orientation (see Table II). As expected, neighborhood risk, academic orientation, and risk taking were all correlated with prototype favorability, such that participants who lived in high-risk neighborhoods or had risk-taking tendencies had more favorable smoker prototypes, and those with high academic orientation had less favorable prototypes. In addition, friends'

use, academic orientation, and risk taking were correlated with willingness. Correlations between smoker prototypes and willingness were also significant.

Full Model

The SEM was specified according to Hypotheses 2 and 3. Parenting style, neighborhood risk, academic orientation, and risk taking were specified to have direct paths to prototypes; smoker prototypes were specified to have a direct path to willingness; and then willingness was specified to have a direct path to subsequent smoking. Nonsignificant paths were dropped from this initial model, and parameter derivatives supplied by Mplus for constrained parameters were examined to determine which parameters were most likely to improve model fit if freed. The final model fit the data well; $\chi^2(38, N = 742) = 77.85$, $p < .001$; TLI = .93, CFI = .95, RMSEA < .04. The model explained 13% of the variance in smoker

Table II. Correlations (and *t* values) Among Single-Item and Latent Constructs in the Measurement Model

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|------------|---|
| 1 SES | – | | | | | | | | |
| 2 Parenting | .06 (1.28) | – | | | | | | | |
| 3 Neighborhood | -.24 (5.27***) | -.19 (2.76***) | – | | | | | | |
| 4 Academic | .13 (2.82***) | .54 (3.38***) | -.21 (4.23***) | – | | | | | |
| 5 Risk taking | .05 (.97) | -.42 (3.28***) | .23 (4.26***) | -.28 (4.56***) | – | | | | |
| 6 Friends' use | -.09 (2.21**) | -.20 (2.88***) | .25 (6.16***) | -.20 (4.76***) | .17 (3.41***) | – | | | |
| 7 Prototype | -.03 (.73) | -.25 (2.95***) | .13 (2.73***) | -.25 (4.43***) | .27 (4.52***) | .11 (2.61***) | – | | |
| 8 Willingness | -.08 (1.81*) | -.37 (3.34***) | .00 (.07) | -.27 (4.96***) | .24 (3.89***) | .17 (4.77***) | .26 (5.51***) | – | |
| 9 T2 cig use | .01 (0.20) | -.18 (1.93**) | .12 (1.62) | -.11 (1.53) | .18 (2.23**) | .14 (2.42**) | .13 (1.67*) | .05 (0.79) | – |

SES = socioeconomic status. *N* = 742. **p* ≤ .10, ***p* ≤ .05, ****p* ≤ .01.

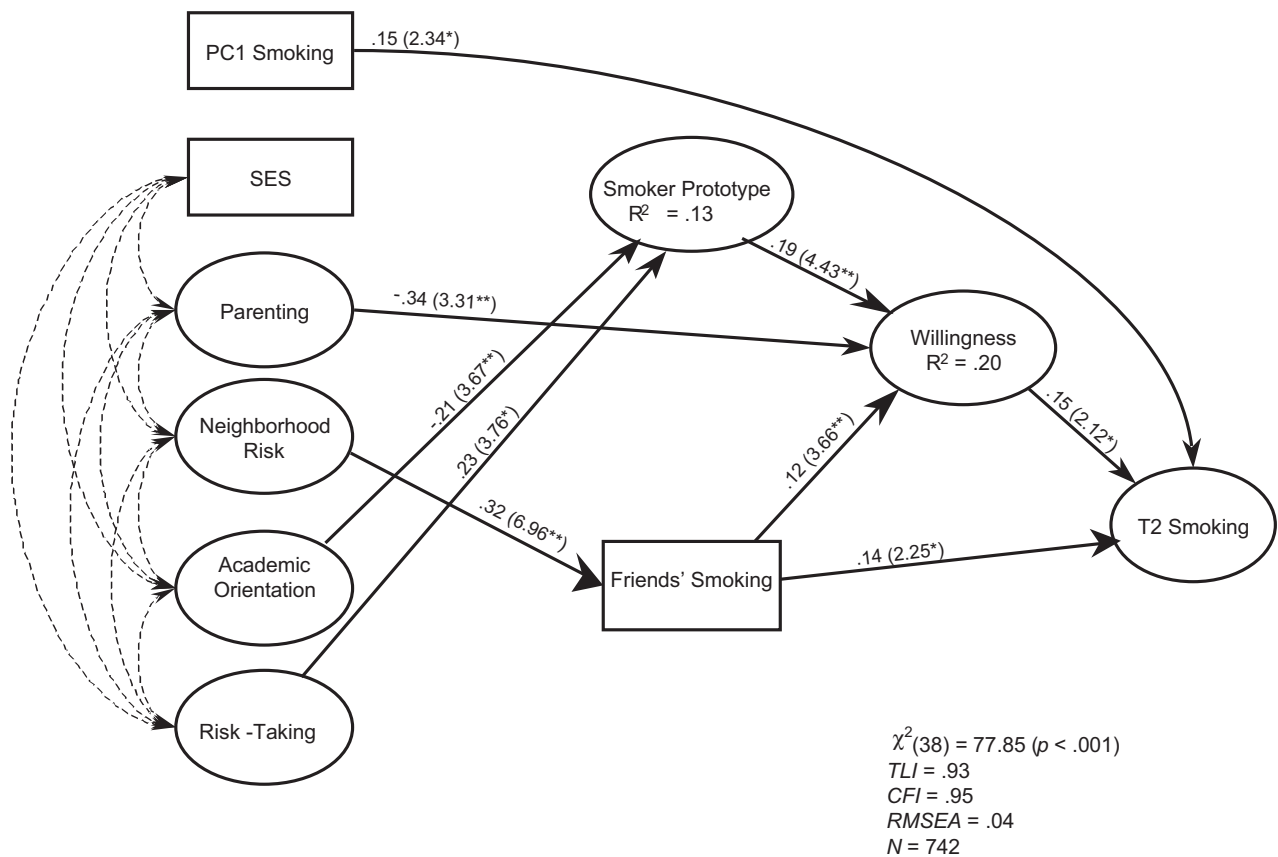


Figure 2. Structural Model of Antecedents of Smoking Initiation. Values represent standardized linear regression and probit regression coefficients (and *t* values). **p* ≤ .05, ***p* ≤ .01.

prototype and 20% of the variance in willingness (see Figure 2). Note, however, that *R*² values for categorical outcomes cannot be interpreted in the same manner as variance explained in continuous outcomes. Rather, examination of the sign and significance of coefficients in

the estimated model are more informative in such models (Muthén & Muthén, 2001). Furthermore, it is important to note that estimates of paths from continuous predictors to an observed categorical outcome-dependent variable are probit regression coefficients.

Prototypes and Willingness. The basic relations predicted by the prototype model emerged as significant in the SEM. First, children's prototypes of the typical smoker were directly and positively associated with their willingness to smoke, $\beta = .19, t = 4.43, p < .001$. Willingness, in turn, was directly and positively related to the children's reports of their smoking almost 2 years later, $\beta = .15, t = 2.12, p = .03$.

Image Antecedents. Examination of the antecedent constructs revealed that neighborhood risk (context) did not have a direct effect on smoker images (even though the two were correlated), but it did have a direct effect on friends' use, $\beta = .32, t = 6.96, p < .001$. As expected, academic orientation had a strong direct effect on images, $\beta = -.21, t = 3.67, p < .001$, as did risk-taking tendency, $\beta = .23, t = 3.76, p < .001$. Although correlated with the children's risk images, there was no direct path from parenting to smoker image. Nonetheless, effective parenting had an important impact: Parents whose style included monitoring and provision of warmth were less likely to have children who were willing to smoke ($p < .001$ for the direct effect).

Control Measures. Although SES was correlated with some other exogenous variables (e.g., positively with academic orientation, negatively with neighborhood risk), there were no direct paths from either gender or SES to any of the endogenous constructs. Thus, neither control variable had much impact on the relations in the SEM. There was a direct path from parent smoking to child smoking, however, which has been found in previous studies (Jackson & Henriksen, 1997). More important, the various relations in the model (e.g., the effect of parenting) existed controlling for the parent's actual tobacco use.

Discussion

The vast majority of the children in this study were not using tobacco and had negative opinions of others their age who did. In fact, these images were much more negative than their self-images, which suggests that the images were not goal states for them but, rather, were acting primarily in an inhibitory fashion (cf. Gerrard et al.'s, 2002, discussion of drinker vs. nondrinker images). At the same time, there was some variability in the favorability of the images, and this variance was associated with the children's willingness to smoke. This willingness, in turn, predicted reports of smoking almost 2 years later. Thus, the results are consistent with the prototype model in general. Also, given the time lag and the young age of the children at T1 (10.5 years), the

results provide further evidence of the utility of the willingness and prototype (image) constructs in predicting this type of behavior. In addition, the current results provide some indication of which factors affect the development of these influential images.

Antecedents of Risk Images and Willingness

Context

The environment in which these African American children lived did have an impact on their behavior, as anticipated (Smart et al., 1994). This contextual effect was mediated rather than direct, however. Although children living in risky environments did have more favorable images (Gibbons, Gerrard, & Lane, 2003), the strongest effect of context was on the children's affiliation with smokers: The higher the risk in the neighborhood, including substance availability, the more likely the children were to associate with peers who were smokers. This tendency in turn led directly to a higher willingness to smoke, and then eventually to more smoking, which is consistent with the prototype model.

The fact that the children reported more smoking by their friends in high-risk neighborhoods is not surprising (Gibbons, Gerrard, & Lane, 2003). At the same time, the fact that the neighborhood effect was mediated is reason for some optimism. There is often very little that parents can do to alter the environment in which they and their children live, but they can have some impact on their child's choice of friends (Melby, Conger, Conger, & Lorenz, 1993) and can alter the cognitions that their child is likely to develop in these environments (see below). Both of these types of parental influence have been linked with reduced substance use, especially smoking, by children (Gibbons, Gerrard, & Lane, 2003). This is one more reason why it is important to examine factors that mediate the strong impact that environments have on children (cf. Chen et al., 2002).

Risk Taking

Controlling for its strong relations with both context and academic orientation, risk taking was related to the children's willingness to smoke, and marginally related to their smoking behavior. Risk taking was also correlated with friends' use at T1 ($p < .01$). The strongest impact of this factor, however, was on its relations with risk cognitions. High risk takers had significantly more favorable risk images, and it was this cognitive factor (perception) that was in turn related to their willingness and then to their behavior. The possibility that

risk taking is related to risk behavior through cognitive channels has received little empirical attention in the literature (Wills et al., 2001), but for the same reasons cited above—having to do with malleability of risk cognitions—it clearly is worthy of future investigation. Studies are currently under way to determine whether the risk cognitions of children labeled as having a “risky temperament” (e.g., low self-control) mediate the relation between this disposition and risk behavior (Wills, Murray, Brody, Gibbons, Gerrard, & Walker, 2004).

Academic Orientation

Another dispositional factor that had an important impact on the children’s cognitions *and* their behavior was their level of academic orientation. Children who felt more “connected” with their school had more negative smoker images and less willingness to smoke and eventually reported less smoking. This was true regardless of the level of risk in the child’s neighborhood or his or her family SES and risk-taking tendency, all of which were controlled in the SEM. The fact that academically oriented children tend to not affiliate with peers who are smoking seems intuitive enough; however, the fact that feeling connected with school has a significant inhibitory effect on the formation of cognitions that promote smoking independent of that affiliation is of more interest. It would appear that these children are paying attention to the messages that the school systems are presenting to them, starting as early as first or second grade, about the dangers of smoking. It also appears that school-focused children are more tuned in to the negative *social* consequences associated with this behavior. Again, from an intervention perspective, there is reason for optimism, as reducing smoking (and substance in general) use may be a beneficial by-product of increasing children’s involvement in school.

Parenting

Effective parenting was an important protective factor. Although a direct effect of this factor on risk images was anticipated, the lack of such an effect is understandable. It suggests, for example, that parents may not discuss with their children the issue of what type of child uses substances. It should also be kept in mind that parenting was correlated with risk images, even though the direct relation was not strong enough to emerge as an independent path given the other relations in the model. Regardless, parenting did have a strong direct impact on the child’s willingness to smoke, which is encouraging given that parenting style—especially monitoring and communication—is something over which parents have some

control. Moreover, there is some reason to believe that the impact of effective parenting may be greater for African American children, especially when it comes to substance use (Rankin & Quane, 2002) and that this effective parenting can buffer the child against the effects of high-risk environments (Cleveland et al., 2004).

Implications for Interventions

Although very few children were actually smoking, a significant number of them were at risk for initiation, because they lived in high-risk environments (e.g., a home where their parent smoked, neighborhoods where substances were available), were high in risk taking, or were not very academically oriented. Once again, these are distal factors that are difficult to alter. That being the case, it is important to note that several studies have suggested that the cognitive factors—images and willingness—which were found to mediate their effects can be modified, with encouraging results.

Altering Prototype Favorability

Two recent studies demonstrated the utility of altering images associated with a risk behavior in order to change that behavior (Gibbons, Gerrard, Lane, Mahler, & Kulik, in press). In these studies, college students, many of whom were using tanning booths, were shown ultraviolet (UV) photographs of their faces. The photographs, which reveal the underlying skin damage already sustained from UV exposure and not visible to the naked eye, tend to be very impactful. Viewing this damage was associated with a significant decline in the students’ prototypes of the typical tanned person, and this change in prototype favorability predicted decreases in reports of tanning in the next 3 to 4 weeks. Using a procedure that is more easily applied to children, Blanton et al. (2001) presented college students with bogus survey information indicating that people who used condoms were less selfish and more responsible than those who did not. As expected, the students who read the personality information about condom users reported significantly less willingness to have casual sex than did those who had not read the material (see also Thornton et al., 2002). These studies suggest that manipulating the favorability of images of smokers, either by reinforcing existing unfavorable characteristics of such images or by increasing the attractiveness of nonsmoker images, could have inhibitory effects on smoking.

Contemplation of Images

Two additional studies have suggested that promoting contemplation of risk images can influence subsequent risk behavior. The first of these was a prospective study

that revealed that adolescents' reported contemplation of a prototypical nondrinker (i.e., "How often have you thought about . . . ?") was associated with alcohol consumption 1 year later (Gerrard, Gibbons, Reis-Bergan, et al., 2002). The more they reported thinking about the nondrinker image, the less likely they were to increase their consumption. In the second study, college students were asked to consider prototypes of people who exercise (Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, in press). This systematic consideration of the exerciser prototype increased exercise over a 4-week interval, which suggests that contemplation of the positive characteristics of nonsmokers might be an effective smoking preventive measure with pre-adolescents. This study also found that focusing on the typical *nonexerciser* increased exercise, suggesting the possibility that a combination of contemplation of the negative aspects of typical smokers and positive aspects of nonsmokers might be especially effective (Gerrard et al., 2002).

Limitations

Exploration of the antecedents of smoking initiation among pre-adolescents is difficult for a number of reasons, and the current study is not immune to the problems inherent in this kind of research. First and foremost among these is the fact that the participants in the study were young enough that few of them were smoking at T2. Thus, there was little variance in smoking initiation to predict, and the resulting R^2 for smoking at T2 was small (.07). Also, the reliabilities of some of the measures were not high—again a reflection of the age of the participants and the fact that risk cognitions at this age are quite dynamic. It should be noted, however, that the small number of children who do start smoking at this early age are those who are most at risk of later addiction (Anthony & Petronis, 1995) and thus, are the most important targets for early prevention programs. We believe the information obtained from participants as young as those in the current study, who have not yet begun to engage in the behavior on a regular basis, can be very useful. Nonetheless, caveats usually associated with interpreting data provided by children this age are in order. Similarly, we relied on the children's self-reports of their smoking. Given the anonymity of the situation (e.g., parents could not see their child's responses), we do not believe the children had reason to report inaccurately; nonetheless, verification of their reports would have been useful.

It should be noted that although the current study was prospective, in that smoking was assessed at T2, the cross-sectional nature of the assessment of the anteced-

ents, images, and willingness does not allow us to interpret relations between these constructs as causal. Thus, the current study is not an ideal test of the unfolding of the process over time, i.e., antecedents → prototypes → willingness → initiation. Furthermore, a two-wave study does not permit examination of reciprocal relations between the cognitions and smoking across time; that is, does trying cigarettes change pre-adolescents' smoker images, and do those changes effect subsequent changes in smoking? (cf. Gerrard, Gibbons, Benthin, & Hessling, 1996). However, experimental research and prospective studies of the prototype model with older samples have suggested that the hypothesized ordering of the constructs in the current model is appropriate and, more important, indicates that images of smokers and willingness to smoke are potentially important targets for intervention. Finally, only one ethnic group was included in the study. Although there is no reason to expect that black children differ from those in other ethnic groups—at this age—in terms of behavior or cognitions (Jackson, 1997), replication with children from other ethnic groups is one future direction for research in this area.

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