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Predictors of the Development of Elementary-School Children=s Intentions to Smoke Cigarettes: Hostility, Prototypes, and Subjective Norms

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Abstract

Children's intentions to smoke are reliable predictors of subsequent smoking and precede smoking initiation, so identifying predictors of intentions is important for preventing or delaying smoking initiation. Children's hostility and sociability, mediated by the development of prototypes (i.e., social images of children who smoke cigarettes) and subjective norms regarding smoking among peers, were expected to predict the development of their intentions to smoke cigarettes in the future. Children in 2nd through 5th grades (N = 809) from a Western Oregon community participated in a longitudinal study. Hostility and sociability were assessed by teachers = ratings, and prototypes, subjective norms, and intentions were assessed by self-report at each of the first four annual assessments. Children's intentions to smoke predicted whether they had tried cigarettes by the fifth assessment. For both genders, latent growth modeling demonstrated that hostility, but not sociability, predicted the development of smoking intentions. More hostile children were more likely to have higher initial levels of intentions to smoke and, for boys, this effect was mediated by their higher initial levels of subjective norms about smoking. Sociability was not related to the development of smoking cognitions for boys or girls. These results were discussed in terms of opportunities to intervene on early influences on smoking intentions.

It is important to establish the etiology of children's smoking intentions so that tobacco-use prevention programs can target factors that decrease intentions to smoke and thus prevent or postpone the initiation of adolescent smoking. Among children and adolescents, the development of susceptible cognitions precedes smoking initiation, experimentation, and the transition to becoming a regular smoker (Choi, Gilpin, Farkas, & Pierce, 2001; Gritz et al., 2003; Jackson, 1998; Pierce, Choi, Gilpin, Farkas, & Merrit, 1996). Intentions to smoke in the future are a key aspect of cognitive susceptibility to future smoking (Ajzen & Fishbein, 1980) and are considered to be the first stage of tobacco acquisition (Pierce & Gilpin, 1996). Children's temperaments have also been implicated as more distal influences on their tendency to engage in health risk behaviors such as smoking (Gerrard, Gibbons, Stock, Houlihan, & Dykstra, 2006).

In this study, we investigated a model of the development of children's smoking intentions in which the development of prototypes (social images) of youth who smoke and subjective norms

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about other children's smoking, were expected to predict the development of intentions. We also examined the influence on smoking intentions of two temperament-related constructs, hostility and sociability, to determine whether their effects on intentions were mediated by the development of prototypes and norms. The model was tested using longitudinal data from the Oregon Youth Substance Use Project (OYSUP) that enabled relations among developmental trajectories of susceptible cognitions to be examined.

Personality Predictors of Smoking

Hostility and sociability are aspects of infant temperament and of the personality dimensions of middle childhood and adolescence (Caspi, 1998; Mervielde & Asendorpf, 2000; Shiner, 2000). Hostility has been associated with adolescent and young adult smoking (Weiss et al., 2005), as have related traits such as rebelliousness (Burt, Dinh, Peterson, & Sarason, 2000), trait anger (Forgays, Forgays, Wrzesniewski, & Bonaiuto, 1993) and negative affect (Tyas & Pederson, 1998). More generally, traits comprising "difficult temperament," which includes aspects of hostility (Gerrard et al., 2006), have been associated with numerous adolescent problem behaviors including smoking (e.g., Caspi et al., 1997; Jessor & Jessor, 1977; Gerrard, Gibbons, Benthin & Hessling, 1996; Shoal & Giancola, 2003; Wills, DuHamel, & Vaccaro, 1995; Zuckerman, 1994). Higher levels of sociability have been associated with more use of substances (e.g., Brook, Whiteman, Gordon, & Cohen, 1986; Chassin, Pillow, Curran, Molina, & Barrera, 1993; Jessor & Jessor, 1977), although in some studies the effect is reversed (Tarter, 1988; Tarter, Sambrano, & Dunn, 2002; Wills, Vaccaro, & McNamara, 1994), suggesting a possible bimodal effect. Sociability is a major component of extraversion, which is associated with smoking in adults (Gilbert, 1995).

Smoking Intentions, Prototypes, and Subjective Norms

Although most children do not express strong intentions to smoke and have relatively negative attitudes towards smoking, many of them will have tried smoking by grades 6 or 7 (Harrell, Bangidwala, Deng, Webb, & Bradley, 1998; Johnston et al., in press). Several studies have demonstrated that smoking intentions predict smoking initiation in children (Andrews, Tildesley, Hops, Duncan, & Severson, 2003) and adolescents (e.g., Chassin, Presson, Sherman, Corty, & Olshavsku, 1984; Choi et al., 2001; Wakefield et al., 2004).

According to the Theory of Reasoned Action (Ajzen & Fisbein, 1980), intentions are the result of a reasoned process influenced by attitudes and subjective norms. Confirming this model, smoking intentions and adolescent smoking have been predicted by attitudes and norms (e.g., Botvin, Baker, Goldberg, Dusenbury, & Botvin, 1992; Maher & Rickwood, 1997; Norman & Tedeschi, 1989; Tyas & Pederson, 1998; Simons-Norton, 2002).

According to the Prototype/Willingness model (Gibbons & Gerrard, 1995; Gibbons, Gerrard, & Lane, 2003; Gibbons, Gerrard, Blanton, & Russell, 1998), adolescents may be more or less willing to try a cigarette depending on their social images, referred to as "prototypes," of a typical smoker. Prototypes for smoking are similar to attitudes in that they have strong evaluative connotations, but they are individuals' beliefs about the social image of smokers such as "kids who smoke are stupid" (Gibbons & Gerrard, 1997). Adolescents with more favorable images of smokers (i.e., less unfavorable than their unsusceptible peers) are more likely to intend to smoke (Burton, Sussman, Hansen, Johnson, & Flay, 1989; Barton, Chassin, & Presson, 1982), to express more willingness to smoke (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997; Gerrard, Gibbons, Stock, Vande-Lune, & Cleveland, 2005), and to engage in smoking (van den Eijnden, Spijkerman, & Engels, 2006). Children develop more positive prototypes of smokers with age (Andrews & Peterson, in press), and these positive perceptions predict their subsequent smoking (Dinh, Sarason, Peterson, & Onstad, 1995). Therefore, in the

present study, the development of more favorable prototypes (i.e., social images) of smokers was expected to predict the development of stronger intentions to smoke.

Subjective norms are part of both the Theory of Reasoned Action (Ajzen & Fishbein, 1980) and the Prototype/Willingness model (Gibbons & Gerrard, 1995). Children and young adolescents are aware of the strong prescriptive norms against smoking, but they are also susceptible to peer influence (Unger, Rohrback, Howard-Pitney, Ritt-Olson, & Mouttapa, 2001; Gecková et al., 2005). Beliefs about the extent to which children and adolescents believe their peers have tried cigarettes, referred to as perceived prevalence or descriptive norms, predicts smoking (e.g., Gritz et al., 2003; Simons-Norton, 2002). It was expected that that development of beliefs that increasing numbers of peers are smoking (i.e., increasing subjective norms) would be associated with the development of stronger intentions to smoke.

Integrating the temperament-personality approach and the social-cognition approach to predictors of smoking resulted in the model tested here. Specifically, this study evaluated a mechanism by which hostility and sociability may influence smoking intentions. It was hypothesized that hostility and sociability are related to the development of smoking intentions because they influence the development of prototypes and subjective norms. More hostile and more sociable children were expected to develop stronger intentions to smoke, and these trait effects were predicted to be mediated by the development of more favorable prototypes of smokers and increasing beliefs about levels of peer smoking (subjective norms). Intentions to smoke were expected to predict subsequent smoking. Several studies suggest gender differences in smoking initiation (see Andrews, 2005 for a review) with boys' initiation exceeding girls' in the early years, but girls quickly catching up and surpassing boys. Andrews et al. (2003) also showed that boys' intention exceeded that of girls, in the elementary years. Girls in the OYSUP sample are more sociable than boys (2006, Andrews, Barckley, & Severson, 2006) and, in other studies, boys are more hostile than girls (Shiner, 2000). Accordingly, gender effects were evaluated in the models tested here.

Method

Design

In a cohort-sequential design, four grade cohorts (2nd through 5th graders at the first assessment) were assessed annually over four years (T1 – T4), until they were in the 5th through 8th grades. The fifth assessment (T5) took place two years after T4, when participants were in 6th through 10th grades. The 1st grade cohort at T1 was not included in the present analyses because of low reliability of the measure of prototypes in these young children.

Participants

Children from 15 elementary schools in one school district in Western Oregon serving a predominantly working class community participated in the study (N = 1075). An average of 215 students in each of the 1st through 5th grades participated at T1 with an even distribution by gender (50.3% female; n = 528). At T1 the average age was 9 years (SD = 1.45). The racial/ethnic composition of this sample was 86% Caucasian, 7% Hispanic, 1% Black, and 2% each of Asian/Pacific Islander, American Indian or Alaskan native, and other or mixed race/ethnicity. Approximately 7% of mothers and 11% of fathers had not obtained a high school diploma. Forty percent of the sample was eligible for a free or reduced lunch, an indicator of low family income.

A detailed description of the sampling procedure and representativeness of the sample is given in Andrews et al. (2003). In brief, the children were representative of other children in the school district in terms of race/ethnicity and participation in the free or reduced lunch program,

but had slightly higher test scores in reading and math. Participants were similar to children across the state in their substance use. Fifty-four children who participated in the study at T1 did not participate in the T4 assessment (5.0% of the total sample). Attrition between assessments was highest between the first and second assessment (3.7%). A comparison of the children who participated in the study at T4 with children who did not participate at T4 showed no differences at T1 on intentions to smoke, or on their prototypes or subjective norms regarding smoking, or on hostility and sociability. Participants were also similar to non-participants in grade, gender, race/ethnicity, proportion who received a free or reduced lunch, and achievement test scores at T1. The sample analyzed here consisted of 809 children in grades 2 – 5 at T1 (404 boys and 405 girls), who reported that they had not ever tried smoking at T1, who participated in at least one additional assessment (T2 – T4), and whose teachers completed ratings of their behavior at one or more of the four assessments.

Procedures

Assessment procedures are described by Andrews et al. (2003). The 2nd and 3rd grade assessment was an individual interactive structured interview, whereas older children answered paper and pencil surveys within a group setting. A separate study of 60 4th graders comparing smoking variables assessed by these two techniques indicated no differences (see Andrews et al., 2003). All T1 assessments and T2 through T4 assessments for students who remained within the district were conducted at school during the school day. Teachers' ratings of the children's behavior were made during the second half of the school year (January - May) ensuring that the teachers had time to get to know the children.

Measures

Intentions—Second and 3rd graders were shown a picture of cigarettes and were asked "Do you think that you would smoke these when you are a teenager?" and "Do you think you would smoke these when you are grown-up?" ("No" = 0, "Maybe" = 1, or "Yes" = 2). Responses to the two items were summed (r = .41). For the older children, intention to smoke was measured by two items: "Do you think you would smoke these when you=re a teenager (4th and 5th graders)/when you are in high school (6th through 8th graders)?" and "Do you think you would smoke when you are a grown-up?" ("No" = 0, "Maybe" = 1, or "Yes" = 2). Responses were summed across the two items (r = .58).

Prototypes—All the children were asked whether kids who smoke are "liked by other kids," are "exciting," and are "cool or neat" ("No" = 0, "Maybe" = 1, or Yes" = 2), and the three items were summed. Andrews and Peterson (in press) showed that a scale comprising these items was stable, valid and unidimensional.

Subjective norms—Two items assessed peer-based descriptive norms, and differed slightly across grades. Second and 3rd graders were shown a picture of cigarettes and asked: "Do any children in your neighborhood or at school smoke these?" and "Do your friends ever smoke these?" ("No" or "Don't know" = 0, "Yes" = 1), r = 0.14 across T1 – T4 assessments. Children in 4th – 8th grade were asked "How many of the kids at school or in the neighborhood smoke or have tried smoking cigarettes or cigars?" ("None" or Some" = 0, "Most" or "All" = 1), and "Do you have any friends who smoke (4th and 5th grades)/how many of your friends (6th – 8th grades) have smoked cigarettes or cigars? ("Yes," "Most," or "All" = 1, "No," "None," or "Some" = 0), r = .31 across T1 – T4 assessments. For all grades, responses were summed across the two items.

Convergent and discriminate correlations among the two items assessing norms and the three items assessing prototypes were examined at each time of assessment. The correlations among items assessing the same construct were consistently higher (mean convergent r for prototype

items = .32, mean convergent *r* for norm items = .22) than the correlations between items assessing divergent constructs (mean divergent *r* = .10).

Trying smoking—Whether or not participants had tried smoking was assessed by a single dichotomous item.

Hostility and sociability—Scales to measure hostility and sociability were developed from teachers' ratings on the Walker McConnell (1995) test of social skills, the acceptance subscale of the Self Perception Profile for children (Harter, 1985), the Achenbach (1991) withdrawn subscale of the Teachers Report Form, and the Crick (1996) aggression scales. Exploratory factor analysis of these items assessed at T1 (for 1st through 5th grades) yielded a two-factor solution accounting for 52.3% of the variance. To maximize the orthogonality between the scales, the ten most factor-pure and high-loading items for each factor were chosen. Confirmatory analysis demonstrated acceptable fit for the measurement model (Hampson, Andrews, Barckley, & Peterson, 2007). The ten hostility items assessed physical and relational aggression, and associating with deviant peers (e.g., hitting or shoving peers, excluding peers, and associating with misbehaving kids). The ten sociability items assessed social competence, activity, and popularity (e.g., invites peers to join in, lacking in energy, has a lot of friends). For the present analyses, hostility and sociability were treated as latent exogenous constructs each with four indicators: scores on the 10-item scales at each of the four times of assessment (T1–T4).

As reported in Hampson et al. (2007), these 10-item measures of hostility and sociability demonstrated rank-order stability and construct validity. Mean rank-order stability correlations across intervals of 1–5 years were *r* = .43 for hostility and *r* = .50 for sociability. To assess validity, hostility and sociability at T1 were related to teachers' ratings of the same children at T5 on traits assessing the five-factor model of personality (John & Srivistava, 1999). Supporting the construct validity of hostility and sociability, structural equation modeling indicated that hostility was most strongly related to low conscientiousness, low emotional stability, and low agreeableness, whereas sociability was most strongly related to extraversion.

Statistical Analysis

We used latent growth modeling (LGM; Muthén, 1991) to test several sequential models leading to a final model relating hostility and sociability to smoking intentions through prototypes and subjective norms. All models were analyzed with Mplus, Version 3 (Muthén & Muthén, 1998–2004) with full maximum likelihood methods used to estimate missing data (Enders, 2001). LGM takes advantage of the longitudinal dataset by allowing for the examination and prediction of individual and average change across the four assessments. LGM provides estimates of the average (group) developmental trajectory, including both the intercept (initial level) and slope (rate of change over time), and the variance or individual differences in these parameters. Intercepts and slopes may both be predictors and predicted. Within the models, intentions, prototypes, and subjective norms were developmental trajectories, and hostility and sociability at T1 were exogenous latent variables. Grade at T1 was included as an exogenous variable in all the models to control for age effects (Gibbons et al., 2003), and the exogenous variables were allowed to correlate. Previous analyses of the OYSUP data indicated that the intra-class correlation of smoking intentions within schools was very low (.005; Andrews et al., 2003). Therefore, analyses were conducted ignoring the school variable and collapsing across schools.

Separate growth models were tested to examine the developmental function that optimally assessed change over the four assessments for intentions, prototypes, and subjective norms. The intercept and slope (latent constructs) were based on four indicators, the variable at each

of four assessments. For each model, the factor loadings of the intercept on all indicators were set to 1. Factor loadings of the linear slope on the four indicators were set sequentially to 0, 1, 2, and 3.

The following procedures were used in model testing. First, an initial model was estimated that included all hypothesized structural paths and correlations between all indicators. Non-significant paths ($p < .05$) were removed from the model. However, paths from grade (to control for age) to all intercepts and slopes were always included as control variables regardless of significance. Correlations between indicators at the same or adjacent assessments were included in the model if indicated by modification indices. A final model, dropping non-significant paths, was then fitted to the data. To examine gender effects, multiple-sample analysis was used. Paths and correlations were initially constrained to be equal between genders but were freed iteratively if a gender difference was indicated through an examination of each modification index.

To test the hypothesis that growth in intentions to smoke is predicted by hostility, sociability, and the growth of prototypes and subjective norms, two models were tested. In model 1 (direct paths), grade, hostility, and sociability were specified as exogenous variables in the prediction of the initial level (intercept) and growth (slope) of intentions to smoke in the future. In model 2 (indirect paths), the intercept and slope of prototypes and subjective norms were specified as predictors of the intercept and slope of intentions, and the effects of hostility and sociability on the intercept and slope of prototypes and subjective norms were estimated.

Results

Descriptive Statistics

At T1, there was no difference in levels of hostility between boys ($M = -.02$, $SD = .76$) and girls ($M = -.02$, $SD = .81$), t (796) = .05, *ns*. However, girls ($M = .11$, $SD = .72$,) had higher levels of sociability than boys ($M = -.06$, $SD = .85$), t (796) = −3.03, $p = < .01$, (95% CI = −.28, −.06). The linear correlation between hostility and intentions ranged from .11 ($p < .01$) at T1 to .16 ($p < .01$) at T4. The linear correlation between sociability and intentions ranged from −.04 (*ns*) at T1 to −.09 ($p < .01$) at T4. The quadratic associations between hostility and intentions at T1 – T4 were small (ranging from .00 – .09) with only the largest one (at T3) reaching significance ($p < .05$). All the quadratic associations between sociability and intentions were nonsignificant (ranging from .00 to −.03).

The means and standard deviations for prototypes, subjective norms, and intentions at each time of assessment are shown separately for boys and girls in Table 1. There were no differences between boys and girls in their prototypes, t (807) = −.49, *ns*, and subjective norms, t (807) = −.38, *ns*, collapsed across times of assessment, but boys had higher intentions to smoke than did girls, t (807) = 1.99, $p < .05$. The correlation between prototypes and subjective norms was .03 at T1, .07 at T2, .20 at T3, and .24 at T4. The correlation between prototypes and intentions was .07 at T1, .10 at T2, .19 at T3 and .23 at T4. The correlation between subjective norms and intentions was .23 at T1, .34 at T2, .30 at T3 and .39 at T4. For boys, the relation between intentions to smoke cigarettes measured at a previous assessment and whether they reported having tried smoking at T5 was significant for intentions measured at T2 ($r = .15$, n = 392, $p < .01$), T3 ($r = .19$, $n = 390$, $p < .01$), and T4 ($r = .18$, $n = 391$, $p < .01$), but not at T1 ($r = .09$, $n = 404$, *ns*). For girls, the association between previously measured intention and trying smoking at T5 was significant at all times of assessment, T1 ($r = .17$, $n = 405$, $p < .01$), T2 ($r = .29$, n = 390, $p < .01$), T3 ($r = .31$, $n = 385$, $p < .01$), and T4 ($r = .32$, $n = 386$, $p < .01$).

Latent Growth Curve Models for Intentions, Prototypes, and Subjective Norms

A linear model best fit the data to model growth in intentions to smoke, χ^2 (4, N = 809) = 3.238, p = .519, RMSEA = .000 (90% CI = .000, .048), CFI = 1.00. The intercept of intentions (M =. 18, p <.001), and the slope (M = .02, p <.05), differed significantly from zero, and the variances were both significant (p < .01). A linear growth model best fit the data for growth in prototypes, χ^2 (5, N = 809) = 5.491, p = .359, RMSEA = .011 (90% CI = .000, .051), CFI = .996. The means and variances of prototypes (intercept M = .35; slope M = .05) differed significantly from zero (p <.001). Similarly, a linear growth model also best fit the data for growth in subjective norms,χ^2 (5, N = 809) = 16.312, p = .004, RMSEA =.053 (90% CI = .026, .082), CFI = .978. The means and variances (intercept M = .33; slope M = .12) of subjective norms differed significantly from zero (p <.001).

Model 1: The Prediction of Growth in Intentions from Hostility and Sociability (Direct Paths)

We examined the paths from the exogenous variables of grade, and hostility and sociability (latent constructs measured by indicators at T2, T2, T3, and T4), to the intercept and slope of intentions. The fit of the final version of the model was good, χ^2 (57, N = 809) = 117.351, p = .000, RMSEA = .036 (90% CI = .027, .045), CFI = .972. Hostility predicted initial level and slope of intentions of intentions. Neither grade nor sociability predicted the initial level or slope of intentions. Multiple-sample analysis indicated no gender differences.

Model 2: The Prediction of Growth in Intentions from Hostility, Sociability, Prototypes, and Subjective Norms (Indirect Paths)

The following paths were examined: (a) from grade at T1 to the intercepts and slopes of prototypes, norms and intentions, (b) from hostility and sociability to the intercept and slope of prototypes and norms, and (c) from the intercept of prototypes and subjective norms to the intercept and slope of intentions, and from the slopes of prototypes and subjective norms to the slope of intentions. The direct paths between hostility and sociability and intentions were not included in this model.

The final model for the entire sample is shown in Figure 1. The fit was satisfactory, χ^2 (104, N = 809) = 209.002, p = .000, RMSEA = .035 (90% CI = .028, .042), CFI = .956. For ease of interpretation of the relative strength of the paths, Figure 1 provides standardized path estimates. Where multiple-sample analysis indicated significant gender differences, results (unstandardized path estimates and their significance) are provided in the text. For simplification, not shown in the figure are the paths between the intercepts and slopes of prototypes and subjective norms (standardized path coefficients as follows: intercepts of prototypes and norms = .23, p < 0.01; slopes of prototypes and norms = .22, p < .05; intercept of prototypes and slope of norms = −.10, *ns*; the slope of prototype and intercept of norm = . 03, *ns*). Also not shown are the paths between the intercepts and slopes for each latent construct (intentions = −.00, *ns*; prototypes = −.28, *ns*; subjective norms = −.26, p < .01). Paths from grade at T1 to the intercepts and slopes of all latent constructs were retained in the model, regardless of significance, but only the significant paths are shown in Figure 1.

Grade at T1 (i.e., age) was negatively related to the intercept of intentions and prototypes (older children had lower initial levels of intentions and less favorable initial levels of social images of smokers), but grade was positively related to the slope of prototypes and the intercept of subjective norms (older children developed increasingly favorable social images of smokers, and beliefs that more of their peers smoked). Hostility was positively related to the intercept and slope of subjective norms: children who were more hostile had higher initial levels of subjective norms and increasing beliefs in the level of peer smoking. However, multiple-sample analysis revealed that the path between hostility and the intercept of norms was significant for boys, B = .20, t = 3.33, p < .001, but not girls, B = .01, t = .15, *ns*. This was the only gender

difference revealed by multiple-sample analysis. Sociability was not related to any of the latent constructs. The slope of prototypes predicted the slope of intentions: that is, children who increased their favorable images of smokers over time were more likely increase their intentions to smoke. The intercept of subjective norms predicted the intercept of intentions, and the slope of subjective norms predicted the slope of intentions. That is, children with higher initial levels of subjective norms about smoking were more likely to have higher initial levels of smoking intentions, and those who increased their subjective norms over time were more likely to also increase their intentions to smoke.

Test for Mediation of the Effect of Hostility on Intentions

Models 1 and 2 indicated two potentially mediated effects of hostility on intentions: (1) for boys only, hostility was related to the intercept of intentions via the intercept of subjective norms, and (2) for boys and girls, hostility was related to the slope of intentions via the slope of subjective norms. To demonstrate mediation, the direct path from the predictor (i.e., hostility) to the outcome (i.e., intercept or slope of intention) must become non-significant (or be significantly reduced) when included in the model with the indirect path (Baron & Kenney, 1986). In structural equation modeling, this is tested by demonstrating that the inclusion of the direct path does not improve the fit of the model (Frazier, Tix, & Barron, 2004; Holmbeck, 1997).

To test whether the addition of the direct path for boys' hostility to the intercept of intentions significantly improved the fit, it was added to model 2 and constrained to be zero for girls and unconstrained for boys. In this model, the addition of the direct path for boys did not significantly improve the fit of the model, $\chi^2_{\text{difference}}$ (1, N = 809) = 3.520, *ns*, and the direct path between boys' hostility and the intercept of intentions failed to reach significance, β = .13, t = 1.89, *ns*. The indirect path for boys between hostility and the intercept of intentions via the intercept of subjective norms was significant, Sobel test = 2.464, p = .014 (McKinnon, Warsi, & Dwyer, 1995; Sobel, 1982), Therefore, the effect of boys' hostility on the intercept of intentions was mediated by the intercept of subjective norms.

When the direct path between hostility and the slope of intentions was included in model 2, it remained significant (β = .20, t = 2.455, p < .05), and including this direct path significantly improved the fit of the model, $\chi^2_{\text{difference}}$ (1, N = 809) = 6.177, p < .01. Therefore, the effect of hostility on the slope of intentions was not mediated by the slope of subjective norms. Moreover, the indirect path between hostility and the slope of intentions via the slope of subjective norms was not significant, Sobel test = 1.871, p = .061, indicating that the effect of hostility on the slope of intentions was a direct effect only.

Discussion

Intentions to smoke were significantly related to reports of trying cigarettes 1 – 5 years later, confirming the importance of identifying predictors of children's smoking intentions. This study extended past research on predictors of children's smoking intentions by testing a latent growth model in which the development of prototypes (social images) and subjective norms was related to the development of smoking intentions. The final model indicated that children who increased their favorable social images (prototypes) over time and increased their beliefs regarding the number of their peers who smoke (subjective norms) also developed stronger intentions to smoke in the future. In addition, those with initially higher subjective norms had initially stronger smoking intentions. These findings replicate previous studies showing that susceptible cognitions are related to smoking intentions (e.g., Botvin et al., 1992; Gibbons & Gerrard, 1995; Gibbons et al.,1998; Maher & Rickwood, 1997; Norman & Tedeschi, 1989; Tyas & Pederson, 1998; Simons-Norton, 2002). However, previous studies were conducted primarily with adolescents, whereas this study extends these previous findings by

demonstrating the relation of susceptible cognitions to intentions to smoke among elementary-aged children. This study further extends these findings by demonstrating this association developmentally across time, and by investigating the effects of hostility and sociability on these susceptible cognitions.

Hostility and sociability were expected to be positively associated with intentions to smoke, and we hypothesized that their influence on smoking intentions was mediated by prototypes and norms. Hostility was related to the initial level and the growth of children's intentions to smoke; in addition, the effect of hostility on the initial level of intentions for boys was mediated by initial levels of subjective norms. More hostile boys believed that more of their friends and other children in the neighborhood were smoking, and higher levels of these beliefs were related to higher initial levels of intentions.

An association between hostility and intentions to smoke has been observed in older children and adolescents (e.g., Forgays et al., 1993; Johnson & Gilbert, 1991), and this study adds to previous research by demonstrating this association for younger children studied developmentally over a series of annual assessments. The indirect association between hostility and smoking intentions through subjective norms for boys suggests two possible and non-exclusive mechanisms by which more hostile boys develop increasing intentions to smoke. They may be more likely to be exposed to deviant children who are (or claim to be) smoking and consequently may be more likely to identify with them (Gerrard, Gibbons, Benthin, & Hessling, 1996). Subjective norms influence intentions for those who identify with the normative reference group (Terry & Hogg, 1996), which in this case is perceived to be comprised of smokers. Alternatively, boys who intend to smoke may be more likely to overestimate how many of their peers are smoking (Ross, Greene & House, 1977; Unger et al., 2001; Urberg, Shyu & Liang, 1990). In future studies, it would be valuable to assess these two aspects of normative beliefs separately.

In another OYSUP study, Hampson et al. (2006) observed the same indirect path for boys from hostility to initial levels of intentions to drink alcohol through initial levels of subjective norms. Together, these studies indicate the mechanisms by which hostility increases boys' cognitive susceptibility to develop intentions to use cigarettes and alcohol are similar (both involve subjective norms). However, the findings for sociability differed across the two studies. Sociability has not been consistently associated with intentions to use substances. In the present study, sociability was not linearly related to cognitive susceptibility to smoking. The bimodal association was also not significant. Previously with OYSUP, we found that sociability predicted growth in intentions to use alcohol (Hampson et al., 2006) but tobacco use may be perceived as more deviant than alcohol use. The difference between personality predictors of intentions to smoke versus intentions to use alcohol demonstrates the importance of investigating the etiology of substance separately for different substances.

A limitation on the interpretation of the findings from this study is that the latent growth models examined here demonstrate associations among developing variables but the direction of causal influence cannot be assumed. Thus the observed growth in prototypes and norms could be either the cause or the result of the growth in intentions, or developmental changes in all three constructs could be due to some third variable. Similarly, the direction of causal influences in the mediated path from hostility and intentions is theoretically consistent but not definitively established by these analyses. Methodological limitations include the measurement of sociability with items that emphasized social competence at the expense of the sensation-seeking element of sociability, which is associated with greater risk taking include substance use (Zuckerman, 1994). This limitation may explain why the relatively socially desirable form of sociability assessed here did not predict smoking intentions whereas is did predict alcohol intentions in our previous study.

In this study, as in previous research, children's intentions predicted subsequent experimentation with smoking. Interventions to change intentions result in changes in subsequent behavior (Webb & Sheeran, 2006), so it is important to identify potentially modifiable factors involved in the development of smoking intentions, and to identify children more at risk of developing susceptible cognitions. The findings from this study have implications for interventions for young children to prevent or delay smoking initiation. This study indicates that prevention programs for children in the early elementary years should aim to make children's social images of smokers more unfavorable (Gerrard, Gibbons, Brody, Murry, & Wills, in press), and more hostile boys will benefit from interventions to change peer-based descriptive norms. Recent research has found that adults who were more hostile demonstrated more brain metabolic responsiveness to nicotine than those who were low on hostility (Fallon, Keator, Mbogori, Turner, & Potkin, 2004). The association between hostility and intentions to smoke was observed here among children who had not tried smoking. However, once smoking is initiated, the greater susceptibility to nicotine of more hostile individuals would serve to strengthen the association between hostility and smoking, which is another reason why it is important to intervene early to prevent such children, and boys in particular, from developing susceptible cognitions that lead to smoking initiation.

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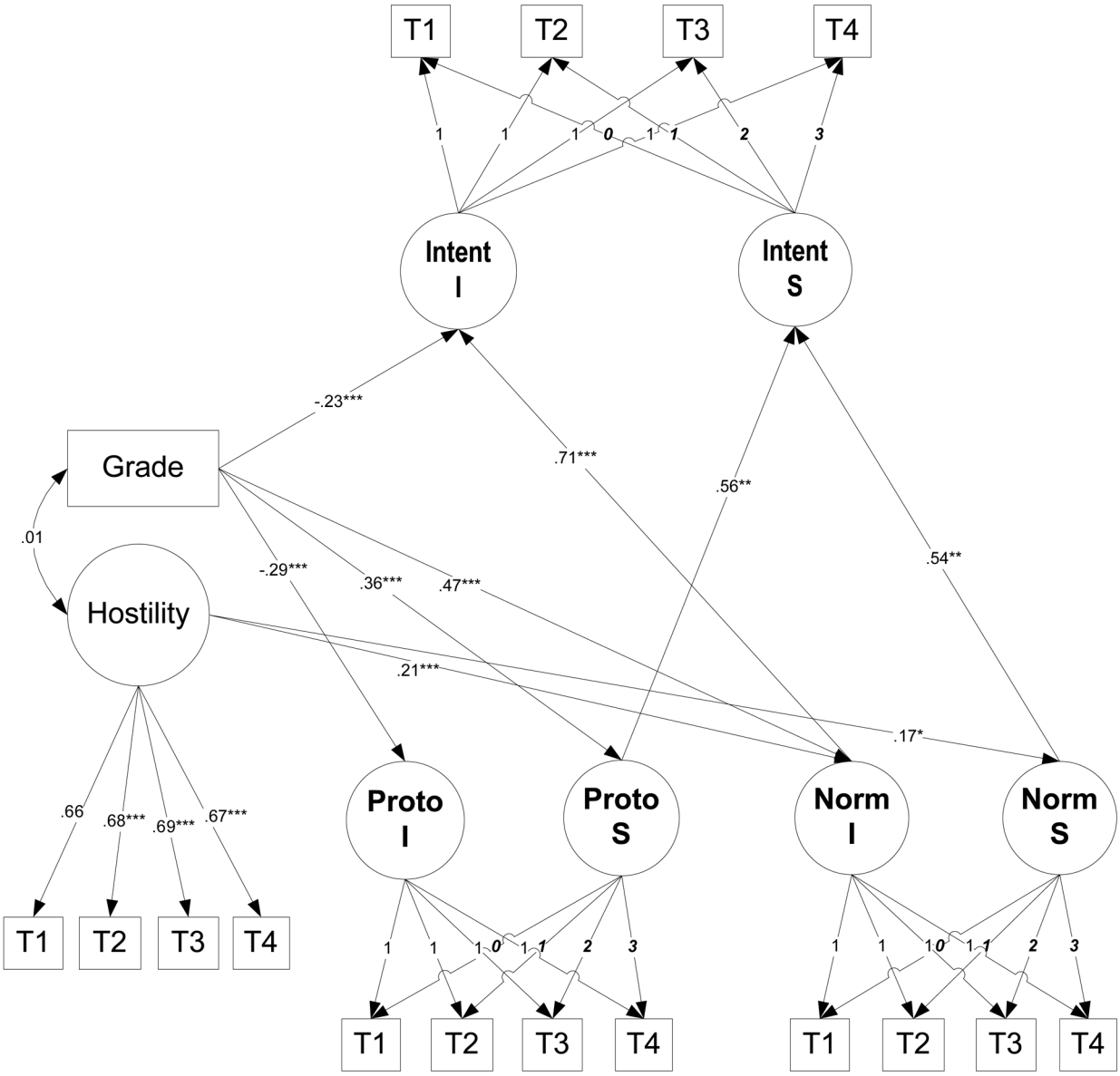

Figure 1. Latent growth model of intentions to smoke

Standardized estimates are shown (* $p = <.05$, ** $p = < .01$, *** $p = < .001$). Intent = intentions, Proto = prototypes, Norm = subjective norms, I = intercept, S = slope.

Table 1

Means and Standard Deviations of Susceptible Cognitions for Boys and Girls at Each Time of Assessment

	Boys						Girls					
	Prototypes		Subjective Norms		Intentions		Prototypes		Subjective Norms		Intentions	
Assessment	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
T1	.38	.84	.39	.59	.24	.59	.37	.66	.33	.53	.15	.46
T2	.33	.70	.41	.59	.20	.50	.40	.71	.40	.60	.17	.51
T3	.47	.97	.61	.68	.25	.62	.44	.76	.61	.68	.21	.58
T4	.48	.98	.64	.69	.23	.58	.52	.92	.73	.72	.24	.65
All Times	.42	.54	.52	.47	.24	.44	.43	.49	.51	.47	.19	.39