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Time-varying effects of family smoking and family management on adolescent daily smoking: The moderating roles of behavioral disinhibition and anxiety

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ABSTRACT

Background: Family smoking environment and family management are associated with risk of teen smoking behaviors. However, less is known about whether these associations increase or decrease in strength across adolescence, and whether there are person-environment interactions. The current study examined 1) the age-varying main effects of family smoking and family management on adolescent daily smoking from ages 12–18 and tested 2) whether behavioral disinhibition and anxiety moderated these relationships.

Methods: Data were drawn from the Seattle Social Development Project (SSDP; N = 808), a longitudinal study examining prosocial and antisocial behavior. Analyses used time-varying effect modeling (TVEM), which tested the stability of the relationship between family smoking and family management and youth daily smoking across adolescence.

Results: Greater family smoking increased the likelihood of adolescent daily smoking, whereas greater family management reduced the likelihood of daily smoking. Significant interactions between family management and youth behavioral disinhibition and anxiety during early and mid-adolescence indicated that family management was more protective for adolescents with low (compared to high) behavioral disinhibition and anxiety. The effect of family smoking was not moderated by behavioral disinhibition or anxiety.

Conclusions: Family smoking and family management are key risk and protective factors that may be targeted for adolescent smoking prevention. Our interaction results for individual differences in behavioral disinhibition and anxiety suggest that certain types of youth may respond differently to family management practices. Findings also show periods during adolescence where family-centered preventive interventions could be optimally timed to prevent or reduce persistent adolescent smoking.

1. Introduction

Significant gains have been made in adolescent tobacco smoking prevention in the United States. The 2014 Surgeon General's Report (SGR) highlighted generally positive changes in smoking behaviors, most notably the steady decline of adolescent cigarette smoking over the past several decades. Although adolescent tobacco smoking rates are at an all-time low, a subset of teens continues to use cigarettes regularly (e.g., daily smokers) despite prevention efforts (Johnston et al., 2018; SGR, 2014). Adolescent daily smoking, rather than experimental or occasional smoking, is more strongly linked to poorer public health consequences, nicotine dependence, and higher risk of continued smoking into adulthood (Hu et al., 2006; Mayhew et al., 2000). Moreover, research shows that 87% of adult current smokers began smoking prior to the age of 18 (SGR, 2014), suggesting that those adolescents who do not initiate regular smoking before age 18 are unlikely to use tobacco as adults. In addition to the likely benefit of delaying smoking onset, previous research has identified family influences and individual characteristics that affect teen smoking behavior. The current study investigated how known risk and protective factors in

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the family environment (i.e., family smoking and family management; Avenevoli and Merikangas, 2003; Chassin et al., 2016; Hiemstra et al., 2017), predict risk of daily smoking across adolescence, and whether these family predictors may work differently for certain types of adolescents.

1.1. Family influences on smoking across adolescence

The Social Development Model (Catalano and Hawkins, 1996), social learning theories (Bandura, 1978), and social cognitive models (Ajzen, 1991) posit that family behavior and attitudes toward substance use, including smoking, affect the risk for adolescent smoking behaviors. Research supporting these theories shows that the family environment (family smoking and parenting) plays a substantial role in the initiation, use, and persistence of adolescent smoking (Chassin et al., 2016; Hiemstra et al., 2017). Several studies have found that parental smoking (Hill et al., 2005; Selya et al., 2012), sibling smoking (Bricker et al., 2007; Leonardi-Bee et al., 2011), permissive parental norms, attitudes, or rules toward child smoking (Andersen et al., 2004), and child involvement in parent tobacco use (e.g., getting or lighting cigarettes; Bailey et al., 2018) are important risk factors for adolescent smoking. Conversely, other research shows the protective value of effective family management practices (i.e., parental monitoring, consistent discipline, family rules, praise for good behavior) for decreasing the risk of teen smoking and other substance use (Chassin et al., 2005; Dick et al., 2007; Hawkins et al., 1992; Hill et al., 2005).

Though there is considerable evidence that both family smoking and family management practices affect teen smoking, fewer studies have examined whether these family influences a) affect the risk for adolescent daily smoking, rather than the more frequently studied outcome of smoking initiation, and b) may have age-varying associations with daily smoking across adolescence. Parenting and other family environment characteristics are a primary socialization context that affect child smoking behaviors throughout adolescence (Bricker et al., 2007; Hawkins et al., 1992; Hill et al., 2005), yet there may be periods during adolescence when the effects of family smoking and family management on daily smoking are stronger or weaker. Many existing adolescent smoking studies tend to examine the effects of family influences on smoking averaged over adolescence or at a specific age during development (e.g., Chassin et al., 2005; Dick et al., 2007; O'Loughlin et al., 2009). Thus, there is limited information on whether there are sensitive periods when family influences on daily smoking may be most salient, which has implications for optimal timing of family-based smoking intervention opportunities.

To address this gap in the teen daily smoking literature, advances in longitudinal data analysis methods allow examination of dynamic associations between predictors and outcomes over time. Several recent studies have investigated age-varying associations in adolescent smoking behaviors, nicotine dependence, and broader substance use (e.g., Epstein et al., 2017; Lanza and Vasilenko, 2015; Lydon-Staley and Geier, 2018; Selya et al., 2016). However, none of these studies have examined how family influences affect risk of daily smoking. We used time-varying effect modeling (TVEM; Tan et al., 2012) to ask innovative research questions about how family risk (family smoking) and protective (family management) factors affect the risk of daily smoking across adolescence, and whether associations are moderated by individual difference characteristics.

1.2. Individual differences and family influences on adolescent smoking

Context-dependent theories focused on explaining individual differences in developmental outcomes guide our conceptual model for examining person-environment interactions. In the current study, family influences on adolescent smoking behavior may vary for adolescents with certain characteristics. According to differential susceptibility theories of development, outcomes may differ based on individual variation in one's sensitivity and adaptations to environmental contexts (Belsky and Pluess, 2009, 2013; Boyce and Ellis, 2005; Ellis et al., 2011). Individuals may be more susceptible to both positive and negative environmental contexts, and variations in susceptibility may change over the course of development (Ellis et al., 2011). In particular, youth with higher levels of behavioral disinhibition (i.e., impulsivity, sensation seeking, and lack of constraint) and anxiety may differ in their responses to environmental risks for smoking, and this may change across adolescence (DiFranza et al., 2004; Hu et al., 2006; Iacono et al., 2008).

Our decision to examine behavioral disinhibition and anxiety as individual differences is motivated by Gray's (1975) theory of complementary motivational systems, based on neurological functioning. Environmental effects may operate differently for youth with higher levels of the behavioral activation system (BAS, responsible for the experience of positive feelings and reward, and regulates desire-related motivation) or the behavioral inhibition system (BIS, an aversive motivational system that promotes feelings of anxiety and avoidance behavior; Carver and White, 1994; Gray, 1987). The BAS, which may be operationalized as behavioral disinhibition, has been associated with earlier smoking onset, more frequent smoking, and longer durations of use (Bloom et al., 2014; Elkins et al., 2006). The BIS, or anxiety, may be another driver in youth smoking, as adolescents with higher anxiety may be more likely to initiate smoking and progress to daily smoking or nicotine dependence by self-medicating to reduce negative affect (Carver and White, 1994; McKenzie et al., 2010). Thus, known family risk factors often targeted by prevention efforts may work differently across adolescence for adolescents who are impulsive or who experience internalizing mental health problems.

Despite the strong theoretical frameworks of differential susceptibility theories and Gray's motivational systems, little is known about how behavioral disinhibition or anxiety may moderate family influences on smoking behavior. Several empirical studies demonstrate *direct* associations between adolescent behavioral disinhibition and anxiety and smoking, yet few have examined potential person-environment interactions to determine whether individuals with high or low disinhibition and anxiety may be differentially sensitive or responsive to family smoking and family management environments. Among the limited number of studies that have examined how parental knowledge, family management, and other family characteristics may interact with behavioral disinhibition and anxiety to predict substance use (e.g., Epstein et al., 2017; Hill et al., 2010; Rioux et al., 2018; Stice and Gonzales, 1998), findings are inconsistent and warrant further investigation across adolescence.

1.3. Aims of the current study

To address gaps in current knowledge, this study examines variability in family influences on daily smoking across adolescence and tests whether family influences on daily smoking work the same for different adolescents. We used TVEM to 1) examine stability in the association (main effects) between family predictors (family smoking, family management) and risk of adolescent daily smoking; and 2) test whether behavioral disinhibition and anxiety moderate the relationship between family predictors and adolescent daily smoking.

2. Methods

2.1. Participants and procedure

Study participants were drawn from The Seattle Social Development Project (SSDP), a longitudinal study examining prosocial and antisocial development. In 1985, 808 fifth grade students were recruited from 18 elementary schools serving high-crime neighborhoods in Seattle, Washington. Annual interviews were conducted with participants from ages 10–16 and at age 18, and questionnaire data from parents were

also collected annually at youth ages 10–16. The sample is gender balanced (49% females) and racially diverse, including 47% White, 26% Black, 22% Asian, and 5% Native American participants. Fifty-two percent of the sample was eligible for free or reduced-price lunch in grades 5, 6, or 7. Annual participant retention rates averaged 89% from ages 10-18. For more information on the original study see Hawkins et al. (2007).

2.2. Measures

2.2.1. *Adolescent Daily Smoking.* At ages 12–18, adolescents self-reported their past month frequency of smoking. Reporting no smoking at all or smoking less than one cigarette per day was coded as (0) and smoking at least one cigarette or more per day was coded as (1).

2.2.2. *Family Smoking Environment* was measured as an index of four family smoking characteristics and was based on measures used in previous studies (Bailey et al., 2014, 2011). Because parent report of family smoking environment was not available for the full range of outcome ages, family smoking at ages 10–12 was treated as a time-fixed measure. An indicator of parent tobacco use was created with parent reports of two items measuring how often the interviewed parent and his/her partner smoke cigarettes in the past month, never/occasionally smokes (0) or smokes less than a pack a day to more than a pack a day (1). Sibling tobacco use was measured with one youth-reported item of whether any of their brothers or sisters have smoked cigarettes in the past year, no (0) or yes (1). Parent/family tobacco norms was assessed with two parent-reported items of perceived harm from smoking and child use of cigarettes. Items indicating acceptance of parent/family smoking were coded as no or low acceptance (0) or high acceptance (1). Child involvement in parents' tobacco use (age 12 only) was assessed using parent reports of their child ever getting or lighting cigarettes for them, coded as no (0) or yes (1). The family smoking environment measure was created by combining the mean standardized scores from the four indicators.

2.2.3. *Family Management* was measured with youth reports during ages 11-18. Family management was included as a time-varying predictor lagged behind daily smoking by 1-year to ensure temporal order. For example, age 11 family management was used to predict age 12 daily smoking, etc. The scale included five items related to parental knowledge of child's whereabouts, family rules and discussions, parental praise for school achievements, and positive parenting (Bailey et al., 2018; Epstein et al., 2017; Hill et al., 2010). Item responses were on a 4-point scale (NO!, no, yes, YES!). A mean score from these five items was calculated at each grade (reliability across adolescence = .70).

2.2.4. *Behavioral Disinhibition* was measured with five items reflecting disinhibited behaviors such as going to wild, uninhibited parties, doing what feels good regardless of consequences, and doing risky or dangerous things (Epstein et al., 2013; Hill et al., 2010). Item responses ranged from never (1) to once a week or more (6). Items were based on youth self-reports, and a mean score was calculated across ages 14–18 (reliability across adolescence = .77) given that behavioral disinhibition is considered to be a relatively stable individual characteristic (Iacono et al., 2008; McGue et al., 1999). The measure was centered before entering in the interaction equation.

2.2.5. *Anxiety* was measured with youth self-reports of three items drawn from the Child Behavior Checklist (Achenbach et al., 2001; Lengua et al., 2001). Items were: I worry a lot, I am nervous or tense, and I am too fearful or anxious. Responses ranged from not true (1) to often true (3), and items were measured at ages 14–16 (reliability across adolescence = .72). A total mean score for anxiety was calculated across the three grades and standardized to represent trait anxiety (Hill et al., 2010). The mean score was then used to compute standardized interaction terms for family smoking and family management.

2.2.6. *Control Variables.* In all analyses, gender, race/ethnicity, and childhood socioeconomic status (SES) were included as time-fixed covariates. Gender was self-reported as female (0) or male (1). Race was dummy coded to create four groups: White, Black, Asian, and Native American, with White as the reference group. The indicator of low childhood SES was based on parent reports of whether the child participant was eligible for free or reduced-price lunch in grades 5, 6, or 7. Participants who were eligible in any of these grades were coded (1), and those who never qualified for free or reduced-price lunch were coded (0).

2.3. Data analysis

We used SAS Studio 3.8 for TVEM, which is an extension of spline regression that flexibly estimates continuous effects between predictors and outcomes as a function of age (Tan et al., 2012). The TVEM method tested the stability of the relationship between family influences and adolescent daily smoking across continuous time (from ages 12–18), and whether the strength of the associations varied between levels of behavioral disinhibition and anxiety. For further details on TVEM, see Tan et al. (2012) and http://www.methdology.psu.edu (Li et al., 2017). TVEM uses exact age which was calculated based on child birthdate, resulting in an age distribution between 11.93 and 20.91 years and a total of 3970 child age observations. Due to sparsity in the data at the tail ends of the age frequency distribution, we trimmed the top and bottom 5% of the age observations to improve estimates and confidence intervals (CIs). After trimming, the number of case observations was reduced from 3970 to 3568, and the final age range for all analyses was 12.8 to 18.5 years.

Analyses first tested the time-varying main effects of family smoking, family management, behavioral disinhibition, and anxiety on daily smoking across adolescence. We tested both univariate and multivariate models of family smoking environment and family management to determine whether family management predicted risk of adolescent daily smoking over and above family smoking (see below for further details). Finally, we tested four separate time-varying interaction models of family smoking x behavioral disinhibition, family smoking x anxiety, family management x behavioral disinhibition, and family management x anxiety predicting daily smoking across adolescence. Areas where the 95% CIs of the odds ratio function do not cross 1 indicate a statistically significant association at $p < .05$ for the reported age range(s) of effects.

3. Results

An intercept-only model of daily smoking showed that daily smoking prevalence rates rose steadily across adolescence from 3.6% in grade 7, 4.6% in grade 8, 10.5% in grade 9, 14.3% in grade 10, to 20.5% in grade 12. Time-fixed estimates of sociodemographic covariates on daily smoking are reported in Table 1 of supplemental materials.[1] To summarize results of the time-fixed covariates, in all main effect and interaction models, identifying as Black or Asian (compared to White) and higher childhood SES were associated with lower odds of daily smoking. Adolescent gender was unrelated to daily smoking in the intercept-only model, and females (compared to males) were at greater risk for daily smoking in all other models.

3.1. Age-varying main effects on daily smoking across adolescence

Results indicated that family smoking and family management significantly predicted risk of adolescent daily smoking. As described above in data analysis section 2.3., we tested both univariate and multivariate models of family smoking and family management. Results of univariate and multivariate models were similar, suggesting independent effects of both family smoking and family management on daily smoking. Multivariate results of family management and family smoking were modeled together and are presented in Fig. 1. The possible age range for all main effects was between ages 12.8-18.5. Greater

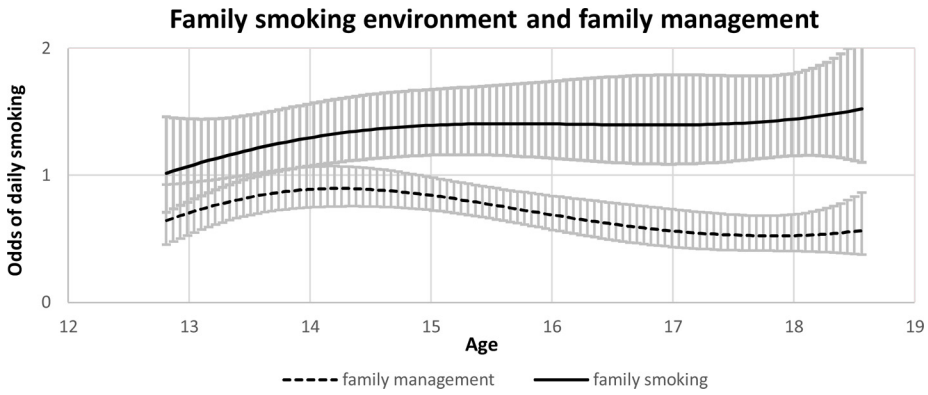

Fig. 1. The multivariate main effects of family smoking (time-fixed at ages 10–12) and time-varying family management (lagged by 1 year) on adolescent daily smoking with 95% confidence intervals.
Note. Ages where the 95% CIs are nonoverlapping with 1 indicate significant effects. The family smoking main effect is significant from ages 13.6-18.5. The family management main effect is significant from ages 12.8–13.4 and from ages 14.9-18.5.

family smoking predicted significantly greater risk of adolescent daily smoking from ages 13.6-18.5. The effect of family smoking increased somewhat over adolescence and significant effects ranged from OR = 1.23 at age 13.6 to OR = 1.52 at age 18.5 (95% CI range = [1.01, 1.50] - [1.10, 2.11]). The protective effect of family management on daily smoking also increased through middle adolescence and then flattened out but was significant from ages 12.8–13.4 and 14.9-18.5. Greater family management significantly predicted lower risk of daily smoking at two age periods. Specifically, the protective effect of family management on daily smoking slightly decreased from OR = .65 at age 12.8 to OR = .82 at age 13.4 (95% CI range = [.453, .927] - [.674, .997]) and then increased from OR = .86 at age 14.9 to OR = .57 at age 18.5 (95% CI range = [.732, .999] - [.373, .862]).

Tests of main effects of the moderator variables indicated that higher behavioral disinhibition predicted greater risk of daily smoking from ages 12.8–18.5, OR = 1.66 at age 12.8 and increasing to OR = 2.06 at age 18.5 (95% CI range = [1.19, 2.32] - [1.36, 3.12]). Similarly, higher anxiety predicted higher risk of daily smoking from ages 15.3–17.9, OR = 1.19 at age 15.3 and slightly increasing to OR = 1.25 at age 17.9 (95% CI range = [1.01, 1.41] - [1.01, 1.55]).

3.2. Age-varying family environment and individual difference interactions

To address research aim 2 of potential moderated effects, we tested interactions between behavioral disinhibition and anxiety and each of the main predictors (family smoking and family management). Like the main effects results above, the possible age range for all interaction effects was between ages 12.8-18.5. Results indicated that the effect of family management (but not family smoking) on adolescent daily smoking differed by levels of behavioral disinhibition and anxiety across adolescence. As shown in Fig. 2, the family management x behavioral disinhibition interaction on daily smoking was significant from ages 12.8–17.1, OR = 1.65 at age 12.8 and slightly decreasing to OR = 1.29 at age 17.1 (95% CI range = [1.22, 2.25] - [1.00, 1.66]). Similarly, Fig. 4 shows that the family management x anxiety interaction was significant from ages 13.5–18, OR = 1.25 at age 13.5 and slightly increasing to OR = 1.28 at age 18 (95% CI range = [1.00, 1.56] - [1.00, 1.64]).

To illustrate the interactions, Figs. 3 and 5 show the simple main effects of family management on youth daily smoking in the top third of the behavioral disinhibition (n = 264) or anxiety (n = 259) distribution compared to youth in the bottom two thirds. Because the simple effect figures are based on separate modeling for low and high levels of behavioral disinhibition and anxiety, rather than the full sample used in interaction plots, CIs are not presented for the stratified sample figures. Family management was protective for both low and high levels of behavioral disinhibition from ages 16.7-18.4. However, family management was more protective for adolescents with low (compared to high) behavioral disinhibition (see Fig. 3) and anxiety (see Fig. 5) across most of adolescence. Further examination of the illustrative simple effects plots indicated that lower behavioral disinhibition and anxiety appear to be driving the protective effects of family management on lower risk of adolescent daily smoking, given the pattern that high behavioral disinhibition and anxiety OR CIs crossed 1 throughout the significant interaction age periods. Lastly, the family smoking x behavioral disinhibition interaction was significant for only two months from ages 12.8–13, OR = .70 at age 12.8 and OR = .75 at age 13 (95% CI range = [.503, .987] - [.561, .996]), whereas the family smoking x anxiety interaction was not significant at any point across adolescence.

4. Discussion

The primary goals of this study were to determine how family smoking and family management predicted risk of daily smoking across adolescence, and the extent to which these relations may be moderated by behavioral disinhibition and anxiety. Family smoking environment was a salient risk factor for adolescent daily smoking across adolescence, regardless of family management and individual differences, suggesting that growing up in a smoking family continues to be a salient and robust risk factor that could be addressed via intervention at any point in adolescence. Family management was a significant protective factor, and its effect increased in middle adolescence. This is an important finding in terms of prevention implications, and suggests that family management strategies like parental monitoring and knowledge, family rules, and positive parenting continue to be effective for lowering the risk of daily smoking across adolescence. These results are consistent with previous research showing that parents still play a pivotal role in reducing smoking and other substance use throughout adolescence and into young adulthood (e.g., Hawkins et al., 1992; Hill et al., 2005; Schulenberg et al., 2014).

Additionally, results indicated that behavioral disinhibition and anxiety were both significant risk factors for daily smoking and moderators of the relationship between family management and daily smoking. Good family management had a greater (protective) effect on the risk of daily smoking for adolescents with *lower* levels of behavioral disinhibition and anxiety. Interaction results were consistent with a previous TVEM analysis using a different longitudinal study (Epstein et al., 2017), which showed that family management was more effective for low behavioral disinhibition youth in predicting marijuana use. Other studies, however, have found that poor family management practices put youth at greater risk for substance use or other problem behaviors for those with high behavioral disinhibition, sensation seeking, or impulsivity (e.g., Chen and Jacobson, 2013; Hill et al., 2010; Rioux et al., 2018).

The notion that consistently low or consistently high family management may have differential impacts on different types of youth should be further explored. For example, it is possible that lower-risk youth (i.e., low disinhibition and anxiety) are easier to parent and manage in supportive family environments than youth with higher levels of externalizing and internalizing problems. Further, higher-risk

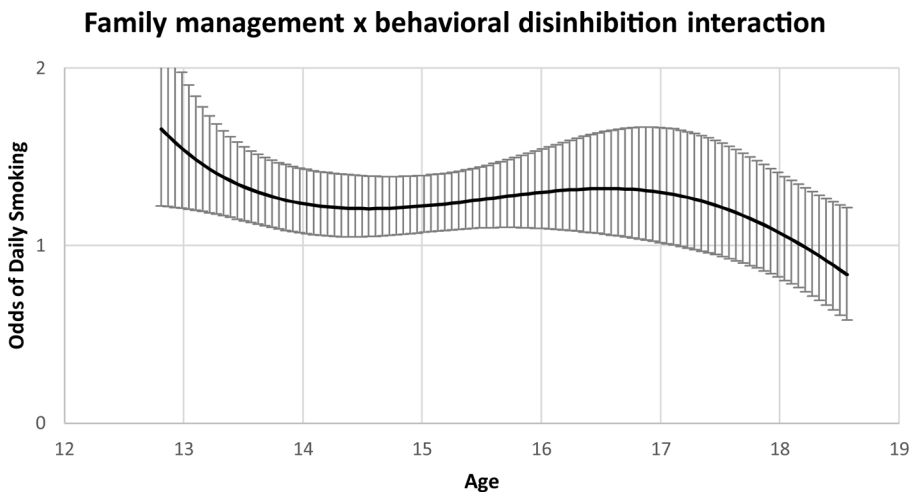

Fig. 2. Time-varying family management x behavioral disinhibition interaction with 95% confidence intervals.
Note. Ages where the 95% CIs are nonoverlapping with 1 indicate significant effects. The family management x behavioral disinhibition interaction is significant from ages 12.8–17.1.

Fig. 3. Simple main effect of family management on daily smoking by low and high levels of behavioral disinhibition.
Note. In an illustration of the simple effects, the area inside the box represents the time span during which the family management x behavioral disinhibition interaction is significant.

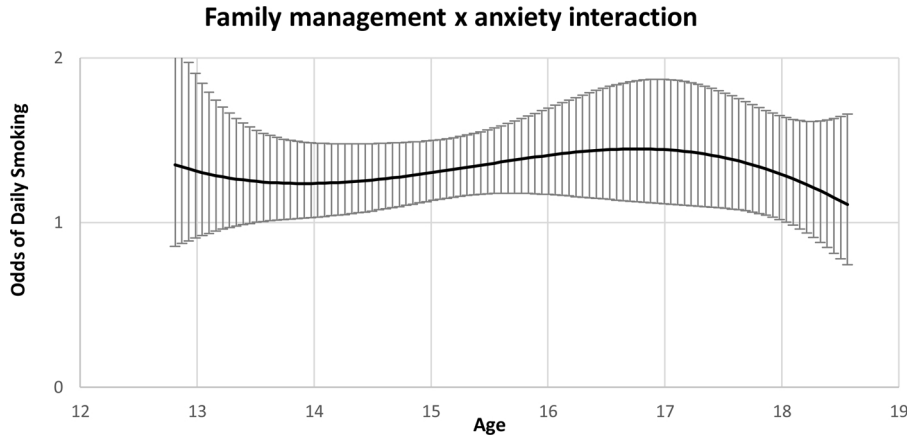

Fig. 4. Time-varying family management x anxiety interaction with 95% confidence intervals.
Note. Ages where the 95% CIs are nonoverlapping with 1 indicate significant effects. The family management x anxiety interaction is significant from ages 13.5–18.

youth may smoke regardless of family management practices and may be reinforced by subjective responses to cigarette smoking, which are driven by neurobiological BAS dopamine reward and impulsivity pathways and BIS serotonin and anxiety pathways (Carver and White, 1994; Moylan et al., 2013). However, it is important to note that although family management was more protective for teens with low behavioral disinhibition and anxiety across a large period of adolescence, family management was protective for all adolescents during the

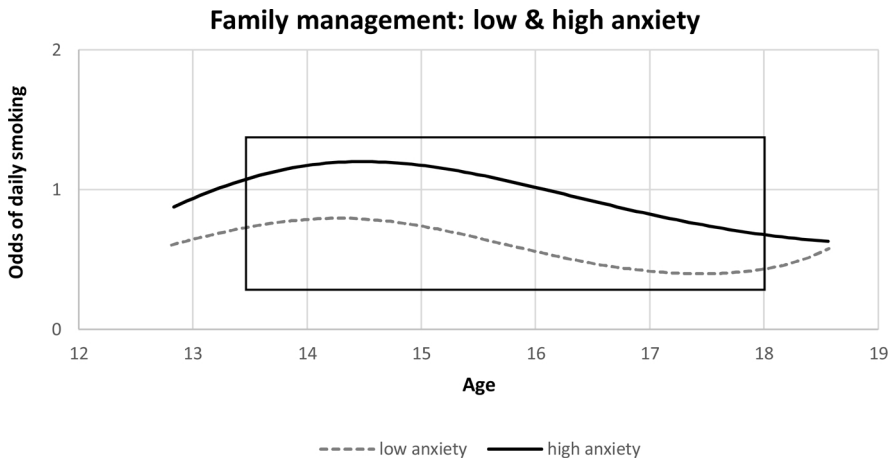

Fig. 5. Simple main effects of family management on daily smoking by low and high levels of anxiety.
Note. In an illustration of the simple effects, the area inside the box represents the time span during which the family management x anxiety interaction is significant.

later high school years.

Limitations should be noted. First, family smoking was not time-varying, though adult daily smokers are generally steady in their smoking behavior across time. Second, like many adolescent smoking studies, our measures of family smoking and daily smoking were self-reported; additional objective measures would strengthen smoking measure reliability (e.g., Bricker et al., 2007). Third, it is possible that youth with higher behavioral disinhibition and higher anxiety drive the familial smoking mechanisms, which, in turn, drive their own daily smoking behavior.

Despite these limitations, this study design has several strengths. The use of TVEM to leverage longitudinal data is an innovative way to explore the stability of risk and protective factor effects across development. We used a large sample with a prospective multi-wave design and lagged effects between family factors and daily smoking across early to middle adolescence. This study contributes to our understanding of family and individual contexts that affect risk of adolescent daily smoking, an important outcome associated with persistent smoking over time, nicotine dependence, and other poor public health consequences (Hu et al., 2006; Mayhew et al., 2000). Additionally, this study adds to the growing literature seeking to understand how person characteristics and the family environment interact over the course of development. Future research should test mediated associations (e.g., positive smoking expectancies, behavior modeling, neurobiological processes through secondhand smoke exposure) and directionality of effects (Lydon et al., 2014; O'Loughlin et al., 2009). Lastly, it is well known that peers greatly influence smoking behaviors and other substance use during adolescence (e.g., O'Loughlin et al., 2009; Van Ryzin et al., 2012). More research is needed to examine the age-varying effects and person-environment interactions among peer influences and daily smoking.

4.1. Conclusions

This study found age-varying associations between family environments (family smoking and family management), individual characteristics (behavioral disinhibition and anxiety), and risk of adolescent daily smoking. Results showing main effects of family environments over and above their interaction with individual differences speak to the importance of universal intervention. Previous research suggests that even among families who smoke, parents can still reduce the risk of child smoking behaviors and other substance use through effective family management practices (Hill et al., 2005). For example, existing family-based prevention programs using substance-specific parenting practices like antismoking socialization (i.e., parent-child interactions that shape development of children's cognitive and behavioral norms against smoking) show that parents who smoke cigarettes can use effective communication, monitoring, rule-setting, and other parenting strategies to decrease the risk of their child initiating smoking and progressing to daily smoking (Andersen et al., 2004; Jackson and Dickinson, 2006; Thomas et al., 2015). Our study suggests that family-based smoking interventions may further benefit from attending to individual differences (e.g., Conrod et al., 2008) and differential sensitivity to the family environment. For teens with greater behavioral disinhibition and anxiety traits, incorporating individually-tailored interventions within a universal prevention framework may be needed to counter a greater risk of daily smoking in adolescence.

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Contributors

Concepts and design (CMS; ME; KGH; ANKV); final data analyses and interpretation (ME; CMS; KGH); drafting of manuscript (CMS); intellectual contributions, reviewing, and critical editing of manuscript content (CMS; ME; KGH; ANKV; JAB; JOL; RK). All authors have read and approved the final manuscript.

Declaration of Competing Interest

No conflict declared.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.drugalcdep.2019.107572.

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