

Associations between Parental Factors and Longitudinal Patterns of Adolescent Smoking Escalation

BY

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LIST OF ABBREVIATIONS

<i>B</i>	Unstandardized Beta
CI	Confidence Interval
df	Degrees of Freedom
LL	Confidence Interval Lower Limit
<i>M</i>	Mean
<i>n</i>	Number in Subgroup
<i>N</i>	Number in Total Group
<i>ns</i>	Nonsignificant
<i>p</i>	Probability
<i>SD</i>	Standard Deviation
<i>SE</i>	Standard Error
OR	Odds Ratio
<i>t</i>	Gosset's Student Distribution
UL	Confidence Interval Upper Limit
χ^2	Chi-square

SUMMARY

The current project examined the effects of parent smoking, general parenting (monitoring, support), and parental antismoking socialization (reactions, messages) on longitudinal patterns of adolescent smoking. We predicted that antismoking socialization mediates the relationship between parent smoking and adolescent smoking, and that general parenting moderates the relationship between antismoking socialization and adolescent smoking. Participants were 970 adolescents (mean age = 15.6) oversampled at baseline for previous smoking. Parent smoking, monitoring, support, messages, and reactions were assessed at baseline. To determine longitudinal smoking patterns, adolescent smoking was assessed at multiple points through 24 months. Of the 970 adolescents in the sample, 25.3% were nonsmokers, 38.5% were infrequent nonescalating smokers, and 36.2% were escalating smokers. A series of logistic regressions examined our hypotheses for ever-smokers (escalators, nonescalators) versus never-smokers and escalating versus nonescalating smokers. Though we did not find support for the mediational role of antismoking socialization in the relationship between parental smoking and adolescent smoking, there were significant univariate relationships among all of the proposed maternal variables. Tests of moderation confirmed that parental antismoking reactions were more protective against adolescent ever smoking at high levels of parental support than at low levels. Although parental support and antismoking reactions protected against adolescent smoking escalation, parenting style did not interact with these factors. Notably, antismoking messages were not related to adolescent ever smoking or smoking escalation. Our findings suggest that while parental support, antismoking reactions, and monitoring are protective against adolescent smoking, the effects may vary based on parental and adolescent smoking status.

I. INTRODUCTION

A. Background

Although the prevalence of cigarette smoking in the United States has decreased over the past 15 years, tobacco still accounts for 443,000 deaths each year in the United States, and 96 billion dollars each year in healthcare (Centers for Disease Control [CDC], 2008). In 2009, 20.6% of adults in the United States smoked cigarettes (CDC, 2010), and most of them had begun smoking by age 18 (Lynch & Bonnie, 1994). Recent data from the 2010 Monitoring the Future Study show that 42.2% of all high school seniors have at least tried a cigarette (Johnston, O'Malley, Bachman, & Schulenberg, 2011). Though a large percentage of high school age adolescents try cigarette smoking, fewer are likely to escalate. In a sample of 5,520 adolescents involved in a school-based tobacco prevention program, Bricker et al. (2006), found that of the adolescents who tried smoking, 40% escalated to monthly smoking and only 28% of those adolescents eventually became daily smokers. Understanding factors that predict which adolescents escalate in their tobacco use compared to those who do not progress beyond initial trials has important intervention implications for curbing smoking rates. This study will examine the role of familial risk and protective factors in predicting smoking escalation among adolescents.

B. Parental Smoking

Familial influences have the potential to be both risk and protective factors in adolescent smoking (Darling & Cumsille, 2003; Turner, Mermelstein, & Flay, 2004; United States Department of Health and Human Services [USDHHS], 1994). Familial influences on

adolescent smoking include both genetic and environmental factors. In a meta-analysis of twin studies, Li et al. (2003) estimated heritability for smoking initiation to be 50% and 59% for smoking persistence. In addition to genetic liabilities, living with a parent who smokes or has a history of smoking increases the likelihood of adolescent smoking (Chassin, Presson, Rose, & Sherman, 1998; Chassin, Presson, Sherman, & Edwards, 1990; Kodl & Mermelstein, 2004). Modeling of parental smoking habits can begin as early as preschool (Dalton et al., 2005). Kodl and Mermelstein (2004) found that children who had at least one parent smoker were twice as likely as those who had nonsmoking parents to experiment with cigarettes and 2.5 times more likely to escalate beyond experimentation. There is also evidence that parental smoking habits may affect adolescent smoking escalation at the transition from initiation to monthly smoking and from monthly smoking to daily smoking, suggesting that parental smoking habits have far reaching effects (Bricker et al., 2006; Flay et al., 1994).

C. General Parenting and Adolescent Smoking

Beyond genetics and parental smoking status, parenting style may affect adolescent smoking outcomes as well. General parenting practices refer to a consistent style of interacting with family members that permeates multiple domains of family life such as communication style, emotional openness and support, monitoring, and disciplinary tactics. A high level of positive general parenting, defined by appropriate adolescent monitoring and supportive behaviors, has been associated with decreased adolescent smoking risk (Chassin et al., 1998; Harakeh, Scholte, Vermulst, de Vries, & Engels, 2010; Melby, Conger, Conger, & Lorenz, 1993). Likewise, low levels of positive general parenting, defined by unsupportive, lax, or harsh parenting behaviors, have been associated with increased risk for adolescent smoking (Chassin,

Presson, Montello, Sherman, & McGrew, 1986; Melby et al., 1993). Melby et al., (1993) found that nurturing parenting practices were negatively associated with adolescent smoking, and that harsh discipline was positively associated with adolescent smoking. Notably, these effects remained significant after controlling for parental smoking status. Chassin et al. (1998) discovered a strong negative relationship between consistent discipline and adolescent smoking. Doherty and Allen (1994) found an interaction between parental smoking status and the quality of the parent-adolescent relationship, a factor related to general parenting style; risk for adolescent smoking was significantly greater for adolescents who had poor relationships with their smoking parents compared to those who had good relationships with their smoking parents.

Despite strong evidence in favor of a positive relationship between supportive parenting and lowered risk of adolescent smoking, Andrews, Hops, and Duncan (1997) found evidence for a negative relationship. Andrews et al. (1997) found that adolescents modeled their substance use after their parents' substance use if they had a strong relationship. Thus, adolescents with positive perceptions of their parents were more likely to follow their parents' behavior, even if it was modeling substance use.

D. Antismoking Socialization and Adolescent Smoking

In addition to examining the relationship between general parenting and adolescent smoking, researchers have investigated how parental antismoking socialization may affect adolescent smoking outcomes. Antismoking socialization refers to smoking-specific communications and parenting, such as rules, discipline, reactions, and feelings regarding smoking. Findings on the effects of smoking-specific parenting on adolescent smoking are mixed. Chassin et al. (1998) found that smoking-specific discussions between parents and

adolescents were associated with a decreased likelihood of adolescent smoking. Similarly, a series of studies by Jackson and Henricksen found that the presence of smoking specific communications in the form of punishment and the expectation of negative consequences were negatively associated with adolescent smoking regardless of parental smoking status (Henricksen & Jackson, 1998; Jackson & Henricksen, 1997). There is evidence that no-smoking rules in the house were also negatively associated with adolescent smoking (Hansen, Graham, Sobel, Shelton, Flay, & Johnson, 1987; Henricksen & Jackson, 1998; Kandel & Wu, 1995). In contrast, other studies have not found a relationship between parental antismoking socialization and adolescent smoking (Ennett, Bauman, Foshee, Pemberton, & Hicks, 2001; Kodl & Mermelstein, 2004), or found that smoking-specific parenting was associated with greater likelihood to smoke (Harakeh et al., 2010). Another study found that the effects of smoking-specific parenting varied as a function of adolescent smoking, such that smoking-specific parenting predicted continued nonsmoking behavior in adolescents who had never smoked but predicted smoking escalation in adolescents who had tried smoking (Andrews, Hops, Ary, Tildesley, & Harris, 1993). In these cases, smoking-specific parenting may be a response to the adolescents' behavior.

E. Combined Effects of General Parenting, Smoking-specific Parenting, and Parental Smoking Status on Adolescent Smoking

To fully understand how parental factors influence adolescent smoking, it is important to examine how general parenting, smoking-specific parenting, and parent smoking status interact. Like smoking-specific parenting, the literature on these combined effects is mixed. One hypothesis postulates that general parenting behaviors moderate the effect of smoking-specific parenting on adolescent tobacco use (Chassin et al., 2005). Both Gusec and Goodnow (1994)

and Chassin et al. (2005) have suggested that adolescents are more likely to accept parental messages and rules if they have a positive and respectful relationship with their parents. Applied to cigarette use and parenting practices, this hypothesis predicts that successful adolescent antismoking socialization depends on the message being communicated (smoking-specific) as well as adolescent perceptions of the parent-adolescent relationship. For example, if the adolescent has a close, respectful relationship with the parent, he or she will be more likely to adhere to the specific rules or warnings the parent espouses (Harakeh et al., 2010).

F. Mediating Effects of Antismoking Socialization in the Relationship between Parental Smoking and Adolescent Smoking

Antismoking socialization may also mediate the relationship between parental smoking status and adolescent smoking outcomes. In addition to finding that parent smoking leads to increased rates of adolescent smoking and that smoking-specific punishment leads to decreased rates of adolescent smoking, Chassin et al. (1998) found that maternal smoking was associated with decreased rates of smoking-specific punishment. In a similar study, Harakeh et al. (2010) found that parents who smoke were less likely to have open discussions regarding smoking with their adolescents, which in turn, lead to greater likelihood of adolescent smoking. To this point, Flay et al. (1994) found evidence for the indirect effects of parental smoking on smoking initiation and escalation by influencing adolescent smoking attitudes and beliefs. The findings of Kodl and Mermelstein (2004) suggest that this indirect effect may be due to deficits in antismoking socialization self-efficacy and weak antismoking beliefs and emotional reactions to child smoking.

Researchers have also considered the possibility that smoking specific parenting behaviors mediate the relationship between general parenting and adolescent tobacco use and that antismoking socialization does not account for any additional variance in adolescent smoking outcomes. Both Chassin et al. (2005) and Harakeh et al. (2010) tested this model and found that although general and smoking-specific parenting are moderately correlated, antismoking socialization contributes effects in predicting adolescent smoking outcomes above and beyond those of general parenting. These researchers concluded that it is unlikely that smoking-specific parenting is simply a situational manifestation of general parenting practices.

G. Complicating Issues in the Current Literature

Some of the mixed findings of the combined role of parental smoking status, general and smoking-specific parenting practices in predicting adolescent smoking may be the result of methodological differences between studies. For example, findings may differ based on the use of parent or adolescent perceptions of parent variables in explanatory models. Though adolescent perceptions of parenting have been more predictive of adolescent substance use than parent perceptions, researchers have found value in both perspectives (Barnes & Farrell, 1992; Chassin et al., 2005, Jenn-Yun, Roosa, & Michaels, 1994). Ennett, Bauman, Foshee et al. (2001) did not find a relationship between parental antismoking socialization and adolescent smoking using parent self-report, but when a portion of the data was analyzed from the perspective of the adolescent, researchers found a negative relationship between parental antismoking socialization and adolescent smoking (Ennett, Bauman, Pemberton et al., 2001).

An additional complicating factor arises from differences in cross-sectional and longitudinal studies. Examining a cross-sectional relationship between adolescent smoking and

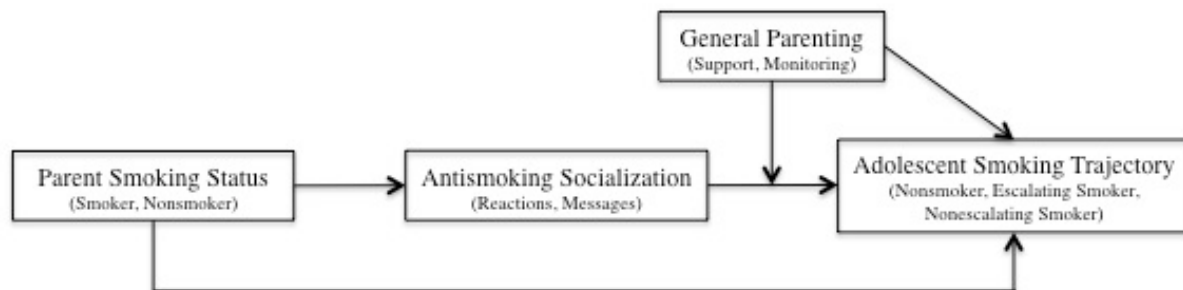
antismoking socialization, Chassin et al. (1998) found a negative correlation such that adolescents whose parents punished them for smoking were less likely to smoke. Unlike Chassin et al. (1998), Ennett, Bauman, Pemberton et al. (2001) used a longitudinal design to discover a positive relationship between parental antismoking socialization and adolescent smoking, such that the more parents communicated negative views and consequences of smoking, the more likely adolescents were to smoke. After finding a similar result, Harakeh et al. (2010) postulated that the inverse relationship between quantity of smoking-specific discussions and adolescent smoking may be a reflection of adolescent rebellion against psychologically controlling parents: the more a parent pushes his or her smoking policies, the more likely the adolescent is to smoke.

H. Hypotheses

Building on the influential work of both Chassin and colleagues and Harakeh and colleagues, the present study sought to replicate prior findings regarding the relationship between parental smoking, antismoking socialization, general parenting, and adolescent smoking, and to extend these investigations by examining these risk factors among a sample of adolescents at-risk for continued smoking based on prior smoking experience and intentions. More specifically, the present study examined whether and how these parenting factors affect longitudinal patterns of smoking over a two year period: nonsmokers, low level, intermittent and nonescalating smokers, and escalating smokers. Our hypotheses are as follows: (1) Parents who smoke will be more likely to have children who have ever smoked versus never smoked. Among adolescent smokers, parental smoking will increase the likelihood of adolescent smoking escalation versus nonescalation. (2) Parents who smoke will engage in weaker antismoking socialization

(messages and reactions) than parents who do not smoke. (3) Antismoking socialization will be positively associated with low levels of adolescent smoking (never smoking; nonescalating smoking). (4) The relationship between parental smoking status and adolescent smoking will be mediated by antismoking socialization, such that parent smoking will be associated with decreased levels of antismoking socialization which in turn will be related to increased levels of adolescent smoking (ever smoking; escalating smoking). (5) In terms of general parenting practices, high levels of parental support and monitoring will be associated with lower levels of adolescent smoking. (6) The relationship between parental antismoking socialization and adolescent smoking will be moderated by general parenting practices, such that high levels of positive general parenting will further protect against adolescent ever smoking and smoking escalation when combined with strong antismoking socialization techniques. Conversely, low levels of positive general parenting will nullify the protective effects of antismoking socialization against adolescent ever smoking and smoking escalation. See Figure 1 for a detailed diagram of the proposed model.

Figure 1. Antismoking Socialization Mediates the Relationship between Parental Smoking Status and Adolescent Smoking, which is Moderated by General Parenting Practices.



II. METHOD

A. Overview

Data for this study come from a large longitudinal study investigating the social and emotional contexts of adolescent smoking patterns. The cornerstone of the longitudinal study was the establishment of a cohort of adolescents comprised primarily of youth who had ever smoked.

B. Participants

Participants were recruited from 16 Chicago-area high schools. The sample was derived in a multi-stage process. All 9th and 10th graders at the schools (N = 12,970) completed a brief screening survey of smoking behavior. Invitations were mailed to eligible students and their parents. Students were eligible to participate in the longitudinal study if they fell into one of four levels of smoking experience: 1) never-smokers; 2) former experimenters (smoked at least one cigarette in the past, have not smoked in the last 90 days, and have smoked fewer than 100 cigarettes in their lifetime); 3) current experimenters (smoked in the past 90 days, but smoked less than 100 cigarettes in lifetime); and 4) regular smokers (smoked in the past 30 days and have smoked more than 100 cigarettes in their lifetime).

Recruitment packets were mailed to 3,654 eligible students and their parents. These recruitment targets included all youth in the “current experimenter” and “regular smoker” categories plus random samples from the “never-smoker” and “former experimenter” categories. Youth were enrolled into the longitudinal study after written parental consent and student assent was obtained. It is important to note that all youth and parents had to agree to potentially

participate in all components of the main larger, program project study including multiple, longitudinal questionnaire assessments, an ecological momentary assessment study, a family observation study, and a psychophysiological laboratory assessment study. Of the 3,654 students invited, 1,344 agreed to participate (36.8%). Of these, 1,263 (94.0%) completed the baseline measurement wave. The baseline sample of 1,263 youth included 213 never-smokers, 304 “former experimenters,” 594 “current experimenters,” and 152 “regular smokers.” These 1263 adolescents had a mean age of 15.6 years (range 13.9-17.5 years), and 56.5% were female. Their racial/ethnic distribution was 56.5% white, 17.2% Hispanic, 16.9% black, 4.0% Asian, and 5.5% “other”.

C. Measures

1. Participant demographics

Participants reported their gender, age, and ethnicity (White, African American, American Indian/Alaska Native, Asian/Pacific Islander, Hispanic, Other).

2. Parent smoking status

Participants reported the smoking status (smoker, nonsmoker) of their parental figures.

3. General parenting practices (support and monitoring)

Participant perceptions of their parents’ style of child-rearing were assessed with a modified version of a scale developed by Brody and colleagues (2001, 2004). Participants rated each parental figure on items that measure their level of warmth, involvement, inductive reasoning, and monitoring. Scale items were assessed on a 4-point scale: (1) never; (2) sometimes; (3) often; (4) always.

We created a measure of parental support by averaging the scores of the warmth, involvement, and inductive reasoning subscales. The warmth subscale measured parental interest in understanding the adolescent's feelings/lives. The involvement subscale measured parental investment in the adolescent's life and wellbeing. The inductive reasoning subscale measured how well the parent explained the reasoning behind his or her parenting decisions to the adolescent. Higher scores indicate greater perceived parental warmth, involvement, and inductive reasoning (coefficient alpha: mom = 0.85, dad = 0.87). Parental support was measured separately for mothers and fathers and then averaged together to yield a composite score which was used in analysis.

Parental monitoring was assessed using the monitoring subscale, which measured how well the parent was informed of the adolescent's behavior and whereabouts. Higher scores indicate greater perceived parental monitoring (coefficient alpha: mom = 0.81, dad = 0.86). Parental monitoring was assessed separately for mothers and fathers and then averaged together to yield a composite parental score, which was used in analysis.

4. Antismoking socialization (messages and reactions)

Antismoking socialization was assessed using adolescent report of parent reactions to smoking and antismoking messages communicated. Antismoking socialization measures were not assessed separately for mothers and fathers.

Parental reactions to adolescent smoking were measured using a scale based on Chassin, et al. (1998) and Kodl and Mermelstein (2004) (coefficient alpha: 0.70). Participants rated parents on items designed to measure parent reactions to adolescent smoking in terms of consequences, emotions, and communication strategy to prevent or limit smoking. Each item was assessed on a 5-point scale: (1) yes, definitely; (2) probably; (3) maybe; (4) probably not; (5)

no way. Items were reverse scored and then averaged so that higher scores indicate that adolescents perceived their parents were more likely to react in the ways described.

Parental antismoking messages were assessed in terms of frequency. These measures were derived from scales used by Henricksen and Jackson (1998) and Kodl and Mermelstein (2004). Items were assessed using the following 3-point scale: (1) never; (2) once or twice; (3) several times, and then averaged to create an overall measure of message frequency (coefficient $\alpha = 0.83$). Higher scores indicate that adolescents reported receiving frequent explicit parental antismoking messages.

5. Participant smoking pattern

The outcome variable was participant smoking pattern from baseline through the 24-months. Using participant data collected in time-line follow-back measurements, a continuous smoking calendar, which began six months prior to the baseline questionnaire and ended 24 months after baseline assessment, was created. Participants who had never smoked formed their own a priori group of nonsmokers. Growth Mixture Models (GMMs; Muthén, 2004) was used, as implemented in Mplus, to identify the form and number of latent smoking trajectory classes based on participant smoking rate (cigarettes/day). A 4-class model was chosen as it fit the data best in terms of the Bayesian information criterion (BIC), and its trajectories were substantively meaningful. For the current study's analyses, these 4 groups were collapsed into two: 1) a group of infrequent, low-level and nonescalating smokers ($N = 373$; 38.1%); and 2) a group of low-level infrequent smokers who escalated over time ($N = 351$; 36.2%). In addition, we retained the a priori defined group of nonsmokers ($N = 246$; 25.4%).

III. ANALYTIC PLAN AND RESULTS

A. Overview of Analysis

We analyzed our model in two parts: a series of moderated logistic regressions and a separate series of mediational regressions. However, before beginning the multivariate portion of analysis, we examined our sample's baseline characteristics and the univariate relationships between parent smoking status, adolescent smoking status, general parenting style, and antismoking socialization.

B. Included Cases Versus Excluded Cases

For inclusion in the current study's analyses, participants needed to have complete data for all adolescent and parenting variables of interest, resulting in total sample of 970. Included and excluded cases did not differ by adolescent gender, age, or smoking outcome groups. Parental smoking status also did not differ between included and excluded cases. However, ethnic composition of the included cases did vary slightly from the composition of the excluded cases ($\chi^2 = 77.60$, $df = 5$, $p < .00$). Specifically, African Americans were more likely to be excluded (31.7% of excluded cases versus 12.5% of included cases), and Caucasians were more likely to be included (61.8% of included cases versus 38.9% of excluded cases).

Based on adolescent report, parenting factors varied slightly between included and excluded participants. Adolescents included in the analysis reported greater parental monitoring ($M = 2.66$, $SD = 0.70$) than did excluded adolescents ($M = 2.56$, $SD = 0.73$), $t(1257) = -2.00$, $p < .05$). Adolescent report of parental reactions, messages, and support did not vary significantly between included and excluded participants.

C. Baseline Characteristics

Slightly over half of the 970 included adolescents were female ($n = 552$, 56.9%) and the average age was 15.6 years old. Ethnic composition of the analyzed sample included 1 (0.1%) American Indian, 43 (4.4%) Asians, 121 (12.5%) African Americans, 161 (16.6%) Hispanics, 599 (61.8%) Caucasians, and 45 (4.6%) individuals with other or unknown ethnic backgrounds.

As reported by the adolescents, 393 (41.5%) had at least one parent who was a current smoker: 214 (22.1%) reported that their mother was a current smoker; 309 (31.6%) reported that their father was a current smoker; and 130 (13.4%) reported that both parents were current smokers.

The means and standard deviations for each parenting variable (reactions, messages, support, monitoring) are presented in Table 1. Table 2 presents the correlations among parental antismoking socialization and general parenting variables; each of the parenting variables was positively related to one another.

A series of t-tests revealed that parents who smoke compared to those who do not smoke do not differ on either of the parenting style variables (support, monitoring). This lack of difference between smoking and nonsmoking parents was true for both parents (see Table 3).

TABLE I

MEANS AND STANDARD DEVIATIONS OF EACH PARENTING VARIABLE (N = 970)

	<i>M</i>	<i>SD</i>
Reactions	3.34	0.76
Messages	2.25	0.54
Support	2.68	0.57
Monitoring	2.66	0.70

TABLE II

CORRELATIONS BETWEEN PARENTING VARIABLES (N = 970)

	Reactions	Messages	Support	Monitoring
Reactions	1	0.32*	0.14*	0.26*
Messages	0.32*	1	0.37*	0.27*
Support	0.14*	0.37*	1	0.59*
Monitoring	0.26*	0.27*	0.59*	1

* $p < .000$.

TABLE III

RESULTS OF T-TESTS COMPARING GENERAL PARENTING (SUPPORT;
MONITORING) AMONG SMOKING AND NONSMOKING PARENTS (N = 970)

Mothers					
Parenting Variable	Smokers <i>N</i> = 214		Nonsmokers <i>N</i> = 756		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Support	2.65	0.55	2.69	0.58	$t(968) = 0.91, ns$
Monitoring	2.65	0.68	2.66	0.70	$t(968) = 0.22, ns$

Fathers					
Parenting Variable	Smokers <i>N</i> = 309		Nonsmokers <i>N</i> = 661		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Support	2.63	0.58	2.70	0.56	$t(968) = 1.78, ns$
Monitoring	2.64	0.73	2.67	0.68	$t(968) = 0.59, ns$

D. Parental Smoking Status and Adolescent Smoking

We predicted that parental smoking would increase the likelihood of adolescent ever smoking versus never smoking, and escalating smoking versus nonescalating smoking. To examine this relationship, we conducted a series of chi-square analyses. As expected, mothers who smoke were more likely to have adolescents who had ever smoked ($\chi^2 = 11.16$, $df = 1$, $p < .00$); 83.6% of mothers who smoke had an adolescent who had ever smoked compared to 72.1% of nonsmoking mothers. We did not find a relationship between paternal smoking and adolescent ever smoking versus never smoking ($\chi^2 = 0.59$, $df = 1$, ns); 76.4% of fathers who smoke had an adolescent who had ever smoked compared to 73.8% of nonsmoking fathers.

We also predicted that among adolescent ever-smokers (escalators and nonescalators), having a parent who smokes increases the likelihood that the adolescent will be an escalating smoker versus a nonescalating smoker. Results confirmed that both paternal and maternal smoking increases the likelihood of adolescent smoking escalation versus nonescalation among adolescent ever-smokers (mothers: $\chi^2 = 14.02$, $df = 1$, $p < .00$; fathers: $\chi^2 = 13.41$, $df = 1$, $p < .00$). 60.9% of smoking mothers had adolescent smoking escalators compared to 44.4% of nonsmoking mothers. Similarly, 58.5% of smoking fathers had adolescent smoking escalators compared to 43.6% of nonsmoking fathers.

E. Parent Smoking Status and Antismoking Socialization

We predicted that adolescent perceptions of antismoking socialization would vary according to parental smoking status, such that adolescents whose parents smoke would report experiencing weaker antismoking socialization (reactions and messages) than adolescents whose parents who do not smoke. To test this prediction, we compared levels of antismoking reactions and messages of mothers/fathers who smoke to those of mothers/fathers who do not smoke. The results of a series of t-tests are presented in Table 4. Analyses confirmed that adolescent perceptions of maternal and paternal antismoking reactions vary as a function of parental smoking status, such that adolescents whose parents smoke report experiencing weaker antismoking reactions than adolescents whose parents do not smoke. Interestingly, results indicated that mothers who smoke deliver more frequent antismoking messages than mothers who don't smoke. Contrary to predictions, there was no relationship between paternal smoking status and antismoking messages.

TABLE IV

RESULTS OF T-TESTS ANTISMOKING SOCIALIZATION (REACTIONS; MESSAGES)
AMONG SMOKING AND NONSMOKING PARENTS (N = 970)

Mothers					
Parenting Variable	Smokers <i>N</i> = 214		Nonsmokers <i>N</i> = 756		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Reactions	3.19	0.83	3.38	0.73	$t(312.83) = 2.98^*$
Messages	2.33	0.48	2.23	0.56	$t(388.84) = -2.61^*$

Fathers					
Parenting Variable	Smokers <i>N</i> = 309		Nonsmokers <i>N</i> = 661		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Reactions	3.21	0.77	3.39	0.75	$t(968) = 3.44^*$
Messages	2.27	0.53	2.24	0.55	$t(968) = -0.80, ns$

F. Parental Antismoking Socialization and Adolescent Smoking Outcomes

In order to examine our prediction that high levels of parental antismoking socialization would be associated with lower levels of adolescent smoking, we compared levels of parental antismoking reactions and messages among adolescent ever-smokers and never-smokers, and then among adolescent escalating smokers and nonescalating smokers via separate logistic regressions.

Our analysis indicated that high levels of parental antismoking reactions decreased the likelihood of adolescent ever smoking versus never smoking, $B = -0.54$, $SE = 0.11$, $p < .00$; OR = 0.58, 95% CI = 0.47, 0.72. However, parental messages were not related to adolescent ever smoking versus never smoking, $B = -0.10$, $SE = 0.14$, *ns*.

When comparing adolescent escalating smokers and nonescalating smokers, results indicated that high levels of parental antismoking reactions decreased the likelihood of adolescent smoking escalation versus nonescalation, $B = -0.25$, $SE = 0.10$, $p < .05$; OR = 0.78, 95% CI = 0.64, 0.95. Similar to the results of the comparison between adolescent ever-smokers and never-smokers, parental antismoking messages were not related to adolescent smoking escalation versus nonescalation, $B = -0.03$, $SE = 0.14$, *ns*. The means and standard deviations of antismoking reactions and messages are presented for each adolescent smoking trajectory comparison in Table 5.

TABLE V

MEANS AND STANDARD DEVIATIONS OF ANTISMOKING REACTIONS AND MESSAGES FOR EACH ADOLESCENT SMOKING TRAJECTORY COMPARISON (N = 970)

Parenting Variable	Ever-smokers <i>N</i> = 724		Never-smokers <i>N</i> = 246	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Reactions	3.26	0.75	3.55	0.73
Messages	2.24	0.55	2.27	0.54

Parenting Variable	Escalating Smokers <i>N</i> = 351		Nonescalating Smokers <i>N</i> = 373	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Reactions	3.19	0.75	3.33	0.75
Messages	2.24	0.54	2.25	0.56

G. Testing the Effects of Mediation

We hypothesized that antismoking socialization (reactions, messages) would mediate the relationship between parental smoking status (mother: smoker/nonsmoker; father: smoker/nonsmoker) and adolescent smoking outcome (ever-smoker/never-smoker; escalating smoker/nonescalating smoker), such that parent smoking would be associated with decreased levels of antismoking socialization which would in turn be associated with increased levels of adolescent smoking.

To test this hypothesis for antismoking parental reactions, we used the Baron and Kenny (1986) analytic method to find and compare path coefficients of the proposed model through a series of regressions. Because we had already determined that antismoking parental messages were not significantly related to adolescent smoking outcomes, it was precluded from further mediational analysis. Similarly, previous analysis indicated that paternal smoking status was not related to adolescent ever smoking versus never smoking, so this particular model was also excluded from mediational analysis. For the remaining viable models, we repeated the path analyses for each outcome comparison (ever-smoker/never-smoker; escalating smoker/nonescalating smoker), and for each parent (mother: smoker/nonsmoker; father: smoker/nonsmoker), resulting in 3 sets of analyses. We also controlled for the effects of adolescent age and gender. Finally, we used a Sobel test of significance to determine if antismoking parental reactions significantly reduced the relationship of parental smoking status to the adolescent smoking outcome (Sobel, 1982).

1. Ever-smokers versus never-smokers

Consistent with findings reported above, current maternal smoking predicted an increased likelihood in adolescent smoking as well as weakened smoking-specific reactions (see Table 6). Smoking-specific reactions were inversely related to adolescent smoking. However, after controlling for smoking-specific reactions, the association between maternal smoking status and adolescent ever smoking versus never smoking was not significantly reduced according to the Sobel test, $Z_{\text{Sobel}} = 1.85$, $SE = 0.03$, *ns*. Consequently, antismoking reactions did not mediate the relationship between maternal smoking status and adolescent smoking.

TABLE VI

ODDS RATIOS AND COEFFICIENTS FROM THE MEDIATIONAL LOGISTIC REGRESSION ANALYSIS OF ADOLESCENT EVER SMOKING (1) VERSUS NEVER SMOKING (0) AS A FUNCTION OF MATERNAL SMOKING AND ANTISMOKING REACTIONS (N = 970)

Predictor	<i>B</i>	<i>SE</i>	<i>OR</i>	95% C.I.	
				<i>LL</i>	<i>UL</i>
Adolescent Age	0.25*	0.12	1.28	1.01	1.63
Adolescent Gender	0.17	0.15	1.19	0.88	1.60
Paternal Smoking Status	-0.10	0.17	0.90	0.64	1.27
Maternal Smoking Status	0.65**	0.22	1.91	1.26	2.91
Parental Reactions	-0.53***	0.11	0.59	0.48	0.73

Note: Maternal/Paternal smoking status coded: 0 = nonsmoker, 1 = smoker.

Adolescent Gender coded: 0 = female, 1 = male.

* $p < .05$.

** $p < .00$.

*** $p < .000$

2. Escalating smokers versus nonescalating smokers

Despite significant univariate relationships among variables in the escalating smoker versus nonescalating smoker mediation model, we did not find support for our proposed mediator when all the variables were entered into the model. As reported above, maternal and paternal smoking predicted an increased likelihood in adolescent smoking escalation (mother: $B = 0.53$, $SE = 0.19$, $p < .05$; OR = 1.69, 95% CI = 1.17, 2.45; father: $B = 0.46$, $SE = 0.17$, $p < .05$; OR = 1.58, 95% CI = 1.13, 2.22). Surprisingly, results indicated that neither parent's smoking predicted likelihood to engage in antismoking reactions (mother: $B = -0.08$, $SE = 0.07$, ns ; father: $B = -0.08$, $SE = 0.06$, ns). Smoking-specific reactions were inversely related to adolescent smoking escalation, $B = -0.25$, $SE = 0.10$, $p < .05$; OR = 0.78, 95% CI = 0.64, 0.96. Because of the nonsignificant relationship between parental smoking status and likelihood to engage in antismoking reactions, neither the maternal nor paternal model met criteria for mediation (Baron and Kenny, 1986).

H. General Parenting Style and Adolescent Smoking

We hypothesized that high levels of positive general parenting (support, monitoring) would be associated with low levels of adolescent smoking. To examine this prediction, we again conducted logistic regressions comparing adolescent ever-smokers and never-smokers and adolescent escalating smokers and nonescalating smokers.

Analysis confirmed that high levels of parental support decreased the likelihood of adolescent ever smoking versus never smoking, $B = -0.41$, $SE = 0.13$, $p < .00$; OR = 0.67, 95% CI = 0.51, 0.86. Similarly, high levels of parental monitoring decreased the likelihood of

adolescent ever smoking versus never smoking, $B = -0.79$, $SE = 0.11$, $p < .00$; OR = 0.46, 95% CI = 0.37, 0.57.

When comparing adolescent escalating smokers and nonescalating smokers, analysis indicated that parental support decreased the likelihood of adolescent smoking escalation, $B = -0.45$, $SE = 0.14$, $p < .00$; OR = 0.64, 95% CI = 0.49, 0.83. Similarly, high levels of parental monitoring decreased the likelihood of adolescent smoking escalation versus nonescalation, $B = -0.27$, $SE = 0.11$, $p < .05$; OR = 0.76, 95% CI = 0.61, 0.95. The means and standard deviations of parental support and monitoring are presented for each adolescent smoking trajectory comparison in Table 7.

TABLE VII

MEANS AND STANDARD DEVIATIONS OF PARENTAL SUPPORT AND MONITORING FOR EACH ADOLESCENT SMOKING TRAJECTORY COMPARISON (N = 970)

Parenting Variable	Ever-smokers <i>N</i> = 724		Never-smokers <i>N</i> = 246	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Support	2.65	0.56	2.78	0.59
Monitoring	2.57	0.68	2.93	0.68

Parenting Variable	Escalating Smokers <i>N</i> = 351		Nonescalating Smokers <i>N</i> = 373	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Support	2.57	0.55	2.72	0.56
Monitoring	2.50	0.68	2.63	0.67

I. Testing the Effects of Moderation

We hypothesized that general parenting would moderate the relationship between parental antismoking socialization and adolescent smoking, such that at high levels of positive general parenting, antismoking socialization would further protect against adolescent ever smoking and smoking escalation. Conversely, we predicted that low levels of general parenting would nullify the protective effects of parental antismoking socialization. To test these hypotheses, we conducted two moderated logistic regressions to examine whether parental antismoking socialization (reactions, messages), general parenting style (support, monitoring), and the interaction between these parenting variables predicted adolescent smoking trajectory among ever-smokers and never-smokers and among varying levels of smokers (escalating and nonescalating). Each parenting variable (messages, reactions, support, monitoring) was centered before creating general parenting style by antismoking socialization interactions (messages x support, messages x monitoring, reactions x support, reactions x monitoring). To fully interpret significant 2-way interactions, we compared high and low levels of the appropriate parenting variables via a chi-square analysis based on a median split. Only significant interactions are presented and discussed.

1. Ever-smokers versus never-smokers

Results of the logistic regression predicting adolescent ever smoking versus never smoking are presented in Table 8. Among the covariates, only adolescent age significantly predicted adolescent ever smoking. Additionally, main effects were observed for maternal smoking status, parental monitoring, and parental antismoking reactions in the predicted directions. There were also 2 significant 2-way interactions between parental reactions and support and parental messages and support. To fully interpret the interactions, we compared high and low levels of antismoking socialization (reactions, messages) at high and low levels of parental support based on a median split.

TABLE VIII

STANDARDIZED ODDS RATIOS AND COEFFICIENTS FROM THE LOGISTIC REGRESSION PREDICTING ADOLESCENT LIKELIHOOD TO EVER SMOKE (1) VERSUS NEVER SMOKE (0) AS A FUNCTION OF SMOKING-SPECIFIC AND NONSPECIFIC PARENTING STRATEGIES (N = 970)

Effect	<i>B</i>	<i>SE</i>	<i>OR</i>	95% C.I.	
				<i>LL</i>	<i>UL</i>
Age	0.17*	0.08	1.18	1.01	1.38
Gender (male)	0.09	0.16	1.09	0.80	1.50
Mom Smoking Status (smoker)	0.72**	0.22	2.04	1.32	3.17
Dad Smoking Status (smoker)	-0.11	0.18	0.90	0.63	1.28
Support	0.17	0.10	1.19	0.97	1.46
Monitoring	-0.59**	0.10	0.56	0.45	0.68
Messages	0.16	0.09	1.17	0.98	1.39
Reactions	-0.33**	0.09	0.72	0.60	0.86
Reactions x Support	-0.39**	0.09	0.68	0.57	0.80
Messages x Support	0.27**	0.09	1.31	1.11	1.54

Note: Maternal and paternal smoking status coded: 0 = nonsmoker, 1 = smoker.

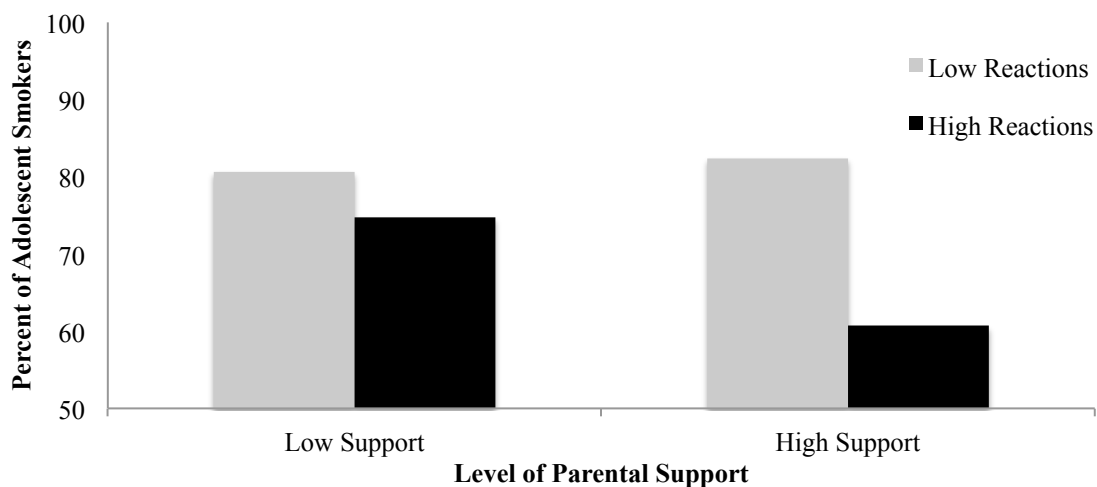
Gender coded: 0 = female, 1 = male.

* $p < .05$.

** $p < .00$

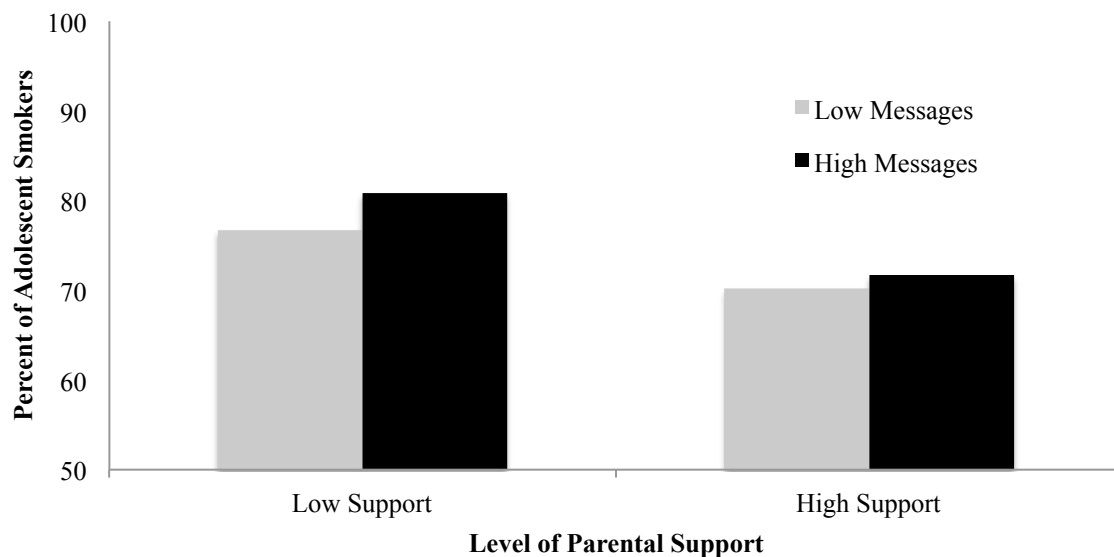
Results of the chi-square examining the interaction between antismoking reactions and support confirmed that there were significant group differences ($\chi^2 = 38.55$, $df = 3$, $p < .00$). As illustrated in Figure 2, fewer adolescents who reported strong parental antismoking reactions and high levels of support were ever-smokers (60.7%) compared to those who reported weak parental reactions and high levels of support (82.4%; $\chi^2 = 26.69$, $df = 1$, $p < .00$). However, there was no difference between adolescent ever and never-smokers based on reported rates of parental antismoking reactions at low levels of support (high reactions: 80.6% ever-smokers; low reactions: 74.8% ever-smokers; $\chi^2 = 2.07$, $df = 1$, ns).

Figure 2. Percent of Adolescent Ever-Smokers based On Median Split Analysis of Parental Antismoking Reactions and Support.



Follow-up chi-square analysis indicated a marginally significant difference between adolescent ever and never-smokers based on reported rates of antismoking parental messages across levels of parental support ($\chi^2 = 7.41$, $df = 3$, $p = .06$). However, further analysis failed to identify significant group differences (high support: $\chi^2 = 0.06$, $df = 1$, ns : high messages: 71.7% ever-smokers; low messages: 70.2% ever-smokers; low support: $\chi^2 = 0.86$, $df = 1$, ns : high messages: 80.8% ever-smokers; low messages: 76.7% ever-smokers). This comparison is presented in Figure 3.

Figure 3. Percent of Adolescent Ever-Smokers based on Median Split Analysis of Parental Antismoking Messages and Support.



2. Escalating smokers versus nonescalating smokers

Results of the logistic regression predicting adolescent escalating versus nonescalating smoking habits are presented in Table 9. Unlike the model examining ever-smokers versus never-smokers, being male increased the risk of adolescent smoking escalation. There was no relationship between adolescent age and smoking escalation. As predicted, parental smoking status was associated with adolescent smoking status, such that parent smokers were more likely to have adolescents who escalated in their smoking. Also consistent with our hypotheses, parental support and parental reactions significantly reduced the likelihood of adolescent smoking escalation. We did not find support for our hypotheses of moderation, as there were no significant interactions among parenting predictors.

TABLE IX

STANDARDIZED ODDS RATIOS AND COEFFICIENTS FROM THE LOGISTIC REGRESSION PREDICTING ADOLESCENT LIKELIHOOD TO BECOME AN ESCALATOR (1) VERSUS A NONESCALATOR (0) AS A FUNCTION OF SMOKING-SPECIFIC AND NONSPECIFIC PARENTING STRATEGIES (N = 970)

Effect	<i>B</i>	<i>SE</i>	<i>OR</i>	95% C.I.	
				<i>LL</i>	<i>UL</i>
Age	0.15	0.08	1.16	0.99	1.35
Gender (male)	0.47**	0.16	1.59	1.17	2.17
Mom Smoking Status (smoker)	0.50*	0.19	1.64	1.12	2.39
Dad Smoking Status (smoker)	0.43*	0.18	1.53	1.09	2.16
Support	-0.29**	0.10	0.75	0.62	0.91
Monitoring	-0.04	0.10	0.96	0.80	1.16
Messages	0.12	0.09	1.13	0.94	1.35
Reactions	-0.21*	0.09	0.81	0.69	0.96

Note: Maternal and paternal smoking status coded: 0 = nonsmoker, 1 = smoker.
Gender coded: 0 = female, 1 = male.

* $p < .05$.

** $p < .00$.

IV. DISCUSSION

Parental smoking status and general parenting style have consistently been related to adolescent smoking behavior (Chassin et al., 1986, 1998, 1990; Harakeh et al., 2010; Kodl & Mermelstein, 2004; Melby et al., 1993). However, it is less clear how these factors interact with antismoking socialization to influence adolescent smoking. The present study investigated the unique and combined effects of parental factors on longitudinal patterns of adolescent smoking using a large sample of at-risk youth. We predicted that parental smoking status would increase the likelihood of adolescent ever smoking and smoking escalation, while antismoking socialization and positive general parenting style would protect against smoking. Additionally, we predicted that general parenting style would moderate the relationship between antismoking socialization and adolescent smoking trajectory and that antismoking socialization would mediate the effects of parental smoking status on adolescent smoking outcome.

A. Parental Smoking Status and Adolescent Smoking

Congruent with the current literature, our results indicated that mothers who smoked were approximately twice as likely as nonsmoking mothers have to an adolescent ever-smoker. This finding was also significant after controlling for other covariates and predictors, indicating that maternal smoking is uniquely associated with adolescent ever-smoking. By contrast, paternal smoking did not predict adolescent ever smoking. The lack of association between paternal smoking and adolescent smoking is well documented (Harakeh et al., 2010; Kandel & Wu, 1995). Avenevoli and Merikangas (2003) suggest that the differential effects of maternal and paternal smoking status on adolescent smoking may be due to the fact adolescents tend to spend more time with their mothers than their fathers. This imbalance provides adolescents with a

greater opportunity to observe and model maternal smoking behavior than paternal smoking behavior.

Among adolescent ever-smokers, having a mother or a father who smokes increased the risk of smoking escalation by about 1.5 times, even after accounting for general parenting and antismoking socialization. This finding is similar to that of Bricker et al. (2006) who found that parental smoking was associated with adolescent smoking transitions of initiation to monthly smoking and then again from monthly smoking to daily smoking. These findings, in conjunction with those of Avenevoli and Merikangas (2003) and the current study suggest that there may be differential effects of paternal smoking on longitudinal patterns of adolescent smoking as a function of whether or not the adolescent has ever tried smoking. More specifically, it is possible that the effects of paternal smoking are only observed once the adolescent has already tried smoking because he or she is more susceptible to the influence of other smoking adult models. Additional research is needed to more fully understand this relationship.

B. Parent Smoking Status and Antismoking Socialization

As we predicted, mothers and fathers who smoke engage in weaker antismoking reactions than those who do not smoke. Interestingly, there was no relationship between paternal smoking status and antismoking message frequency, while maternal smoking status was associated with an increased frequency of antismoking messages. While our findings on antismoking reactions and parental smoking status are in line with the current literature (Kodl & Mermelstein, 2004; Chassin et al., 2005), there is limited evidence demonstrating that maternal smoking is associated with increased frequency of antismoking messages. Notably however, researchers investigating other associations between familial factors and adolescent smoking have observed similar

effects. For example, Andrews et al. (1993) found that antismoking socialization increased the likelihood of adolescent smoking. Similarly, Harakeh et al. (2010), found that antismoking message frequency increased the likelihood of adolescent smoking. While one hypothesis states that this effect may be due to adolescent rebellion, another suggests that it is actually due to the bidirectional relationship between antismoking socialization and adolescent smoking. Given the association between maternal smoking and adolescent ever smoking, it is possible that the observed increased frequency of antismoking messages is actually a maternal reaction to control ongoing adolescent smoking. This reactive effect may be more prevalent among adolescents whose mothers smoke because of the known association between maternal smoking and adolescent smoking. Because the temporal relationship between antismoking message frequency and adolescent smoking was not directly measured, we are not able to confirm the bidirectional hypothesis, and there may be other explanations.

C. Parental Antismoking Socialization and Adolescent Smoking Outcomes

Congruent with Kodl and Mermelstein (2004) and Ennett, Bauman, Pemberton et al. (2001), we found that the frequency of antismoking messages was unrelated to adolescent smoking outcomes. Interestingly, our findings regarding antismoking reactions were more in line with those of Jackson and Henricksen (1997; Henricksen & Jackson, 1998) in that they protected against adolescent ever-smoking and smoking escalation and remained significant after accounting for parental smoking status, general parenting style, adolescent age, and adolescent gender. The differing effects between antismoking message frequency and antismoking reactions may be explained by a finding by Hansen et al. (1987). Hansen et al. (1987) discovered that parental anger towards adolescent smoking was associated with less adolescent

smoking. Applied to the current study, adolescent perceptions of parental reactions and immediate emotional and disciplinary consequences may be a more effective mechanism in preventing adolescent smoking than antismoking messages. Although speculative, it is also possible antismoking reactions are a more salient deterrent for adolescent smoking than conversations about smoking and smoking-specific messages because they are delivered within close temporal proximity to the offending smoking event.

D. Effects of Mediation

Antismoking reactions did not mediate the effects of maternal smoking status on adolescent ever smoking. Because none of the other models were viable due to nonsignificant paths, we did not find support for any of our proposed mediational models. This finding indicates that parental smoking status and antismoking reactions have unique and separate effects on adolescent smoking outcomes. Although antismoking reactions protect against adolescent ever smoking and are related to maternal smoking, the effects of maternal smoking cannot be eliminated by strong antismoking reactions.

E. General Parenting Style and Adolescent Smoking

Consistent with prior investigations (Chassin et al., 1986, 2005; Melby et al., 1993; Harakeh et al., 2010), results indicated that high levels of support and monitoring decreased the likelihood of adolescent ever smoking and smoking escalation. However, these effects differed when other important factors (e.g. antismoking socialization, parental smoking status, adolescent age and gender) were included in the model. For instance, parental monitoring protected against adolescent ever smoking, but did not predict smoking escalation. In contrast, parental support

protected against smoking escalation, but did not significantly protect against adolescent ever smoking. Chassin, Presson, Pitts, and Sherman (2000) found similar results in that parental strictness was not differentially associated with adolescent smoking trajectory, but parental support protected against ever smoking, erratic, and early stable smoking patterns among adolescents. These findings suggest that while both general parenting variables are important, monitoring is more effective in preventing ever smoking while parental support is more effective in protecting against smoking escalation.

F. Testing the Effects of Moderation

1. Ever-smokers versus never-smokers

Our findings indicated that the combined effects of antismoking reactions and parental support further decreased the likelihood of adolescent ever smoking versus never smoking. These results extend the works of previous studies (Jackson and Henricksen, 1997; Henricksen & Jackson, 1998) which found that antismoking socialization mitigates adolescent smoking regardless of parental smoking status. In light of these findings, it appears that adolescents who feel supported by their parents are more likely to respond positively to parental antismoking reactions.

Despite preliminary indications that there was a significant interaction between parental support and antismoking message frequency, this effect appeared more negligible upon follow-up. It is possible that when considered within the context of the full model, there was a small interactive effect between support and antismoking message frequency, but the effect was not robust enough to be reliably detected with follow-up analyses. Further, main effects for parental support and antismoking message frequency were not observed in the full model, also suggesting

that these factors may also not be robust independent predictors of adolescent smoking escalation. Taken together, although extant research and theory suggest that parental support and frequent antismoking messages influence adolescent smoking and smoking escalation, there is limited evidence to support the proposed interactive effect.

2. Escalating smokers versus nonescalating smokers

We did not find evidence that general parenting moderated the effect of antismoking socialization on adolescent smoking escalation, indicating that the additive effects of antismoking socialization and general parenting are limited to the prevention of ever smoking and do not influence smoking escalation. Though speculative, it is possible that current smoking behaviors are more resistant to parental influence than nonsmoking.

G. Implications and Limitations

The current study has several notable strengths. First, it was longitudinal in design and specifically examined the familial factors as they relate to adolescent smoking patterns. The few studies which have examined this relationship (Chassin et al., 2000, 1998, 2005), have used a data from a sample that is over 20 years old and thus, may not be representative of current social norms regarding smoking. Further, while prior samples were relatively homogenous, we recruited an ethnically and economically diverse sample which increases the generalizability of the current findings. These unique features, in addition to the fact that we oversampled for youth at-risk for smoking, may have increased our ability to detect differences where others did not. Additionally, the current study adds clarity to the mixture of findings regarding the importance of parenting factors on adolescent smoking patterns. Our findings clearly suggest that antismoking reactions, but not antismoking message frequency, are protective against adolescent

ever smoking and smoking escalation. As such, parenting interventions may benefit by targeting adolescent smoking reactions and encouraging support and monitoring of daily activities.

Despite the study's strengths, there are also several limitations. First, inclusion in the current study required complete data for both adolescent and parenting variables of interest, thereby excluding adolescents who did not report information on both parents. Additionally, we did not account for the amount of time adolescents spent with their parents, nor did we differentiate between single and co-parent households. It is possible that there may have been key differences in the current findings as a function of these measures given that research has indicated that living in a single parent household is a risk factor for adolescent substance use (Kuntsche & Silbereisen, 2004). Additional research may be necessary to fully understand the impact of single versus co-parent households on adolescent smoking escalation.

An additional limitation of the present study is that we analyzed adolescent reports of study measures, but not parent reports. Although research has shown adolescent reports to be more strongly correlated with adolescent smoking outcomes, they may not be as useful from the standpoint of engineering parenting antismoking interventions (Chassin et al. 2005; Jenn-Yun, Roosa, & Michaels, 1994).

In sum, the current study examined the unique and combined effects of parental smoking status, general parenting, and antismoking socialization on adolescent longitudinal patterns of adolescent smoking. It appears that while antismoking message frequency was not a robust predictor of adolescent ever smoking and smoking escalation, antismoking reactions have protective qualities against adolescent smoking habits. Further, we found that the protective qualities of antismoking reactions were strengthened when delivered from a highly supportive parent. Along those lines, general parenting factors were associated with different adolescent

smoking outcomes such that monitoring protected against adolescent ever smoking while support protected against smoking escalation. Similarly, paternal smoking increased the risk of adolescent smoking escalation, but was unrelated to ever smoking; familial factors may differentially affect adolescent smoking outcomes at different stages in the adolescent smoking trajectory. These findings highlight the importance of identifying current smoking trajectory among adolescents before enlisting an intervention or prevention program. Further, creating targeted intervention or prevention programs engineered specifically to address these factors among these subgroups of adolescents may lead to greater success in mitigating long-term smoking habits.

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APPENDICES

APPENDIX A

General Parenting Practices (support and monitoring); Brody et al. (2001, 2004)

Below you will find questions about how you and your mom/dad get along. We would like to know how often these things occur between you and your mom/dad. Circle the answer (Never, Sometimes, Often, or Always) that best fits how often each question occurs. All answers are completely confidential. For each of the questions below, please answer for each parent separately.

	Never	Some times	Often	Always
a. When you and your mom/dad have a problem, how often can you both figure out how to deal with it?				
Mom	1	2	3	4
Dad	1	2	3	4
b. When you have done something your mom/dad likes or approve of, how often does he/she let you know he/she is pleased about it?				
Mom	1	2	3	4
Dad	1	2	3	4
c. How often do you talk to your mom/dad about things that bother you?				
Mom	1	2	3	4
Dad	1	2	3	4
d. When you don't understand why your mom/dad makes a rule for you to follow, how often does he/she explain the reason?				
Mom	1	2	3	4
Dad	1	2	3	4
e. How often can you do whatever you want without your mom/dad knowing what you are doing?				
Mom	1	2	3	4
Dad	1	2	3	4
f. When your mom/dad asks you to do something and you don't do it right away, how often does he/she give up?				
Mom	1	2	3	4
Dad	1	2	3	4

- g. When you do something wrong and your mom/dad decides on a type of discipline, how often do you get out of it?

Mom	1	2	3	4
Dad	1	2	3	4

- h. When your mom/dad disciplines you, how often does the type of discipline depend on his/her mood?

Mom	1	2	3	4
Dad	1	2	3	4

Please answer the following questions about how you and your mom/dad get along. For each of the questions below, please answer for each parent separately.

How often does your mom or dad:

		Never	Some times	Often	Always
	Mom	1	2	3	4
a. ...give you reasons for his/her decisions?	Dad	1	2	3	4
	Mom	1	2	3	4
b. ...ask you what you think before making a decision that affects you?	Dad	1	2	3	4
	Mom	1	2	3	4
c. ...discipline you by reasoning, explaining, or talking to you?	Dad	1	2	3	4
	Mom	1	2	3	4
d. ...give you a reward when you do something well (get good grades, do your chores)?	Dad	1	2	3	4
	Mom	1	2	3	4
e. ...discipline you for something at one time, and then at other times not discipline you for the same thing?	Dad	1	2	3	4

How often does your mom or dad:

		Never	Some times	Often	Always
f. ...go to special events in your school that you are involved in (like sports, choir, etc.)?	Mom	1	2	3	4
	Dad	1	2	3	4
g. ...go to parent-teacher conferences at your school?	Mom	1	2	3	4
	Dad	1	2	3	4
h. ...talk with you about what is going on in your life?	Mom	1	2	3	4
	Dad	1	2	3	4
i. ...know when you do something really well at school or some place else away from home?	Mom	1	2	3	4
	Dad	1	2	3	4
j. ...know where you are and what you are doing?	Mom	1	2	3	4
	Dad	1	2	3	4
k. ...know what you do after school?	Mom	1	2	3	4
	Dad	1	2	3	4
l. ...know if you do something wrong?	Mom	1	2	3	4
	Dad	1	2	3	4

m. ...know who you are with, when you are away from home?

	1	2	3	4
Mom				
Dad	1	2	3	4

n. ...get so mad at you that he/she throws or breaks things?

	1	2	3	4
Mom				
Dad	1	2	3	4

o. ...criticize you or your ideas?

	1	2	3	4
Mom				
Dad	1	2	3	4

How often does your mom or dad:

p. ...push, grab, hit, or shove you?

	Never	Some times	Often	Always
Mom	1	2	3	4
Dad	1	2	3	4

q. ...lose his/her temper and yell at you when you do something wrong?

	1	2	3	4
Mom				
Dad	1	2	3	4

r. ...argue with you when you disagree about something?

	1	2	3	4
Mom				
Dad	1	2	3	4

s. ...let you know he/she really cares about you?

	1	2	3	4
Mom				
Dad	1	2	3	4

t. ...act supportive and understanding toward you?		1	2	3	4
	Mom				
	Dad	1	2	3	4
u. ...act loving and affectionate toward you?	Mom	1	2	3	4
	Dad	1	2	3	4
v. ...have a good laugh with you about something that is funny?	Mom	1	2	3	4
	Dad	1	2	3	4
w. ...let you know that he/she appreciates you, your ideas or the things you do?	Mom	1	2	3	4
	Dad	1	2	3	4
x. ...understand the way you feel about things?	Mom	1	2	3	4
	Dad	1	2	3	4
y. ...help you do something that is important to you?	Mom	1	2	3	4
	Dad	1	2	3	4

APPENDIX B

Antismoking Reactions; Chassin, et al. (1998) and Kodl and Mermelstein (2004)

If your parent(s) found out that you tried smoking or smoked, would/did they:	Yes, Definitely	Probably	Maybe	Probably not	No way
a. Take away something from you like treats or allowance?.....	1	2	3	4	5
b. Ground you?.....	1	2	3	4	5
c. Act disappointed?	1	2	3	4	5
d. Act less loving?	1	2	3	4	5
e. Act angry?	1	2	3	4	5
f. Take away a privilege, like watching TV?	1	2	3	4	5
g. Talk with you about reasons why you shouldn't smoke?	1	2	3	4	5
h. Talk with you about why you smoked?	1	2	3	4	5
i. Scold you?	1	2	3	4	5
j. Talk about how it makes him or her feel when you smoke?	1	2	3	4	5
k. Try to make you scared about what smoking could do to you?	1	2	3	4	5
l. Try to make you feel guilty, like you let him or her down?	1	2	3	4	5
m. Offer you a reward if you don't smoke again?	1	2	3	4	5
n. Make smoking sound so silly that you don't want to do it again	1	2	3	4	5

APPENDIX C

Antismoking Messages; Henricksen and Jackson (1998) and Kodl and Mermelstein (2004)

How often has either of your parents said to you that...

	Never	Once or Twice	Several Times
a. Smoking gives you cancer	1	2	3
b. Smoking is bad for you	1	2	3
c. It is hard to quit smoking once you start	1	2	3
d. Smoking is addictive	1	2	3
e. You don't need to use a drug to feel good	1	2	3
f. I don't want you to smoke	1	2	3
g. I would be really upset if you smoked	1	2	3

APPENDIX D

Household Smoking Consumption

Please fill in the following chart. Start by first checking either the Yes or No box if you live with each person listed below, and then put a check in the box that best describes their smoking behavior. If you live in more than one household (for example, part-time with your mom and part-time with your dad), check all that apply.

Check if . . .	You live with this person		He/She smokes	He/She is an ex- smoker	He/She has never smoked
	Yes	No			
Mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Step-mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Step-father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foster parent/adult.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grandparent(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other adult relative(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unrelated adult(s).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX E

UNIVERSITY OF ILLINOIS AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice Continuing Review

September 20, 2011

Robin J. Mermelstein, PhD
Psychology
1747 W Roosevelt
Room 558, M/C 275
Chicago, IL 60612
Phone: (312) 996-1469 / Fax: (312) 413-0474

RE: Protocol # 2004-0621
“Social-Emotional Contexts of Adolescent Smoking - Longitudinal Study”

Dear Dr. Mermelstein:

Your Continuing Review was reviewed and approved by the Expedited review process on September 14, 2011. You may now continue your research.

Please note the following information about your approved research protocol:

Protocol Approval Period: October 5, 2011 - October 3, 2012

Approved Subject Enrollment #: 3080

Additional Determinations for Research Involving Minors: The Board determined that this research satisfies 45CFR46.404, research not involving greater than minimal risk. Therefore, in accordance with 45CFR46.408, the IRB determined that only one parent's/legal guardian's permission/signature is needed. Wards of the State may not be enrolled unless the IRB grants specific approval and assures inclusion of additional protections in the research required under 45CFR46.409. If you wish to enroll Wards of the State contact OPRS and refer to the tip sheet.

Performance Sites: UIC, Northwestern University, Georgia State University, University of Utah, West Virginia University, Wesleyan University

Sponsor: NCI - National Cancer Institute, NIH-National Institutes of Health, NIH/National Cancer Institute, National Cancer Institute, NIDA

PAF#: - 2009-06591,2009-01725,2011-02902,2010-01561,2003-02925

Grant/Contract No: 3 P01 CA098262-05S1,1 R21 CA140696-01,1F31DA032244-01,2 P01 CA098262-06A1,CA 9862-01A5

Grant/Contract Title: Social-Emotional Contexts of Adolescent Smoking Patterns,Variance Modeling of Smoking-related EMA Data,A Situational Examination of Neurocognition and Affect with Simultaneous Cannabis and Tobacco Use,Social-Emotional Contexts of Adolescent Smoking Patterns,Social-Emotional Contexts of Adolescent Smoking Patterns

Research Protocols:

- a) Project 3: Social-Emotional Contexts of Adolescent Smoking-Smoking and Emotions Version 1, 04/05/2011
- b) Project 1, Health Habits, Version 3.0, 05/23/2011
- c) Genetic Marker Project 4, Version 1, 09/24/10
- d) Project 2, Electronic Diary, Version 2.0, 05/23/2011

Recruitment Materials:

- a) Renewal Enrollment Script: Health Habits and Genetics, Version 2, 03/10/2011
- b) Renewal Enrollment Script: Electronic Diary (ED), Version 2, 03/10/2011
- c) Debriefing Script Project 3: Smoking and Emotions, Version 1, 03/21/2011
- d) Renewal Enrollment Script: Smoking & Emotions Version 1, 04/05/2011
- e) Renewal Web Site Text Version 2, 09/09/2011
- f) Extended Study Recruitment Letter, Version 1.0, 9/24/10

Informed Consents:

- a) Project 3 Smoking & Emotions Consent Version 1, 04/05/2011
- b) Consent by Phone/Web Script SHORT 5-year Health Habits Version 1, 05/23/2011
- c) Project 1 Extended Health Habits Consent Version 2, 09/06/2011
- d) Project 2 Electronic Diary Consent, Version 2, 09/06/2011
- e) Genetic Marker Consent, Version 3, 09/06/2011
- f) Alteration of informed consent [45 CFR 46.116(d)], administered over phone/web, for the short version of the 5-year Health Habits Questionnaire

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category:

(9) Continuing review of research, not conducted under an investigational new drug application or investigational device exemption where categories two (2) through eight (8) do not apply but IRB has determined and documented at a convened meeting that the research involves no greater than minimal risk and no additional risks have been identified.

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
09/09/2011	Continuing Review	Expedited	09/14/2011	Approved

Please remember to:

→ Use your **research protocol number** (2004-0621) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the enclosure,
"UIC Investigator Responsibilities, Protection of Human Research Subjects"

Please note that the UIC IRB has the right to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 355-2764. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Betty Mayberry, B.S.
 IRB Coordinator, IRB # 3
 Office for the Protection of Research Subjects

Enclosures:

- 1. UIC Investigator Responsibilities, Protection of Human Research Subjects**
- 2. Data Security Enclosure**
- 3. Informed Consent Documents:**
 - a) Project 3 Smoking & Emotions Consent Version 1, 04/05/2011
 - b) Consent by Phone/Web Script SHORT 5-year Health Habits Version 1, 05/23/2011
 - c) Project 1 Extended Health Habits Consent Version 2, 09/06/2011
 - d) Project 2 Electronic Diary Consent, Version 2, 09/06/2011
 - e) Genetic Marker Consent, Version 3, 09/06/2011
- 4. Recruiting Materials:**
 - a) Renewal Enrollment Script: Health Habits and Genetics, Version 2, 03/10/2011
 - b) Renewal Enrollment Script: Electronic Diary (ED), Version 2, 03/10/2011
 - c) Debriefing Script Project 3: Smoking and Emotions, Version 1, 03/21/2011
 - d) Renewal Enrollment Script: Smoking & Emotions Version 1, 04/05/2011
 - e) Extended Study Recruitment Letter, Version 1.0, 9/24/10
 - f) Renewal Web Site Text, Version 2, 09/09/2011

cc: Jon D. Kassel, Psychology, M/C 285
 OVCR Administration, M/C 672

VITA

RACHEL GERSON

PSYCHOLOGY DEPT • UNIVERSITY OF ILLINOIS AT CHICAGO (UIC)
1007 WEST HARRISON • CHICAGO, IL • 60608
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EDUCATION

August 2010- Present	UNIVERSITY OF ILLINOIS AT CHICAGO (UIC) <i>Doctoral Program in Clinical Psychology</i> Masters of Arts (received June 2012) Doctor of Philosophy (expected May 2017)	Chicago, IL
August 2002- May 2006	Washington University in St. Louis <i>Bachelor of Arts</i> Major: Psychology, Marketing	St. Louis, MO

POSTERS AND PRESENTATIONS

-
- Gerson, R. & Mermelstein, M. (2012, April 12). *General Parenting, Antismoking Socialization, and Adolescent Smoking Escalation*. Poster session presented at the annual meeting and scientific sessions of the Society for Behavioral Medicine, New Orleans, LA.

RESEARCH EXPERIENCE

May 2010- Present	UNIVERSITY OF ILLINOIS AT CHICAGO DEPARTMENT OF PSYCHOLOGY <i>Graduate Research Assistant, Institute of Health Research and Policy (IHRP)</i> <ul style="list-style-type: none">Graduate research assistant on a longitudinal study examining the etiology and progression of health-promoting and health compromising behaviors, namely tobacco use, among adolescents and adults (PO1 CA98262 from the National Cancer Institute)Specific responsibilities include managing and analyzing a multi-level, longitudinal data set as well as retention of a large adolescent participant poolWriting duties including conference and manuscript preparationSupervisor: <i>Robin Mermelstein, Ph.D.</i>	Chicago, IL
February 2009- March 2010	NORTHWESTERN UNIVERSITY FEINBERG SCHOOL OF MEDICINE <i>Project Assistant, Northwestern Juvenile Project</i> <ul style="list-style-type: none">Responsibilities included checking and coding data from quantitative interviews. Helped organize and manage the database that warehouses the digital and hard copies of subject interviews. Updated subject	Chicago, IL

contact information to aid in the tracking process while maintaining participant confidentiality

- Supervisor: *Karen Abram, Ph.D.*

**June 2009-
June 2010**

**NORTHWESTERN UNIVERSITY
DEPARTMENT OF PSYCHOLOGY**

Evanston, IL

Research Assistant, Human Sexuality Lab

- Responsibilities included utilizing an online survey tool to screen and schedule potential subjects for the study. Recruited subjects at community halls and events. Analyzed physiological data. Conducted participant scans using an fMRI. Researched previous pedophilic studies and laws for a pilot study.
- Supervisor: *J. Michael Bailey, Ph.D.*

**September 2009-
January 2010**

**NORTHWESTERN UNIVERSITY
DEPARTMENT OF PSYCHOLOGY**

Evanston, IL

Research Assistant, Anxiety and Depression Lab

- Responsibilities included recruiting, scheduling, and conducting participant interviews using the Autobiographical Memory Test (AMT).
- Coded and analyzed results of AMT and personal narrative
- Supervisor: *Susan Mineka, Ph.D.*

CLINICAL EXPERIENCE

**August 2011-
Present**

UNIVERSITY OF ILLINOIS AT CHICAGO

Chicago, IL

Clinical Assessment Practicum Student, Office of Applied Psychological Services (OAPS)

- Responsible for selecting, administering, scoring and interpreting neuropsychological assessments
- Trained to administer and score various neuropsychological and diagnostic tests including but not limited to the California Verbal Learning Test (CVLT), Comprehensive Test of Phonological Processing (CTOPP), Conners ADHD Index, Conners Continuous Performance Test II (CPT-II), Delis-Kaplan Executive Function System (DKEFS), Diagnostic Interview for Children and Adolescents IV (DICA-IV), Learning and Study Strategies Inventory (LASSI), Minnesota Multiphasic Personality Inventory (MMPI), Structured Clinical Interview for DSM-IV (SCID-IV), Wechsler Adult Intelligence Scale-IV (WAIS-IV), Wechsler Individual Achievement Test III (WIAT-III), Wechsler Intelligence Scale for Children-IV (WISC-IV), Wender Utah Rating Scale (WURS), Woodcock Johnson Tests of Achievement III and Cognitive abilities III (WJ-ACH III; WJ-COG III)
- Communicate test results, interpretations, and recommendations to clients
- Provide referrals to clients based on the psychological assessment

- Present completed cases at team supervision meeting
- Population served includes ethnically and economically diverse children, adolescents, and adults
- Supervisors: *Nancy Dassoﬀ, Ph.D., Audrey Ruderman, Ph.D., Neil Pliskin, Ph.D., Ellen Herbener, Ph.D.*

**August 2010-
Present**

UNIVERSITY OF ILLINOIS AT CHICAGO **Chicago, IL**
Clinical Therapy Practicum Student, Office of Applied Psychological Services (OAPS)

- Provide individual, family, and couples psychotherapy under the supervision of a licensed clinical psychologist
- Responsible for developing initial and ongoing treatment plans and writing weekly summary reports of therapeutic progress and goals
- Train and mentor first-year clinical graduate students in intake interviews
- Supervision includes weekly individual meetings with audio/video review of sessions, and presentation at case conferences
- Supervised in behavioral therapies, cognitive-behavioral therapy and interpersonal psychotherapy
- Population served includes children, families, and adults; presenting problems includes: depression, anxiety, panic disorder with agoraphobia, relational difficulties, personality disorders, obesity, and disruptive behavior
- Supervisors: *Nancy Dassoﬀ, Ph.D., Audrey Ruderman, Ph.D., Gloria Balgue, Ph.D.*

**August 2008-
Present**

UNIVERSITY OF ILLINOIS AT CHICAGO **Chicago, IL**
Clinical Intake Interview Practicum Student, Office of Applied Psychological Services (OAPS)

- Responsible for conducting comprehensive diagnostic interviews and reports for adults and children seeking therapy or assessments, and provided referrals
- Receive hour-for-hour supervision using audio/video review of sessions
- Present cases at clinic staffing meetings
- Supervisors: *Gloria Balague, Ph.D., and Nancy Dassoﬀ, Ph.D.*

**September 2008-
October 2009**

NATIONAL RUNAWAY SWITCHBOARD **Chicago, IL**
Crisis Consultant

- Provided impartial resources and counseling to youth in crisis and their families. Facilitated the Home Free program and screened potential recipients.

TEACHING EXPERIENCE

- | | | |
|-----------------------------------|---|----------------------|
| August 2011-
May 2012 | UNIVERSITY OF ILLINOIS AT CHICAGO
DEPARTMENT OF PSYCHOLOGY | Chicago, IL |
| | <i>Teaching Assistant, Introduction to Psychology</i> | |
| | <ul style="list-style-type: none"> • Responsibilities included conducting weekly discussion sessions, grading papers, answering questions, evaluating students, maintaining complete records, reinforcing lecture material, emphasizing relevance of course content, stimulating interest and enthusiasm, encouraging student initiative, and directing students to additional resources. • Professor: <i>Gary Greenberg, Ph.D.</i> | |
| January 2006-
May 2006 | WASHINGTON UNIVERSITY IN ST. LOUIS
DEPARTMENT OF PSYCHOLOGY | St. Louis, MO |
| | <i>Pseudo-patient, Abnormal Psychology Class</i> | |
| | <ul style="list-style-type: none"> • Created two case studies of characters with disorders to be interviewed in a didactic setting for an Abnormal Psychology Class • Professor: <i>Richard Kurtz, Ph.D.</i> | |

MEMBERSHIP IN PROFESSIONAL ASSOCIATIONS

- *Society for Behavioral Medicine*