

Girls, Gender Roles and Cigarettes: An Intersectional Analysis of Psycho-Social  
Influences on the Relationship between Depressive Symptoms and Smoking among Early  
Adolescents

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## Dedication

I dedicate this dissertation to my Mom and Dad, and to my Grandma, from whom I have learned the power of hope and perseverance.

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## Abstract of Dissertation

### Girls, Gender Roles and Cigarettes: An Intersectional Analysis of Psycho-Social Influences on the Relationship between Depressive Symptoms and Smoking among Early Adolescents

Despite the well-publicized health and economic costs of tobacco use, cigarette smoking remains the leading preventable cause of morbidity and mortality in the U.S. For most, cigarette use is already a well-established habit by adulthood, with smoking initiation most frequently occurring in the 6<sup>th</sup>-7<sup>th</sup> grade. To deter youth from smoking cigarettes and from transitioning from experimentation to daily smoking requires a comprehensive, multidisciplinary approach to understanding the various personal, demographic, and social/environmental factors that put adolescents at risk, and at times even motivate youth, to smoke cigarettes. Review of the depressive symptoms-smoking relationship among adolescents suggests that girls and boys often have differing motives for smoking, many of which are connected to depression or have particularly strong implications for those with depressive symptoms. Gender differences in norms for the expression of depressive symptoms may explain why girls with depressive symptoms use smoking as a coping mechanism in disproportionately high rates compared to their male peers. To better understand how depressive symptoms and smoking are related among teenage girls, integrating role constraint and future orientation research with the gender role attitudes literature suggests that it may be the interaction between beliefs in traditional gender roles and depressive symptoms that relates to or predicts smoking

among adolescent girls. Gender role attitudes may have different meanings for Black and White women, complicating the depressive symptoms-smoking relationship even further. In the current study I analyzed the most recent four years of data from a subset of 8<sup>th</sup> and 10<sup>th</sup> grade Monitoring the Future survey participants to test the following hypotheses: 1) Gender modifies the depressive symptoms-smoking relationship, such that being female (rather than male) predicts a stronger positive association between depressive symptoms and smoking, 2) Among girls, gender role attitudes modify the depressive symptoms-smoking relationship, such that endorsing more traditional (rather than more egalitarian) gender roles predicts a stronger positive association between depressive symptoms and smoking, and 3) Among girls with traditional gender role attitudes, race/ethnicity modifies the depressive symptoms-smoking relationship, such that being White (rather than Black) predicts a stronger positive association between depressive symptoms and smoking. Responses to questions on cigarette smoking, depressive symptoms, gender role attitudes, socio-demographics, and correlates of smoking (e.g., sensation-seeking, deviant behavior) were analyzed for N = 23,776 participants. Results of logistic and multiple regression analyses revealed partial support for Hypothesis 1 (depressive symptoms and gender interacted to predict ever smoking) and Hypothesis 2 (depressive symptoms and gender role traditionalism interacted to predict past 30 day smoking frequency among girls), but no support for Hypothesis 3. I explore potential explanations for the various findings and how they converge or diverge with the research literature, several study limitations, theoretical and applied implications of the current study, and directions for future research.

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## Chapter 1: Introduction

November 2008 marked two historical milestones whose common thread may not be immediately apparent. One event was the first national election that had a genuine possibility of electing the first female President of the United States. Although President Barack Obama eventually won the Democratic nomination over Senator Hillary Rodham Clinton (and in doing so marked a similarly significant historic accomplishment as the first African American nominee and President of the U.S.), a CBS News/New York Times poll (February 5, 2006) found that 92% of adults said they would vote for a qualified female candidate from their political party (this represents an increase of 40 percentage points from 1955). The second was the tenth anniversary of the implementation of the tobacco *Master Settlement Agreement* (MSA), the resolution requiring tobacco product manufacturers in the U.S. to make sizeable payments to individual states in exchange for dropping past, present, and future legal claims; fund a public health national foundation; and modify marketing and advertising tactics to assist in efforts to reduce youth smoking (National Association of Attorneys General, 1998). These landmark events both reflect the strides forward and obstacles remaining from two major movements of change in the 20<sup>th</sup> century: Second Wave feminism and tobacco control.

### *Cigarette Use Overview and Trends*

Despite progress made over the past several decades in the fight against tobacco, cigarette smoking remains an issue worthy of continued investigation, study and concern. Since 1964, tobacco use has been recognized as a major health concern in 29 Surgeon

General's reports and has been the cause of approximately 12 million deaths in the United States (CDC, 2007). Cigarette smoking, the leading preventable cause of morbidity and mortality in the United States, is responsible for an estimated 435,000 deaths per year (Mokdad, Marks, Stroup, & Gerberding, 2004). Each year, another 8.6 million Americans suffer from one or more of the negative physical and mental health outcomes caused by or associated with cigarette smoking and exposure to cigarette smoke, including coronary heart disease, stroke, lung cancer, chronic lung disease, reproductive difficulties, and psychiatric disorders (CDC, 2007; USDHHS, 2001). In addition to the numerous chronic illnesses and conditions caused by smoking cigarettes, the economic costs of tobacco use are substantial, including a \$92 billion per year loss in worker productivity and yearly medical costs exceeding \$75 billion (CDC, 2007).

Despite these well-publicized health and economic costs of tobacco use, an estimated 45.1 million, or 20.9%, of adults in the U.S. currently smoke cigarettes (23.9% of men and 18.1% of women) (CDC, 2006b). For most, cigarette use is already a well-established habit by adulthood. Smoking initiation most frequently occurs in the 6<sup>th</sup>-7<sup>th</sup> grade (youth ages 11-12) (Campaign for Tobacco-Free Kids, 2007). Every day, an additional 4,000 youth smoke a cigarette for the first time, resulting in a total of 416,000 new underage daily smokers per year (SAMHSA, 2005). With the striking similarity between this statistic and the number of smoking-related deaths per year, it is not surprising that tobacco companies often refer to youth as "replacement smokers" (Campaign for Tobacco-Free Kids, 2001). As an R.J. Reynolds report, *Young Adult Smokers: Strategies and Opportunities* describes, "Younger adult smokers are the only source of replacement smokers...If younger adults turn away from smoking, the industry

must decline, much as a population which does not give birth will eventually dwindle” (February 29, 1984. Bates No. 501928462-8550).

The thousands of chemicals found in cigarettes, most notably nicotine, help ensure that youth who experiment with cigarettes progress to regular, daily adult smokers. Addiction to tobacco usually develops during adolescence, with 82% of U.S. adults who have ever smoked daily trying their first cigarette before the age of 18 years, and 53% becoming daily smokers while still underage (Campaign for Tobacco-Free Kids, 2007). Girls may be particularly vulnerable to these effects, displaying signs of nicotine addiction more quickly than boys do (Office of National Drug Control Policy, 2006). These gender differences in vulnerability to nicotine addiction lend support to the inclusion of biological factors in a comprehensive model of influences on tobacco use (Baker, Brandon, & Chassin, 2004). However, as Baker et al. (2004) and others noted, biological processes (e.g., addiction to nicotine) may have more relevance for understanding smoking maintenance or cessation, while social and contextual factors (e.g., peers, impression management) may have greater explanatory power for the earlier stages of smoking. Smoking cessation in general and its intertwinement with biology, genetics, physiology and neurology are clearly an integral aspect of tobacco control. Although beyond the scope of the current project, the research literature on smoking cessation in general, and on smoking cessation among young adults in particular, is extensive (e.g., Niaura & Abrams, 2002; Sussman, Sun, & Dent, 2006).

Tobacco use is such a serious national health concern that smoking was named one of *Healthy People 2010*'s ten leading health indicators (USDHHS, 2000a). Nicotine dependence and smoking among early adolescents underscore the importance of tobacco

control, especially youth smoking prevention efforts. To deter youth from smoking cigarettes and from transitioning from experimentation to daily smoking requires a comprehensive, multidisciplinary approach to understanding the various factors that put adolescents at risk, and at times even motivate youth, to smoke cigarettes (USDHHS, 1994).

Reducing smoking rates in general, and a better understanding of reasons for youth smoking, as indicated by status and frequency, are priorities for researchers and government officials alike (USDHHS, 2000a, 2000b). Much of the social scientific research has been devoted to what factors are predictive of or associated with smoking (Baker et al., 2004; Carvajal, Hanson, Downing, Coyle, & Pederson, 2004; Tyas & Pederson, 1998). The most consistently related variables include: sociodemographics (e.g., age, race/ethnicity, gender), behavior (e.g., school, risk-taking, lifestyle), and physical and social environment/contextual (e.g., parental/sibling/peer smoking, attitudes and norms, family environment, availability of tobacco, stress and coping, depression, self-esteem, attitudes towards smoking and smokers, health risk knowledge and personal health concern), with the most effective models using more integrated approaches that include multiple risk factors or types of risk factors (Carvajal et al., 2004; Collins & Ellickson, 2004).

With this in mind, I used a multifaceted approach in the current study to investigate how our understanding of a social/contextual factor (depression) that is a consistently strong correlate of smoking can be further elucidated by examining how depression interacts with elements of both another social/contextual variable (gender role attitudes) and sociodemographic variables (gender and race/ethnicity). I first discuss the

history of the depression-smoking relationship, with particular attention to the gendered aspects of both smoking and depression. Next, I describe gender role attitudes and assert that holding particular gender role attitudes may enhance or weaken the depression-smoking relationship. Finally, I utilize an intersectional approach to contribute to a more nuanced understanding of the meaning of traditional gender role attitudes for women of different races/ethnicities, and how that may shape the depression-smoking relationship.

## Chapter 2: Literature Review

### *Cigarettes and Mental Health: Smoking as a Gendered Expression of Depressive Symptoms*

Depression, one of the most prevalent mental health conditions, is a complex pattern of affect, behavior and cognitions marked by alterations in mood (e.g., sadness, loneliness and apathy), negative self-concept and self-blame, regressive and self-punitive wishes (e.g., to hide, to escape), vegetative changes (e.g., insomnia, loss of libido), and change in activity level (e.g., agitation) (Beck, 1967). Over the years, an array of instruments, such as the Center for Epidemiologic Studies Depression Scale [CES-D] (Radloff, 1977) and the Beck Depression Inventory [BDI] (Beck, Steer, & Brown, 1996) have been designed to measure various depressive symptoms. Signs and symptoms of depression can manifest themselves in a variety of manners (e.g., crying spells, distortion of body image, avoidance, loss of appetite) and can range in intensity from mild to severe (Beck, 1967).

Evidence for a positive association between depression<sup>1</sup> and smoking among both adolescents and adults is clear and well-substantiated (e.g., Baker et al., 2004; Office of National Drug Control Policy, 2006; Pomerleau, Zucker, & Stewart, 2003; Tyas & Pederson, 1998). Research consistently shows that depressed individuals are more likely to be smokers than are non-depressed people (see Fergusson, Goodwin, & Horwood, 2003 for a review of the literature on the co-morbidity of depression and smoking).

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<sup>1</sup>From this point forward, throughout the text the word “depression” is used to refer to clinically-measured depression. In contrast, the phrase “depressive symptoms” is used to refer to symptoms of depression, often self-reported by sub-clinical populations.

National survey data indicate that depressed early adolescents, those as young as ages 12-17, are more than twice as likely as their non-depressed peers to be daily cigarette smokers (5.3% vs. 2.5%, respectively) (SAMHSA, 2005). Research and empirical findings are mixed, however, regarding the existence and temporal order of a causal relationship between depression and smoking. While some studies have found that smoking increases adolescents' vulnerability to depression (perhaps due to stigma associated with smoking and/or physiological effects of smoking on mental health) (e.g., Brown, Lewinsohn, Seeley, & Wagner, 1996; Choi, Patten, Christian Gillin, Kaplan, & Pierce, 1997; Wu & Anthony, 1999), the reverse temporal order of depression preceding smoking has also been demonstrated frequently, with the explanation that individuals smoke cigarettes as a form of self-medication for existing symptoms of depression (e.g., Baker et al., 2004; Pomerleau et al., 2003).

Several longitudinal studies provide empirical support for the argument that depression or depressive symptoms predict smoking. For example, results of a 5-year longitudinal study of 1,000 young adults showed that individuals with a history of major depression at baseline were three times more likely to progress from never smoking cigarettes daily (in the past one or more months) to smoking daily (Breslau, Peterson, Schultz, Chilcoat, & Andreski, 1998). Similarly, in a 4-year longitudinal study of high school students, boys with no history of smoking but with depressive symptoms at baseline were more likely to try a cigarette over the course of the study (Killen et al., 1997), while a longitudinal study of a nationally representative sample of 9-, 11-, and 13-year olds showed that depression predicted smoking initiation among girls (Costello, Erkanli, Federman, & Angold, 1999). Although the findings on the temporal order of

depression and smoking at times seem to contradict one another, it may be more likely, as demonstrated in a 4-year longitudinal study of 1,218 adolescents, that depression and smoking have a reciprocal influence upon one another (Windle & Windle, 2001). At initial stages of smoking, adolescents may smoke to reduce negative affect and the successful management of affect may reinforce smoking. At later stages (e.g., when adolescents want to quit smoking), smoking cessation may put depressed individuals at increased risk for a depressive episode, in turn leading to a relapse to smoking cigarettes (Windle & Windle, 2001).

Depression's influence on smoking can be explained further by its interaction with gender (e.g., Galambos, Leadbeater, & Barker, 2004; Hankin, Mermelstein, & Roesch, 2007; Husky, Mazure, Paliwal, & McKee, 2008; Pomerleau et al., 2003; Poulin, Hand, Boudreau, & Santor, 2005). Depression is twice as prevalent among adult women as among men, and is the leading psychological disease burden among women in both developed and developing countries (Goldman & Hatch, 2000). Gender differences in incidence of depression begin at earlier ages, though, with male and female adolescents showing vast disparities in depression prevalence rates. In general, boys tend to exhibit more depressive symptoms than girls do during the preadolescent years. However, this balance begins to shift around age 13-15, with depression rates soaring among girls and exceeding the rates among boys by two times by the age of 18 (Sparks, 2002). Results from the National Survey on Drug Use and Health indicate that 2.2 million youth (8.8% of youth ages 12-17) suffered from a Major Depressive Episode (MDE) during 2005. The rate of MDE was approximately three times higher among adolescent females (13.3%) than among adolescent males (4.5%) (SAMHSA, 2005).

In contrast to the notable gender differences in rates of depression, male and female adolescents ages 12-17 exhibit nearly equivalent rates of current cigarette use, with prevalence rates of 10.7% and 10.8%, respectively (SAMHSA, 2005). In fact, higher smoking prevalence rates among males are typically observed in the general population (23.9% of men vs. 18.1% of women), though these differences do not usually emerge until adulthood (CDC, 2006b). One possible explanation may be that despite the almost negligible gender differences in smoking prevalence rates in early adolescence, depressive symptoms are expressed among girls through smoking more frequently than among boys.

Girls and boys often have differing motives for smoking (Honjo & Siegel, 2003; Nichter, Nichter, Vuckovic, Quintero, & Rittenbaugh, 1997; USDHHS, 2001). Many of these factors, from social pressures to weight concerns, are connected to depression or have particularly strong implications for depressed individuals. They are also symptomatic of gender differences in socialization practices and learned coping styles (Sparks, 2002). Quantitative and qualitative analyses of reasons for youth smoking revealed that girls are most likely to smoke when stressed (60%), angry (46%), and lonely (30%) (Nichter et al., 1997). This stems from the commonly-held belief, learned from parents, peers, the media, and the tobacco industry, that smoking helps reduce feelings of distress and helps one to relax (Nichter et al., 1997). The research literature on predictors of smoking that are unique to boys is equivocal and far less extensive, perhaps reflective of increased national health research attention focused on the rising smoking rates among adolescent girls. However, a focus on the relationship between smoking and traits of behavioral “undercontrol” (e.g., sensation seeking, rebelliousness,

and conduct disorder) that are more frequently identified among males, suggests that these may be especially relevant risk factors for smoking among male youth (Baker et al., 2004; Galambos, 2004; Tyas & Pederson, 1998; Waldron, 1991).

Only a few studies have specifically examined gender differences in the relationship between depression and smoking. In an analysis of data on major depression and smoking from a national epidemiological study, Husky et al. (2008) found a significant relationship between both current depression and smoking (occasional, daily, and prior) and between lifetime depression and smoking (occasional, daily, and prior). Interestingly, the associations were significantly stronger among women than among men. In fact, the link between occasional smoking and depression among men was non-significant (Husky et al., 2008). Similarly, Fernander et al.'s (2006) study of youth in Cape Town, Australia found that mild and severe depression predicted ever smoking among girls, and mild, moderate and severe depression were positively associated with current smoking among girls. For boys, on the other hand, depression and smoking status were not significantly related (Fernander et al., 2006). Biological explanations for gender differences in the depression-smoking relationship among adolescents have tended to focus on hormonal changes related to puberty and genetic predispositions and vulnerability, and have received mixed support (see Nolen-Hoeksema & Hilt, 2002, for a review biological and genetic explanations). Biological factors are frequently viewed as one element of a larger model that focuses on social and psychological explanations for gender differences in the depression-smoking relationship that emerge in adolescence (Waller et al., 2006). For example, the different ways that girls and boys are commonly socialized to react to stressful events and situations (Fine & Macpherson, 1998) reflect

gender differences in norms of expressing depressive symptoms (Wisdom, Rees, Riley, & Weis, 2007).

Overall, girls are more likely than boys are to express their distress with certain behaviors (Leadbeater, Blatt, & Quinlan, 1995). From a young age, girls are taught that women are overly emotional, and that expressing feelings in a traditionally feminine manner is a sign of weakness, vulnerability, and even hysteria (Schulz & Mullings, 2006). To “calm down,” society encourages girls to self-manage their feelings instead, with emotions manifested as depression, and frustration and anger from stressors taken out on the self. This can lead adolescent girls who are depressed to engage in specific health risk behaviors, most frequently smoking and dieting, as a gendered form of self-medicating (American Psychological Association, 2007; Fine & Macpherson, 1998; Harrell, Fredrickson, Pomerleau, & Nolen-Hoeksema, 2006; Leadbeater et al., 1995; Nichter et al., 1997; Tolman, Impett, Tracy, & Michael, 2006). Male youth, in contrast, are socialized to cope with these same emotions by exhibiting outward displays of anger and engaging in conflict with others, often in the form of physical aggression. Male adolescents may turn to different health risk behaviors for self-medication. For example, male adolescents show higher rates of current alcohol use, binge drinking, and heavy drinking than their female counterparts (SAMHSA, 2005). By lowering inhibitions, alcohol provides a more socially acceptable avenue, often in the form of aggression, for male youth to express their feelings of anger and distress (Nolen-Hoeksema & Hilt, 2006).

Thus, it is gender differences in norms for the expression of depressive symptoms that may explain why girls with depressive symptoms use smoking as a coping

mechanism in disproportionately high rates compared to their male peers. Depression is more likely to be manifested through smoking among girls than it is among boys.

Because girls who are depressed are more likely to express depressive symptoms through health risk behaviors such as smoking than boys are, the relationship between depressive symptoms and smoking should be stronger for girls than it is for boys. *Therefore, I hypothesize (H1) that gender modifies the depressive symptoms-smoking relationship, such that being female (rather than male) predicts a stronger positive association between depressive symptoms and smoking.*

#### *Traditional Gender Role Attitudes and Depressive Symptoms: The Impact of Role Constraint*

Demonstrating that the depressive symptoms-smoking relationship is particularly strong for girls does not fully explain the arguably more complex relationship between depressive symptoms and smoking. After all, not all girls with depressive symptoms smoke, and not all female smokers exhibit depressive symptoms. However, it does suggest that to better understand *how* depressive symptoms and smoking are related among teenage girls, it is useful to examine gender-related variables that predict smoking or those that interact with depressive symptoms to affect this relationship. Previous research has documented the importance of variables such as self-objectification (Fredrickson & Roberts, 1997; Harrell et al., 2006; Tolman et al., 2006), internalization of thinness pressures and related weight concerns (Honjo & Siegel, 2003; Potter, Pederson, Chan, Aubut, & Koval, 2004; Zucker et al., 2001; Zucker, Stewart, Pomerleau, & Boyd, 2005), and sexism (Zucker & Landry, 2007).

Gender role attitudes, or beliefs about the behaviors, responsibilities, and activities that are appropriate for men and for women, are another aspect of gender-related constructs (e.g., gender role ideology, gender schemas, stereotypes) (Galambos, 2004; McHugh & Frieze, 1997), but one that has rarely been studied in the context of its relation to the depressive symptoms-smoking association. Gender role attitudes reflect the extent to which one approves or disapproves of these shared cultural assumptions about attitudes, personality traits, abilities, and behaviors that are suitable for men and for women (Galambos, 2004; Lyons, Carlson, Thurm, Grant, & Gipson, 2006). Gender role attitudes range on a continuum from traditional to egalitarian, from an emphasis on women's roles as wives and mothers (a more gendered division of labor and childcare) to a belief in equal opportunities and responsibilities for men and women in education, occupation, and care giving (Davis & Pearce, 2007; Seginer & Mahajna, 2004). Individuals espousing traditional gender role attitudes regard a woman's primary role to be as homemaker and a man's chief responsibility to be as family wage earner. In contrast, those with egalitarian gender role attitudes believe that women and men should share in the financial support of the family, household labor, and childcare (Corrigan & Konrad, 2007).

A fair amount of research has focused on how gender role attitudes are formed, with literature indicating that these attitudes are a function of socialization and/or exposure processes (Brody & Hall, 2008; Galambos, 2004). As Matud (2004) and others explain, socialization processes encourage a traditional role for young women that is marked by low levels of assertiveness and an emphasis on showing emotion, dependence, affiliation and tending to the needs of others. These socialization patterns are in stark

contrast to roles traditionally deemed appropriate for young men, roles that encourage assertiveness expressed through autonomy, self-confidence, and instrumentality. As adolescents are increasingly exposed to role models who exemplify and are rewarded for adherence to these socially constructed norms, this reinforces socialization patterns from childhood (Leadbeater et al., 1995; Williams & Kurina, 2002). To conduct a comprehensive analysis of gender role attitudes, it is equally important to understand the implications of beliefs in traditional versus egalitarian gender roles, particularly given the gender differences in the type and depth of consequences stemming from these attitudes (David & Kaplan, 1995; Davis & Pearce, 2007; Williams & Kurina, 2002).

Men's varied attitudes toward appropriate gender roles do not generally have an impact on their employment status because of societal norms that men work outside of the home (Corrigan & Konrad, 2007; Davis & Pearce, 2007). Of course, their attitudes do have implications for many other aspects of their lives, such as choice of an educationally and occupationally equal life partner (Davis & Pearce, 2007). A woman's attitudes toward gender roles, on the other hand, have a myriad of consequences for her occupational and educational trajectory, as well as indirect effects on her health and well-being (Barnett, 2004; David & Kaplan, 1995; Davis & Pearce, 2007; Williams & Kurina, 2002). Two consequences of interest that are especially pertinent to the current study are: future orientation and role constraint.

Future orientation, the picture an individual has about his or her future, "provides the grounds for setting goals, planning, exploring options and making commitments that guide the person's behavior and developmental course" (Seginer, 2008, p. 272). Future orientation is particularly salient for individuals approaching developmental milestones,

commonly times when constructing plans for the future are desired, and in some instances, necessary. It is not surprising then, that future orientation research frequently focuses on adolescents as the population of interest (Davis & Pearce, 2007; Seginer, 2008). The current generation of teenage girls and boys shows similar expectations in terms of their educational futures. Despite this egalitarian ideology, societal norms still dictate - and trends in behavior follow - that women rather than men should be the partner to limit educational and career achievements for marriage and childcare responsibilities (Davis & Pearce, 2007). It would be erroneous to conclude from this that the belief in traditional gender roles per se is associated with a negative future orientation for adolescent girls. As Seginer and Mahajna (2004) demonstrated, traditional beliefs about women's roles were associated with a more positive family future orientation among teenage girls. However, these traditional beliefs may limit an adolescent girl's options through their negative effects on educational expectations and perceptions of instrumentality (Davis & Pearce, 2007).

Results of recent studies (e.g., Davis & Pearce, 2007; Seginer & Mahajna, 2004) have demonstrated that adolescent girls who believe in traditional gender roles have more negative academic future orientations than do girls with egalitarian attitudes. The link between traditional gender role attitudes and negative future orientation is significant, as previous research findings showed robust associations between negative future orientation and both depression and smoking (Beck, 1967; Davis & Pearce, 2007; Johnston, O'Malley, Bachman, & Schulenberg, 2007). The depression research literature indicates that depressed individuals tend to have more negative future orientations than do non-depressed teens (Beck, 1967). This may be a function of their tendency to

attribute negative events to global, stable, and internal causes, an attribution style that increases vulnerability to depression and that, as some research indicates, is more common among adolescent girls than among adolescent boys (Lyons et al., 2006). In terms of the association between negative future orientation and smoking, national studies have consistently demonstrated a steep inverse relationship between plans to attend college and cigarette smoking among teens (e.g., NCHS, 2006; SAMHSA, 2005). From the end of elementary school and continuing throughout high school, adolescents reporting a low likelihood of completing a four-year college are substantially more likely to smoke cigarettes (and to smoke more frequently and in greater quantities) than their self-reported college-bound peers (Johnston, O'Malley, et al., 2007).

Role constraint theory, introduced as an explanation for gender differences in coping, proposes that men and women respond to stressors in similar ways when they occupy similar social roles. However, traditional social roles often disproportionately expose women to certain stressors and hinder effective coping strategies, leading to negative health outcomes. As Rosario et al. (1988, p.68) describe, “[s]ituations may generate stressors that directly influence psychological disturbance, or they may constrain coping and support responses. To the extent that men and women encounter different stressors and different constraints on coping due to their social roles, they may cope differently and experience different outcomes.” The social roles that constrain individuals are associated with a belief in traditional gender roles (Cole & Rakhra, 2008; Matud, 2004; Rosario et al., 1988). The role constraints associated with these roles are particularly relevant to women (Barnett, 2004; David & Kaplan, 1995; Davis & Pearce, 2007; Williams & Kurina, 2002). Women are socialized to take on traditional gender

roles that reflect and reinforce passivity and an emphasis on pleasing others (often at the expense of their own needs) to keep interpersonal relationships harmonious (Leadbeater et al., 1995; Matud, 2004). The significance of this traditional emphasis on women as caregivers is matched by the importance of women receiving social support to promote their mental and physical health. For a woman with egalitarian gender role attitudes, the multiple roles that she occupies, although perhaps opening her up to additional stressors, actually serve a protective function as she is provided with more opportunities to receive social support from her greater number of social networks. When women believe in traditional gender roles, on the other hand, the social support they receive from their partners may be more limited to the domains of wife and mother, and social support that comes from involvement in employment-related domains is absent (Barnett, 2004; Leadbeater et al., 1995; Williams & Kurina, 2002).

Gender role attitudes from socialization processes and role constraint theory<sup>2</sup> can help explain how depressive symptoms predict smoking among girls. As one line of research suggests, beliefs in traditional roles for women are linked to depressive symptoms through the tendency of depressed women to look to others to validate their sense of self-worth (e.g., Girgus, Nolen-Hoeksema, & Seligman, 1989, as cited in Lyons et al., 2006). Within this context, the relationship between an endorsement of traditional gender roles and depressive symptoms among adolescent girls is perhaps most accurately represented through their shared set of characteristics or symptoms. Role constraints may be a problem for adolescent girls, but only for those who are also suffering from

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<sup>2</sup> Although, as Rosario et al.'s (1988) series of studies confirm, differences do exist between the ideas of role constraint theory (RCT) and socialization, the terms are similar enough in perspective for the scope of the current project to be used interchangeably.

symptoms of depression (David & Kaplan, 1995; Rosario et al., 1988). When adolescent girls with depressive symptoms endorse traditional gender roles, these attitudes and the associated social roles may further constrain the ability to implement effective coping strategies that are often lacking or insufficient among those suffering from depression or depressive symptoms. It may be the limited options for flourishing faced by women who believe in traditional roles for women and are depressed or show symptoms of depression that leads to higher rates of smoking among these girls in particular (Rosario et al., 1988).

In sum, integrating role constraint and future orientation research with the gender role attitudes literature has the potential to add to our knowledge base regarding teenage girls and the depressive symptoms-smoking relationship. It may be the interaction between beliefs in traditional gender roles and depression that relates to, and is (perhaps) predictive of, cigarette smoking among this group. If adolescent girls believe in egalitarian gender roles and do not have depressive symptoms, they may be more hopeful and perceive more domains in which they can flourish (Barnett, 2004; Seginer, 2008). Yet, even if women with egalitarian gender role attitudes are also showing symptoms of depression, suggesting that they may have less hope for the future and lower satisfaction with life in general, research indicates that they still perceive greater social support in the role of wife and mother and have more domains in which to thrive (Barnett, 2004; Leadbeater et al., 1995). In essence, a belief in egalitarian gender roles may lessen, or act as a buffer to, the effects of depressive symptoms on smoking via resources for coping in the form of social support and self-efficacy. Adolescent girls with traditional gender role attitudes without depressive symptoms may feel efficacious and be satisfied with life in general, be hopeful, and have a positive future orientation. However, when adolescent

girls with depressive symptoms also endorse traditional gender role attitudes, that combination of distress and limited coping resources may interact to diminish the domains through which they can express self-efficacy and competence (Leadbeater et al., 1995). *Therefore, I hypothesize (H2) that among girls, gender role attitudes modify the depressive symptoms-smoking relationship, such that endorsing more traditional (rather than more egalitarian) gender roles predicts a stronger positive association between depressive symptoms and smoking.*

### *Racial Differences in Meaning of Traditional Gender Role Attitudes: An Intersectional Approach*

Using an intersectional approach, as feminist scholarship suggests (Sparks, 2002; Unger, 1995; Whittle & Inhorn, 2001), provides a more complete, nuanced understanding of the interaction between depressive symptoms and gender role attitudes on smoking.

The intersection of race and gender, identities that women hold simultaneously, is strongly related to women's health outcomes in general (Fine & Macpherson, 1998; Krieger, 1999; Schulz & Mullings, 2006; Unger, 1995; Whittle & Inhorn, 2001).

Women, especially women of color, face disparities in health status and healthcare due to long-time patterns of discrimination and unequal treatment (Krieger, 1999).

The intersection of race and gender-related variables also informs our understanding of the initiation and early stages of health risk behaviors (Zucker & Landry, 2007). Youth smoking is one such example, with racial/ethnic differences in prevalence rates existing between White girls and Black girls (CDC, 2006a; Ellickson, Orlando, Tucker, & Klein, 2004; Johnston, O'Malley, et al., 2007). Specifically,

smoking prevalence rates appear equal among White (24.8%) and Black (27.0%) adults. Among teens, however, prevalence rates are nearly twice as high among White adolescents (12.8%) as among Black adolescents (6.5%) (CDC, 2006a). With a prevalence rate of 9.1%, cigarette use among Hispanic youth falls in between the rates for White and Black teens, while the rate among Hispanic adults (22.2%) is lower than the rates for both White and Black adults (SAMHSA, 2005). These racial/ethnic differences in smoking prevalence rates appear among both male and female adolescents ages 12-17 (CDC, 2006a). The differences in smoking rates suggest that there may be risk factors that are particularly strong predictors among certain racial/ethnic groups of adolescent girls, but not among others, perhaps because their socially-constructed definitions show cultural differences in meaning and significance.

The way that women perceive themselves and how society views them are a function of stereotypes related to gender, race/ethnicity and social class, and the various connections among these identities (Landrine, Klonoff, & Brown-Collins, 1992; Sparks, 2002; Unger, 1995). Landrine et al. (1992) confirmed this with a study that asked Black and White women to define and evaluate a series of gender-related constructs (e.g., assertiveness, femininity). Their findings showed that Black and White women ascribed different definitions to the same constructs, explaining some of the apparent differences in evaluations of favorability. The authors emphasized that conclusions of group similarities or differences can be subject to misinterpretation, implying group differences in attitudes and behaviors that more accurately reflect cultural differences in meanings and perceptions (Landrine et al., 1992).

Gender role attitudes may have different meanings for White and Black women (Buckley & Carter, 2005; Cole & Zucker, 2007; Landrine et al., 1992; Lyons et al., 2006; Rederstorff, Buchanan, & Settles, 2007). For example, in their study of conceptions of femininity among a nationally representative sample of Black and White women, Cole and Zucker (2007) found that feminine gender role ideology was negatively related to feminism for White women, but not for Black women. One explanation is that Black women endorsing traditional gender roles do so in part to promote the idea of the man as the provider, important to Black men's self-esteem and masculinity (Cole & Zucker, 2007). Similar results were obtained by Lyons et al. (2006) in a study of early risk factors for depression among a sample of Black and Hispanic children, though the researchers offered a slightly different explanation. Lyons et al. (2006) found that while girls were more likely than boys to identify with a traditional gender role, this was not associated with poor body image, and was actually linked with a positive attribution style. The authors suggest that traditional gender roles may have a broader definition for Black girls, one that promotes self-esteem and identity formation through competence, resourcefulness, and connection to family and the community at large (Lyons et al., 2006).

In contrast, Rederstorff et al. (2007) showed the opposite finding, with traditional gender roles being more negative for Black women than for White women. They argued that traditional gender roles make Black women conscious of their double jeopardy status and discrimination (Rederstorff et al., 2007). However, as Lyons et al. (2006) explained, this consciousness-raising does not necessarily lead to poor mental health. The discrimination that Black women have historically faced may promote a resistance to

internalization of negative gender norms (Lyons et al., 2006). Buckley and Carter's (2005) study of high school girls, gender roles, and self-esteem also showed evidence for the positive link between Black identity and self-esteem among adolescent girls. While research studies on racial/ethnic differences in the meaning of traditional gender role attitudes for young women suggest a variety of explanations, some of which are contradictory (e.g., traditional gender roles being associated with more positive attribution style vs. a more negative view of one's status for Black women), the majority of these interpretations are not mutually exclusive, but rather, support individual and cultural variations that exist within the same racial/ethnic category.

If traditional gender role attitudes are more likely to represent role constraint for White women than for Black women, then its moderating effect on the depressive symptoms-smoking relationship should apply for White women more than it should for Black women. It may be the interaction between race/ethnicity and traditional gender role attitudes that helps explain the depressive symptoms-smoking relationship more completely. This would mean that the effects of the interaction between depressive symptoms and traditional gender role attitudes on smoking will be stronger among White girls than they will be among Black girls. This hypothesized interaction model is shown in Figure 1. *Therefore, I hypothesize (H3) that among girls with traditional gender role attitudes, race/ethnicity modifies the depressive symptoms-smoking relationship, such that being White (rather than Black) predicts a stronger positive association between depressive symptoms and smoking.*

*The Current Study*

In the present study, I aimed to expand on the vast body of literature dedicated to understanding the mechanisms behind youth smoking to further reduce the prevalence of cigarette smoking among American youth. I analyzed the most recent four years of data (2004, 2005, 2006, and 2007) from eighth and tenth grade participants in the Monitoring the Future survey (Johnston, Bachman, O'Malley, & Schulenberg, 2005; 2006; 2007; 2008) to examine how the interaction of gender role attitudes with common predictors of smoking contributes to existing knowledge in the research literature regarding the complex pathway to youth smoking. My objective was to utilize this information to develop a more nuanced understanding of gendered aspects of the depressive symptoms-smoking relationship.

I selected students in the eighth and tenth grade, rather than twelfth grade students participating in the Monitoring the Future series, as the study population for several reasons. Most importantly, as mentioned previously, early experimentation with smoking most frequently occurs in the 6<sup>th</sup>-7<sup>th</sup> grade, and continues to rise throughout high school (Campaign for Tobacco-Free Kids, 2007). Therefore, examining cigarette use among adolescents in the 8<sup>th</sup> and 10<sup>th</sup> grade presented a sufficient degree of variability in smoking status, and provided an opportunity to better understand why some adolescents, but not others, are interested in cigarette use at this stage in their development. Similarly, gender differences in depression prevalence that emerge during adolescence begin to surface at ages 13-15, around the time of 8<sup>th</sup> grade (SAMHSA, 2005; Sparks, 2002). This suggests that a deeper examination of the complexities involved in the formation of social identity, and of gender differences in the multi-influence root causes and expressions of these struggles, have the potential to aid in the prevention of youth smoking and/or in the

reduction of the number of teens who progress from experimental smoking to regular smoking.

Utilizing an interdisciplinary approach, this project drew upon a variety of perspectives with conceptual frameworks rooted predominantly in the fields of social and community psychology, women's studies, and public health. Similar to contemporary approaches to understanding the complex interplay of multiple risk factors and types of risk factors on youth smoking (e.g., Carvajal et al., 2004; Collins & Ellickson, 2004; Finkelstein, Kubzansky, & Goodman, 2006; Tyas & Pederson, 1998; USDHHS, 2000a), the current study, with foundations in ecological theories of health (see Sallis & Owen, 2002), used an intersectional approach to consider how person, environment, and sociodemographic risk factors and motives for smoking cigarettes operate and interact with one another. Consistent with social psychology's emphasis on the attitude-behavior relationship and the interplay between people and the environment, the current analyses focused on the role of an attitudinal variable (gender role attitudes) in explaining contextual influences (depressive symptoms, gender, race/ethnicity) on a health risk behavior (cigarette smoking status and frequency).

Building on the extensive body of literature on the relationship between depression and smoking (Fergusson et al., 2003; Harrell et al., 2006; Husky et al., 2008; Pomerleau et al., 2003; Tolman et al., 2006; Zucker & Landry, 2007), the present analyses evaluated the effects of traditional gender role attitudes on this association. While gender role attitudes are not often included in the typical battery of psychosocial variables measured as predictors of smoking, feminist scholarship, particularly over the past decade, indicates the significance and suggests further exploration of gendered

causes, correlates, and consequences of depressive symptoms as it relates to women's health outcomes. Further, an examination of the intersection of gender with race/ethnicity, and how these identities interact with gender role attitudes and depressive symptoms may provide additional insight into the widely-evidenced racial/ethnic disparities in adolescent girls' smoking prevalence rates.

The significance of this project is perhaps most apparent in its potential to further reduce cigarette smoking among American youth. Although rates of smoking among youth have exhibited commendable declines in the past decade, about 1 in 5 youth still try a cigarette by the eighth grade, suggesting that the work of the anti-tobacco movement is far from complete and may require deeper examination of less well-understood predictors and influences on smoking status and frequency. If, as hypothesized, holding traditional gender role attitudes exacerbates the depressive symptoms-smoking relationship among young women, this suggests a specific segment of girls with depressive symptoms who are a particularly at-risk group for smoking cigarettes, and who need to be the focus of tailored tobacco prevention and cessation campaigns.

### *Hypotheses*

The current study addressed these topics and questions of interest by testing the following hypotheses:

*H1: Gender modifies the depressive symptoms-smoking relationship, such that being female (rather than male) predicts a stronger positive association between depressive symptoms and smoking.*

*H2: Among girls, gender role attitudes modify the depressive symptoms-smoking relationship, such that endorsing more traditional (rather than more egalitarian) gender roles predicts a stronger positive association between depressive symptoms and smoking.*

*H3: Among girls with traditional gender role attitudes, race/ethnicity modifies the depressive symptoms-smoking relationship, such that being White (rather than Black) predicts a stronger positive association between depressive symptoms and smoking.*

*Supplemental Analyses.* As discussed earlier, the literature suggests that the effects of gender role attitudes on the depressive symptoms-smoking relationship should be particularly relevant for girls. I formulated the hypotheses for the current study with this prediction in mind. However, for all three hypotheses I tested models for both girls and boys, enabling true gender comparisons of the effects of the models, rather than a sole focus on girls' data, the group with the predicted effects.

## Chapter 3: Method

### *Participants and Procedure*

Participants for the current study were a subset of the eighth and tenth grade 2004, 2005, 2006, and 2007 cohorts of the Monitoring the Future [MTF] survey. Monitoring the Future (<http://monitoringthefuture.org/>), developed by researchers from the University of Michigan's Institute for Social Research to measure the attitudes and behaviors of high school seniors and changes in these trends over time, was first administered to students from the class of 1975. The project, as described in comprehensive detail in a recent report published by the principal investigators (Bachman, Johnston, & Schulenberg, 2006), utilizes a cohort-sequential design, wherein high school seniors are assessed each year, and a subset of each sample completes follow-up surveys at multiple time points. This enables researchers to examine and differentiate between secular, age, and cohort trends and changes. Questionnaire topics cover a variety of issues of interest and relevance to teens nationwide and to those around them, ranging from personal lifestyle preferences to intergroup relations to social and economic concerns. While the survey questions focus most heavily on attitudes and behaviors related to drug use, the project takes a multi-influence approach in its recognition of the myriad ways that drug use is symptomatic of, predictive of, and interconnected with a wide range of indicators of adolescent health and well-being.

Over the years, the study has followed up with a subset of teens from each survey cohort to observe and explore the various shifts in these attitudes and behaviors. A major addition to the study design was implemented in 1991, when the project was expanded to include 8<sup>th</sup> and 10<sup>th</sup> grade students. As Bachman et al. (2006) noted, the primary reason

for extending the survey to this age group was to measure the attitudes and behaviors of those who drop out of school by the twelfth grade (a group particularly prone to high drug use and associated negative outcomes). Further, this enhanced the ability to more carefully examine age trends and to identify shifts in attitudes and behaviors earlier, as many changes in societal trends first appear among students in the younger grades and take time to show a spread to the high school level. Initially, eighth and tenth grade participants were randomly assigned to complete one of two survey forms, Form 1 or Form 2 (two-thirds of the content in Forms 1 and 2 overlap). The survey was further divided into four forms in 1997 to enable the inclusion of additional questions and topic areas of interest without incurring prohibitive costs or respondent burden. Since then, four questionnaire forms have been randomly distributed with one-third of the sample receiving Form 1, one-third of the sample receiving Form 2, one-sixth of the sample receiving Form 3, and one-sixth of the sample receiving Form 4. With this design, new content area was collected from one-third of the sample (if included in Forms 3 and 4), and original material was available from either all survey respondents (if included in Forms 1-4) or from one-third of respondents (if included in either only Form 1 or only Form 2). I selected Form 2, distributed to a random 1/3 of respondents and sharing 2/3 of the content with Form 1, for the current analyses, as it was the form that contained the predictor and outcome variables of interest (Bachman et al., 2006). Key demographic variables, and attitudes and behaviors related to drug use are included on all questionnaire forms for all three grade levels, and the eighth and tenth grade forms are identical in content (Bachman, et al., 2006).

For the MTF study, eighth grade participants are recruited using a multistage sampling procedure: Stage 1 is Geographic Region, Stage 2 is School, and Stage 3 is Students. However, usually all 8<sup>th</sup> graders at a given school are sampled due to the smaller size of 8th grade classes than 10<sup>th</sup> or 12<sup>th</sup> grade classes. Each year, 17,000-19,000 eighth grade students from 140-160 schools are surveyed. The recruitment of tenth graders uses the same multi-stage sampling procedure: Stage 1 is Geographic Region, Stage 2 is School, and Stage 3 is Students. Due to the larger size of tenth grade classes, a subsample of students from a school's tenth grade class is generally selected for data collection. Each year, approximately 14,000-17,000 10<sup>th</sup> graders from 120-140 schools are surveyed. An active parental dissent form is typically used for informed consent, unless a school requires an active consent procedure for recruitment. The self-completed questionnaire, administered by Survey Research Center representatives during class time, uses closed-ended items and is optically scanned. Students are assured that their responses are anonymous (note: this assurance changed from one of confidentiality to anonymity in 1999 after the study investigators decided to no longer conduct longitudinal panel follow-up surveys for 8<sup>th</sup> and 10<sup>th</sup> graders). A weight variable, ranging from 0.0966 to 5.5882, was applied to each participant ( $N = 23,776$ ) in the aggregated dataset comprised of the publicly available datasets of Form 2 respondents. The weight variable, initially varying by school, was altered for the publicly available datasets to maintain respondent confidentiality (Johnston, Bachman, et al., 2005; 2006; 2007; 2008).

The publicly available datasets refer to archived data from The Interuniversity Consortium for Political and Social Research [ICPSR] (<http://www.icpsr.umich.edu/>), available for download as SAS, SPSS, or STATA data files. ICPSR, comprised of 640

member colleges and universities around the world, is a unit of the University of Michigan's Institute for Social Research (also home of the MTF study). The ICPSR website provides detailed information on its procedures for ensuring confidentiality (e.g., see ICPSR statement on safeguarding confidentiality in Appendix B). To ensure confidentiality, additional modifications have been made to variables from the publicly available datasets. Several of these changes, relevant to the current analyses, are explained in the corresponding parts of the measures section.

### *Measures*

All measures utilized for the current study are from Form 2 of the 2004-2007 eighth and tenth grade Monitoring the Future questionnaires (the question items are identical for all four years and for both grade levels), and are described in further detail below.

*Cigarette smoking.* I measured cigarette smoking by lifetime use and by frequency/quantity. Smoking status was determined by participant response (1=Never, 2=Once or twice, 3=Occasionally but not regularly, 4=Regularly in the past, and 5=Regularly now) to the question "Have you ever smoked cigarettes?" Those indicating any past or present cigarette use were asked to rate the frequency with which they smoke with the question "How frequently have you smoked cigarettes during the past 30 days?" Respondents selected from the following options: 1=Not at all, 2=Less than one cigarette per day, 3=One to five cigarettes per day, 4=About one-half pack per day, 5=About one pack per day, 6=About one and one-half packs per day, and 7=Two packs or more per

day. In the codebook, it is noted that the frequency count for “1=Not at all” includes respondents who marked "Never" for the first question (assessing smoking status).

While multi-item measures are generally preferred over single-item measures, experts in the topic area of attitudes and behavior (Bohner & Wänke, 2002) note that it is common practice for researchers to use single-item measures for behaviors such as smoking (e.g., Munafo, Hitsman, Rende, Metcalfe, & Niaura, 2008), especially when it is one of many behaviors of interest in large scale studies, such as the National Longitudinal Study of Adolescent Health [Add Health] (<http://www.cpc.unc.edu/projects/addhealth>) or the Behavioral Risk Factor Surveillance System [BRFSS] (<http://www.cdc.gov/brfss/>). Additionally, data from a recent nationally representative study of adolescents 12-17 years of age suggests that self-reports of cigarette smoking are fairly accurate (i.e., consistent with biochemically measured serum cotinine concentration levels) (Caraballo, Giovino, & Pechacek, 2004).

*Gender role attitudes.* I measured gender role attitudes based upon respondents' ratings of the extent to which they agreed or disagreed with four statements: (1) “Men and women should be paid the same money if they do the same work,” (2) “A woman should have the same job opportunities as a man,” (3) “It is usually better for everyone involved if the man is the achiever outside the home and the woman takes care of the home and family,” [reverse scored] and (4) “A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.” Participant responses to each item were measured using a 5-point scale ranging from 1 (*disagree*) to 5 (*agree*). These (or similarly worded) items have been widely used over the past several decades in a number of large-scale, longitudinal surveys, such as the

General Social Survey, to measure gender role attitudes (Gurin, 1985; McHugh & Frieze, 1997). Higher scores indicate egalitarian gender role attitudes, while lower scores signify traditional gender role attitudes. In the publicly available dataset, responses from the Western region to the last two items were intentionally deleted to protect the identities of students at potentially identifiable schools from the region that chose not to administer those particular questions.

*Depressive symptoms.* I evaluated depressive symptoms using the mean score of participants' responses to seven items measuring happiness. The wording and content of these items are similar to those of commonly used scales measuring depression, such as the Beck Depression Inventory [BDI] (Beck, Steer, & Brown, 1996) and the Center for Epidemiologic Studies Depression Scale [CES-D] (Radloff, 1977). For one item, participants responded to the question: (1) "Taking all things together, how would you say things are these days--would you say you're very happy, pretty happy, or not too happy these days?" Participant responses for this item are measured on a 3-point scale with scores ranging from 1 (*not too happy*) to 3 (*very happy*). Next, participants rated their level of agreement or disagreement with five items: (2) "Life often seems meaningless," (3) "I enjoy life as much as anyone," (4) "The future often seems hopeless," (5) "On the whole, I'm satisfied with myself," and (6) "It feels good to be alive." Responses were measured using a 5-point scale with scores ranging from 1 (*disagree*) to 5 (*agree*). Finally, participants were asked: (7) "How do you think your own life will go in the next few years--do you think it will get better or worse?" Responses were measured on a 5-point scale from 1 (*get much better*) to 5 (*get much worse*). Several items were reverse scored such that higher scores correspond to elevated

levels of depressive symptoms. I standardized each of the seven items that comprised the reversed happiness scale so that they could be combined into a single scale. I checked the alpha level of the scale with and without the first and the final question to determine the appropriateness of keeping these items in the depressive symptoms scale. Cronbach's alpha for the five items (deleting the first and final item) was .83.

*Participant demographics.* Participants responded to several questions on background information (e.g., "What is your sex?" 1=male, and 2=female). Participants were asked to select one or more of the following responses to describe their race/ethnicity: Black or African American; Mexican American or Chicano; Cuban American; Puerto Rican; Other Hispanic or Latin; Asian American; White (Caucasian); American Indian or Alaska Native; Native Hawaiian or Other Pacific Islander. In the publicly-available datasets uploaded to the ICPSR database for 2005-2007 survey data (Johnston et al., 2006; 2007; 2008), the codebook presents a modified set of responses, using the coding 1=Black or African American, 2=White (Caucasian), and 3=Hispanic (Mexican American or Chicano or Cuban American or Puerto Rican or Other Hispanic or Latin). All other responses, including those of respondents who chose alternatives that fell into more than one of the three recoded categories (Black, White, Hispanic), were deleted from the publicly available dataset. The publicly available dataset for 2004, on the other hand, only included coding for two groups: Black and White (Johnston et al., 2005). Participants responded to two questions about their parents' educational attainment. They indicated the highest level of schooling that their mother completed and that their father completed (1=Completed grade school or less, 2=Some high school, 3=Completed high school, 4=Some college, 5=Completed college, 6=Graduate or

professional school after college, and 7=Don't know, or does not apply). Participants were instructed that if they were raised mostly by foster parents, stepparents, or others (e.g., if they have both a stepfather and a natural father), they should answer for the one that was the most important in raising them.

*Sensation-seeking.* As a main risk factor for smoking in general, sensation-seeking was measured with participants' indicated level of agreement or disagreement with six statements: (1) "I get a real kick out of doing things that are a little dangerous," (2) "I like to test myself every now and then by doing something a little risky," (3) "I like to explore strange places," (4) "I like to do frightening things," (5) "I like new and exciting experiences, even if I have to break the rules," and (6) "I prefer friends who are exciting and unpredictable." Responses were measured on a 5-point scale from 1 (*disagree*) to 5 (*agree*). Cronbach's alpha was .85.

*Social influence.* Respondents' exposure to cigarettes through peers was assessed with the item, "How many of your friends would you estimate smoke cigarettes?" Responses were measured on a 5-point scale (1=None, 2=A Few, 3=Some, 4=Most, and 5=All).

*Deviance.* As a known correlate of smoking among youth, deviant behavior was measured with participants' responses to past 12 month frequency of engaging in nine deviant behaviors. Recognizing the sensitivity of the topic area, this group of items was preceded by the following statement: "The next questions deal with activities which may be against the rules or against the law. We hope you will answer all of these questions. However, if you find a question which you cannot answer honestly, we would prefer that you leave it blank. Remember, your answers will never be connected with your name".

Participants were asked how often in the last 12 months they have (1) “Run away from home (for more than 24 hours),” (2) “Gotten into a serious fight in school or at work,” (3) “Taken part in a fight where a group of your friends were against another group,” (4) “Hurt someone badly enough to need bandages or a doctor,” (5) “Taken something not belonging to you worth under \$50,” (6) “Taken something not belonging to you worth over \$50,” (7) “Gone into some house or building when you weren't supposed to be there,” (8) “Damaged school property on purpose,” and (9) “Sold an illegal drug.” Responses were measured on a 5-point scale (1=Not At All, 2=Once, 3=Twice, 4=3 or 4 Times, and 5=5 or More Times). Cronbach’s alpha for the 9 deviance items was .84.

*Year of survey administration.* Participants were asked to mark the year of survey administration (the current year). Depending on the year of the survey data, the variable had a possible value of 2004, 2005, 2006, or 2007.

*Grade level.* Participants indicated their grade level in school by marking their response on a 6-point scale ranging from 1 (*7th grade*) to 6 (*12<sup>th</sup> grade*).

## Chapter 4: Results

### *Preliminary Analyses*

I first downloaded the on-line data files for the 2004, 2005, 2006, and 2007 surveys and merged the four years of Form 2 eighth and tenth grade data into a single aggregated dataset containing all variables measured in Form 2 of the 8<sup>th</sup> and 10<sup>th</sup> grade surveys. From the initial aggregated dataset of 2004-2007 8<sup>th</sup> and 10<sup>th</sup> grade Form 2 respondents ( $N = 44,815$ ), I created a final sample of  $N = 23,776$  (unweighted<sup>3</sup>) using several exclusion criteria. Cases were retained for analyses if they satisfied all of the following conditions: 1) Race identified as Black or White ( $N = 31,942$ ); 2) Valid response for gender ( $N = 31,487$ ); 3) Valid responses for ‘ever smoke’ and ‘smoking frequency’ ( $N = 30,937$ ); 4) Valid response for gender role attitude item ( $N = 26,331$ ); 5) Valid responses for at least 4 out of 5 depressive symptoms items ( $N = 23,776$ ). All statistical analyses were run using SPSS version 16.0. Graphs and figures were generated using SPSS or Interaction (Soper, 2009).

I ran a comparison between survey years on key variables of interest to assess the validity of aggregating the four years of data. I ran descriptive statistics (overall, by gender and by race/ethnicity) for each individual item and for scales (or potential scales). I generated correlation matrices that included all variables being tested (overall, by gender, and by race/ethnicity), and assessed the internal consistencies of the depressive symptoms scale, the four items measuring gender role attitudes, the six items measuring sensation-seeking, and the 9-item deviance scale.

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<sup>3</sup> While the sample size is reported here unweighted, all analyses were run using the weighting variable described previously in the Method section.

Although I examined how the four gender role attitude items loaded together, it seemed more likely that these four items represented two constructs: attitudes towards gender equality (first two items), and attitudes towards gender roles (last two items). With this in mind, I planned to perform a median split for the attitudes towards gender equality items (which had little variance) and for the attitudes towards gender role items (which had greater variance). This would create two variables upon which an individual is classified as either egalitarian or traditional, depending on their position on that variable's median split. With an unacceptable alpha for the four items ( $\alpha = .54$ ) and little improvement from deleting one or more items, I decided to use a single item ("It is usually better for everyone involved if the man is the achiever outside the home and the woman takes care of the home and family") that had face validity and greater variability than the other items, allowing for more balanced sample sizes for comparison. Responses were coded such that higher scores indicated greater gender role traditionalism. For Hypothesis 3, which tested the depressive symptoms-race/ethnicity interaction on smoking among those high in gender role traditionalism, participants who responded 4 (*agree*) or 5 (*strongly agree*) to this item were considered high on traditionalism and were the subsample for Hypothesis 3 analyses.

I operationalized smoking status by dichotomizing responses into those who had ever smoked a cigarette ("ever smokers") and those who reported never having smoked a cigarette ("never smokers"). I then created a dummy variable for smoking status, with never smokers = 0 and ever smokers = 1. Measuring smoking frequency/quantity on a continuous scale, with higher scores indicating greater use, enabled finer distinctions among ever smokers.

Means and frequencies for all predictor variables among the total sample ( $N = 23,776$ ) are presented in Table 1. Distributions for participant demographics were fairly even with regard to gender (51.5% girls; 48.5% boys), grade level (46.3% 8<sup>th</sup> graders; 53.4% 10<sup>th</sup> graders), and survey year (the percentage of respondents per survey year ranged from 22.6% for 2007 to 26.6% for 2004). A vast majority of the sample (84.6%) identified their race/ethnicity as White. On average, participants' parents had completed some amount of college ( $M = 4.10, SD = 1.16$ ). Participants reported fairly low levels of smoking in the past 30 days ( $M = 1.22, SD = 0.73$ ), few depressive symptoms ( $M = 2.04, SD = 1.15$ ), little deviant behavior ( $M = 1.23, SD = 0.51$ ), intermediate levels of sensation-seeking ( $M = 3.37, SD = 1.06$ ) and gender role traditionalism ( $M = 2.67, SD = 1.41$ ), and having a few friends who smoke ( $M = 2.11, SD = 1.03$ ).

Comparisons between ever smokers (32.2% of sample) and never smokers (67.8% of sample) showed significant differences on all predictor variables. Compared to never smokers, ever smokers were more likely to be female, were more likely to be White, were less likely to be in the 8<sup>th</sup> grade, had higher levels of depressive symptoms, had more traditional gender role attitudes, had parents with lower levels of educational attainment, had more friends who smoke, and had higher levels of sensation-seeking and deviance.

Noticing some unusually large chi-square values, I consulted with a statistical expert (R.J. Ozminkowski, personal communication, April 16, 2009). After confirming that there were no mistakes in coding by calculating a few chi-squares by hand and rerunning frequencies for all variables), I next explored whether multicollinearity was inflating the chi-square. Although I had standardized or centered all variables beforehand to address this very issue, I nevertheless checked indices of multicollinearity. As

expected, the VIF and tolerance level values were all well within reason and inter-item correlations confirmed no unusually high correlation coefficients. One additional possibility suggested by Dr. Ozminkowski was that the models presented here are missing some key variables (some may be measurable, and some may not be). Pursuing this line of thinking, I reran the models for Hypothesis 1, this time including race/ethnicity (shown to be a strong predictor of smoking). The addition of this variable did not change the overall model or individual values significantly. Based on the steps outlined above, the values (while unusual) appear to be accurate.

Intercorrelations between variables analyzed among the total sample ( $N = 23,776$ ) are presented in Table 2. All items and scales theorized to be predictors of smoking showed statistically significant associations with smoking status: having friends who smoke ( $r = .48$ ), deviance ( $r = .32$ ), and sensation-seeking ( $r = .24$ ) displayed the strongest correlations, all  $p < .001$ . Similarly, as expected, correlates of smoking showed significant, but reasonable associations with one another (i.e., values were not so high as to suggest multicollinearity).

#### *Depressive Symptoms and Gender as Predictors of Smoking Status*

To test the first part of Hypothesis 1 [Gender modifies the depressive symptoms-smoking relationship, such that being female (rather than male) predicts a stronger positive association between depressive symptoms and smoking status], I estimated a binary logistic regression model to predict smoking status (0 = *never smoker*, 1 = *ever smoker*). For the first step of the model, I entered a block of psychosocial and demographic variables shown to be predictors of smoking status: parent SES, having

friends who smoke, sensation-seeking, deviance, grade in school, and year of survey. The second step of the model was comprised of depressive symptoms, gender, the depressive symptoms x gender interaction (all variables were standardized), as well as the block of predictors from Step 1. As shown in Table 3, all psychosocial and demographic predictors included in Step 1 were significant predictors of smoking status. Specifically, having more friends who smoke, higher levels of sensation-seeking, engaging in more deviant behavior, and being in 10<sup>th</sup> rather than 8<sup>th</sup> grade predicted a greater likelihood of having ever smoked cigarettes. Those with higher parent SES and those who took the survey more recently, on the other hand, were less likely to have ever smoked. The block of variables in Step 1 accounted for 36% of the variance in smoking status, a significant improvement over the constant-only model.

As predicted, in Step 2 those with higher levels of depressive symptoms were more likely to have ever smoked cigarettes ( $\beta = 0.06, p < .05$ ). Gender was also significant, such that girls were more likely to have ever smoked than boys ( $\beta = 0.18, p < .001$ ). Finally, as expected, the depressive symptom x gender interaction was significant ( $\beta = 0.11, p < .001$ ). As Figure 2 demonstrates, among those with low levels of depressive symptoms<sup>4</sup>, boys were more likely to have ever smoked than girls (26.3% of boys vs. 24.8% of girls low on depressive symptoms). However, the reverse trend was found among those with high levels of depressive symptoms, such that girls were significantly more likely to have ever smoked than boys (47.5% of girls vs. 41.5% of

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<sup>4</sup> Low and high levels of depressive symptoms determined using median split of scores on depressive symptoms scale.

boys high on depressive symptoms). With the addition of the second block of variables, the model accounted for 37% of the variance in smoking status.

### *Depressive Symptoms and Gender as Predictors of Smoking Frequency*

Next, I ran hierarchical multiple regression analyses to test the second part of Hypothesis 1 [that being female (rather than male) would predict a stronger positive association between depressive symptoms and past 30 day smoking frequency]. The first block of the model contained the same psychosocial and demographic predictors used in the logistic regression analysis above. Three of the six variables were significant: having friends who smoke and engaging in more deviant behavior predicted smoking more frequently in the past 30 days, while parent SES was a negative predictor of smoking frequency (see Table 4). The block of variables in Step 1 accounted for 24% of the variance in smoking frequency, a significant improvement over the constant-only model. The second step of the model consisted of depressive symptoms, gender, and the depressive symptoms x gender interaction (all variables were standardized) in addition to the control variables entered in Step 1. As expected, higher levels of depressive symptoms ( $\beta = .05$ ) and being a girl ( $\beta = .02$ ) were associated with greater past 30 day smoking frequency, both  $p < .001$ . The depressive symptom x gender interaction, on the other hand, was not a significant predictor of smoking frequency. Nevertheless, the addition of the predictors in Step 2 significantly improved the amount of variance accounted for in the model ( $\Delta R^2 = .003, p < .001$ ).

*Depressive Symptoms and Gender Role Traditionalism as Predictors of Smoking Status*

As a preliminary step to testing Hypothesis 2 [Among girls, gender role attitudes modify the depressive symptoms-smoking relationship, such that endorsing more traditional (rather than more egalitarian) gender roles predicts a stronger positive association between depressive symptoms and smoking], I separated the total sample by gender. Means and frequencies for all predictor variables among all girls ( $N = 12,214$ ) are presented in Table 5. Similar to findings for the overall sample, a vast majority of girls (83.6%) identified their race/ethnicity as White, and participants were fairly evenly distributed by grade level (47.2% 8<sup>th</sup> graders; 52.8% 10<sup>th</sup> graders) and survey year (the percentage of respondents per survey year ranged from 22.5% for 2007 to 27.1% for 2004). On average, girls' parents had completed some amount of college ( $M = 4.05$ ,  $SD = 1.18$ ). Girls reported fairly low levels of smoking in the past 30 days ( $M = 1.23$ ,  $SD = 0.73$ ), few depressive symptoms ( $M = 2.06$ ,  $SD = 1.16$ ), low levels of gender role traditionalism ( $M = 2.26$ ,  $SD = 1.33$ ), low levels of deviant behavior ( $M = 1.22$ ,  $SD = 0.42$ ), intermediate levels of sensation-seeking ( $M = 3.22$ ,  $SD = 1.04$ ), and having a few friends who smoke ( $M = 2.14$ ,  $SD = 1.04$ ).

Comparisons between ever smokers (32.8% of all girls) and never smokers (67.2% of all girls) showed significant differences on all predictor variables. Compared to never smokers, girls who had ever smoked cigarettes were more likely to be White, were less likely to be in the 8<sup>th</sup> grade, had higher levels of depressive symptoms, had more traditional gender role attitudes, had parents with lower levels of educational attainment, had more friends who smoke, and had higher levels of sensation-seeking and deviance.

Intercorrelations between variables analyzed among all girls ( $N = 12,214$ ) are presented below the diagonal in Table 6. All items and scales theorized to be predictors of smoking among girls showed statistically significant associations with smoking status: having friends who smoke ( $r = .50$ ), deviance ( $r = .32$ ), sensation-seeking ( $r = .29$ ), depressive symptoms ( $r = .25$ ), and parent SES ( $r = -.23$ ) displayed the strongest correlations, all  $p < .001$ . Similarly, as expected, correlates of smoking among girls showed significant, but reasonable associations with one another (i.e., values were not so high as to suggest multicollinearity).

To test the first part of Hypothesis 2 [endorsing more traditional (rather than egalitarian) gender role attitudes predicts a stronger positive association between depressive symptoms and smoking status among girls], I estimated a binary logistic regression model to predict smoking status ( $0 = \textit{never smoker}$ ,  $1 = \textit{ever smoker}$ ) among girls. For the first step of the model, I entered a block of psychosocial and demographic variables shown to be predictors of girls' smoking status: parent SES, having friends who smoke, sensation-seeking, deviance, grade in school, and year of survey. The second step of the model was comprised of depressive symptoms, gender role attitude traditionalism, the depressive symptoms x gender role traditionalism interaction (all variables were standardized), as well as the block of predictors from Step 1. As shown in Table 7, all psychosocial and demographic predictors included in Step 1 were significant predictors of smoking status among girls. Specifically, having more friends who smoke, higher levels of sensation-seeking and engaging in more deviant behavior predicted a greater likelihood of having ever smoked cigarettes. Higher parent SES, being in 8<sup>th</sup> rather than 10<sup>th</sup> grade, and taking the survey more recently, on the other hand, were all associated

with a lower likelihood of having ever smoked. The block of variables in Step 1 accounted for 40.0% of the variance in smoking status among girls, a significant improvement over the constant-only model.

As predicted, girls with higher levels of depressive symptoms were more likely to have ever smoked cigarettes ( $\beta = 0.14, p < .001$ ). Gender role attitude traditionalism was also significant, such that girls with traditional gender role attitudes were more likely to have ever smoked than were girls with more egalitarian gender role attitudes ( $\beta = 0.08, p < .001$ ). However, contrary to expectations, the depressive symptoms x gender role traditionalism interaction was not significant ( $p = .09$ ). With the addition of the block of variables in Step 2, 40.4% the variance in smoking status among girls was accounted for in the model.

### *Depressive Symptoms and Gender Role Traditionalism as Predictors of Smoking Frequency*

Next, I ran hierarchical multiple regression analyses to test the second part of Hypothesis 2 [endorsing more traditional (rather than egalitarian) gender role attitudes predicts a stronger positive association between depressive symptoms and past 30 day smoking frequency among girls]. The first block of the model contained the same psychosocial and demographic predictors used in the logistic regression analysis above. As shown in Table 8, four of the six variables were significant: having friends who smoke and engaging in more deviant behavior predicted smoking more frequently in the past 30 days among girls, while higher parent SES and grade level were negative

predictors of smoking frequency among girls. The block of variables in Step 1 accounted for 26.0% of the variance in past 30 day smoking frequency among girls, a significant improvement over the constant-only model.

The second step of the model consisted of depressive symptoms, gender role attitude traditionalism, and the depressive symptoms x gender role traditionalism interaction (all variables were standardized) in addition to the control variables entered in Step 1. As expected, higher levels of depressive symptoms ( $\beta = .06, p < .001$ ) were associated with greater past 30 day smoking frequency among girls. Although gender role traditionalism was not a significant predictor of smoking frequency among girls, the depressive symptoms x gender role traditionalism interaction was significant ( $\beta = .03, p < .01$ ). As Figure 3 demonstrates, at low levels of depressive symptoms, girls scoring high on gender role traditionalism showed lower past 30 day smoking frequency than did girls scoring low on gender role traditionalism ( $M = 1.20$  vs.  $M = 1.24$ ). In contrast, at high levels of depressive symptoms the trend was reversed, such that girls scoring high on gender role traditionalism showed greater past 30 day smoking frequency than girls scoring low on gender role traditionalism ( $M = 1.32$  vs.  $M = 1.29$ ). Low and high levels of depressive symptoms and gender role traditionalism were determined using Aiken and West's (1991) recommendation of one standard deviation above or below the mean value for a given variable. The addition of the predictors in Step 2 significantly improved the amount of variance accounted for in the model ( $\Delta R^2 = .003, p < .001$ ).

As a supplemental analysis, I re-ran Hypothesis 2 for boys to test whether a relationship exists among depressive symptoms, gender role traditionalism, and smoking status and frequency among boys. Means and frequencies for all boys ( $N = 11,492$ ) are

presented in Table 5, as are comparisons between boys who have ever smoked (31.5% of all boys) and boys who have never smoked (68.5% of all boys). One noteworthy difference between mean values for the boys and girls was in gender role traditionalism. As mentioned previously, girls reported a mean traditionalism score of 2.26 ( $SD = 1.33$ ). For boys, on the other hand, the mean traditionalism score was much higher, at 3.12 ( $SD = 1.36$ ). Similar to the results for girls, ever smokers reported significantly more traditional gender role attitudes than never smokers. With the exception of race/ethnicity, all predictor variables showed significant differences between ever smokers and never smokers among boys. Intercorrelations between variables analyzed among all boys are presented above the diagonal in Table 6. As was the case for the girls, all items and scales theorized to be predictors of smoking among boys showed statistically significant associations with smoking status/frequency.

Using the same methodology described above for girls, I estimated a binary logistic regression model to predict smoking status (0 = *never smoker*, 1 = *ever smoker*) among boys. The first step of the model consisted of a block of psychosocial and demographic variables shown to be predictors of smoking status, while the second step of the model was comprised of depressive symptoms, gender role traditionalism, the depressive symptoms x gender role traditionalism interaction (all variables were standardized), as well as the block of predictors from Step 1. As shown in Table 9, all psychosocial and demographic predictors included in Step 1 were significant predictors of smoking status among boys. Having more friends who smoke, higher levels of sensation-seeking and engaging in more deviant behavior predicted a greater likelihood of having ever smoked cigarettes. Higher parent SES, being in 8<sup>th</sup> rather than 10<sup>th</sup> grade,

and taking the survey more recently, on the other hand, were all associated with a lower likelihood of ever smoking among boys. The block of variables in Step 1 accounted for 33% of the variance in smoking status among boys, a significant improvement over the constant-only model. Adding the second block of variables, boys with higher levels of depressive symptoms ( $\beta = 0.08, p < .01$ ) and gender role traditionalism ( $\beta = 0.10, p < .001$ ) were more likely to have ever smoked cigarettes. As expected, the depressive symptom x gender role traditionalism interaction was not significant for boys. With the addition of the block of variables in Step 2, the model accounted for 34% of the variance in smoking status among boys.

Results of the hierarchical multiple regression analyses predicting smoking frequency are presented in Table 10. The first block of the model contained the same psychosocial and demographic predictors used in the logistic regression analysis above. Having friends who smoke and engaging in more deviant behavior predicted smoking more frequently in the past 30 days among boys, while higher parent SES was a negative predictor of smoking frequency. The block of variables in Step 1 accounted for 22.9% of the variance in past 30 day smoking frequency among boys, a significant improvement over the constant-only model. Adding the second block of variables, higher levels of depressive symptoms ( $\beta = .06, p < .001$ ) were associated with greater past 30 day smoking frequency among boys. Gender role traditionalism and the interaction between the two, on the other hand, were not significant predictors of smoking frequency among boys. However, the addition of the predictors in Step 2 significantly improved the amount of variance accounted for in the model ( $\Delta R^2 = .003, p < .001$ ).

*Depressive Symptoms and Race/Ethnicity as Predictors of Smoking Status among Gender Role Traditionalists*

As a preliminary step to testing Hypothesis 3 [Among girls with traditional gender role attitudes, race/ethnicity modifies the depressive symptoms-smoking relationship, such that being White (rather than Black) predicts a stronger positive association between depressive symptoms and smoking], I created a subset of the sample used in Hypothesis 2, consisting of girls scoring high (4 or 5) on traditional gender role attitudes. Means and frequencies for all predictor variables among girls with traditional gender role attitudes ( $N = 2,692$ ) are presented in Table 11. White girls with traditional gender role attitudes were fairly equally distributed among 8<sup>th</sup> grade (50.2%) and 10<sup>th</sup> grade (49.6%), and between survey years (the percentage of respondents per survey year ranged from 24.0% for 2007 to 26.1% for 2004). On average, White girls' parents had completed some amount of college ( $M = 3.90$ ,  $SD = 1.18$ ). They reported fairly low levels of smoking in the past 30 days ( $M = 1.29$ ,  $SD = 0.84$ ), few depressive symptoms ( $M = 2.11$ ,  $SD = 1.18$ ), low levels of deviant behavior ( $M = 1.23$ ,  $SD = 0.44$ ), intermediate levels of sensation-seeking ( $M = 3.25$ ,  $SD = 1.07$ ), and having a few friends who smoke ( $M = 2.24$ ,  $SD = 1.10$ ).

Comparisons between ever smokers (37.6% of all White girls with traditional gender role attitudes) and never smokers (62.4% of all White girls with traditional gender role attitudes) showed significant differences on all predictor variables. Compared to never smokers, ever smokers were less likely to be in the 8<sup>th</sup> grade, had higher levels of depressive symptoms, had parents with lower levels of educational attainment, had more friends who smoke, and had higher levels of sensation-seeking and deviance.

Black girls with traditional gender role attitudes were somewhat more likely to be in 8<sup>th</sup> grade (54.2%) than in the 10<sup>th</sup> grade (45.7%), and were somewhat less likely to have taken the survey in 2007 (20.6%) than in the other years (the percentage of respondents per survey year were 26.8%, 28.1%, and 24.5% for 2004, 2005, and 2006, respectively). On average, Black girls' parents had completed high school or some amount of college ( $M = 3.62$ ,  $SD = 1.28$ ). Black girls with traditional gender role attitudes reported low levels of smoking in the past 30 days ( $M = 1.14$ ,  $SD = 0.60$ ), few depressive symptoms ( $M = 2.27$ ,  $SD = 1.30$ ), low levels of deviant behavior ( $M = 1.32$ ,  $SD = 0.52$ ), intermediate levels of sensation-seeking ( $M = 2.92$ ,  $SD = 1.10$ ), and having a few friends who smoke ( $M = 2.03$ ,  $SD = 1.08$ ).

Comparisons between ever smokers (32.8% of all Black girls with traditional gender role attitudes) and never smokers (67.2% of all Black girls with traditional gender role attitudes) showed significant differences on most predictor variables. Compared to never smokers, ever smokers were less likely to be in the 8<sup>th</sup> grade, had higher levels of depressive symptoms, had more friends who smoke, and had higher levels of sensation-seeking and deviance.

Intercorrelations between variables analyzed among all girls with traditional gender role attitudes are presented in Table 12 (results for Black girls ( $n = 546$ ) are above the diagonal, while results for White girls ( $n = 2,146$ ) are below the diagonal). All items and scales theorized to be predictors of smoking showed statistically significant associations with smoking status. For White girls with traditional gender role attitudes, having friends who smoke ( $r = .52$ ), deviance ( $r = .30$ ), and sensation-seeking ( $r = .30$ ) displayed the strongest correlations, all  $p < .001$ . For Black girls with traditional gender

role attitudes, having friends who smoke ( $r = .37$ ) and deviance ( $r = .30$ ) were the strongest predictors of smoking (both  $p < .001$ ).

To test the first part of Hypothesis 3 [being White (rather than Black) predicts a stronger positive association between depressive symptoms and smoking status among girls with traditional gender role attitudes], I estimated a binary logistic regression model to predict smoking status (0 = *never smoker*, 1 = *ever smoker*) among girls with traditional gender role attitudes ( $N = 2,692$ ). For the first step of the model, I entered a block of psychosocial and demographic variables shown to be predictors of smoking status: parent SES, having friends who smoke, sensation-seeking, deviance, and grade in school. As shown in Table 13, all psychosocial and demographic predictors included in Step 1 were significant predictors of smoking status among girls with traditional gender role attitudes. Specifically, having more friends who smoke, higher levels of sensation-seeking and engaging in more deviant behavior predicted a greater likelihood of having ever smoked cigarettes. Higher parent SES, and being in 8<sup>th</sup> rather than 10<sup>th</sup> grade, on the other hand, were all associated with a lower likelihood of having ever smoked. The block of variables in Step 1 accounted for 38% of the variance in smoking status among girls with traditional gender role attitudes, a significant improvement over the constant-only model. The second step of the model was comprised of depressive symptoms, race/ethnicity, and the depressive symptoms x race/ethnicity interaction (all variables were standardized), as well as the block of predictors from Step 1. Contrary to expectations, neither of the two main effects nor the interaction term was a significant predictor of smoking status (see Table 13). With the addition of the block of variables in

Step 2, the model accounted for 39% of the variance in smoking status among girls with traditional gender role attitudes.

*Depressive Symptoms and Race/Ethnicity as Predictors of Smoking Frequency among Gender Role Traditionalists*

With insufficient cell counts to conduct a multiple regression analysis for the second part of Hypothesis 3 [being White (rather than Black) predicts a stronger positive association between depressive symptoms and smoking frequency among girls with traditional gender role attitudes], I ran a second logistic regression analysis to predict past 30 day smoking frequency (0 = *did not smoke in past 30 days*, 1 = *smoked in past 30 days*) among girls with traditional gender role attitudes ( $N = 2,692$ ). The first block of the model contained the same psychosocial and demographic predictors used in the logistic regression analysis above. As shown in Table 14, all psychosocial and demographic predictors included in Step 1 were significant predictors of smoking frequency. Specifically, having more friends who smoke, higher levels of sensation-seeking and engaging in more deviant behavior predicted a greater likelihood of having smoked cigarettes in the past 30 days. Higher parent SES, and being in 8<sup>th</sup> rather than 10<sup>th</sup> grade, on the other hand, were both associated with a lower likelihood of having smoked in the past 30 days. The block of variables in Step 1 accounted for 41% of the variance in past 30 day smoking status among girls with traditional gender role attitudes, a significant improvement over the constant-only model. The second step of the model consisted of depressive symptoms, race/ethnicity, and the depressive symptoms x race/ethnicity interaction (all variables were standardized) in addition to the control

variables entered in Step 1. Consistent with expectations, race/ethnicity was a significant predictor of past 30 day smoking, such that White girls with traditional gender role attitudes were more likely to have smoked in the past 30 days than were Black girls with traditional gender role attitudes ( $\beta = 0.66, p < .01$ ). However, neither depressive symptoms nor the depressive symptoms x race/ethnicity interaction were significant predictors of smoking cigarettes in the past 30 days among girls with traditional gender role attitudes. With the addition of the block of variables in Step 2, the model accounted for 43% of the variance in past 30 day smoking status among girls with traditional gender role attitudes.

As a supplemental analysis, I re-ran Hypothesis 3 for boys to test whether a relationship exists between depressive symptoms, race/ethnicity, and smoking status and frequency among boys with traditional gender role attitudes ( $N = 4,845$ ). Means and frequencies for White boys with traditional gender role attitudes ( $n = 4,168$ ) and for Black boys with traditional gender role attitudes ( $n = 677$ ) are presented in Table 15. This table also displays the results of comparisons between White boys with traditional gender role attitudes who have ever smoked (35.6% of sample) and who have never smoked (63.9% of sample), and the results of comparisons between Black boys with traditional gender role attitudes who have ever smoked (32.9% of sample) and who have never smoked (67.1% of sample). One noteworthy difference between mean values for White boys and Black boys is in the association of parent SES with smoking. Parent SES for White boys with traditional gender role attitudes was significantly lower for ever smokers ( $M = 3.94, SD = 1.15$ ) than for never smokers ( $M = 4.25, SD = 1.09$ ),  $t(3,974) = -8.40, p < .001$ . For Black boys, on the other hand, ever smokers ( $M = 3.62, SD = 1.08$ )

and never smokers ( $M = 3.80$ ,  $SD = 1.24$ ) did not differ significantly in parent SES,  $t(613) = -1.90$ , *ns*. Intercorrelations between variables analyzed among all boys with traditional gender role attitudes are presented in Table 16 (results for Black boys are above the diagonal, while results for White boys are below the diagonal). As was the case for girls with traditional gender role attitudes, all items and scales theorized to be predictors of smoking showed statistically significant associations with smoking status/frequency among boys with traditional gender role attitudes.

Using the same methodology described above for girls with traditional gender role attitudes, I estimated a binary logistic regression model to predict smoking status (0 = *never smoker*, 1 = *ever smoker*) among boys with traditional gender role attitudes. The first step of the model consisted of a block of psychosocial and demographic variables shown to be predictors of smoking status. As shown in Table 17, all psychosocial and demographic predictors included in Step 1 were significant predictors of smoking status among boys. Having more friends who smoke, higher levels of sensation-seeking and engaging in more deviant behavior predicted a greater likelihood of having ever smoked cigarettes. Higher parent SES, being in 8<sup>th</sup> rather than 10<sup>th</sup> grade, and taking the survey more recently, on the other hand, were all associated with a lower likelihood of ever smoking among boys. The block of variables in Step 1 accounted for 32% of the variance in smoking status among boys with traditional gender role attitudes, a significant improvement over the constant-only model. The second step of the model was comprised of depressive symptoms, race/ethnicity, the depressive symptoms x race/ethnicity interaction (all variables were standardized), as well as the block of predictors from Step 1. Neither of the two main effects nor the interaction term was a significant predictor of

smoking status among boys with traditional gender role attitudes. With the addition of the block of variables in Step 2, the model accounted for 33% of the variance in smoking status among boys with traditional gender role attitudes (see Table 17).

Results of the logistic regression analysis predicting past 30 day smoking frequency (0 = *did not smoke in past 30 days*, 1 = *smoked in past 30 days*) among boys with traditional gender role attitudes ( $N = 4,845$ ) are presented in Table 18. The first block of the model contained the same psychosocial and demographic predictors used in the logistic regression analysis above. Having friends who smoke, sensation-seeking, and engaging in more deviant behavior predicted a higher likelihood of having smoked in the past 30 days, while being in the 8<sup>th</sup> grade (rather than the 10<sup>th</sup> grade) was a negative predictor of past 30 day smoking frequency. The block of variables in Step 1 accounted for 38% of the variance in past 30 day smoking status among boys with traditional gender role attitudes, a significant improvement over the constant-only model. The second step of the model was comprised of depressive symptoms, race/ethnicity, the depressive symptoms x race/ethnicity interaction (all variables were standardized), as well as the block of predictors from Step 1. Only race/ethnicity was a significant predictor of past 30 day smoking status among boys with traditional gender role attitudes, such that White boys with traditional gender role attitudes were more likely to have smoked in the past 30 days than were Black boys with traditional gender role attitudes ( $\beta = 0.81, p < .001$ ). With the addition of the block of variables in Step 2, the model accounted for 39% of the variance in past 30 day smoking status among boys with traditional gender role attitudes (see Table 18).

*Alternative Analysis for Hypothesis 3*

As an alternative approach to evaluating the potential moderating roles of race/ethnicity and gender role traditionalism on the depressive symptoms-smoking relationship, I re-ran Hypothesis 3 with gender role traditionalism as a continuous, rather than dichotomous, variable. I ran a model separately for girls and for boys. Instead of only including girls who scored high on gender role traditionalism ( $N = 2,692$ ), all girls in the sample were included ( $N = 12,214$ ). With this larger sample size, I was also able to return past 30 day smoking frequency to a continuous variable, rather than dichotomizing it into those who had or had not smoked cigarettes in the past 30 days. Using the same methodology as for previous hypotheses, the first step of the model consisted of the block of six psychosocial and demographic variables shown to be predictors of smoking. Having friends who smoke and engaging in higher levels of deviant behaviors were both associated with an increase in past 30 day smoking frequency among girls. Higher parent SES and being in the eighth grade, on the other hand, were both associated with lower past 30 day smoking frequency among girls. The block of variables in Step 1 accounted for 26% of the variance in past 30 day smoking frequency among girls, a significant improvement over the constant-only model. The second step of the model was comprised of depressive symptoms, gender role traditionalism, race/ethnicity, the depressive symptoms x gender role traditionalism interaction, the depressive symptoms x race/ethnicity interaction, and the depressive symptoms x gender role traditionalism x race/ethnicity interaction (all variables were standardized), as well as the block of predictors from Step 1. Race/ethnicity was the only main effect that was a significant predictor of past 30 day smoking frequency among girls ( $\beta = 0.07, p < .001$ ), and the depressive symptoms x race/ethnicity interaction was the only significant interaction term

( $\beta = 0.09, p < .001$ ) (see Table 19). White girls reported smoking cigarettes more frequently in the past 30 days than did Black girls at both low and high levels of depressive symptoms. At high levels of depressive symptoms however, White girls smoked more frequently in the past 30 days than they did at low levels of depressive symptoms. Among Black girls, the trend was reversed, such that Black girls with high levels of depressive symptoms smoked less frequently in the past 30 days than did Black girls with low levels of depressive symptoms. The three-way interaction between depressive symptoms, gender role traditionalism, and race/ethnicity was not significant. The addition of the predictors in Step 2 significantly improved the amount of variance accounted for in the model to 27% ( $\Delta R^2 = .01, p < .001$ ).

Next, I ran this analysis for all boys in the sample ( $N = 11,492$ ), rather than only for boys with traditional gender role attitudes ( $N = 4,845$ ). Using the same methodology as for the girls, the first step of the model consisted of the block of six psychosocial and demographic variables shown to be predictors of smoking. Having friends who smoke and engaging in higher levels of deviant behaviors were both associated with an increase in past 30 day smoking frequency among boys, while higher parent SES was a negative predictor of past 30 day smoking frequency among boys. The block of variables in Step 1 accounted for 23% of the variance in past 30 day smoking frequency among boys, a significant improvement over the constant-only model. The second step of the model was comprised of depressive symptoms, gender role traditionalism, race/ethnicity, the depressive symptoms x gender role traditionalism interaction, the depressive symptoms x race/ethnicity interaction, and the depressive symptoms x gender role traditionalism x race/ethnicity interaction (all variables were standardized), as well as the block of

predictors from Step 1. As was the case for girls, race/ethnicity was the only main effect that was a significant predictor of past 30 day smoking frequency among boys ( $\beta = 0.06$ ,  $p < .001$ ), and the depressive symptoms x race/ethnicity interaction was the only significant interaction term ( $\beta = 0.05$ ,  $p < .01$ ) (see Table 20). Mirroring the findings for girls, White boys reported smoking cigarettes more frequently in the past 30 days than did Black boys at both low and high levels of depressive symptoms. At high levels of depressive symptoms however, White boys smoked more frequently in the past 30 days than they did at low levels of depressive symptoms. For Black boys, on the other hand, the trend was reversed, such that Black boys with high levels of depressive symptoms smoked less frequently in the past 30 days than did Black boys with low levels of depressive symptoms. The three-way interaction between depressive symptoms, gender role traditionalism, and race/ethnicity was not significant. The addition of the predictors in Step 2 significantly improved the amount of variance accounted for in the model to 24% ( $\Delta R^2 = .01$ ,  $p < .001$ ).

## Chapter 5: Discussion

### *Summary of Results*

Overall, results of the analyses I conducted demonstrated partial support for the study hypotheses. I confirmed the first part of Hypothesis 1: being female (rather than male) predicted a stronger positive association between depressive symptoms and smoking status. As I expected, higher levels of depressive symptoms predicted a greater likelihood of having ever smoked cigarettes, and being a girl predicted a greater likelihood of having ever smoked cigarettes. In addition, the interaction between depressive symptoms and gender was significant. At low levels of depressive symptoms, boys were more likely to have ever smoked than girls. At high levels of depressive symptoms, on the other hand, girls were more likely to have ever smoked cigarettes than boys. I obtained these results controlling for parent SES, having friends who smoke, sensation-seeking, deviance, grade level, and year of survey administration, all significant predictors of having ever smoked cigarettes.

Similar to the findings for smoking status, the main effects for the second part of Hypothesis 1 [that being female (rather than male) would predict a stronger positive association between depressive symptoms and past 30 day smoking frequency] were significant in the expected direction. Both higher levels of depressive symptoms and being a girl were associated with greater frequency of smoking cigarettes in the past 30 days, with depressive symptoms demonstrating a somewhat stronger relationship to past 30 day smoking than gender. Contrary to expectations, however, the depressive symptom x gender interaction was not significant. At both low levels and high levels of depressive symptoms, girls reported smoking cigarettes more frequently than did boys in

the past 30 days. I obtained these results controlling for the six psychosocial and demographic variables included in the model, three of which were predictors of past 30 day smoking frequency: parent SES, having friends who smoke, and deviant behavior.

As was the case for the first hypothesis, results of the analyses indicated partial support for Hypothesis 2 [Among girls, gender role attitudes modify the depressive symptoms-smoking relationship, such that endorsing more traditional (rather than more egalitarian) gender roles predicts a stronger positive association between depressive symptoms and smoking]. The main effects in the model predicting smoking status were significant in the expected direction. Both higher levels of depressive symptoms and reporting more traditional gender role attitudes were associated with a greater likelihood of having ever smoked cigarettes among girls. Contrary to expectations, however, the depressive symptom x gender role attitudes interaction was not significant. At both low levels and high levels of depressive symptoms, girls with traditional gender role attitudes were more likely to have ever smoked cigarettes than were girls with more egalitarian gender role attitudes. I obtained these results controlling for the six psychosocial and demographic variables included in the model, all of which were predictors of having ever smoked cigarettes: having friends who smoke, sensation-seeking and deviant behavior were positively associated with smoking status, while parent SES, grade level, and year of survey administration were negatively associated with having ever smoked cigarettes. As a supplemental analysis, I ran this hypothesis separately for boys. I found that the results for boys mirrored the results for girls: higher levels of depressive symptoms and greater gender role traditionalism were associated with a greater likelihood of having ever smoked cigarettes, but the interaction between the two was not significant.

I confirmed the second part of Hypothesis 2 [endorsing more traditional (rather than egalitarian) gender role attitudes predicted a stronger positive association between depressive symptoms and past 30 day smoking frequency among girls]. As expected, higher levels of depressive symptoms predicted greater smoking frequency in the past 30 days. Holding traditional gender role attitudes, on the other hand, did not predict past 30 day smoking frequency. However, as predicted, the interaction between depressive symptoms and gender role traditionalism was significant. At low levels of depressive symptoms, girls low on gender role traditionalism reported smoking cigarettes more frequently in the past 30 days than did girls with more traditional gender role attitudes. At high levels of depressive symptoms, on the other hand, this trend was reversed, such that girls high on gender role traditionalism reported smoking more frequently in the past 30 days than did girls with more egalitarian gender role attitudes. I obtained these results controlling the six psychosocial and demographic variables, four of which were significant predictors of past 30 day smoking frequency: parent SES, having friends who smoke, deviance, and grade level. The supplemental analysis I conducted for boys separately showed a main effect for depressive symptoms only, such that boys with higher levels of depressive symptoms reported smoking more frequently in the past 30 days. Neither gender role traditionalism, nor the interaction between the two, was significant. Similar to the results for girls, I obtained these findings controlling for all six psychosocial and demographic variables, three of which were significant predictors of past 30 day smoking frequency: parent SES, having friends who smoke, and deviant behavior. As with the results for Hypothesis 1, the second part of Hypothesis 2 further

supported the strength of depressive symptoms in particular as a predictor of past 30 day smoking.

In contrast to the results for Hypotheses 1 and 2, I did not find support for Hypothesis 3 [Among girls with traditional gender role attitudes, race/ethnicity modifies the depressive symptoms-smoking relationship, such that being White (rather than Black) predicts a stronger positive association between depressive symptoms and smoking]. Neither depressive symptoms nor race/ethnicity (or the interaction between the two) predicted the likelihood of a girl with traditional gender role attitudes having ever smoked cigarettes, controlling for psychosocial and demographic predictors of smoking (all of which were significant in the expected direction). For the second part of the hypothesis, only race/ethnicity was significant, such that among girls with traditional gender role attitudes, White girls reported smoking more frequently in the past 30 days than did Black girls (controlling for psychosocial and demographic predictors of smoking). Results of the supplemental analyses I conducted for Hypothesis 3 for boys with traditional gender role attitudes mirrored the results for the girls, with only race/ethnicity emerging as a significant predictor of smoking frequency. White boys with traditional gender role attitudes reported smoking more frequently in the past 30 days than did Black boys with traditional gender role attitudes.

When I tested this hypothesis among all girls in the sample and among all boys in the sample (rather than just among those high on gender role traditionalism), race (being White) remained a predictor of past 30 day smoking frequency among both girls and boys. In addition, the interaction between depressive symptoms and race/ethnicity was significant. Among girls (and boys) both with low levels and with high levels of

depressive symptoms, being White was associated with greater past 30 day smoking frequency. However, as one moved from low to high levels of depressive symptoms, White girls (and boys) past 30 day smoking frequency increased significantly. For Black girls (and boys), on the other hand, past 30 day smoking frequency decreased significantly as an individual moved from low to high levels of depressive symptoms.

#### *Explanations for Findings and Integration with Past Literature*

Explanations for these results suggest several areas of convergence, and several areas of divergence, between the current findings and past research literature on youth smoking prevention, depressive symptoms, and gender role attitudes in the context of gender and race/ethnicity. The inclusion of control variables in Step 1 of each of the models confirmed a number of psychosocial and demographic variables consistently found to be predictive of cigarette smoking among youth. In general, smokers differed from non-smokers on measures of parent SES, having friends who smoke, sensation-seeking, deviance, grade level, and year of survey administration. Consistent with past literature (Baker et al., 2004; Carvajal et al., 2004; Tyas & Pederson, 1998), reporting having more friends who smoke, higher levels of sensation-seeking, and higher levels of deviant behavior were all positive predictors of having ever smoked cigarettes and past 30 smoking frequency, while higher parent SES, being in 8<sup>th</sup> grade (i.e., being younger), and year of survey (taking the survey more recently) were all associated with a decreased likelihood of cigarette smoking. The confirmation of these psychosocial and demographic predictors of smoking, while unsurprising, can be viewed as support for the representativeness of the current sample and high external validity of the study.

The main effects found in Hypothesis 1 lend support to the well-evidenced association between depression/depressive symptoms and smoking among youth. Consistent with past literature (Baker et al., 2004; Fergusson et al., 2003) and national survey data (SAMHSA, 2005) examining the relationship between depression and smoking, early adolescents with depressive symptoms were more likely to have ever smoked cigarettes, and to have smoked cigarettes more frequently in the past 30 days, than their non-depressed peers. As Baker et al. (2004) and Pomerleau et al. (2003) among others suggested, teens with depressive symptoms may turn to cigarette smoking as a form of self-medication for negative affect. Although the main effect obtained for gender on smoking (girls were more likely than boys to have ever smoked cigarettes) is not usually found for this age group, the gender distribution of ever smokers shows fairly similar percentages (perhaps significant due to the large sample size), consistent with past research (SAMHSA, 2005).

As expected, depressive symptoms and gender interacted to predict having ever smoked cigarettes. At low levels of depressive symptoms, boys were more likely to have ever smoked than girls, while at high levels of depressive symptoms, girls were more likely to have ever smoked than boys. In contrast, the interaction between depressive symptoms and gender was not predictive of past 30 day smoking frequency. At both low and high levels of depressive symptoms, girls reported smoking cigarettes more frequently in the past 30 days than did boys. One possible explanation for the non-significant interaction for past 30 day smoking frequency is suggested by research indicating the girls may be particularly vulnerable to the effects of nicotine, displaying signs of nicotine addiction more quickly than boys do (Office of National Drug Control

Policy, 2006). Such biological explanations of gender differences in vulnerability to nicotine addiction may explain why the main effects of gender and depressive symptoms, but not the interaction term, were significant. Girls, regardless of level of depressive symptoms, may be more likely than boys are to have smoked in the past 30 days because of the greater susceptibility to nicotine addiction among girls. More generally, the gender differences in Hypothesis 1 show at least some support for past research literature indicating that girls and boys have different motives for smoking cigarettes (Honjo & Siegel, 2003; Nichter et al., 1997; USDHHS, 2001) and that boys and girls may express depressive symptoms differently, engaging in different high-risk health behaviors (Leadbeater et al., 1995; Nolen-Hoeksema & Hilt, 2006; Poulin et al., 2005; Tolman et al., 2006).

Extending these findings, the results of Hypothesis 2 provided some additional clarification regarding gendered aspects of the depressive symptoms-smoking relationship. For adolescent girls, both depressive symptoms and endorsing more traditional gender role attitudes predicted a greater likelihood of having ever smoked cigarettes. While the first part of this finding (note: depressive symptoms were also predictive of past 30 day smoking frequency) was expected for reasons mentioned above and indicates further support for Hypothesis 1, the main effect of gender role attitudes on smoking status was not anticipated. There are a number of possible explanations for these findings. For example, adolescent girls may recognize the role constraint associated with traditional gender role attitudes, and use smoking as a way to cope with the stress that they feel from being constrained by these traditional roles. Another potential explanation is that traditional gender role attitudes may be constraining for all

girls, even if girls do not recognize the endorsement of traditional gender role attitudes as such. Women may report, and truly believe, that they are happy with a traditional gendered division of labor, but the meaning of this division of labor may have negative effects for women (Barnett, 2004; David & Kaplan, 1995; Williams & Kurina, 2002). Perceptions among early adolescent girls of a traditional gendered division of labor may work in a similar manner. Alternatively, the reality of the two wage-earner household (and particularly in difficult economic times) leaves a couple less likely to achieve a traditional division of labor, should they desire such an arrangement. Instead, a woman often must juggle a disproportionate amount of the household responsibilities with outside work (Cole & Rakhra, 2008; Davis & Pearce, 2007). The effects of taking on multiple roles are felt by all members of the family, and may act as an unwelcome model of sorts for young women.

More likely, perhaps, is that it is not traditional gender role attitudes per se that are predictive of ever smoking, but rather, something unmeasured that is related to the item used as the operationalization of gender role attitudes (e.g., gender role intensification) that predicts a greater likelihood of having ever smoked cigarettes. This would also provide an explanation for the finding that traditional gender role attitudes predicted ever smoking among boys. It may not be traditional gender role attitudes per se that are predictive of ever smoking among boys, but rather, a related variable may explain the relationship between gender role traditionalism and ever smoking among boys. For example, it may be the expression of gendered ideals that makes smoking a particularly attractive behavior to boys with traditional gender role attitudes. Images of the Marlboro man have been synonymous with perceptions of masculinity for decades. For boys with

traditional gender role attitudes, smoking cigarettes represents a way to express the masculine image to which they aspire at this developmental stage. In a similar fashion, the return of cigarette advertisements to notions of traditional femininity (e.g., Elliott, 2007) may appeal to traditional girls in particular. Girls with traditional gender role attitudes may be more likely to have ever smoked cigarettes than their egalitarian counterparts because of the association they make between the act of smoking cigarettes and the attainment of idealized standards of beauty for girls (see, for example, Anderson, Glantz, & Ling, 2005; Gilbert, 2007; Wearing & Wearing, 2000).

In contrast to the main effect of traditional gender role attitudes on smoking status, traditional gender role attitudes were not associated with past 30 day smoking frequency among girls. This finding, inconsistent with the main effect of traditional gender role attitudes on smoking status, seems to contradict the theoretical explanations offered above. This incompatibility may be a function the small effect size found for gender role attitudes on smoking status. While statistically significant, the practical meaning of the results (i.e., how strongly they support the traditional gender role attitudes-smoking status relationship) is less clear.

While traditional gender role attitudes did not moderate the relationship between depressive symptoms and ever having smoked cigarettes among girls, it did moderate the relationship between depressive symptoms and past 30 day smoking frequency. More traditional gender role attitudes were associated with more frequent smoking in the past 30 days among girls, but only among girls with higher levels of depressive symptoms. This finding provides some support for the idea of traditional gender role attitudes being problematic for girls with depressive symptoms through role constraint theory (Rosario et

al., 1988). As previous research indicates, those with depressive symptoms tend to have negative expectations about their future. As the supplemental analyses for Hypothesis 2 demonstrated, these individuals (regardless of gender) are more likely to smoke cigarettes and to smoke more frequently. Gender differences emerge when depressive symptoms are coupled with the prescribed social roles for women associated with traditional gender role attitudes. The combination of distress and limited resources for coping may exacerbate the effects of depressive symptoms and be expressed through smoking by girls (Beck, 1967; Davis & Pearce, 2007; Seginer & Mahajna, 2004).

The supplemental analyses for Hypothesis 2 confirmed predicted gender differences in the moderating role of traditional gender role attitudes. As expected, depressive symptoms and traditional gender role attitudes interacted to predict past 30 day smoking among girls, but not among boys. These findings support the idea of the role constraint associated with traditional gender role attitudes having an effect on girls' health in particular (Barnett, 2004; David & Kaplan, 1995; Leadbeater et al., 1995; Matud, 2004). The meaning of traditional gender role attitudes is salient for girls, but not for boys, with depressive symptoms. For boys with depressive symptoms, traditional gender role attitudes do not have the same level of impact on health outcomes (in this instance, smoking frequency) as they do for girls, because holding traditional gender role attitudes does not represent the same kind of role constraint that they do for women, exacerbating feelings of constraint among those with depressive symptoms. It is expected that men will be the ones working and women will be the ones with their choices limited. Support for this theory should be approached with some caution, as once

again the effect size for this interaction was quite small, and gender role attitudes was not a moderator in the smoking status model for girls.

The results of Hypothesis 3 (examining the subset of girls who reported traditional gender role attitudes) did not provide support for the idea of racial/ethnic differences in the effects of depressive symptoms on smoking among girls with traditional gender role attitudes. Among both girls and boys with traditional gender role attitudes, depressive symptoms were not predictive of having ever smoked cigarettes or of having smoked cigarettes in the past 30 days. For both boys and girls with traditional gender role attitudes, race/ethnicity was not a significant predictor of having ever smoked cigarettes, but it was a significant predictor of having smoked cigarettes in the past 30 days. Finally, no interactions were found between depressive symptoms and race/ethnicity among those with traditional gender role attitudes among girls or boys. Although the sample size for these analyses were much smaller than for Hypotheses 1 and 2 since only the subset of the sample that endorsed traditional gender role attitudes were included, there was certainly a sufficient number (especially once years and grade levels were combined) to detect differences. Rather, these null results may reflect a body of research on differences in the meaning of traditional gender role attitudes for Black and White women that is at times contradictory. Among some women, traditional gender role attitudes may have a broader and more positive definition for Black women than they do for White women, as suggested by Buckley and Carter (2005), Cole and Zucker (2007), and Lyons et al. (2006). For others, Rederstorff et al.'s (2007) finding of traditional gender role attitudes as more negative for Black women than for White women may be a more accurate representation. Any interpretation of these results needs

to consider the large variations that exist within individuals of the same racial/ethnic group, as well as the possibility that women of different ethnicities are more similar to one another as a group than they are different from each other.

The alternative analysis run for Hypothesis 3 (models including the entire sample of girls and the entire sample of boys, rather than only those high on gender role traditionalism) demonstrated slightly different results. When I ran a model testing for a three-way interaction between depressive symptoms, gender role traditionalism, and race/ethnicity, race/ethnicity was once again a predictor of past 30 day smoking frequency among girls and among boys. Unlike in the previous model, however, in this model the depressive symptoms-race/ethnicity interaction was significant. An additional finding in the model for girls was that the depressive symptom x gender role traditionalism interaction was not significant. This would seem to contradict the results of the second part of Hypothesis 2, which showed a significant interaction between gender role traditionalism and depressive symptoms among girls. It is likely that this difference is due to the addition of race/ethnicity into the alternative model. In the alternative model, race/ethnicity may be overshadowing variance that depressive symptoms and gender role traditionalism would account for otherwise. Thus, the results of these additional analyses are not necessarily inconsistent with the results of Hypothesis 2. Rather, they underscore the particularly strong association that race/ethnicity has with smoking among both adolescent boys and girls.

### *Limitations*

These results can be further elucidated by some of the challenges of the current project, most notably with regard to measurement and analyses/statistical power. I will consider the limitations associated with both of these areas separately (though connections between the two are inevitable). I will then discuss issues related to design/internal validity and external validity/generalizability, and how the strength of the study in these areas balances out measurement and statistical limitations.

The operationalization of gender role attitudes is likely the greatest measurement limitation associated with the current project. While the initial plan was to combine participants' responses to four questionnaire items to create a score on a gender role traditionalism scale, the low inter-item reliability was unacceptable and instead a single item was chosen to represent gender role attitudes. Although this item's low correlation with the other gender role attitude items and the operationalization of a construct using a single item raises concerns about construct validity, the item does show face validity (it is also listed in the Monitoring the Future index under the heading of Sex Roles and Family) and convergent validity (this item is frequently used in large-scale studies as a measure of gender role attitudes). Use of the publically available dataset also precluded analyzing responses from the Western region of the U.S. (responses were deleted to protect participant confidentiality). Thus, a caveat to interpretation of these results is that they may not be representative of gender role attitudes of Black and White 8<sup>th</sup> and 10<sup>th</sup> graders across the entire U.S., depending on regional differences in gender role attitude traditionalism.

A second measurement issue to consider when interpreting the results is the time frame for the measurement of depressive symptoms and smoking status and frequency.

Although the study question and analyses were framed with the intention of depressive symptoms being the predictor (antecedent) of smoking, it is possible that the questions are actually measuring smoking behaviors that precede depressive symptom. The questions that comprise the depressive symptoms scale assess an individual's current level of depressive symptoms. However, the questions about smoking behavior ask about ever having smoked cigarettes, and past 30 day smoking frequency. Because the time frames that survey respondents are asked to consider may encompass earlier time points than for the depressive symptoms questions, it is possible that an individual's smoking preceded the onset of their current level of depressive symptoms. While this is an important issue to disentangle in studies of the depressive symptoms-smoking relationship, it seems likely that for a sample this young in age (some have smoked cigarettes, but many others who will eventually have not yet), it is depressive symptoms that are predicting smoking, as theorized.

A third measurement issue that may pose challenges for interpreting the results is the various definitions used for smoking by Monitoring the Future. How smoking is defined in general, and particularly among youth, varies widely across studies. What does it mean in terms of conceptualizing youth smoking that someone reports having ever smoked a cigarette? With the number of teens reporting smoking cigarettes in the past 30 days much smaller than the number of ever smokers, it was not possible to make finer distinctions between smokers based on stage of smoking experimentation. While it is most desirable to operationalize a variable based on theoretical considerations, the use of secondary data necessitated a more practical approach. For example, a comparison between the frequency with which Black girls and White girls smoke cigarettes daily

would not have met power requirements needed for statistical testing of racial/ethnic differences in daily cigarette smoking frequency. Similarly, for Hypothesis 3, past 30 day smoking frequency had to be recoded from a continuous variable into a dichotomous variable (yes, have smoked in the past 30 days or no, have not smoked in the past 30 days) to allow for sufficient sample sizes for each cell. Consideration of additional stages is certainly important, and will be discussed in further detail below. However, it was the use of a broader (more lenient) definition that allowed for racial/ethnic comparisons among the subset of the sample reporting traditional gender role attitudes.

The sample, while perhaps too small to measure multiple stages of smoking experimentation (likely to be a more accurate representation of the adoption of a high risk health behavior such as smoking), in general is considered quite large, and is a positive aspect of the current project. It facilitated the appropriate statistical testing of predictors of smoking among a nationally representative sample of Black and White female and male early adolescents (and the measurement of trends among and differences between demographic sub-groups). With the analysis of a large sample, however, it is important to consider potential limitations to the study's statistical power. Perhaps most relevant to the current study is the issue of effect size. Many of the results obtained demonstrated statistical significance; that is, they supported the existence of a relationship between predictor variables and smoking status/frequency, as measured by a *p*-value of less than .05. What is more ambiguous, however, is evidence for the practical significance of the results; that is, how *much* of an effect the variables had on predicting smoking, as measured by the effect size. The small effect size of the significant results for all of the hypotheses tested puts them into perspective in terms of how practically meaningful they

are. Using a strict interpretation of Cohen's definitions of a small, medium, and large effect size, one would certainly conclude that these results do not have practical significance. However, as Cohen himself notes (Cohen, 1998, as cited in Valentine & Cooper, 2003), effects sizes in certain sub-disciplines of social sciences tend to be smaller than effect sizes in other topic areas to begin with.

"Many effects sought in personality, social, and clinical-psychological research are likely to be small . . . because of the attenuation in validity of the measures employed and the subtlety of the issue frequently involved" (p. 13). Large effects, according to Cohen, are frequently "at issue in such fields as sociology, economics, and experimental and physiological psychology, fields characterized by the study of potent variables or the presence of good experimental control or both" (p. 13) (Cohen, 1998, as cited in Valentine & Cooper, 2003, p.5).

An analysis of the practical vs. the statistical significance of the findings needs to consider the context, in this case smoking. If the inclusion of depressive symptoms and gender role attitudes can explain even just an additional 1% of the variance in youth smoking, this still translates to a very real opportunity to save lives. A youth smoking prevention effort that shows even a slight increase in effectiveness over previous programs means reduced mortality and morbidity rates and their associated costs. Considered in this light, the practical significance of the results is unquestionable, at least to advocates of youth smoking prevention efforts. This is not to suggest a major shift in the focus of youth smoking prevention campaign time and resources. The majority of funding should still be directed towards risk factors that are known predictors of cigarette smoking among youth. However, the results of the current study do highlight the need to

address gender-related issues when developing and implementing tobacco prevention interventions and to consider gender within the context of these interventions.

Recognizing these limitations, it is equally important to not underestimate the strengths of the current study. The data used for the analyses come from Monitoring the Future, a well-respected study of adolescent attitudes and behaviors for more than 30 years. Various facets of the study, from its sampling procedures and survey administration to publicly available datasets, press releases and publications all indicate a strong study design. Similarly, the strong external validity of the current study cannot be underestimated. The sample utilized in the analyses was an aggregation of several years of the most recent data from a nationally representative sample of 8<sup>th</sup> and 10<sup>th</sup> grade students in the United States. Gaining access to this diverse and large a sample, particularly this age group, is certainly not an effortless undertaking. Offering researchers access to publicly-available datasets, Monitoring the Future and similar surveys help ensure that information about serious health issues is being collected using the population of interest, rather than a sample of convenience. Results of the Monitoring the Future survey are widely disseminated and used to inform discussions about the state of the health of America's youth, with diverse and far-reaching implications.

### *Implications of Findings*

The implications of the results of the current project are varied, but generally fall under two broad categories: theoretical and research implications, and applied implications. I will consider several implications for each in turn. The finding that holding traditional gender role attitudes is predictive of ever having smoked cigarettes

among both girls and boys indicates the importance of the inclusion of gender role attitudes in the theoretical framework for understanding risk factors and motives for youth smoking. Further, traditional gender role attitudes, as a moderator of the relationship between depressive symptoms and past 30 day smoking frequency among girls, may be an especially salient factor in the context of understanding smoking among teenage girls with depressive symptoms. However, before concluding that the importance of traditional gender role attitudes is unique to girls, it is worth noting a finding from the supplemental analysis that suggests that an alternative explanation may be warranted. Gender role traditionalism was predictive of having ever smoked cigarettes among both girls *and* boys. Perhaps it is not traditional gender role attitudes per se that are predictive of ever smoking, but rather, something unmeasured that is related to the item used as the operationalization of traditional gender role attitudes that predicts a greater likelihood of having ever smoked cigarettes among both girls and boys alike. With this in mind, it may be useful to consider correlates of the item/construct that were not measured. This would mean finding a variable related to traditional gender role attitudes that would predict having ever smoked cigarettes, but not past 30 day smoking frequency, among girls and boys. After all, no significant main effects were found for traditional gender role attitudes on past 30 day smoking frequency for either girls or boys. In this way, the results are a bit difficult to interpret. It may be, as discussed earlier, that the main effects of traditional gender role attitudes on smoking, while statistically significant, may not be practically significant due to the small effect size. Nevertheless, the partial support found for the effects of traditional gender role attitudes on the

relationship between depressive symptoms and smoking suggests potential value in further exploration of this variable's relationship to smoking among youth.

Similarly, results of the current study suggest the importance of additional consideration of characteristics that differentiate those who never smoke cigarettes, those who experiment with cigarettes, and those who progress to more regular smoking behaviors. For example, in Hypothesis 1, both higher levels of depressive symptoms and being female were positive predictors of having ever smoked cigarettes and of having smoked cigarettes in the past 30 days. A difference between these two groups (ever smokers and past 30 day smokers) emerged in the depressive symptoms-gender interaction. While depressive symptoms and gender interacted to predict ever smoking, the interaction was not significant for past 30 day smoking frequency. Future research should explore reasons why the interaction between depressive symptoms and gender is predictive of youth smoking initiation, but why it does not predict past 30 day (more regular) smoking. Similarly, results of Hypothesis 2 indicated that while depressive symptoms was predictive of ever smoking and past 30 day smoking among girls, gender role traditionalism was only predictive of ever smoking among girls. In contrast, while the depressive symptoms-gender role traditionalism interaction was not significant for ever smoking among girls, it did predict past 30 day smoking frequency among girls. If researchers are able to identify predictors of smoking among adolescents that are unique to or especially relevant to initiating smoking or more regular smoking, this would enable more focused research on how to best approach youth smoking prevention for adolescents at specific stages of smoking experimentation.

Another theoretical/research implication of the current study is the issue of what is really meant when gender is cited as a risk factor for smoking. There are some biological differences in vulnerability to smoking. However, for the most part, when researchers in the social sciences are discussing gender as a risk factor for smoking, they are treating it as a socially constructed identity, referring to characteristics associated with men or women. It is important for researchers to make clear distinctions between sex differences and gender differences in smoking, as the implications for each may differ. The same holds true for the study of racial/ethnic differences in smoking. In many ways, we do not currently have a complete picture of racial/ethnic differences in youth smoking. This is becoming even more apparent as the U.S. population becomes more diverse. In this project, only differences between White and Black adolescents were explored because of insufficient sample sizes to analyze additional populations. This was the case even after including an additional three years and an additional grade of data. Related to this is the issue of recoded/deleted variables in the publicly available dataset for race/ethnicity. Because of the smaller sample sizes for many of the racial/ethnic group response options, only respondents who marked one of three options (Black, White, and Hispanic) were included in the publicly available dataset. As the codebook explains, this was done to protect the identity of respondents. While deleting these responses achieves that goal, there is also a degree of irony in “the benefits” of protecting an already marginalized individual’s identity by making their identity and existence essentially invisible. The extra steps needed to gain permission to analyze the full set of data bias who is going to study the data and how research in these fields progresses.

Finally, there is a need to standardize, or at least to increase consistency, in measures of cigarette smoking and different levels of experimentation among youth in particular (operationalizing smoking among adults tends to be more consistent across research studies). Currently, researchers vary widely in how they define terms such as “current smoker,” “daily smoker,” “experimenter,” etc. Depending on the operationalization, a youth smoker ranges from someone who has ever smoked a cigarette to someone who has smoked at least 100 cigarettes in their lifetime, to someone smokes at least a pack of cigarettes per day. With such different definitions applied to the same label, it is difficult to aggregate findings about youth cigarette smoking in an accurate way and to use labels to make meaningful distinctions between stages of experimentation.

The applied implications of the current study are wide-ranging, and can (and should) be considered at multiple levels, from the individual and his or her community to society and national (and global) policy. At the individual level, this project suggests implications for mental health treatment and prevention, particularly for clinicians treating adolescent girls who are depressed or who exhibit depressive symptoms. For example, therapy could address how girls express their depressive symptoms and gender role traditionalism, with particular attention to the negative health effects. Therapy can also help girls find healthy ways to cope with concerns about one’s future related to depressive symptoms and gender role traditionalism that may arise at an early age, during a formative time. For example, therapy may focus on what is changeable versus what is not changeable about one’s situation and life circumstances, with the ultimate purpose of empowering young women. It will also be important to form successful collaborations

between physicians and mental health professionals. For instance, overall health and well-being may benefit from increased sensitivity among primary care physicians to reasons/risk factors for smoking (e.g., depressive symptoms) that are particularly strong among girls.

Public health and anti-smoking campaigns have traditionally focused on reaching as wide an audience as possible. In more recent years, there has been a growing trend of gearing these messages towards particular sub-populations. It is important to appropriately tailor messages to meet the needs of specific at-risk groups, such as women and youth (USDHHS, 2001). With the especially limited resources available during the current economic climate (and money from the Master Settlement Agreement dwindling), developing individualized, tailored, targeted approaches become even more important. Increasing understanding of what risk factors/motives are particularly pertinent to segments of the population most at-risk for smoking cigarettes and targeting these groups before they start smoking (or worse, become addicted to nicotine) can have ripple effects beyond the individual being targeted. The robust relationship between an individual smoking cigarettes and having friends (or parents) who smoke, particularly strong among adolescent girls, provides support for this notion.

This brings up the larger issue of change at the societal level in terms of gender role attitudes, depressive symptoms, girls, and smoking. Programs tailored to particular at-risk groups traditionally follow a positivist biomedical paradigm, focusing on motives and risk factors that are viewed as changeable (e.g., risk perception and health knowledge, industry manipulation, glamorization of smoking), and treat life experience and contextual factors (e.g., education, socioeconomic status, race/ethnicity) as constants

that remain static (Schulz & Mullings, 2006). This tendency to focus on individual traits rather than on the broader social context, while certainly not unique to smoking, encourages the perpetuation of blaming the individual for initiating health risk behaviors such as smoking. It also assigns the individual the responsibility of modifying the behavior, rather than questioning and analyzing the contributions and accountability of social institutions, social status, and power dynamics.

One way to begin to change some of these factors is through policy initiatives. For example, taxing of cigarettes and access to cigarettes are two related and important issues, especially if depressed teens are turning to cigarettes as a way of coping with the depressive symptoms. Over the past several years, increases in taxing and stricter enforcement of age requirements have had positive effects on decreasing smoking prevalence across the U.S. and prevalence rates in particular cities/states. Making the cost of cigarettes prohibitive for teens is one way to decrease access to a substance that many still report as being fairly easy to gain access to if they would like (even though it is illegal for all those surveyed, as they are all under the age of 18). Schools, businesses and the community at large have a responsibility and a role to play in reducing teens' access to cigarettes.

While the lower smoking rates of the past decade and the success of various anti-tobacco campaigns is a cause for celebration, there also needs to be sustained resources and attention focused on youth smoking prevention. President Obama took a major step in this direction with his recent appointment of Tom Frieden as head of the Centers for Disease Control and Prevention. Formerly Commissioner of the New York City Department of Health and Mental Hygiene, Dr. Frieden is well-known for his focus on

tobacco control as a health topic of priority and for the implementation of broad anti-smoking policies in New York City. If Dr. Friedan is able to have similar success at a national level, the development of successful smoking prevention strategies have the potential to help contain the costs of a healthcare system that is spiraling out of control. On June 22, 2009, President Obama facilitated this process greatly with the bold move of signing into law the bill granting the Food and Drug Administration (FDA) the authority to regulate tobacco use in the United States. This historic legislation includes provisions to further reduce tobacco industry advertising to kids, to place health warnings more prominently on cigarette packaging, and to ban the use of terms such as “light” and “mild” to describe cigarettes, among other requirements.

As we make strides in the U.S. towards decreasing the use of tobacco, it is important to note that cigarette manufacturers have taken their business overseas. The prevalence of cigarette smoking among women and men in third world countries is staggering and should be an issue of national concern. It is not clear at this point whether or not traditional gender role attitudes have the same connection to smoking for young women from other countries (especially those in which the norm is more traditional roles for men and women) as they do for young women in the U.S. However, if it is something about traditional gender role attitudes themselves that are connected to an increased likelihood of smoking, our sending cigarettes overseas may be particularly dangerous for women. Cultural variations in the meaning of traditional gender role attitudes and their effects on women’s physical and mental health are one possible area for future research. Several others are described below.

### *Future Directions*

It would be useful to evaluate whether the items used in the Monitoring the Future survey (developed in the 1970s) still accurately represent the construct of gender role attitude traditionalism. Are these measures up-to-date in terms of current conceptualizations of gender role attitudes? The items are similar to those used on surveys from the 1970s, but much has changed over the past 30-40 years with regard to women and perceptions of gender roles. It would be interesting for future studies to replicate the current analyses using alternative measures of gender role attitudes and gender role traditionalism to assess whether the results show convergent validity (that they are consistent with other measures operationalizing gender role attitudes). If items/scales are outdated, the development or use of a gender role attitudes scale that is more relevant to the conceptualization of gender role attitudes by today's young woman may be an important addition to the measurement tools in this field of research.

Questions about gender equality and equal pay for equal work may not have the same relevance or discriminating power as they did decades ago, with clear socially desirable responses at this point in time. In this way, measuring attitudes towards gender equality may require more sophisticated methods and more subtle types of questioning; much in the same way the researchers have revised tactics for questionnaires to assess racism. Use of implicit association tests show promise in this area. Additionally, instead of asking about general attitudes towards men and women's equality, it may be more useful to evaluate perceptions regarding sharing household chores and childcare, importance of partners' job status, etc. Finally, the structure of many American households is no longer that of the traditional nuclear family, with a husband and wife. Assumptions about the

basic makeup of a family and associated roles need to be altered to match the reality that families come in a variety configurations.

Another aspect of gender role attitudes that future research could focus on has to do with the potential benefits of endorsing egalitarian gender role attitudes. It would be interesting to explore whether there is a protective role that egalitarian gender role attitudes play in the depressive symptoms-smoking relationship among girls. If there is, a next step would be for researchers to explore how this information can be used to reduce smoking among girls with depressive symptoms. For example, do egalitarian gender role attitudes play the same role for other behaviors that girls commonly use to express depressive symptoms (e.g., unhealthy weight control practices)? Stepping back for a moment, it would also be useful to understand if traditional gender role attitudes play similar roles in the relationship between depressive symptoms and high risk health behaviors other than smoking (especially other weight-related behaviors, such as diet pill use) that are particularly prevalent among girls of this age group. Future research could test this theory with other outcomes such as these to examine the extent to which the effects of the interaction between depressive symptoms and traditional gender role attitudes seems to be unique to smoking as well as the extent to which findings are replicable.

An additional area for future research is made possible by the rigorous study design of Monitoring the Future. Longitudinal analyses could be conducted using the results of the analyses of these Monitoring the Future data along with follow-up data (collected at various time intervals from a subset of the original sample) to look at the influence of depressive symptoms and traditional gender role attitudes on later smoking,

later depressive symptoms and later gender role attitudes. Analyses could also examine the effects of these variables (at grade 8 and 10) on other health outcomes (e.g., drug use, alcohol use), as well as on other outcomes of interest (e.g., later work status, profession, marriage and kids, socioeconomic status). If the link can be established between particular attitudes and behaviors in the 8<sup>th</sup> and 10<sup>th</sup> grade and later health and well-being (or later high risk health behaviors), this provides further evidence for the importance of anti-smoking campaigns in reducing the prevalence of smoking and related illnesses among the next generation of girls and boys in the U.S. It will be important for any longitudinal studies to consider differences that may emerge in several of the key variables of interest at different points in adolescence. For example, as boys and girls continue into adolescence, the nature and severity of depressive symptoms may shift (and do so differently for boys and for girls). Similarly, boys' and girls' gender role attitudes may become increasingly salient (and thus more pronounced/extreme) as teenagers move closer to young adulthood. To make useful comparisons over time, these differences associated with changes in developmental moments must be considered.

Longitudinal studies often present a number of practical difficulties, not the least of which is the amount of time it takes to find and verify results. For a behavior with such dangerous consequences as cigarette smoking, it may not be feasible to wait for definitive results before taking action. With a generation of youth that is growing up with all of the advances in technology, the expectation is to find information quickly and in real-time from a multitude of sources, and to communicate with others instantly and constantly. Public health campaigns have already started to use various forms of technology (e.g., websites, texting, emails, interactive discussion groups online, YouTube

videos) to promote public health initiatives. One channel that may also hold potential is Facebook and other popular social networking sites that collect information about their users as they engage with the various features to choose what ads to display for a given individual. Just as Facebook uses personal information to select ads for clothing or activities that they believe a particular user would have interest in, if girls showed symptoms of depression, and particularly if combined with traditional gender role attitudes, the website could target those girls with public health-sponsored anti-smoking ads.

### *Conclusion*

Cigarette smoking, widely recognized as the leading preventable health behavior associated with death and disease in the United States, remains a public health issue of national concern. While research studies have identified and found empirical evidence for a multitude of behavioral, social and demographic predictors and risk factors for youth smoking initiation, the relative importance of particular types of risk factors and the connections between these variables remains complex and an issue of debate. My aim in the current study was to expand upon previous literature showing a strong relationship between depressive symptoms and cigarette smoking among youth by considering the influence of gender and gender role attitudes on this association. Consistent with previous research, depressive symptoms and being female predicted an increased likelihood of having ever smoked cigarettes (and having smoked cigarettes in the past 30 days) among early adolescents, as did the interaction between depressive symptoms and gender. Although not typically included as a predictor of youth smoking

initiation, research on gender differences in the expression of depressive symptoms, and gender differences in the meaning of traditional gender role attitudes for those with and without depressive symptoms suggested the relevance of this construct. Some preliminary support for the inclusion of gender role attitudes in models of youth smoking initiation emerged from finding that the interaction between depressive symptoms and gender role traditionalism predicted past 30 day smoking among girls.

The implications of these findings are diverse and wide-ranging. From a theoretical/research perspective, the results suggest a previously unexplored factor (gender role traditionalism) that may further elucidate the depressive symptoms-smoking relationship among early adolescents. Future research should investigate this variable and its potential role in identifying sub-groups of adolescents with depressive symptoms that may be particularly at-risk for either trying a cigarette, or progressing to further experimentation with cigarettes. The results of the current study also point to the importance of recognizing gender as a socially-constructed variable in explaining gender differences in predictors and correlates of youth smoking. Although findings for race/ethnicity were not significant, a discussion of race/ethnicity as a risk factor for smoking needs to similarly consider how correlated variables (rather than the variable of race itself) explains and predicts racial/ethnic differences in youth smoking patterns. Applied implications of the current study are multi-level and interconnected, from individual and group-oriented interventions to policy initiatives and society-wide changes.

To prevent youth from experimenting with cigarettes and from transitioning to regular smokers as adults requires collaboration, cooperation, and communication among

a multi-disciplinary group of interested stakeholders (e.g., researchers, scientists, educators, politicians, community organizers). There is nothing simple about achieving this goal, particularly when the involved parties often have conflicting interests and agendas, and when attributions of responsibility for the problem and for finding and implementing a solution are shifted from one party to another. There is, however, continued evidence of progress in youth smoking prevention efforts in recent years. Successful changes of this magnitude take time to implement and maintain. What is important is to remain hopeful about the power we have to shape the future.

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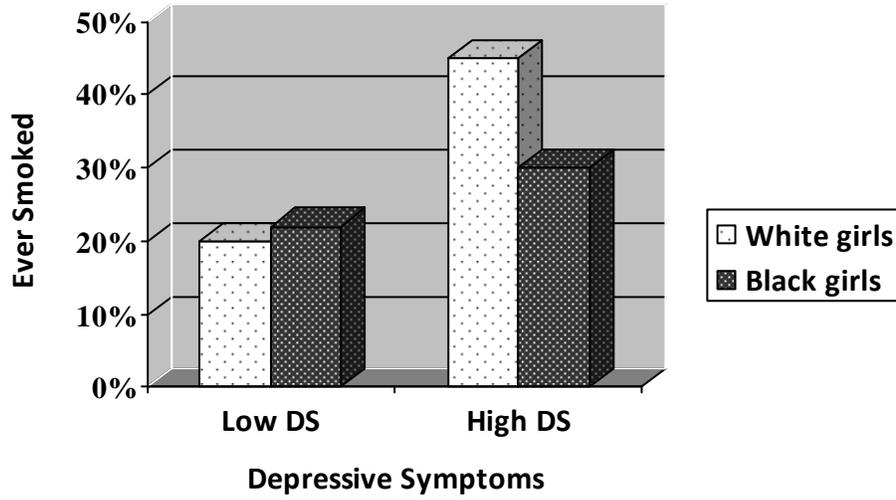
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**Figure 1**

*Hypothesized Interaction between Depressive Symptoms (DS) and Race/Ethnicity on Smoking Status among Girls with Traditional Gender Role Attitudes*



**Table 1**

*Mean Values or Frequencies for Predictor Variables as a Function of Smoking Status for Total Sample*

Variable	Total Sample <i>N</i> = 23,776 (unweighted)		Has Smoked <i>n</i> = 7,623 (32.2%)		Never Smoked <i>n</i> = 16,084 (67.8%)		$\chi^2$ or <i>t</i>
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	
Gender							$\chi^2$ (1) = 4.66*
Girls	12,214	51.5	4,005	52.5	8,209	51.0	
Boys	11,492	48.5	3,618	47.5	7,875	49.0	
Race/ethnicity							$\chi^2$ (1) = 6.03*
White	20,044	84.6	6,509	85.4	13,535	84.2	
Black	3,662	15.4	1,114	14.6	2,549	15.8	
Grade							$\chi^2$ (1) = 434.00***
8 <sup>th</sup> grade	10,983	46.3	2,785	36.5	8,197	51.0	
10 <sup>th</sup> grade	12,662	53.4	4,818	63.2	7,845	48.8	
Year of survey							$\chi^2$ (3) = 42.98***
2004	6,317	26.6	2,180	28.6	4,137	25.7	
2005	6,194	26.1	2,048	26.9	4,146	25.8	
2006	5,826	24.6	1,833	24.0	3,994	24.8	
2007	5,369	22.6	1,561	20.5	3,807	23.7	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i> (22,516-23,704)
Smoking Frequency	1.22	0.73	1.70	1.15			
Depressive symptoms	2.04	1.15	2.39	1.24	1.87	1.06	31.79***
Traditional GRA	2.67	1.41	2.78	1.45	2.62	1.39	7.74***
Parent SES	4.10	1.16	3.77	1.16	4.25	1.13	-29.87***
Friends who smoke	2.11	1.03	2.83	1.02	2.00	0.84	78.89***
Sensation-seeking	3.37	1.06	3.74	0.98	3.17	1.05	39.58***
Deviance	1.23	0.51	1.52	0.68	1.17	0.36	41.43***

Note: Percentages that do not add up to 100 reflect missing values.

Smoking frequency coded as 1=Not at all, 2=Less than one cigarette per day, 3=One to five cigarettes per day, 4=About one-half pack per day, 5=About one pack per day, 6=About one and one-half packs per day, and 7=Two packs or more per day. Depressive symptoms, gender role traditionalism, and sensation-seeking measured on a 5-point scale from 1 (*disagree*) to 5 (*agree*). Parent SES scores range from 1=Completed grade school or less, 2=Some high school, 3=Completed high school, 4=Some college, 5=Completed college, 6=Graduate or professional school after college. Friends who smoke measured on a 5-point scale (1=None, 2=A Few, 3=Some, 4=Most, and 5=All). Deviance measured on a 5-point scale (1=Not At All, 2=Once, 3=Twice, 4=3 or 4 Times, and 5=5 or More Times).

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 2***Intercorrelations for Smoking Status, Smoking Frequency, and Predictor Variables for Total Sample*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Smoking Status (Yes)	--											
2. Smoking Frequency	.45 <sup>***</sup>	--										
3. Depressive Symptoms	.21 <sup>***</sup>	.20 <sup>***</sup>	--									
4. Traditional GRA	.05 <sup>***</sup>	.03 <sup>***</sup>	.04 <sup>***</sup>	--								
5. Gender (Girls)	.01 <sup>*</sup>	.01	.02 <sup>**</sup>	-.31 <sup>***</sup>	--							
6. Race/Ethnicity (White)	.02 <sup>*</sup>	.06 <sup>***</sup>	.01	.01	-.03 <sup>***</sup>	--						
7. Parent SES	-.20 <sup>***</sup>	-.15 <sup>***</sup>	-.14 <sup>***</sup>	-.06 <sup>***</sup>	-.04 <sup>***</sup>	.10 <sup>***</sup>	--					
8. Friends Smoke	.48 <sup>***</sup>	.45 <sup>***</sup>	.25 <sup>***</sup>	.03 <sup>***</sup>	.03 <sup>***</sup>	.04 <sup>***</sup>	-.18 <sup>***</sup>	--				
9. Sensation Seeking	.24 <sup>***</sup>	.16 <sup>***</sup>	.24 <sup>***</sup>	.06 <sup>***</sup>	-.14 <sup>***</sup>	.13 <sup>***</sup>	-.06 <sup>***</sup>	.27 <sup>***</sup>	--			
10. Deviance	.32 <sup>***</sup>	.34 <sup>***</sup>	.25 <sup>***</sup>	.08 <sup>***</sup>	-.12 <sup>***</sup>	-.06 <sup>***</sup>	-.09 <sup>***</sup>	.36 <sup>***</sup>	.28 <sup>***</sup>	--		
11. Grade (8 <sup>th</sup> )	-.14 <sup>***</sup>	-.10 <sup>***</sup>	-.02 <sup>***</sup>	.02 <sup>*</sup>	.02 <sup>*</sup>	-.02 <sup>***</sup>	.00	-.22 <sup>***</sup>	-.04 <sup>***</sup>	-.02 <sup>**</sup>	--	
12. Year of Survey (2004)	-.04 <sup>***</sup>	-.01	-.03 <sup>***</sup>	.02 <sup>**</sup>	-.01	.00	.00	-.03 <sup>***</sup>	.01	.01	-.01	--

*Note.* Smoking status coded as 0 = never smoked cigarettes, 1 = has smoked cigarettes. Gender coded as 0 = boy, 1 = girl. Race/ethnicity coded as 0 = Black, 1 = White. Grade coded as 0 = 10<sup>th</sup> grade, 1 = 8<sup>th</sup> grade.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 3**

*Summary of Logistic Regression Analysis Predicting Smoking Status as a Function of Depressive Symptoms and Gender for Total Sample*

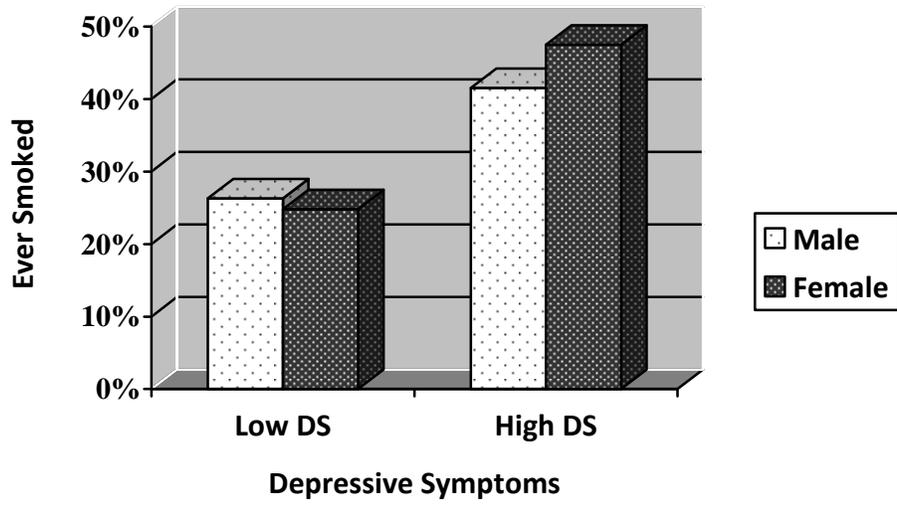
Variable	$\beta$	SE	Odds ratio	95% CI		Wald statistic
				Lower	Upper	
Block 1: $R^2 = 0.36, \chi^2 (6) = 6679.82^{***}$						
Parent SES	-0.33	0.02	0.72	0.70	0.75	352.80 <sup>***</sup>
Friends who smoke	0.96	0.02	2.60	2.50	2.70	2311.20 <sup>***</sup>
Sensation-seeking	0.30	0.02	1.35	1.30	1.41	253.92 <sup>***</sup>
Deviance	0.41	0.02	1.50	1.44	1.56	400.68 <sup>***</sup>
Grade (8 <sup>th</sup> )	-0.33	0.04	0.72	0.70	0.75	85.12 <sup>***</sup>
Year of survey (2004)	-0.11	0.02	0.90	0.87	0.93	38.44 <sup>***</sup>
Block 2: $R^2 = 0.37, \chi^2 (9) = 6771.73^{***}$						
Depressive symptoms	0.06	0.03	1.06	1.01	1.12	5.96 <sup>*</sup>
Gender (Girls)	0.18	0.04	1.19	1.12	1.28	25.46 <sup>***</sup>
DS x Gender (Girls) Interaction	0.11	0.03	1.12	1.05	1.20	10.85 <sup>***</sup>

*Note.* Smoking status coded as 0 = *never smoked cigarettes*, 1 = *has smoked cigarettes*. Gender coded as 0 = *boy*, 1 = *girl*. Odds ratios presented for the first block in all logistic regression analysis tables are from the model estimated with just the first block of variables.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Figure 2**

*Interaction between Depressive Symptoms (DS) and Gender on Smoking Status*



**Table 4**

*Summary of Multiple Regression Analysis Predicting Smoking Frequency as a Function of Depressive Symptoms and Gender for Total Sample*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$
Block 1 $F(6) = 1180.00$ ***				.24	.242***
Parent SES	-.05	.00	-.07***		
Friends who smoke	.26	.01	.36***		
Sensation-seeking	-.00	.01	-.00		
Deviance	.16	.01	.21***		
Grade (8 <sup>th</sup> )	-.02	.01	-.01		
Year of survey (2004)	.00	.00	.00		
Block 2 $F(9) = 801.09$ ***				.25	.003***
Depressive symptoms	.03	.01	.05***		
Gender (Girls)	.03	.01	.02***		
DS x Gender (Girls) Interaction	.01	.01	.02		

Note.  $\Delta R^2$  rounded to three decimal places to show additional variance in model accounted for with inclusion of second block of variables. Regression coefficients presented for the first block in all multiple regression analysis tables are from the model estimated with just the first block of variables.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 5***Mean Values or Frequencies for Predictor Variables as a Function of Smoking Status for Girls and Boys*

Sample	Girls (N = 12,214)						Boys (N = 11,492)							
	Total Girls N = 12,214 (unweighted)		Has Smoked n = 4,005 (32.8%)		Never Smoked n = 8,209 (67.2%)		$\chi^2$ or t	Total Boys N = 11,492 (unweighted)		Has Smoked n = 3,618 (31.5%)		Never Smoked n = 7,874 (68.5%)		$\chi^2$ or t
Variable	N	%	N	%	N	%		N	%	N	%	N	%	
Race/ethnicity							$\chi^2 (1) = 20.12^{***}$							$\chi^2 (1) = 1.45$
White	10,213	83.6	3,435	85.8	6,778	82.6		9,831	85.5	3,074	85.0	6,757	85.8	
Black	2,001	16.4	570	14.2	1,431	17.4		1,661	14.5	544	15.0	1,117	14.2	
Grade							$\chi^2 (1) = 248.50^{***}$							$\chi^2 (1) = 188.50^{***}$
8 <sup>th</sup> grade	5,755	47.2	1,478	37.0	4,277	52.2		5,228	45.6	1,307	36.2	3,921	50.0	
10 <sup>th</sup> grade	6,431	52.8	2,515	63.0	3,916	47.8		6,231	54.4	2,303	63.8	3,928	50.0	
Year of survey							$\chi^2 (3) = 29.31^{***}$							$\chi^2 (3) = 26.29^{***}$
2004	3,306	27.1	1,133	28.3	2,173	26.5		3,011	26.2	1,047	28.9	1,964	24.9	
2005	3,215	26.3	1,097	27.4	2,118	25.8		2,978	25.9	951	26.3	2,027	25.7	
2006	2,939	24.1	989	24.7	1,950	23.8		2,887	25.1	844	23.3	2,043	25.9	

Sample	Girls (N = 12,214)							Boys (N = 11,492)						
	Total Girls N = 12,214 (unweighted)		Has Smoked n = 4,005 (32.8%)		Never Smoked n = 8,209 (67.2%)		$\chi^2$ or t	Total Boys N = 11,492 (unweighted)		Has Smoked n = 3,618 (31.5%)		Never Smoked n = 7,874 (68.5%)		$\chi^2$ or t
2007	2,753	22.5	786	19.6	1,967	24.0		2,615	22.8	775	21.4	1,840	23.4	
	M	SD	M	SD	M	SD	t(11,692-12,212)	M	SD	M	SD	M	SD	t(10,822-11,490)
Smoking Frequency	1.23	0.73	1.70	1.14				1.22	0.73	1.70	1.16			
Depressive symptoms	2.06	1.16	2.48	1.26	1.85	1.05	27.23***	2.02	1.13	2.30	1.21	1.89	1.07	17.50***
Traditional GRA	2.26	1.33	2.35	1.37	2.21	1.31	5.03***	3.12	1.36	3.26	1.38	3.05	1.35	7.49***
Parent SES	4.05	1.18	3.66	1.15	4.24	1.15	-25.54***	4.15	1.14	3.89	1.15	4.27	1.11	-16.32***
Friends who smoke	2.14	1.04	2.88	1.03	1.78	0.84	59.14***	2.09	1.01	2.78	1.01	1.77	0.84	52.35***
Sensation-seeking	3.22	1.04	3.66	0.96	3.01	1.01	34.61***	3.52	1.06	3.83	0.99	3.38	1.06	22.23***
Deviance	1.22	0.42	1.42	0.58	1.13	0.27	30.00***	1.34	0.58	1.62	0.76	1.21	0.42	29.94***

Smoking status coded as 0 = never smoked cigarettes, 1 = has smoked cigarettes. Race/ethnicity coded as 0 = Black, 1 = White. Grade coded as 0 = 10<sup>th</sup> grade, 1 = 8<sup>th</sup> grade. Smoking frequency coded as 1=Not at all, 2=Less than one cigarette per day, 3=One to five cigarettes per day, 4=About one-half pack per day, 5=About one pack per day, 6=About one and one-half packs per day, and 7=Two packs or more per day. Depressive symptoms, gender role traditionalism, and sensation-seeking measured on a 5-point scale from 1 (disagree) to 5 (agree). Parent SES scores range from 1=Completed grade school or less, 2=Some high school, 3=Completed high school, 4=Some college, 5=Completed college, 6=Graduate or professional school after college. Friends who smoke measured on a

5-point scale (1=None, 2=A Few, 3=Some, 4=Most, and 5=All). Deviance measured on a 5-point scale (1=Not At All, 2=Once, 3=Twice, 4=3 or 4 Times, and 5=5 or More Times).

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 6**

*Intercorrelations for Smoking Status, Smoking Frequency, and Predictor Variables for Boys (n = 11,492, above diagonal) and for Girls (n = 12,214, below diagonal)*

Variable	1	2	3	4	5	6	7	8	9	10	11
1.Smoking Status (Yes)	--	.45***	.17***	.07***	-.01	-.16***	.46***	.20***	.32***	-.13***	-.04***
2.Smoking Frequency	0.45***	--	.18***	.04***	.04***	-.13***	.44***	.11***	.34***	-.10***	-.01
3.Depressive Symptoms	.25***	.22***	--	.05***	.01	-.12***	.21***	.20***	.24***	-.04***	-.03**
4.Traditional GRA	.05***	.02*	.05***	--	.04***	-.06***	.04***	.06***	.06***	.00	-.00
5.Race/Ethnicity	.04***	.08***	.01	-.03***	--	.10***	.01	.16***	-.07***	-.02*	.01
6.Parent SES	-.23***	-.16***	-.17***	-.09***	.10***	--	-.15***	-.03***	-.09***	-.01	-.00
7.Friends Smoke	.50***	.46***	.30***	.03***	.07***	-.21***	--	.22***	.37***	-.25***	-.03***
8.Sensation Seeking	.29***	.21***	.29***	-.02	.10***	-.09***	.34***	--	.25***	-.04***	.01
9.Deviance	.32***	.37***	.29***	.02**	-.05***	-.09***	.37***	.31***	--	-.04***	.01
10. Grade (8 <sup>th</sup> )	-.14***	-.10***	-.00	.04***	-.03**	.00	-.20***	-.03**	.01	--	-.01
11.Year of Survey (2004)	-.04***	-.00	-.04***	.03***	-.01	.00	-.03***	.01	.01	-.01	--

*Note.* Smoking status coded as 0 = *never smoked cigarettes*, 1 = *has smoked cigarettes*. Race/ethnicity coded as 0 = *Black*, 1 = *White*. Grade coded as 0 = *10<sup>th</sup> grade*, 1 = *8<sup>th</sup> grade*.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 7**

*Summary of Logistic Regression Analysis Predicting Smoking Status among Girls as a Function of Depressive Symptoms and Gender Role Traditionalism*

Variable	$\beta$	SE	Odds ratio	95% CI		Wald statistic
				Lower	Upper	
Block 1: $R^2 = 0.400$ , $\chi^2 (6) = 3905.72^{***}$						
Parent SES	-0.40	0.03	0.67	0.64	0.71	260.95 <sup>***</sup>
Friends who smoke	0.94	0.03	2.56	2.43	2.71	1150.30 <sup>***</sup>
Sensation-seeking	0.37	0.03	1.45	1.38	1.53	186.06 <sup>***</sup>
Deviance	0.54	0.04	1.71	1.59	1.84	216.56 <sup>***</sup>
Grade (8 <sup>th</sup> )	-0.48	0.05	0.62	0.56	0.68	92.68 <sup>***</sup>
Year of survey (2004)	-0.12	0.02	0.89	0.85	0.94	22.75 <sup>***</sup>
Block 2: $R^2 = 0.404$ , $\chi^2 (9) = 3953.09^{***}$						
Depressive symptoms	0.14	0.03	1.15	1.10	1.21	30.74 <sup>***</sup>
Gender Role traditionalism	0.08	0.03	1.09	1.03	1.15	10.51 <sup>***</sup>
DS x GRT Interaction	-0.02	0.02	0.98	0.94	1.03	0.64

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 8**

*Summary of Multiple Regression Analysis Predicting Smoking Frequency among Girls as a Function of Depressive Symptoms and Gender Role Traditionalism*

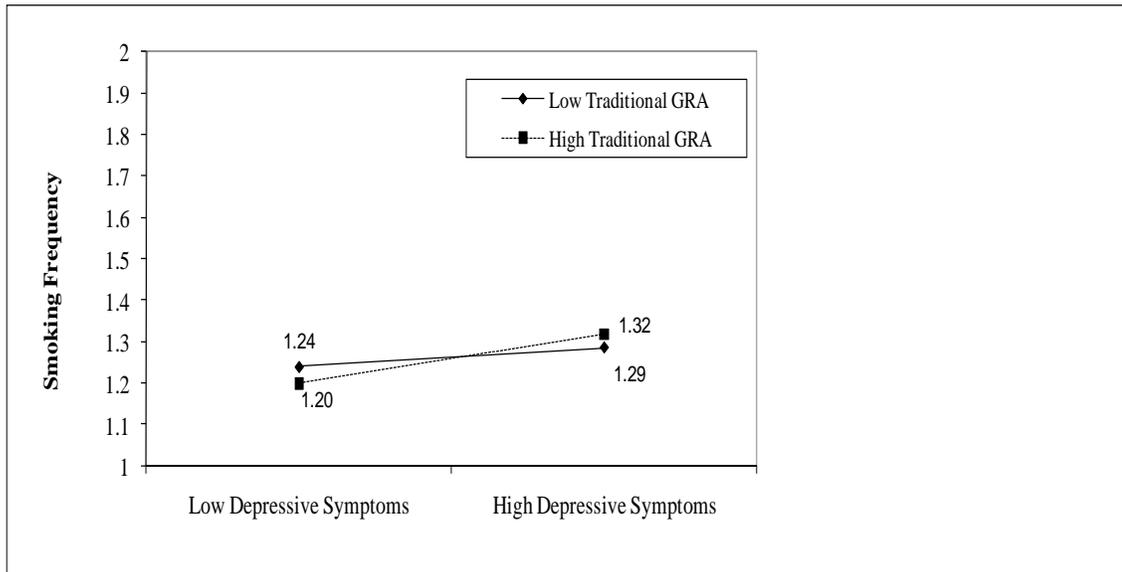
Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$
Block 1: $F(6) = 674.61^{***}$				.260	.260 <sup>***</sup>
Parent SES	-0.05	0.01	-0.07 <sup>***</sup>		
Friends who smoke	0.25	0.01	0.35 <sup>***</sup>		
Sensation-seeking	0.01	0.01	0.01		
Deviance	0.20	0.01	0.23 <sup>***</sup>		
Grade (8 <sup>th</sup> )	-0.04	0.01	-0.02 <sup>**</sup>		
Year of survey (2004)	0.00	0.01	0.01		
Block 2: $F(9) = 455.73^{***}$				.262	.003 <sup>***</sup>
Depressive symptoms	0.04	0.01	0.06 <sup>***</sup>		
Gender role traditionalism	-0.00	0.01	-0.00		
DS x GRT interaction	0.02	0.01	0.03 <sup>**</sup>		

Note.  $\Delta R^2$  rounded to three decimal places to show additional variance in model accounted for with inclusion of second block of variables.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Figure 3**

*Interaction between Gender Role Traditionalism and Depressive Symptoms on Smoking Frequency for Girls*



Note. Line graphs used for continuous variables (multiple regression analyses), while bar graphs used for dichotomous variables (logistic regression analyses – e.g., Figure 2).

**Table 9**

*Summary of Logistic Regression Analysis Predicting Smoking Status among Boys as a Function of Depressive Symptoms and Gender Role Traditionalism*

Variable	$\beta$	SE	Odds ratio	95% CI		Wald statistic
				Lower	Upper	
Block 1: $R^2 = 0.33$ , $\chi^2 (6) = 2864.34^{***}$						
Parent SES	-0.24	0.03	0.78	0.75	0.82	92.88 <sup>***</sup>
Friends who smoke	0.95	0.03	2.57	2.43	2.72	1074.43 <sup>***</sup>
Sensation-seeking	0.25	0.03	1.28	1.22	1.35	84.05 <sup>***</sup>
Deviance	0.37	0.03	1.44	1.38	1.51	222.50 <sup>***</sup>
Grade (8 <sup>th</sup> )	-0.20	0.05	0.82	0.74	0.91	15.09 <sup>***</sup>
Year of survey (2004)	-0.10	0.03	0.91	0.86	0.95	16.48 <sup>***</sup>
Block 2: $R^2 = 0.34$ , $\chi^2 (9) = 2889.86^{***}$						
Depressive symptoms	0.08	0.03	1.08	1.03	1.14	8.64 <sup>**</sup>
Gender role traditionalism	0.10	0.03	1.10	1.05	1.16	14.52 <sup>***</sup>
DS x GRT interaction	0.01	0.03	1.01	0.96	1.06	0.08

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 10**

*Summary of Multiple Regression Analysis Predicting Smoking Frequency among Boys as a Function of Depressive Symptoms and Gender Role Traditionalism*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$
Block 1: $F(6) = 525.45^{***}$				0.229	0.229 <sup>***</sup>
Parent SES	-0.05	0.01	-0.06 <sup>***</sup>		
Friends who smoke	0.26	0.01	0.35 <sup>***</sup>		
Sensation-seeking	-0.01	0.01	-0.02		
Deviance	0.14	0.01	0.21 <sup>***</sup>		
Grade (8 <sup>th</sup> )	-0.01	0.01	-0.00		
Year of survey (2004)	0.00	0.01	0.00		
Block 2: $F(9) = 356.37^{***}$				0.232	0.003 <sup>***</sup>
Depressive symptoms	0.04	0.01	0.06 <sup>***</sup>		
Gender role traditionalism	0.00	0.01	0.00		
DS x GRT interaction	0.00	0.01	0.00		

Note.  $\Delta R^2$  rounded to three decimal places to show additional variance in model accounted for with inclusion of second block of variables.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 11**

*Mean Values or Frequencies for Predictor Variables as a Function of Smoking Status among Girls with Traditional Gender Role Attitudes*

Sample	White Girls with TGRA (N = 2,146)						Black Girls with TGRA (N = 546)							
Variable	Total White Girls with TGRA N = 2,146 (unweighted)		Has Smoked n = 806 (37.6%)		Never Smoked n = 1,340 (62.4%)		$\chi^2$ or t	Total Black Girls with TGRA N = 546 (unweighted)		Has Smoked n = 179 (32.8%)		Never Smoked n = 367 (67.2%)		$\chi^2$ or t
	N	%	N	%	N	%		N	%	N	%	N	%	
Grade							$\chi^2 (1) = 45.08^{***}$							$\chi^2 (1) = 12.14^{***}$
8 <sup>th</sup> grade	1078	50.2	329	40.9	749	55.9		296	54.2	78	43.6	218	59.4	
10 <sup>th</sup> grade	1065	49.6	475	59.1	591	44.1		250	45.7	101	56.4	149	40.6	
Year of survey							$\chi^2 (3) = 6.19$							
2004	560	26.1	221	27.4	339	25.3		146	26.8	52	29.1	94	25.6	
2005	520	24.2	210	26.1	310	23.1		154	28.1	56	31.3	97	26.4	
2006	552	25.7	202	25.1	350	26.1		134	24.5	42	23.5	92	25.1	
2007	515	24.0	173	21.5	341	25.4		112	20.6	29	16.2	84	22.9	
	M	SD	M	SD	M	SD	t(2,052-2,144)	M	SD	M	SD	M	SD	t(495-544)

Sample	White Girls with TGRA (N = 2,146)							Black Girls with TGRA (N = 546)						
	Total White Girls with TGRA N = 2,146 (unweighted)		Has Smoked n = 806 (37.6%)		Never Smoked n = 1,340 (62.4%)		$\chi^2$ or t	Total Black Girls with TGRA N = 546 (unweighted)		Has Smoked n = 179 (32.8%)		Never Smoked n = 367 (67.2%)		$\chi^2$ or t
Smoking Frequency	1.29	0.84	1.78	1.22				1.14	0.60	1.43	0.98			
Depressive symptoms	2.11	1.18	2.54	1.26	1.85	1.04	13.18***	2.27	1.30	2.43	1.29	2.12	1.30	2.11*
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	t(2,052-2,144)	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	t(495-544)
Parent SES	3.90	1.18	3.50	1.15	4.13	1.13	-12.19***	3.62	1.28	3.48	1.25	3.69	1.29	-1.72
Friends who smoke	2.24	1.10	2.97	1.01	1.79	0.89	27.30***	2.03	1.08	2.59	1.23	1.76	0.87	8.11***
Sensation-seeking	3.25	1.07	3.66	0.96	3.01	1.05	14.76***	2.92	1.10	3.14	1.09	2.81	1.09	3.35***
Deviance	1.23	0.44	1.40	0.60	1.13	0.26	12.21***	1.32	0.52	1.54	0.69	1.21	0.37	5.98***

Smoking frequency coded as 1=Not at all, 2=Less than one cigarette per day, 3=One to five cigarettes per day, 4=About one-half pack per day, 5=About one pack per day, 6=About one and one-half packs per day, and 7=Two packs or more per day. Depressive symptoms and sensation-seeking measured on a 5-point scale from 1 (*disagree*) to 5 (*agree*). Parent SES scores range from 1=Completed grade school or less, 2=Some high school, 3=Completed high school, 4=Some college, 5=Completed college, 6=Graduate or professional school after college. Friends who smoke measured on a 5-point scale (1=None, 2=A Few, 3=Some, 4=Most, and 5=All). Deviance measured on a 5-point scale (1=Not At All, 2=Once, 3=Twice, 4=3 or 4 Times, and 5=5 or More Times).

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 12**

*Intercorrelations for Smoking Status, Smoking Frequency, and Predictor Variables for Black Girls (n = 546, above diagonal) and for White Girls (n=2,146, below diagonal) with Traditional Gender Role Attitudes*

Variable	1	2	3	4	5	6	7	8	9
1. Smoking Status (Yes)	--	.42***	.09*	-.08	.37***	.14***	.30***	-.15***	-.08
2. Smoking Frequency	.55***	--	.11*	-.07	.37***	.06	.25***	-.03	-.04
3. Depressive Symptoms	.29***	.27***	--	-.00	.11**	.28***	.11**	.02	-.00
4. Parent SES	-.26***	-.19***	-.18***	--	-.09*	.10*	.01	.05	.03
5. Friends Smoke	.52***	.49***	.30***	-.23***	--	.13**	.37***	-.13**	.03
6. Sensation Seeking	.30***	.24***	.34***	.09***	.32***	--	.23***	.01	.08
7. Deviance	.30***	.39***	.29***	.09***	.37***	.32***	--	-.01	.05
8. Grade (8 <sup>th</sup> )	-.15***	-.18***	-.01	-.04	-.21***	-.06**	-.00	--	.02
9. Year of Survey (2004)	-.05*	-.03	-.03	.00	-.03	.03	.01	-.02	--

*Note.* Smoking status coded as 0 = never smoked cigarettes, 1 = has smoked cigarettes. Smoking frequency coded as 0 = has not smoked in the past 30 days, 1 = has smoked in the past 30 days. Grade coded as 0 = 10<sup>th</sup> grade, 1 = 8<sup>th</sup> grade.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 13**

*Summary of Logistic Regression Analysis Predicting Smoking Status among Traditional Girls as a Function of Depressive Symptoms and Race/Ethnicity*

Variable	$\beta$	SE	Odds ratio	95% CI		Wald statistic
				Lower	Upper	
Block 1: $R^2 = 0.38, \chi^2 (5) = 823.96^{***}$						
Parent SES	-0.39	0.05	0.68	0.61	0.75	59.38 <sup>***</sup>
Friends who smoke	0.90	0.06	2.45	2.20	2.73	261.84 <sup>***</sup>
Sensation-seeking	0.36	0.05	1.43	1.29	1.59	44.42 <sup>***</sup>
Deviance	0.45	0.07	1.57	1.37	1.80	41.10 <sup>***</sup>
Grade (8 <sup>th</sup> )	-0.50	0.10	0.61	0.50	0.74	24.46 <sup>***</sup>
Block 2: $R^2 = 0.39, \chi^2 (8) = 838.24^{***}$						
Depressive symptoms	0.07	0.10	1.07	0.88	1.31	0.45
Race/ethnicity (White)	0.01	0.13	1.01	0.78	1.30	0.00
DS x Race (White) interaction	0.15	0.12	1.16	0.92	1.45	1.60

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 14**

*Summary of Logistic Regression Analysis Predicting Past 30 Day Smoking Status among Traditional Girls as a Function of Depressive Symptoms and Race/Ethnicity*

Variable	$\beta$	SE	Odds ratio	95% CI		Wald statistic
				Lower	Upper	
Block 1: $R^2 = 0.41, \chi^2 (5) = 652.25^{***}$						
Parent SES	-0.27	0.07	0.76	0.67	0.87	15.80 <sup>***</sup>
Friends who smoke	1.17	0.08	3.21	2.76	3.73	232.64 <sup>***</sup>
Sensation-seeking	0.32	0.08	1.38	1.18	1.61	16.85 <sup>***</sup>
Deviance	0.42	0.07	1.52	1.33	1.74	36.04 <sup>***</sup>
Grade (8 <sup>th</sup> )	-0.31	0.15	0.73	0.55	0.97	4.61 <sup>*</sup>
Block 2: $R^2 = 0.43, \chi^2 (8) = 683.87^{***}$						
Depressive symptoms	0.28	0.17	1.33	0.95	1.86	2.71
Race/ethnicity (White)	0.66	0.24	1.93	1.22	3.06	7.80 <sup>**</sup>
DS x Race (White) interaction	0.03	0.19	1.03	0.72	1.49	0.03

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 15**

*Mean Values or Frequencies for Predictor Variables as a Function of Smoking Status among Boys with Traditional Gender Role Attitudes*

Sample	White Boys with TGRA (N = 4,168)							Black Boys with TGRA (N = 677)						
	Total White Boys with TGRA N = 4,168 (unweighted)		Has Smoked n = 1,485 (35.6%)		Never Smoked n = 2,664 (63.9%)		$\chi^2$ or t	Total Black Boys with TGRA N = 677 (unweighted)		Has Smoked n = 223 (32.9%)		Never Smoked n = 454 (67.1%)		$\chi^2$ or t
	N	%	N	%	N	%		N	%	N	%	N	%	
Grade							$\chi^2(1)=91.70^{***}$							$\chi^2(1) = 4.41^*$
8 <sup>th</sup> grade	1916	46.0	538	36.2	1377	51.7		337	49.8	99	44.4	240	53.0	
10 <sup>th</sup> grade	2234	53.6	947	63.8	1287	48.3		339	50.1	124	55.6	213	47.0	
Year of survey							$\chi^2(3) = 12.12^{**}$							$\chi^2(3) = 2.13$
2004	1104	26.5	438	29.4	666	24.9		179	26.5	62	27.8	117	25.8	
2005	1047	25.1	377	25.3	670	25.0		181	26.7	65	29.1	116	25.6	
2006	1059	25.4	349	23.4	710	26.5		153	22.6	48	21.5	105	23.1	
2007	958	23.0	327	21.9	631	23.6		164	24.2	48	21.5	116	25.6	
	M	SD	M	SD	M	SD	t(3,974-4,166)	M	SD	M	SD	M	SD	t(613-675)

Sample	White Boys with TGRA (N = 4,168)							Black Boys with TGRA (N = 677)						
Variable	Total White Boys with TGRA N = 4,168 (unweighted)		Has Smoked n = 1,485 (35.6%)		Never Smoked n = 2,664 (63.9%)		$\chi^2$ or t	Total Black Boys with TGRA N = 677 (unweighted)		Has Smoked n = 223 (32.9%)		Never Smoked n = 454 (67.1%)		$\chi^2$ or t
Smoking Frequency	1.27	0.80	1.75	1.19				1.12	0.46	1.37	0.73			
Depressive symptoms	2.06	1.16	2.34	1.24	1.90	1.08	11.49***	2.03	1.20	2.19	1.19	1.95	1.20	2.40*
	M	SD	M	SD	M	SD	t(3,974-4,166)	M	SD	M	SD	M	SD	t(613-675)
Parent SES	4.14	1.12	3.94	1.15	4.25	1.09	-8.40***	3.74	1.19	3.62	1.08	3.80	1.24	-1.90
Friends who smoke	2.15	1.02	2.81	1.00	1.78	0.83	33.90***	2.05	1.06	2.51	1.04	1.82	1.00	8.18***
Sensation-seeking	3.65	1.04	3.96	0.95	3.48	1.05	14.95***	3.14	1.20	3.30	1.15	3.07	1.21	2.34*
Deviance	1.37	0.61	1.65	0.77	1.21	0.42	20.10***	1.46	0.71	1.65	0.84	1.37	0.62	4.48***

Smoking frequency coded as 1=Not at all, 2=Less than one cigarette per day, 3=One to five cigarettes per day, 4=About one-half pack per day, 5=About one pack per day, 6=About one and one-half packs per day, and 7=Two packs or more per day. Depressive symptoms and sensation-seeking measured on a 5-point scale from 1 (*disagree*) to 5 (*agree*). Parent SES scores range from 1=Completed grade school or less, 2=Some high school, 3=Completed high school, 4=Some college, 5=Completed college, 6=Graduate or professional school after college. Friends who smoke measured on a 5-point scale (1=None, 2=A Few, 3=Some, 4=Most, and 5=All). Deviance measured on a 5-point scale (1=Not At All, 2=Once, 3=Twice, 4=3 or 4 Times, and 5=5 or More Times).

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 16**

*Intercorrelations for Smoking Status, Frequency, and Predictor Variables for Black Boys (n = 677, above diagonal) and for White Boys (n = 4,168, below diagonal) with Traditional Gender Role Attitudes*

Variable	1	2	3	4	5	6	7	8	9
1. Smoking Status (Yes)	--	.44***	.09*	-.07	.31***	.09*	.19***	-.08*	-.05
2. Smoking Frequency	.54***	--	.15***	-.03	.32***	.05	.29***	-.02	.02
3. Depressive Symptoms	.18***	.19***	--	-.09*	.04	.28***	.18***	-.01	-.04
4. Parent SES	-.13***	-.10***	-.12***	--	-.01	.14***	-.10*	-.04	-.10*
5. Friends Smoke	.49***	.48***	.21***	-.15***	--	.18***	.29***	.21***	-.01
6. Sensation Seeking	.22***	.14***	.21***	-.04*	.23***	--	.21***	-.01	-.05
7. Deviance	.34***	.36***	.27***	.08***	.37***	.26***	--	-.03	.05
8. Grade (8 <sup>th</sup> )	-.15***	-.14***	-.03	-.03	-.25***	-.05***	-.07***	--	.00
9. Year of Survey (2004)	-.05**	-.02	-.04**	-.01	-.06***	.02	.01	-.01	--

Note. Smoking status coded as 0 = *never smoked cigarettes*, 1 = *has smoked cigarettes*. Smoking frequency coded as 0 = *has not smoked in the past 30 days*, 1 = *has smoked in the past 30 days*. Grade coded as 0 = *10<sup>th</sup> grade*, 1 = *8<sup>th</sup> grade*.

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 17**

*Summary of Logistic Regression Analysis Predicting Smoking Status among Traditional Boys as a Function of Depressive Symptoms and Race/Ethnicity*

Variable	$\beta$	SE	Odds ratio	95% CI		Wald statistic
				Lower	Upper	
Block 1: $R^2 = 0.32, \chi^2 (6) = 1204.80^{***}$						
Parent SES	-0.17	0.04	0.84	0.78	0.91	21.34 <sup>***</sup>
Friends who smoke	0.92	0.04	2.52	2.32	2.74	474.36 <sup>***</sup>
Sensation-seeking	0.24	0.04	1.27	1.17	1.37	35.51 <sup>***</sup>
Deviance	0.35	0.04	1.42	1.32	1.52	100.13 <sup>***</sup>
Grade (8 <sup>th</sup> )	-0.18	0.08	0.84	0.72	0.97	5.70 <sup>*</sup>
Year of survey (2004)	-0.08	0.03	0.93	0.87	0.99	5.32 <sup>*</sup>
Block 2: $R^2 = 0.33, \chi^2 (9) = 11250.17^{***}$						
Depressive symptoms	0.03	0.10	1.03	0.85	1.25	0.09
Race/ethnicity (White)	0.12	0.11	1.13	0.91	1.41	1.16
DS x Race (White) interaction	0.09	0.11	1.10	0.89	1.35	0.74

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 18**

*Summary of Logistic Regression Analysis Predicting Past 30 Day Smoking Status among Traditional Boys as a Function of Depressive Symptoms and Race/Ethnicity*

Variable	$\beta$	SE	Odds ratio	95% CI		Wald statistic
				Lower	Upper	
Block 1: $R^2 = 0.38$ , $\chi^2 (6) = 1050.11^{***}$						
Parent SES	-0.04	0.05	0.96	0.87	1.07	0.46
Friends who smoke	1.29	0.06	3.63	3.22	4.10	446.81 <sup>***</sup>
Sensation-seeking	0.12	0.06	1.13	1.00	1.27	4.12 <sup>*</sup>
Deviance	0.35	0.04	1.42	1.32	1.52	96.07 <sup>***</sup>
Grade (8 <sup>th</sup> )	-0.29	0.11	0.75	0.60	0.94	6.42 <sup>*</sup>
Year of survey (2004)	-0.02	0.05	0.99	0.90	1.08	0.10
Block 2: $R^2 = 0.39$ , $\chi^2 (9) = 1086.11^{***}$						
Depressive symptoms	0.29	0.16	1.34	0.98	1.82	3.39
Race/ethnicity (White)	0.81	0.19	2.25	1.54	3.29	17.61 <sup>***</sup>
DS x Race (White) interaction	-0.10	0.17	0.90	0.65	1.25	0.39

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 19**

*Summary of Multiple Regression Analysis Predicting Smoking Frequency among Girls as a Function of Depressive Symptoms, Gender Role Traditionalism, and Race/ethnicity – 3-Way Interaction*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$
Block 1: $F(6) = 674.61^{***}$				0.26	0.26 <sup>***</sup>
Parent SES	-0.05	0.01	-0.07 <sup>***</sup>		
Friends who smoke	0.25	0.01	0.35 <sup>***</sup>		
Sensation-seeking	0.01	0.01	0.01		
Deviance	0.20	0.01	0.23 <sup>***</sup>		
Grade (8 <sup>th</sup> )	-0.04	0.01	-0.02 <sup>**</sup>		
Year of survey (2004)	0.00	0.01	0.01		
Block 2: $F(12) = 352.22^{***}$				0.27	0.01 <sup>***</sup>
Depressive symptoms	-0.01	0.02	-0.02		
Gender role traditionalism	0.00	0.01	0.00		
Race/ethnicity (White)	0.14	0.02	0.07 <sup>***</sup>		
DS x GRT interaction	0.02	0.01	0.03		
DS x Race (White) interaction	0.07	0.02	0.09 <sup>***</sup>		
DS x GRT x Race (White) interaction	0.00	0.02	0.01		

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

**Table 20**

*Summary of Multiple Regression Analysis Predicting Smoking Frequency among Boys as a Function of Depressive Symptoms, Gender Role Traditionalism, and Race/ethnicity – 3-Way Interaction*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$
Block 1: $F(6) = 525.45^{***}$				0.23	0.23 <sup>***</sup>
Parent SES	-0.05	0.01	-0.06 <sup>***</sup>		
Friends who smoke	0.26	0.01	0.35 <sup>***</sup>		
Sensation-seeking	-0.01	0.01	-0.02		
Deviance	0.14	0.01	0.21 <sup>***</sup>		
Grade (8 <sup>th</sup> )	-0.01	0.01	0.00		
Year of survey (2004)	0.00	0.01	-0.00		
Block 2: $F(12) = 273.49^{***}$				0.24	0.01 <sup>***</sup>
Depressive symptoms	0.01	0.02	0.01		
Gender role traditionalism	0.00	0.01	0.00		
Race/ethnicity (White)	0.13	0.02	0.06 <sup>***</sup>		
DS x GRT interaction	-0.01	0.02	-0.02		
DS x Race (White) interaction	0.04	0.02	0.05 <sup>**</sup>		
DS x GRT x Race (White) interaction	0.02	0.02	0.02		

\*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

## Appendix B

### ICPSR Statement on Safeguarding Confidentiality

ICPSR considers the protection of confidentiality in archived data to be of paramount importance in its service to the social science research community. Since its inception in 1962, ICPSR has routinely subjected all data deposited in the archive to rigorous examination with respect to disclosure risk. All data collections acquired by ICPSR undergo stringent confidentiality reviews to determine whether the data contain any information that could be used -- on its own or in combination with other publicly available information -- to identify respondents. Should such information be discovered, the sensitive data are altered after consultation with the principal investigator to create public use files that limit the risk of disclosure.

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