The Link between Smoking and Body Weight among Adolescents

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THE LINK BETWEEN SMOKING AND BODY WEIGHT AMONG ADOLESCENTS

Tracey Barnett, Ph.D.
Western Michigan University, 2002

Trends in smoking rates among adolescents indicate that white females generally smoke more than their adolescent counterparts, the only substance in which this occurs. Another trend in which white females far outnumber any other adolescent group is eating disorders. This study was conducted to assess the relationship between cigarette smoking and perception of weight among adolescents. A logistic regression model was constructed to test the relationship using the Adolescent Health Public Dataset. For females, there was a link between cigarette smoking and perception of overweight which was not found among the males. Similarly, white females had a significantly higher rate of smoking than black females. Understanding the reasons behind the trends is vital when developing policy or education programs.
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This dissertation is dedicated to the loving memory of my father, Charles E. Barnett. If only adolescents could fully understand the ramifications of choices that they make.

Tracey Barnett
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CHAPTER I

INTRODUCTION

This project was designed to understand the relationship between smoking and weight concerns, particularly for adolescent white females. Adolescent white females were targeted for study because smoking cigarettes is generally a pattern in which they tend to exceed their peers, unlike all other substances. In addition to this trend, adolescent white females also tend to lead their peers with respect to eating disorders. Noting these two trends, this study was designed to assess any relationship that might exist between smoking cigarettes and weight concerns.

Berg (1997) notes that 6 out of 10 high school girls diet, and that “girls are also taking up smoking more and more as they grasp at every straw to lose weight” (p. 18). Girls now surpass boys for smoking rates. Female adolescents are smoking more than male adolescents (Youth Risk Behavior Survey, 1999; Bachman et al, 1991), with cigarettes being one of only a few drugs that females outnumber males (Bachman et al, 1991).

The same group of adolescents with higher smoking rates (white females) are also noted to have higher rates of eating disorders (Abrams et al, 1993). Not only do females have higher incidence of eating disorders, but they also have a general overall dissatisfaction with their body. Felts et al (1996) and Serdula (1993) both found that girls were more likely to describe themselves as “too fat” compared to boys of the
same age. In addition, French et al (1997) report that those that express dissatisfaction were more likely to diet, purge and binge. The race connection includes research that shows black girls and women are less driven to achieve thinness compared to white girls (Rand, 1990; Thomas, 1988). The question to be answered is whether there might be a connection between cigarette use as a means of controlling weight. If current smokers cite weight gain as a reason for not quitting (Pirie et al, 1991), do adolescent females see starting cigarette smoking as a way to control weight?

In Western culture, thin is ideal, especially for females. Magazines use computers to alter covers and pictures of already near-perfect models. The desire for thinness has been attributed to popular media images of women emphasizing thinness as fashionable (Johnson & Petrie, 1995). Cigarette ads for female targeted brands include young females shown as happy and successful, one major brand claiming “you’ve come a long way baby.” Research of non-Western culture has also demonstrated a change in female attitudes toward weight and body-image as Western culture has permeated their culture (Lai, 2000; Lee and Lee, 1996).

Through the review of literature, a pattern has been established that includes both cigarette rates and weight ideals for adolescents. The rates for cigarette use have been established among male and female adolescents, as well as differences between white and black adolescents explored. Also, weight issues for both male and female adolescents and differences among white and black adolescents have been detailed.

Using logistic regression, a model has been developed to assess the predictors
of cigarette use, among males and females, whites and blacks, and for those that indicate needing to lose weight, regardless of current weight. The pattern to be tested here is that white female adolescents will have higher rates of smoking. The contribution to this well-established current knowledge is the link to weight control. White adolescent females will have higher rates of smoking, and this will be assessed with weight control patterns too. These young females’ answers to questions about themselves and weight loss will be included as a further predictor of cigarette smoking.

The data used for this project is the National Longitudinal Study of Adolescent Health (Add Health) carried out at the University of North Carolina, Carolina Population Center. The data were selected for both content and generalizability. First, the dataset contains data directly relevant to this project, including the respondent’s actual height and weight, as well as questions about perception of weight. The dataset also contains questions about substance use, which will be studied in conjunction with perception of weight, as is detailed in the literature review. Finally, it includes important pieces of demographic information, such as race, age, and sex.

The chapters that follow are organized to establish the existing research on these topics, the results of this particular project, and the reporting of these two areas combined. Chapter II is the Literature Review, which offers a detailed review of current literature including smoking behaviors and weight behaviors among all adolescents. Chapter III is the Methods Chapter, detailing the dataset used as well as
the details of how the data were handled and what variables were included and any special ways of defining certain characteristics. Chapter IV is the Results Chapter which includes details of all data analysis, including some discussion of how these analyses compare to the research reported in the Literature Review. Finally, Chapter V is the Conclusion chapter offering still more ideas of how the existing research and this project can be combined. There are details of how this analysis supports current literature and research, as well as the differences that arose. There are also ideas as to how this research can fit with the current research and ways it can be incorporated going forward.

Understanding the connections and perceptions that are made when choosing to use a potentially harmful substance is vital. Policy is often driven by existing research. Money is directed at non-smoking campaigns for adolescents. Companies are also forced to change advertising, such as no longer being allowed to use Joe Camel for Camel cigarettes because of its proposed attractiveness to children. Advertisements such as billboards are now required to be a certain distance from schools. The most common public service announcement at this point includes the slogan “smoking stinks” with a mouth as an ash tray. However, if half of the smoking adolescent population uses cigarettes as a means to maintain or control weight, then these monies are perhaps wasted. The purpose of this project is to further explore the possible connection between weight and cigarette use for adolescent females and its potential meaning.
CHAPTER II

LITERATURE REVIEW

The purpose of this chapter is to establish the existing literature about cigarette use among adolescents. Cigarette use will be discussed overall, and then further exploration of racial differences and sex differences among cigarette users. Upon establishing the differences and higher rates of cigarette use among white adolescent females, literature with respect to weight issues and cigarette use as well as weight issues and race and sex differences will be detailed.

Cigarettes

Many studies are done of several or all substances, not just tobacco. However, a great deal can be learned about adolescent substance use whether one is looking at one substance or many. For example, the Monitoring the Future (MTF) study shows, “In twelfth grade, of the three racial/ethnic groups, whites have the highest rates of use on a number of drugs, including marijuana, inhalants hallucinogens, LSD specifically, barbiturates, amphetamines, tranquilizers, opiates other than heroin, alcohol, cigarettes, and smokeless tobacco” (Johnston et al., 1996, p. 21). The Michigan Alcohol and Other Drugs (MAOD) results for high school students indicate similar findings for drug use in respect to race. For each year, and for most of the substances tested, black high school students reported lower levels of use than their white counterparts (Van Valey & Newman, 1996).
A study conducted by Welte and Barnes (1988) found that the highest rate of cigarette use was among white adolescents in New York State, compared with both blacks and Hispanics. Graham (1996) also showed that whites were found to be significantly higher than blacks with respect to prior-year cigarette use (as well as alcohol, hallucinogen, and marijuana use). In addition, it seems that the relationship remains about race, not a social class issue. For instance, Hover and Gaffney (1988) indicate that there is not a significant association between social class and smoking behavior for their study of adolescent girls, although race was not a studied variable.

The 1999 Youth Risk Behavior Survey indicates that occasional smoking (at least one cigarette in the previous month) is highest for white students (at 38.6%) and nearly doubles that of black students (at 19.7%). White girls have the highest rates (39.1%), compared to black girls (17.7%), white boys (38.2%) and black boys (21.8%). According to the Healthy People 2000 report, high school students who have ever smoked are starting younger also. About one-quarter of those that have smoked had their first cigarette by sixth grade, one-half by eighth grade, and three-fourths by ninth grade.

Castro et al (1987) suggest that ethnicity is an independent predictor of adolescent substance use, indicating cultural or ethnic group differences in the meaning of factors that may influence substance use, including peer influences. Further study of race differences in adolescent use suggest that among black adolescents, "Afrocentrism" is a determinant of self-esteem (Belgrave et al, 1985). Adolescents who have a strong connection with their black identity tend to have high
self-esteem. Moreover, high self-esteem has been suggested as a protective factor for adolescents against substance use (Graham, 1997).

Overall, not only do whites report using most substances more than their minority counterparts, males tend to use most substances more often than females. The exception, however, seems to lie with cigarette use. Chassin et al (1981) showed that girls were smoking at a slightly higher level in both middle school (6.5% vs. 5.3%) and high school (13.5% and 11.3%). Bachman et al (1991) showed that there was higher daily use among white females (13.3%) than white males (12.5%) in their analysis of current use for the MTF 1985-1989 data. “Since 1980, among college students, females have had slightly higher probabilities of being daily smokers” (Johnston et al., 1996, p. 20). The MAOD reported similar findings among high school students, “with respect to cigarette smoking rates, in four of the six years, the females have caught up with and/or passed the males” (Van Valey & Newman, 1996, p. 4).

MTF is a longitudinal study that has been continuing since 1975. Therefore, trends and patterns of use are possible with their data. For example, Bachman et al (1991) showed that the trend (from 1976 – 1989) in prevalence of cigarette use was declining among non-white groups. “Most notably, daily smoking prevalence rates of Black seniors dropped by two-thirds (from 23.6% to 8.6% for males, and 22.3% to 7.1% for females)” (Bachman et al, 1991: 375). Bachman et al (1991) concluded that the black-white differences for cigarette smoking have become more pronounced for high school seniors in recent years. They further concluded there is consistency
between their findings and other national household surveys (including National Institute on Drug Abuse National household study on drug abuse: Main findings 1985), "black youth show much lower usage rates than white youth" (Bachman et al, 1991: 376).

Further research concerning race differences has presented a possible link to self-esteem as protective factors for some adolescents. Graham (1997) has noted "Black females and males and white males all report fairly high degrees of satisfaction with self, while white females were identified as least satisfied" (Graham, 1997: 85). Graham (1997) also showed that white females were significantly more likely than white males, black males and black females to use cigarettes (p. 100), suggesting a possible connection between satisfaction and cigarette use among adolescents.

**Cigarette Use and Weight**

The purpose of this section is to establish a connection between weight and cigarette use. Adults and adolescents both indicate using cigarettes as a means to control weight, or at least as an excuse to continue cigarette use for fear of weight gain upon quitting.

Rienzi et al (1996) studied adolescents’ attitudes toward different substances, and found that approval of other teenagers smoking cigarettes was significant, with female adolescents approving at a rate of 47 percent compared to males at 36 percent. Also, girls and boys both approved of teenagers taking diet pills to lose weight. Although they did not analyze this data to see if the teenagers believed cigarettes
were a method of weight control, they did show that the same group of teenagers approved of both behaviors at significant levels when comparing males and females.

Pirie et al (1991), in a follow-up study of participants from the Minnesota adolescent study, found that more women than men were current smokers. Also when respondents were asked about quitting behaviors, “women were more likely than men to report wanting to eat more than usual, and they also reported more weight gain” (Pirie et al, 1991: 325). The actual weight gain, however, did not support these problems, as the female quitters weighed about the same as the current female smokers. Women were also more likely to agree that barriers to quitting included concern about major weight gain. Pirie et al (1991) conclude, “young women are smoking cigarettes in greater numbers than young men, and concern about weight gain emerges as a major issue for these young women smokers” (p. 326).

Berg (1997) notes that 6 out of 10 high school girls diet, and that “girls are also taking up smoking more and more as they grasp at every straw to lose weight” (p. 18). Girls now surpass boys for smoking rates.

French et al (1994) found significant correlations between smoking and weight concerns for girls but not for boys. “Girls who reported two or more eating disorder symptoms, who had tried to lose weight during the past year, who reported fear of weight gain, or who reported a strong wish to be thin were about twice as likely as girls who did not report these behaviors or concerns to be current smokers” (French et al, 1994: 1819). The same study showed, “among boys, dieting behaviors and weight concerns were largely unrelated to current smoking” (French et al, 1994: 1819).
They did note that the exception to the rule for boys was for boys who reported a strong wish to be thin. They were also significantly more likely to be smokers. French et al (1994) concluded that adolescent girls who have concerns over their weight initiate smoking at higher rates than those girls without concerns about their weight.

Klesges and Klesges (1988) found that nearly one-third (32.5%) of all smokers reported using smoking as a weight loss strategy. There were differences by sex as 39 percent of females and 25 percent of males reported using smoking as a dieting strategy. They also looked at the racial distribution of smokers and found that 21 percent of all Caucasians in their sample were smokers while only 7 percent of Blacks from the sample were smokers (significant $p < .001$). They also indicated that younger smokers (< 25 years old) were more likely to approve of smoking as a weight control strategy than older smokers. When observing smoking cessation, "females were almost three times as likely to cite a weight gain as the reason for relapse (20%) compared with males (7%)" (Klesges and Klesges, 1988: 417).

There is also reason to believe that current smokers continue smoking because they are concerned about gaining weight if they quit. For example, Williamson et al (1991) showed that weight gain was 6.2 pounds in men and 8.4 pounds in women, indicating that women who quit smoking gain more weight than the men. Nichter (2000) also provides insight through interviews into the association between smoking cigarettes and weight for adolescent females. Several of the girls in her study group had experienced weight gain after they tried to quit. One girl remarked that "smoking
makes you not want to eat," while another girl who recently quit said, "when I used to smoke, I hardly ate. As soon as I stopped smoking, I ate all the time" (Nichter, 2000: 77).

Nichter (2000) conducted a long-term study of adolescent females through ethnography and interviews, and provides enlightening insight to the feelings of the girls in her study. For example, in her discussion with a 10th grader who recently lost 30 pounds, the respondent explained that she used a variety of strategies, including smoking cigarettes and fasting. This girl was painfully aware that smoking was bad for her health as her grandmother had died of lung cancer. But she also recognized that being overweight was bad for her self-image and her popularity. To her, therefore, smoking cigarettes seemed to be the lesser of two evils.

Weight

Balentine, et al (1986) conducted a survey of students where information was gathered on dieting, methods used to lose weight, actual and perceived body weights, eating disorders and demographics. Nearly half (44%) of the students questioned indicated that they had tried to lose weight. Of these, 72% were female, and 83% were white. The age range for the majority of the dieters was 13 to 17 years of age, with a peak at age 15. When asked, many students listed more than one method of weight reduction. Fasting was reported by more than 50 percent of the students, with 22 percent reporting diet pills, and 21 percent reporting liquid diets. Diet programs (for example, Richard Simmons or Weight Watchers) was reported by 44 percent of the respondents, while 21 percent used laxatives or diuretics. Most of the methods
mentioned are reported more among the white participants in comparison to the black participants. Also, Balentine, et al (1986) assessed actual versus perceived weight, and found that "evidently, the black students were more realistic in their assessment of their actual weight" (p. 49).

Feldman et al (1988) showed similar patterns in the perception of weight versus actual weight in girls, but not boys. "Almost half the girls thought they were too fat when in fact 83% of girls who thought they were too fat were normal weight for height" (Feldman, et al, 1988: 190). In addition, more than half the girls had dieted compared to only 14 percent of the boys. About 15 percent of the girls had even induced vomiting as a method to lose weight, compared to less than 1 percent of boys.

Abrams et al (1993) found that "white female students were likely to adopt disordered eating attitudes and behaviors regardless of actual weight problems" (p. 55). They also suggested that, "Weight-loss concern and efforts for white college women are seldom about actual weight problems; rather, the concern and efforts are about perceived weight problems" (Abrams et al, 1993: 55). Abrams et al (1993) also indicate that their findings suggest a stronger relationship between anxiety and dieting attitudes and behavior for young white women in comparison to young black women.

Felts et al (1996) found a significant sex difference in weight perception, showing that females were more likely than males to report being overweight. Moreover, the differences in weight perception were significant, with females (34.6%) being substantially more likely than males (14.4%) to report being "too fat."
Serdula et al (1993) found similar results, with female students more than twice as likely as male students to consider themselves to be “too fat” (34% and 15%, respectively). In analyzing race, whites (26%) reported themselves as being “too fat” somewhat more often than either Hispanics (23.9%) or blacks (17.2%). In a similar study, “among females, whites (36.7%) and Hispanics (36.5%) were more likely than blacks (25.3%) to view themselves as overweight” (Felts et al, 1996: 23). Of these students reporting themselves as too fat, females reported more efforts to lose weight than males, and whites reported more attempts to lose weight than either Hispanics or blacks. Felts et al (1996) also noted considerable consistency of findings in the literature that there is a greater percentage of females, particularly white females, who perceive themselves as being overweight.

Dawson (1988) showed that black adult women are actually more likely to be overweight than white adult women or adult men of either race. Results from Dawson’s study indicated a median body mass index for black women of 25.1 and a median body mass index for white women of 22.9. Among the same subjects, however, white women were more likely than black women to perceive themselves as being overweight. Moreover, among adult females who do perceive themselves as overweight, blacks were less likely than whites to be trying to alter their weight. French et al (1997) showed that “across all ethnic groups, poor body image was the strongest correlate of dieting, purging, and binge eating” (p. 320).

Desmond et al (1989) and Wilson et al (1994) both demonstrated that black women and girls are more tolerant of being overweight, diet less frequently, and
perceive themselves to be less overweight than white women with similar body weight. Desmond et al (1989) studied 341 black and white adolescent girls. They found that 43 percent of the normal weight white females perceived themselves heavy while most normal weight black females correctly identified their weight category. Also, 100% of the overweight white females identified themselves as overweight, while only 40% of the overweight black females perceived themselves as heavy. Story et al (1995) found that “black females were more likely than other groups to report being satisfied with their weight and proud of their body” (p. 175).

With regard to their research, Striegel-Moore et al (1995) reported that “only the interaction of race with body esteem was significant, suggesting that satisfaction with appearance plays a significantly greater role in drive for thinness in white girls than in black girls” (pgs. 64-65). Abrams et al (1993) supports this notion as he found that black women who were less encultured into the black culture scored higher on dieting and weight concern measures than other black women. They also suggest that the results of their study indicate that behaviors and attitudes related to eating disorders are culture bound.

Kemper et al (1994) and Parnell et al (1996) found that their black female subjects selected ideal body sizes larger than those selected by their white female subjects. Kemper et al (1994) also found that blacks tended to be more satisfied with their body size compared to whites. The white students tended to want to be smaller, while black students wanted to stay the same or be only slightly smaller. “Black subjects were two times as likely as white subjects to indicate that they were thinner
than other girls their age" (Kemper et al, 1994: 123). Also, "black subjects were seven times as likely as white subjects to report that they were not overweight" (Kemper et al, 1994: 123). Parnell et al (1996) also found that white subjects did not believe the expected size of females should increase as much with age as the black subjects believed.

Story et al (1995) found that the prevalence of frequent dieting was lowest among black females in a study of a large adolescent population. Story et al (1995) also assessed weight and diet differences between the sexes and found that "among males, dieting behaviors and negative body image perceptions were less common compared to females" (p. 176).

Parnell et al (1994) also assessed some of the perceived influences on adolescent females regarding body image. They found that white girls expected their parents, their friends, and boys to select a smaller body size for females than black subjects. Also, white subjects were influenced significantly more by magazines and by television. Interestingly, although the body size considered ideal by black females was significantly larger than the ideal size selected by white females, there were no differences between the actual body mass index of the black and white subjects.

Rand & Kuldau (1990) and Thomas & James (1988) found that black women are less driven to achieve thinness than white women.

The research literature further indicates that the relationship between body image and actual weight is appropriately studied by race rather than socio-economic status (SES). For instance, Kemper et al (1994) categorized their subjects by SES
(high, medium, low) in addition to race. They found no significant differences for body size among the three SES groups. However, there were significant differences in perceived ideal body size between the black and white females, with black females ideal being significantly larger than the size selected as ideal by white females (p<.001). Black females were also two times more likely than white females to describe themselves as thinner than other girls their age (odds ratio 2.01). They concluded that perhaps there is a 'cultural buffer' for those in minority populations. The cultural buffer may be a result of 'differing social norms for ideal or appropriate body size between ethnic or economic groups' (Kemper et al, 1994: 124). Neumark-Sztainer et al (2000) also showed that SES (household income and educational level) was not associated with weight-control behavior for the adolescents in their study. Rosen et al (1987) and Whitaker et al (1989) both found that SES and the drive for thinness were unrelated.

Much of these findings perhaps suggest that there is a broader sociological emphasis on an ideal thin body for members of different ethnic groups.

**Body Image**

In interviews, black women often exhibit more positive body images and are less likely to desire being thin than either white or Hispanic women (Lopez, Blix, & Gray, 1995). Demarest & Allen (2000) not only studied what females thought of their own bodies, but also asked both males and females to assess what the opposite sex finds attractive (120 male and female U.S. college students of black, white or Hispanic origin). Black women in their study had the most accurate perceptions of
what men found attractive, while white women had the most distorted views (selecting figures much smaller than what the males rated attractive).

The desire for thinness detailed here has been attributed to popular media images of women emphasizing thinness as fashionable (Johnson & Petrie, 1995). Many researchers propose that culture is a major influence in the differences in the desire for thinness between females and males, especially the differences between white females and black females. Some researchers have even assessed the influx of Western cultural values into other cultures. Recent findings by Becker & Burwell (researchers from the Harvard Medical School), for example, (unpublished data, highlighted in Chronicle of Higher Education), indicated that the arrival of television along with Western cultural values is associated with a large increase in eating disorders among teenage girls in Fiji (McDonald, 1999). Just over three years after the arrival of television in Fiji, “15% of the girls surveyed reported that they had induced vomiting to control weight, compared with only 3% who did so in 1995” (McDonald, 1999: A22). The researchers found that the girls watching television at least three times a week were 50% more likely than other girls to see themselves as fat, even though this group was no more likely to be overweight than the non-television group.

Lai’s (2000) research in Hong Kong supports the findings of the Harvard group in Fiji. She suggests, “globalization of Western culture, from eating habits to body shape ideals, has often been said to be the driving force behind the rising incidence of anorexia nervosa in non-Western populations” (Lai, 2000: 566). The
new concept of “fear of fatness” is said to likely be “a reflection of this shift in cultural emphasis” (Lai, 2000: 566). Lee and Lee (1996) conducted a community study of adolescent girls in Hong Kong, and indicate that the pattern of body dissatisfaction and fat phobic attitudes found in Western culture were reported by over 40 percent of the sample when tested with the Eating Attitudes Test.

When researchers observe and discuss eating disorders, often times culture becomes a major component. Garfinkel & Garner (1982) believed that higher prevalence rates of eating disorders occur in Western culture, while Hsu (1987) furthers the research to focus on whites, and Gordon (1990) further proposes that it is particularly common among women. The basic argument is that cultural standards of beauty emphasizing slenderness as a main feature of femininity are very powerful (Striegel-Moore, 1993). Many have shown that the cultural standards are so powerful that even if eating disorders are not apparent, body dissatisfaction is still high (Cohn & Adler, 1992; Pliner, Chaiken, & Flett, 1990). Some have felt the dissatisfaction was pervasive enough to be characterized as “normative discontent” (Rodin, Silberstein, & Striegel-Moore, 1985).

Berg (1993) indicated that media pressure to be thin was stronger in the mid-1990s than at any time in the previous two decades. This was based on a study compiling statistics for television commercials on diet foods, diet program foods and chemically-based reducing aids. In studies of Miss America contestants and Playboy models over a 30-year span (1959-1988), the women have become thinner each year (Berg, 1993). At the time of this study, he indicated that the typical contestant or
model is about 13 to 19 percent below expected weight. The clinical criteria for anorexia nervosa is 15 percent below expected weight (Berg, 1993: 109).

Some of these researchers connecting eating disorders to culture conceptualize culture as an action system. For example, “exposure to the media-portrayed thin-ideal is related to eating pathology and suggests that women may directly model disordered eating behavior” (Strice et al, 1994: 839). This identifies culture as an independent variable of its own. Viewing theory this way sets culture as a means-end situation, with culture being theorized as an action variable (Haworth-Hoeppner, 2000). Others criticize the use of cultural theory in this manner. For example, Swidler (1986) proposes that viewing culture in this way is misleading. She states, “A culture is not a unified system that pushes action in a consistent direction. Rather it is more like a ‘tool kit’ or repertoire from which actors select differing pieces for constructing lines of action” (Swidler, 1986: 277). Culture, therefore, is not an independent form of action, rather an interaction.

Weight Loss

With the disparity of perceptions of weight among black and white female adolescents, it is not surprising that the methods chosen to lose weight are also different. Neumark-Sztainer (2000) found that 44 percent of adolescent girls were currently trying to control their weight. Of these, nearly one-third (30.4%) were using unhealthy practices (diet pills, laxatives, or water pills; self-induced vomiting; skipping meals; fasting). Neff et al (1996) showed similar results. White teens had six times the likelihood of taking diet pills and vomiting as weight management
behaviors than the black teens. Stice (1998) discussed the perceived pressure to be thin, whether it be from family, friends, dating partners, and/or the media, and concluded that it was positively related to bulimic symptoms found among her respondents.

Hypotheses

Clearly, concerns about weight are a concern for adolescents, with much of the focus on white females due to a higher incidence of eating disorders and greater concern about weight issues. This project tests the use of cigarette smoking as a subtle form of weight control. It is proposed that some adolescents use cigarettes to control their weight, and that the incidence will be higher among white, female adolescents. In addition, those expressing concern over their weight, regardless of actual weight, will be more likely to smoke than those not concerned with their current weight.

Perhaps those that have not taken dieting to an extreme (vomiting, pills, starvation, etc.) use smoking as another means of weight control. Frequent dieting among adolescents has often been associated with higher levels of smoking initiation. For example, French et al (1995) showed that “weekly or daily alcohol or tobacco use was about one and a half times more prevalent in those who always dieted compared with never dieters” (pg. 699).
CHAPTER III

METHODOLOGY

The data used for this study are from the National Longitudinal Study of Adolescent Health (Add Health) carried out by the Population Center at the University of North Carolina, Chapel Hill. The dataset was selected not only for its content but also because of its generalizability to a larger population. First, the dataset contains data directly relevant to this project, including the respondent’s actual height and weight, as well as questions about perception of weight. It also contains questions about substance use, which are studied in conjunction with perception of weight and actual weight. Finally, it includes important pieces of demographic information, such as race, age, and sex.

More importantly, this particular dataset was selected because the findings will be generalizable to a larger population. The Add Health project incorporated a stratified, random sample of all high schools in the United States that had an 11th grade, and at least 30 enrollees. The result was a sample size of 26,666. Since the unit of analysis is the individual, the results should be broadly generalizable to American adolescents.

The Dataset

The original research project was supported by a grant from the National Institute of Child Health and Human Development (and 17 other federal agencies).
Researchers at the Carolina Population Center collected the data. "Add Health is a longitudinal study of adolescents in grades 7 through 12 and the multiple social contexts in which they live" (Resnick, et al., 1997, p. 824). It was designed to ensure that the sample would be representative of U.S. schools with respect to region of the country, urban/rural location, school type, ethnicity, and school size.

First, an in-school survey was conducted of the selected schools, using a class period and lasting from 45 – 60 minutes, depending on the school. More than 90,000 adolescents completed the in-school questionnaire. Parents were informed before the survey date so they had the opportunity to refuse their child's participation. This passive consent process was used by most of the schools, with a few requiring active consent from the parents. The student could also refuse to participate. If the student was absent, no make-up time was given for the survey, yet the student still qualified for the in-home survey. The sample for the in-home survey was taken from the school rosters.

The in-home survey was also done with approximately 27,000 adolescents, and was drawn from a core sample from each community plus selected special oversamples. Eligibility for the over-samples depended on responses to the in-school questionnaire. Before the in-home survey was conducted, the adolescent had to give his/her consent, as did a legal parent or guardian. "Extensive precautions were taken to maintain confidentiality and to guard against deductive disclosure of participants' identities. All protocols received institutional review board approval" (Resnick, et al., 1997, p. 824).
The public dataset used for this study consists of a core sample, including adolescents who completed the in-home survey and an oversample based on ethnicity of blacks from well-educated families, Chinese, Cuban and Puerto Rican adolescents. The total core sample contained about 12,105 adolescents who were interviewed. The public-use dataset contains about 50 percent of this core sample, including wave I in-home interview data, in-school questionnaire, parent questionnaire data, and wave II in-home interview data, totaling approximately 6,500 adolescent records. In order to protect the confidentiality of the respondents, no identifying information is included. The in-home interviews were conducted between April and August, 1996. About 5,000 participants in the in-home component had not completed an in-school questionnaire. The in-home interviews lasted for an average of 90 minutes, and the response rate was 88.2%. This response rate is in accordance with typical response rates for interviews, which are very high, around 90% (Monette et al, 1994).

The “data collected during the in-home phase of Add Health provide information on sensitive health-risk behaviors such as drug and alcohol use, sexual behavior, and criminal activities in addition to detailed information on health status, health service utilization, family dynamics, peer networks, romantic relationships, decision making, aspirations, and attitudes. During the more sensitive portions of the interview, adolescents listened to questions through earphones and directly entered their responses into a laptop computer, thereby greatly reducing any potential for interviewer or parental influences on their responses” (Resnick, et al., 1997, p. 824). Information on substance use, specifically cigarette smoking behavior, was gathered.
using the earphone/laptop computer method.

The questions on the in-home interviews do not rely on recollection of events for respondents. "The Add Health study is longitudinal, with adolescents interviewed for a second time at a one-year interval. Instead of relying on respondents' memories and reconstructions of past events, it is thus possible to measure directly the influence of their experiences at one time on their behavior, and its consequences, at another" (website of project: www.cpc.unc.edu/projects/addhealth/). Therefore, information such as cigarette use is current, not a recollection of use from a year ago. All of the data used for this project are thus the most recent information available.

**Item Descriptions**

The data for this project are only a small fraction of the overall data collected in the Add Health project. The specific items of data were selected because of their applicability to this project. The data extracted include: demographic information, weight information (both actual weight and perceptions of weight), and cigarette smoking.

During the in-home interviews, respondents were asked their actual height and weight, and the interviewer actually conducted these measurements in order to get more accurate information. Thus, the weight variables are clearly more reliable than self-reported information would likely be. Later, during a series of health questions, all respondents were asked how they thought of themselves in terms of weight (a 5 point Likert scale, ranging from very underweight to very overweight), and whether they were trying to lose, gain, or stay the same weight (a 3 point Likert scale). These
two questions are used to assess perception of weight. If the respondents indicated that they were either trying to lose weight or keep the same weight, they were next asked what methods they had used in the previous week to accomplish this goal. The following responses were offered: “dieted”, “exercised”, “made yourself vomit”, “took diet pills”, “took laxatives”, “other”, and “none”. Responses to this question that are potential indicators of unhealthy behavior as discussed in the literature review would include: vomiting, taking diet pills or laxatives. These variables are included for their potential relationship with cigarette smoking behaviors.

Demographic information gathered in the Add Health project was also important for this project. There was an explicit oversample of black adolescents who had one or more parents with a college education. This is beneficial because it allowed a direct assessment of the contributions of race, and not only through socioeconomic status or other factors. In particular, the analysis of differences in actual versus perceived weight were assessed among black and white adolescent girls as it relates to smoking behaviors.

The sex of the respondent is also a key variable for this project. Differences in actual weight and perceived weight were observed with respect to the sex of the respondent. Also, perception of weight and cigarette use were analyzed with respect to sex, to note differences in male and female patterns of smoking behaviors.

Age will also be included in this project. Although the study was done only with adolescents, it does include a wide range of ages, ranging from grades 7 – 12 (ages 11 – 18). Again, differences by age will be analyzed with respect to smoking behaviors.
behaviors.

Smoking behavior is assessed with the question about regular smoking habits. The question, "during the past 30 days, on how many days did you smoke cigarettes?" was used to determine whether a respondent is a current smoker or non-smoker. If the respondent indicated 20 or more days, then he or she was defined as a smoker for this project. Current use, or past month usage, is considered to be the most accurate for every participant to remember and thus report (O'Malley, Bachman, and Johnston, 1983). The 1999 Youth Risk Behavior Survey actually uses smoking on 1 or more days in the past 30 days as current smoker status. This project uses more days smoked to establish a smoking pattern.

Potential Problems with Self-reported Data

Becker (1963) discusses substance use with respect to its overreported and underreported use. He suggests that underreporting may be in part due to fears of rejection by people whose respect and acceptance are desired by the individual respondent. "This inexpediency, real or presumed, arises from the fact or belief that if nonusers discover that one uses the drug, sanctions of some important kind will be applied" (Becker, 1963: 66). Along with underreporting, Becker suggests that overreporting can also be a problem in self-reported substance use. While there may be a fear of sanctions for use, there may also be a fear of sanctions for non-use. Thus, a non-user may attempt to "fit-in" with other peers who do use substances, thus reporting use that may not occur, or exaggerating the level of use. Both of these issues must be taken into consideration when observing self-reported drug use.
Currie (1993) notes that there are potential problems with self-reported data with respect to drug use. Self-report surveys rely on the respondents to tell the truth. Obviously, although cigarette use is a legal substance, it is not legal for the adolescents in this study, so it is likely that not all respondents will tell the truth (Currie, 1993).

Barnea, Rahav, & Teichman (1987) found a "high rate of reliability in self-reporting of substance use, both cross-sectionally and longitudinally" (p. 896). The study was in agreement with "studies which evaluated self-reports of drug use and found them to be a reliable instrument for collecting data and arriving at conclusions" (Barnea, Rahav, & Teichman, 1987: 896).


It is, however, important to note that O'Malley et al (1983) also found discrepancies when comparing drug use during the past month to drug use during the past year. Logically, the past year's drug use should be roughly 12 times the past month's use, or vice versa with the past month's use being approximately 1/12th of the past year's use. They attempted these calculations and did not find much consistency. The likely explanation is that it is easier for a respondent to accurately
remember drug use for the past month versus the entire year. They reported, "an overall underreporting of frequency of annual use in these kinds of drug use reports" (1983: 821). Therefore, they concluded that estimates of prevalence (use versus no use) may be less subject to bias than estimates of frequency (how much of the substance is used) (1983: 821). Finally, since the patterns of reporting - to the extent that they exist - were consistent among the respondents, levels of underreporting were similar from one data collection to the next, allowing the conclusion that the reports were valid measures. This project also relies on prevalence and past month’s use, thus not requiring accurate recollection up to one year.

Methods that attempt to deal with misreporting (either underreporting or overreporting) focus on ensuring the confidentiality of the respondent. For this project, all substance use data were collected using a laptop and earphone combination, as described previously. Therefore, the respondent did not have to answer an interviewer, or provide answers that others in the room (if any) could observe. This method was an important tool for accurate data collection of substance use questions.

Although the issue of reliability is extremely important in observing substance use, this project is an assessment of cigarette smoking only. While cigarettes are illegal for those under the age of 18, they are socially accepted in the U.S. culture, and easily attainable, even for those underage. Therefore, it is less likely that a respondent would misreport cigarette use, either through underreporting or overreporting, out of fear of official sanction.
Limitations

In addition to limitations with self-reported substance use as detailed above, there are other limitations to the data for this project. For instance, the original project was designed to ensure that the sample would be representative of U.S. schools with respect to region of the country, urban/rural location, school type, ethnicity, and school size. The samples were therefore clustered based on schools, and there is likely some assimilation in the sample with respondents from the same school giving similar answers. However, the sample is still representative on a national level, and results should still enable making generalizations to United States adolescents.

Further, the conclusions intended in this project are to assess reasons for cigarette use among adolescents that are not directly asked in a question on the survey. For example, conclusions are drawn based on probabilities of smoking given certain characteristics of each respondent. In a further study, respondents should merely be asked if they started smoking or continue to smoke for the purpose of losing or maintaining weight.
CHAPTER IV

DATA ANALYSIS

Description of Sample

Tables 1, 2 and 3 show the demographic breakdown of the Add Health Project data.

Table 1
Gender of Sample

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
<th>Census (1996)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3147</td>
<td>48.4</td>
<td>51.5%</td>
</tr>
<tr>
<td>Female</td>
<td>3356</td>
<td>51.6</td>
<td>48.5%</td>
</tr>
<tr>
<td>Total</td>
<td>6503</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 appears to include similar numbers of males and females. Using the chi-square test, the samples are significantly different (p<.01). However, the likely reason for this significant difference is the large sample sizes. Census numbers for adolescents in 1996 are similar, although the proportions are reversed, with males at 51.5 percent and females at 48.5 percent.

Table 2 shows the breakdown of respondents by race. Over half (57.3%) of the respondents are white, while nearly one fourth (24.4%) are black (this is in large part due to deliberate oversampling). Only blacks and white respondents were used for this analysis, partially due to inconclusive data on other minorities (Hispanics mostly) and the small number of other minorities that responded. There is a statistical
difference between the white (N=3720, 70.1%) and the black (N=1584, 29.9%) samples (p<.001). Similar to the gender findings, this is likely due to the large sample sizes.

Table 2
Race of Sample

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
<th>Census (1996)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White / Caucasian</td>
<td>3720</td>
<td>57.3</td>
<td>67.6%</td>
</tr>
<tr>
<td>Black / African</td>
<td>1584</td>
<td>24.4</td>
<td>14.7%</td>
</tr>
<tr>
<td>Native / American Indian</td>
<td>131</td>
<td>2.0</td>
<td>1.0%</td>
</tr>
<tr>
<td>Asian</td>
<td>246</td>
<td>3.8</td>
<td>3.6%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>760</td>
<td>11.7</td>
<td>13.0%</td>
</tr>
<tr>
<td>Other</td>
<td>55</td>
<td>0.8</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>6496</td>
<td>100.0</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

With respect to race, the census numbers are similar to the Add health data, with one exception. As described in the methods section, the Add health project data contains an oversample of black youths with at least one parent having a college education. This is clearly reflected in the sample percentages for each race group. The purpose of this oversample was to eliminate class bias and enable the researchers to make clear distinctions and conclusions based on race.

Table 3 shows that the differences among age categories appear to be minimal. However, using the chi-square test there is a statistical difference among the different age categories (p<.001). As in the previous two tables, this difference is likely due to large sample sizes. The census numbers are similar, with each age category representing about 17 percent of the adolescent population.
Table 3
Age of Sample

<table>
<thead>
<tr>
<th>N</th>
<th>%</th>
<th>Census (1996)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>995</td>
<td>15.3</td>
</tr>
<tr>
<td>14</td>
<td>998</td>
<td>15.4</td>
</tr>
<tr>
<td>15</td>
<td>1105</td>
<td>17.0</td>
</tr>
<tr>
<td>16</td>
<td>1190</td>
<td>18.3</td>
</tr>
<tr>
<td>17</td>
<td>1140</td>
<td>17.5</td>
</tr>
<tr>
<td>18</td>
<td>1073</td>
<td>16.5</td>
</tr>
<tr>
<td>Total</td>
<td>6501</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Description of Measures

Table 4 includes the frequency table for measures specifically tested in this model, including smoking, perception of weight, desire to lose weight, method of weight loss, and actual body mass index (BMI).

Table 4
Frequency for Included Variables

<table>
<thead>
<tr>
<th></th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Male</td>
<td>303</td>
<td>16.7</td>
</tr>
<tr>
<td>White Female</td>
<td>339</td>
<td>17.7</td>
</tr>
<tr>
<td>Black Male</td>
<td>32</td>
<td>4.2</td>
</tr>
<tr>
<td>Black Female</td>
<td>13</td>
<td>1.6</td>
</tr>
<tr>
<td>Perceived as overweight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>81</td>
<td>2.4</td>
</tr>
<tr>
<td>Female</td>
<td>159</td>
<td>4.5</td>
</tr>
<tr>
<td>Need to lose weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>848</td>
<td>25.0</td>
</tr>
<tr>
<td>Female</td>
<td>1415</td>
<td>40.5</td>
</tr>
<tr>
<td>Risky methods of weight loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>0.5</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>1.2</td>
</tr>
<tr>
<td>Actual Overweight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>196</td>
<td>6.2</td>
</tr>
<tr>
<td>Female</td>
<td>210</td>
<td>6.3</td>
</tr>
</tbody>
</table>
Smoking was measured as those adolescents that indicated that they smoked on 20 or more days during the past month. Past month substance use is preferred to be included as current usage rates, as previously discussed in the methods section. About 17 percent of both white male (16.7%) and female (17.7%) respondents were considered smokers in this sample, while far fewer black respondents were smokers (black males 4.2%, black females 1.6%). Using the T-test procedure, there was a significant statistical difference (p<.0001) between whites’ smoking rates compared to blacks’.

With regard to perception of weight, respondents were included in this variable if they considered themselves to be overweight. If they selected the highest category on a 5-point Likert scale, “very overweight,” then they were coded as overweight. The highest category was selected for a conservative measure given the lack of theory and literature to guide perception of weight in this manner. More females than males perceived themselves as overweight. Using the T-test, a significantly higher percentage of females consider themselves to be overweight compared to males (p<.0001). This finding is consistent with the current literature (Feldman et al, 1988), as females were much more likely to express concern for their weight, even when an actual body weight problem did not exist.

Respondents were also asked if they needed to lose weight, gain weight or stay the same. The difference between males and females with regard to the perception of needing to lose weight is substantial and statistically significant (p<.0001). Many (40.5%) of the females in this study indicated that they felt they
needed to lose weight. This is in contrast to the males, for whom only 25.0% indicated a need to lose weight.

Once respondents indicated needing to lose weight or stay the same weight, they were asked what methods they chose to accomplish this goal. The options included: exercise, diet, vomit, diet pills, laxatives, and other. Only the answers vomit, diet pills and laxatives were included for this measure. Although any of the answers taken to an extreme could be harmful, there is no way to tell if options like exercise or diet are done at healthy or unhealthy levels. “Other” could potentially include smoking, so it was not used because of that possibility. Although relatively few participants indicated these methods, significantly more females chose these methods compared to males (p<.0001, T-test).

A body mass index (BMI) greater than 25 (measured based on height and weight) is considered overweight according to the National Heart, Lung and Blood Institute (1998). Body mass index serves as an objective measure of actual weight to be used in addition to the perception of weight already used. Similar numbers of males and females are defined as actually being overweight in this study.

To verify the use of the body mass index as a control variable versus the perception of weight and desire to lose weight, Tables 5-6 were created using the chi-square test.

In general, as shown in Table 5, both females and males that are not overweight do not perceive themselves as overweight (p<.001).
Table 5
BMI versus Perceived Overweight

<table>
<thead>
<tr>
<th>BMI</th>
<th>&lt;25</th>
<th>&gt;25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Overweight</td>
<td>51 (1.9%)</td>
<td>132 (20.4%)</td>
</tr>
<tr>
<td>Not perceived Overweight</td>
<td>2657 (98.1%)</td>
<td>516 (79.6%)</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Overweight</td>
<td>12 (0.5%)</td>
<td>43 (5.9%)</td>
</tr>
<tr>
<td>Not perceived Overweight</td>
<td>2411 (95.5%)</td>
<td>682 (94.1%)</td>
</tr>
</tbody>
</table>

Indeed, very few of either the males or females that are under the recommended BMI level describe themselves as “very overweight.” However, even though the numbers are very small, four times as many females (1.9%) as males (0.5%) perceive themselves as “very overweight.” Furthermore, for those respondents that are considered overweight as defined by government standards (BMI > 25) nearly four times as many females indicated that they were “very overweight,” compared to their male counterparts (20.4% vs. 5.9% respectively).

Both males and females that are not overweight are significantly less likely to be trying lose weight (p<.001). Table 6 indicates that among respondents having a normal weight as defined by BMI scores under 25, many are still trying to lose weight. This is particularly the case for females, since over 3 times as many females (39.8%) as males (11.6%) respond that they are trying to lose weight. However, over three-quarters (78.7%) of females who are actually defined as overweight are trying to lose weight. This is in comparison to only about half (49.7%) of the males who are defined as overweight.
Table 6
BMI versus Trying to Lose Weight

<table>
<thead>
<tr>
<th>BMI</th>
<th>&lt;25</th>
<th>&gt;25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trying to lose weight</td>
<td>1078 (39.8%)</td>
<td>510 (78.7%)</td>
</tr>
<tr>
<td>Not trying to lose weight</td>
<td>1630 (60.2%)</td>
<td>138 (21.3%)</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trying to lose weight</td>
<td>282 (11.6%)</td>
<td>360 (49.7%)</td>
</tr>
<tr>
<td>Not trying to lose weight</td>
<td>2141 (88.4%)</td>
<td>365 (50.36%)</td>
</tr>
</tbody>
</table>

Testing Weight Perception versus Smoking. Controlling for Race, Age, and BMI

For comparison purposes, the model was split between males and females and tested separately for each group. Tables 7 and 8 present results from the logistic regression model for the selected weight variables against the dependent variable smoking. The entries in the table are odds ratios for the likelihood that the particular group will smoke. The first run included only the two demographic variables (race and age). In each successive run, the variables were added one at a time to the model to note the impact of each new variable.

Each run of the model has overall statistical significance (p<.0001), indicating that some of the variables are appropriate predictors of smoking. For the males (see Table 7), only the demographic information (race and age) had a statistically significant impact on smoking.
Table 7
Logistic Regression Model – Cigarette Use
Males (N=335)

<table>
<thead>
<tr>
<th>Run</th>
<th>Race</th>
<th>Age</th>
<th>Perception of Overweight</th>
<th>Trying to lose weight</th>
<th>Method of weight loss</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.75*</td>
<td>1.43*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4.75*</td>
<td>1.43*</td>
<td>1.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4.76*</td>
<td>1.43*</td>
<td>1.12</td>
<td>0.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.76*</td>
<td>1.43*</td>
<td>1.09</td>
<td>0.86</td>
<td>1.84</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4.75*</td>
<td>1.44*</td>
<td>1.15</td>
<td>0.90</td>
<td>1.84</td>
<td>0.89</td>
</tr>
</tbody>
</table>

* p< 0.05

White male adolescents are 4.8 times more likely to smoke than their non-white counterparts (p<.0001). Also, as age increases, males are 1.4 times more likely to smoke (p<.0001). These findings are both consistent with other studies of adolescent substance use that have shown whites to be more likely to smoke and older adolescents more likely to smoke (Bachman et al, 1991; Johnston et al, 1996; Van Valey & Newman, 1996).

Turning to Table 8, here again, each run of the model has overall statistical significance (p<.0001), indicating that some of the variables are appropriate predictors of smoking. For females, those that are white are 14 times more likely to smoke than their non-white counterparts (p<.0001). Also, as age increases, females are 1.4 times more likely to smoke (p<.0001). These findings are also consistent with other studies of adolescent substance use that show whites and older adolescents to be more likely to smoke (Bachman et al, 1991; Johnston et al, 1996; Van Valey & Newman, 1996).
Table 8
Logistic Regression Model – Cigarette Use
Females (N=352)

<table>
<thead>
<tr>
<th>Run</th>
<th>Race</th>
<th>Age</th>
<th>Perception of Overweight</th>
<th>Trying to lose weight</th>
<th>Method of weight loss</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14.24*</td>
<td>1.43*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14.18*</td>
<td>1.43*</td>
<td>1.70*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14.17*</td>
<td>1.43*</td>
<td>1.69*</td>
<td>1.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>14.14*</td>
<td>1.43*</td>
<td>1.67*</td>
<td>0.99</td>
<td>1.40</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>13.62*</td>
<td>1.44*</td>
<td>2.12*</td>
<td>1.06</td>
<td>1.39</td>
<td>0.61*</td>
</tr>
</tbody>
</table>

* p< 0.05

When perception of weight is added to the models, however, females are approximately 1.7 times more likely to smoke if they perceive themselves as “very overweight.” This increases to 2.1 times more likely to smoke if they perceive themselves as “very overweight” when the actual weight is introduced (BMI > 25). When the actual weight is high, however, females are 0.6 times less likely to smoke than females with lower body mass index.

It is interesting to note that the variables for desire to lose weight and the method of losing weight were not significantly correlated with smoking patterns either among females or among males. The method of losing weight shows higher probabilities to smoke among both males and females, but none of the results are significant. There were very few adolescents who selected an unhealthy method (55 females and 11 males) so it is possible that the lack of significance is due to the extremely small number in this variable. Unfortunately, no conclusions can be clearly drawn as to the real impact of this variable on smoking behaviors among
adolescents. It appears that the relation between weight and smoking for female adolescents resides largely within the perception of weight, rather than the behavior of actually trying to lose weight. The perception of weight variable shows a stronger relationship with smoking, as the odds ratio increases when actual weight is controlled for in the model, even when females with higher BMI scores are less likely to smoke.

These findings indicate that it is not actual weight gain that is associated with smoking behavior. Rather, it is the perception of being overweight that is the strongest predictor. This holds particularly for older adolescent white females. These findings are consistent with both Klesges and Klesges (1988) conclusion that smoking is a weight loss strategy, as well as Pirie’s (1991) findings that fear of major weight gain is a barrier to quitting smoking. Additionally, these findings held true only for the adolescent females in this study, not for the adolescent males. Among adolescent males, only race and age were useful predictors of smoking behavior.

French et al (1997) were able to show that poor body image rather than actual weight problems was the strongest correlate of dieting, purging, and bingeing. They also concluded that girls with concern over their weight initiated smoking at higher rates than girls without concern over their weight. In a similar study, Stice (1998) related the perceived pressure to be thin with bulimic symptoms for young girls. This pattern holds true in this study, to the extent that perception of overweight is an indicator of body image. It indicates that poor body image is the strongest correlate for adolescent white female smoking. Purging and bingeing are clearly more radical
approaches when a young girl perceives herself as having a weight problem. Thus, it is not surprising that methods of weight loss did not turn out to be useful predictors. However, smoking may be a less radical / more acceptable "solution" for young girls to adopt. Purging and bingeing have serious short-term effects for young females, while smoking appears to carry serious long-term effects for their health. Thus, it may be the case that girls feel smoking can be used as short-term solution to weight control which they also view as a short-term problem.

Low Perception of Self-Esteem and Smoking

Since smoking rates were statistically related to the perception of weight among females and not among males, perhaps the results are indicative of low perception of self-esteem being related to smoking behavior. In the same dataset, respondents were asked how they perceive their level of intelligence in comparison to their peers (in this dataset, this was the closest comparison possible to measure perception of self-esteem). This question was also presented on a Likert scale, and the answers "slightly below average" and "moderately below average" were combined to create a "perceived low intelligence" score.

Table 9
Logistic Regression Model – Perceived Low Intelligence

<table>
<thead>
<tr>
<th></th>
<th>Race</th>
<th>Age</th>
<th>Perception of Low Intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>4.77*</td>
<td>1.44*</td>
<td>1.95*</td>
</tr>
<tr>
<td>Females</td>
<td>14.23*</td>
<td>1.43*</td>
<td>1.27</td>
</tr>
</tbody>
</table>

* p< 0.05
Perceived low intelligence was included in a logistic regression model against smoking. In this instance, males were nearly 2 times more likely to smoke if they perceived themselves as less intelligent than their peers ($p<.002$). Females, however, showed no statistically significant relationship between perceived low intelligence and smoking. From these results, therefore, one might conclude that it may be low perception of self-esteem that is associated with smoking patterns for males and females. However, the particular perception and the importance it carries (weight for females and intelligence for males) is critical, since neither perception applies to the other group. In this regard, it would appear that adolescents strongly perceive cultural ideals that beauty is an important aspect for a female, while intelligence is an important aspect for males.

**Weight Perception versus Other Substance Use**

To further explore the association between perception of weight and substance use, parallel analyses were also carried out with both alcohol use and marijuana use to see if perception of weight impacted other substances beyond smoking for weight control. Unfortunately, however, the alcohol questions in this particular survey did not include either current alcohol use or use of alcohol during the past 30 days. However, it did include alcohol use over the past year. Those respondents answering that they use alcohol one day a week or more were included as “drinkers.”
Table 10  
Logistic Regression Model – Alcohol Use

<table>
<thead>
<tr>
<th>Sex</th>
<th>Race</th>
<th>Age</th>
<th>Perception of Overweight</th>
<th>Trying to lose weight</th>
<th>Method of weight loss</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1.34*</td>
<td>1.55*</td>
<td>0.99</td>
<td>0.74</td>
<td>0.98</td>
<td>1.15</td>
</tr>
<tr>
<td>Female</td>
<td>1.41*</td>
<td>1.52*</td>
<td>0.65</td>
<td>1.19</td>
<td>2.34*</td>
<td>0.80</td>
</tr>
</tbody>
</table>

* p< 0.05

For females, whites were 1.4 times more likely to drink than blacks (p<.02). Also, older adolescents were 1.5 times more likely to drink (p<.0001) than younger ones. Both results are consistent with previous studies (Bachman et al, 1991; Johnston et al, 1996; Van Valey & Newman, 1996). Neither perception of weight, nor trying to lose weight, nor BMI were statistically associated with alcohol use among females. However, the chosen method of losing weight (vomit, diet pills or laxatives) was significantly associated with drinking behavior for females (p<.05). Those that chose one of these methods were 2.3 times more likely to drink than those that did not.

Among males, age was significantly associated with alcohol use. Older males were 1.3 times more likely to drink (p<.0001) than younger. Also, race was statistically significant for males, with whites 1.6 times more likely to drink than blacks (p<.04). These result are consistent with previous studies (Bachman et al, 1991; Johnston et al, 1996; Van Valey & Newman, 1996). The other weight variables were not statistically associated with drinking patterns for males.
Smoking marijuana was also used as a dependent variable in the weight perception model. Any marijuana use over the past 30 days was included for this measure.

Table 11
Logistic Regression Model – Marijuana Use

<table>
<thead>
<tr>
<th>Sex</th>
<th>Race</th>
<th>Age</th>
<th>Perception of Overweight</th>
<th>Trying to lose weight</th>
<th>Method of weight loss</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1.03</td>
<td>1.27*</td>
<td>1.00</td>
<td>0.98</td>
<td>0.98</td>
<td>0.89</td>
</tr>
<tr>
<td>Female</td>
<td>1.61*</td>
<td>1.24*</td>
<td>1.28</td>
<td>0.98</td>
<td>1.91</td>
<td>0.66*</td>
</tr>
</tbody>
</table>

* p< 0.05

For females, whites were 1.6 times more likely to smoke marijuana than blacks (p<.002). Also, older adolescents were 1.2 times more likely to have smoked marijuana at least once in the last 30 days (p<.0001). Like alcohol use, the perceptions of being overweight and trying to lose weight were not associated with smoking marijuana. Also, those with a BMI greater than 25 were 0.7 times less likely to smoke marijuana (p<.03).

For males, the results are also parallel to those for alcohol. Only age was statistically related to smoking marijuana. Older adolescents were 1.3 times more likely to have smoked marijuana at least once in the last 30 days (p<.0001) than younger. None of the weight variables were statistically associated with smoking marijuana.

Finally, to verify the choice of cigarette use for 20 days as the measure of smoking among adolescents, the data were all re-run to include only daily smokers.
cigarette use (every day for the past 30 days). There were relatively few differences found between these models and the original models defining adolescents who smoke on 20 or more days as smokers.
CHAPTER V

CONCLUSIONS

Many of the conclusions expected for this project were supported. The data support the existing literature with respect to whites smoking more than their non-white counterparts, and also with cigarette use increasing with age (Bachman et al, 1991; Johnston et al, 1996; Van Valey & Newman, 1996). This project does, however, demonstrate that there are other variables that may contribute to adolescent smoking, at least among white females.

A connection was established associating the perception of weight among white females and cigarette smoking. The model with all of the characteristics included (race, age, perception of overweight, trying to lose weight, method of weight loss, and body mass index) had overall statistical significance (p<.0001), indicating that the variables chosen were important predictors of smoking. For the race variable, being white indicated a probability of 14 times more likelihood to smoke than being black, while the perception of being overweight was 2 times more likely to smoke for females. These results are consistent with the existing literature which indicates that the desire to be thin is found less often among black women (Rand et al, 1990; Thomas et al, 1988).

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The difference in smoking patterns for adolescent males was only found to be related to race and age, with whites smoking more than non-whites, and smoking rates increasing as age increases. This supports the existing literature for male smoking rates (Bachman et al, 1991; Johnston et al, 1996; Van Valey & Newman, 1996). The male smoking rates were not related to weight perception, as was found in the female population. With females more likely to report being “too fat” compared to males (Felts et al, 1996; Serdula, 1993) and thus more likely to act on that dissatisfaction with dieting, purging, or binging (French et al, 1997), it seems likely that females would also include smoking cigarettes as weight control while males would not.

It is interesting to note that only perception of weight was associated with cigarette smoking behavior, and trying to lose weight was not. Given the existing literature, trying to lose weight was also expected to be related to smoking cigarettes. However, there were far more adolescents (both males and females) who were found to express trying to lose weight (25.0% of males, 40.5% of females), even if they did not describe themselves as overweight (2.4% of males, 4.5% of females). Perhaps there are varying degrees of effort to control weight. Apparently many adolescents express an interest in losing some weight, even if they realize that their current weight is within acceptable limits. A next level occurs when they actually view themselves as overweight, and that is where the smoking behavior becomes more likely among females. Finally, the method to lose weight (purging or binging) was not associated with cigarette smoking, but is clearly found more often among females who are
dissatisfied with their bodies (French et al, 1997).

Understanding the characteristics, and the possibilities that lead an adolescent to smoke are important in assessing strategies to promote not smoking. Perhaps running advertisements about smoking as a stinky or dirty habit does not have the impact on girls that educating and helping them with their weight issues might have. Culture does play a part in all of our daily decisions, and understanding that link is pertinent. As previously mentioned, culture may not be the action in the behavior, but it certainly does have an interaction with our behaviors (Swidler, 1986). Young, white females are clearly accepting the cultural pressures that thin is ideal. They also make potentially life threatening decisions depending on the extent of internalization of that ideal, whether it be through eating disorders or smoking cigarettes. A long-lasting discontent with one's body, and the constant struggle to maintain or change it, are not likely to be a healthy way of life, especially if these lead to adopting unhealthy behaviors. The current normative discontent among many Americans with respect to weight clearly is also impacting the young of our society.

As mentioned in the methods chapter, the link between cigarette smoking and perception of weight was not directly asked as part of this survey. Therefore, the conclusions can only be drawn through associations and statistical relationships. It is clear, however, that a relationship and pattern has been established. Consequently, it seems extremely important to alter further adolescent surveys to include cigarette smoking as a possible option when asking methods of weight loss. Only then can we further study the association between cigarette smoking and weight perceptions.
Two easy ways to include weight with cigarette smoking would be with the
questions asked in this survey, and in many other surveys. The question about
methods of losing weight was a closed-ended question, and the options “dieted”,
“exercised”, “made yourself vomit”, “took diet pills”, “took laxatives”, “other”, and
“none” were the only options. Merely adding “smoked” would be an easy addition to
such a question. Also, it is common when surveying adolescents about substance use
to ask them why they use particular substances. Again, adding “to maintain or lose
weight” to the closed-ended options is one easy solution to further explore this
association.

Theory

Theory was not overlooked in this project by accident, but rather specifically
left out until this point. The reason for this lies in the fact that testing theory was not
seen as the best route for such a project. Oftentimes adolescent substance use is
theorized about after the trends become apparent. For example, Time Magazine
(Morse, 2002) recently ran an article about the increase of binge drinking and alcohol
use in general by young females. With this new trend, the author proposed that
women wanted their seats at the table, viewed alcohol as a means to equality, and
posed the question, is this “girl power gone awry?” This theory came about in
reaction to a new trend that appears to be unfolding. Although this project is close to
violating the same issue (using trends to explore an issue), the trends were studied
with some underlying beliefs that an explanation is viable if the two trends truly were
related.
Theories of deviance firmly establish that a wide range of deviant behaviors are positively correlated with one another during adolescence and early adulthood, that engaging in one form of deviant behavior leads to engaging in others as well. Many researchers believe that there are causal links between some forms of deviance (Osgood et al., 1988). Jessor and Jessor (1977) defined deviance as "behavior that is socially defined as a problem, a source of concern, or as undesirable by the norms of conventional society and the institutions of adult authority, and its occurrence usually elicits some kind of social control response" (p. 33).

Deviance theory is often used when dealing with substance use, especially among adolescents. However, by definition, deviance theory does not explain the findings of this study. Although cigarette smoking is illegal, it does not really violate conventional standards of behavior. Also, while using cigarettes as a means to control weight is potentially harmful, the striving to be thin among adolescent girls is not deviant. Rather, the are attempting to conform to what they believe is the norm.

Attempting to conform to a norm with respect to weight and beauty issues for young female adolescents is reinforced by Naomi Wolf's "The Beauty Myth." She noted that during the 1980s, as women became more liberated to pursue education, careers and families, eating disorders rose exponentially and cosmetic surgery became the fastest-growing medical specialty. Even as they were achieving much, there continued to be a struggle as "...thirty-three thousand American women told researchers that they would rather lose ten to fifteen pounds than achieve any other goal" (Wolf 1990: 10).
Anorexia and bulimia are female maladies – from 90 to 95 percent of anorexics and bulimics are females. As Wolf (1990) notes, “America, which has the greatest number of women who have made it into the male sphere, also leads the world with female anorexia” (p. 181). Researchers propose that the number of anorexics is 5 to 10 percent of all American girls and women. Further, studies suggest that 20 percent of American college women binge and purge on a regular basis. Wolf (1990) suggests, “the norm, then, for young, middle-class American women, is to be a sufferer from some form of the eating disease” (p. 182).

On any given day, 25 percent of women are on diets, with 50 percent either finishing, breaking, or starting one (Wolf, 1990). This self-hatred must eventually impact the young females of our society. The cultural norm for women seems to be that there are always 10 pounds to be lost, at least. Perhaps the smaller numbers seen in this dataset are reflective of the normative nature of this problem – rather than indicating that eating issues are not truly there, they are such a part of daily life that adolescent females do not include them as an issue in answering such health behavior questions.

With such numbers appearing only among women in our society, one could argue that it is perhaps merely women’s issues. However, men do play a role in promoting and maintaining the status quo of beauty that women strive so hard to achieve. Industry, interpreted through advertising, has historically been aimed at the female of the household. During the 1950s, the products and advertisements were aimed at housewives to keep the excitement in an otherwise boring job. As women
left their role of housewives, the advertising agencies also transitioned into the beauty industry as a means of maintaining female spending. For example, in 1989, toiletries/cosmetics ad revenue offered $650 million to the magazines, while soaps, cleansers and polishes yielded only one tenth that amount (Wolf 1990). Friedan (1982) proposes that the crucial function that women serve as aspiring beauties is to buy more things for the body.

As Wolf (1990) notes, "clever economists did figure out what would keep our affluent economy going once the housewife market began to fall off after the second wave of women's advancement sparked by Friedan's book: The modern form of the beauty myth was figured out, with its $33 billion thinness industry and its $20 billion youth industry" (p. 66). In a sense, the beauty myth was created as a way to save magazines and advertisers from the economic fallout of the women's revolution.

In a recent telephone poll, People Magazine asked 1,000 women about their bodies and how the images of Hollywood's thin stars influence their self-esteem. Only 10 percent of respondents said they were completely satisfied with their bodies, and 80 percent said that images of women on TV and in movies, fashion magazines and advertising made them feel insecure about their looks (Dam, 2000). The staggering statistics continue: 93 percent have tried to lose weight, 34 percent have had or would consider having cosmetic surgery, and 34 percent said they would be willing to try a diet even if it posed at least a slight health risk. When asked what methods they have tried in order to lose weight, 12 percent of the polled women said smoking.
When asked to help shed light on this lack of self-esteem with respect to body image, Tom Cash, professor of psychology at Old Dominion University, indicated that the bodies of models have gotten thinner over the years while the number of diet articles grows bigger. He said, “these messages increase the dissatisfaction of body image” (Dam, 2000). There is clearly a culture dominated by advertisers and industry (cosmetic, exercise, etc.) that continuously sends the message to all American women that their current bodies are not acceptable, and attempts to sell them the products that will make their bodies better.

Judging from these statistics of American adult women polled, it does not take too much to realize that if these women internalize images in such a profound way, it must clearly be impacting the young American women. However, in a patriarchal society, these issues are not seen as an epidemic or ever particularly worrisome, given the contribution that such messages give to the economy. It might be instinctive to ask ourselves if young white males were starving themselves at alarming rates whether we would continue to ignore it, and even continue to promote the current status quo. There do not appear to be any major physical changes among the male actors in Hollywood, or the male models - no evidence of them being significantly smaller (or even bigger if that was the message to send). Body image messages generally are not aimed at the male in any way. Not many in Hollywood appear to be alarmed by the impact. When one actress accepts a Golden Globe Award, holds it over her head and triumphantly states, “this is for all the fat girls,” and it comes off like a joke, the underlying message seems reinforced to any female watching.
Going Forward

Practically speaking, major changes are not feasible in the advertising industry, the cosmetic industry, or even Hollywood, given the patriarchal nature of society. Therefore, the best way to combat such images and continued dissatisfaction is through education programs. Attempts must be made to reinforce healthy body images. In addition, using “real” women as role models is vital for young women. Schools would be the most reasonable place to begin such a discussion. Not only must body image be addressed, but the harmful things young women choose to do to themselves to achieve cultural goals must be discussed openly and candidly. Perhaps then, such activities could be reduced.
Appendix

HSIRB Approval Letter
Date: 25 September 2000

To: Thomas Van Valley, Principal Investigator
   Tracey Barnett, Student Investigator for dissertation

From: Sylvia Culp, Chair

Re: HSIRB Project Number: 00-09-10

This letter will serve as confirmation that your research project entitled "Predictors of Adolescent Substance Abuse" has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 25 September 2001
BIBLIOGRAPHY


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