Obesity and the Timing of Cohabitation and Marriage

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Abstract

Tianji Cai: Obesity and the Timing of Cohabitation and Marriage

(Under the direction of Guang Guo)

The prevalence of adult overweight and obesity has increased substantially in the United States over the past few decades. Besides the health consequences of obesity, it also has social and psychological consequences. As a social marker, it influences individuals' positions or status in a various social contexts and thereby contributes to social stratification. Using The National Longitudinal Study of Adolescent Health (Add Health) data, this paper analyzes the effect of obesity on the likelihood and timing of union formation (marriage and cohabitation) among young adults. The research questions are: Does obesity affect union formation such as cohabitation and marriage? If obesity affects union formation, what are the mechanisms through which it does so? We found that before controlling possible confounding variables, obese young adults will have lower likelihood of entering cohabitation and marriage. After controlling those variables, the difference between obese and non-obese young adult becomes non-significant, but those who are over weighted have higher likelihood to marry and cohabit.

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Chapter 1

INTRODUCTION

The prevalence of adult overweight (defined as body mass index (BMI) of 25-29.9 kg/m^2) and obesity (BMI over 30 kg/m^2) has increased substantially in the United States over the past few decades. While in the 1960's, 12 percent of adults were overweight or obese, that proportion has now risen to about 18 to 25 percent (Ferraro and Moore 2003). The health consequences of obesity have long been well-documented. For instance, researchers have reported physiological consequences such as increasing the risk of physical functional disability, morbidity, and mortality at every stage of the life course (Field et al. 1999; Gordon-Larsen, McMurray, and Popkin 2001; Rogers, Hummer, and Krueger, 2003; Reynolds et al, 2005).

Obesity also has social and psychological consequences. As a social marker, it influences individuals' positions or status in a variety of social contexts and thereby contributes to social stratification. For example, researchers have shown that certain physical or biological markers can reveal a substantial amount about life course opportunities and constraints (Barker 1997; Booth, Carver, and Granger 2000; Conley and Bennett 2000; Seeman et al. 2001). For example, Register and Williams (1990) demonstrated that obesity has a significant negative effect on wages; Laitinen et al. (2002) suggested that adolescent obesity was associated with several adverse social outcomes among women, but not men; and Sargent and Blanchflower (1994) reported that women in the United Kingdom, but not their male counterparts, who had been obese at age 16 earned less than their non-obese peers about seven years later. Another study, which included only young men, observed that severely obese young

men attained a lower social class than comparable non-obese men, independent of parental social class, intelligence, and education (Montgomery et al., 1998). However, while Viner and Cole (2005) found that persistent obesity in women was associated with a lower likelihood of having ever found gainful employment when it was sought, they identified no association of childhood or persistent obesity with annual net income, current unemployment, and social class for either sex. They also found that obesity that was limited to childhood has little impact on socioeconomic, educational, social, and psychological outcomes in adult life. Persistent child-to-adult obesity is associated with somewhat poorer employment and relationship outcomes in women, but not men. Health inequalities and social adversity related to obesity probably develop after childhood.

Considering these multiple facets is crucial for understanding the social meaning of obesity, as well as for going beyond the simple recognition of the stigma affecting obese persons in order to address the important task of developing coping strategies.

This paper analyzes the effect of obesity on the likelihood and timing of union formation among young adults. The first research question is: Does obesity affect union formation such as cohabitation and marriage? In order to assess the direct effect of obesity on union formation, a number of variables will be controlled for such as socioeconomic status, daily activities, and habits. In addition, gender and race patterns will be examined. The second research question is: If obesity affects union formation, what are the mechanisms through which it does so? Since there is no direct measurement of stigma or discrimination available in the data set that is used in this analysis, a number of variables that could contribute to union formation will be controlled. The unexplained effect after controlling for these variables will be identified as stigma or discrimination. My hypothesis is that obesity will have a

significant negative effect on cohabitation and marriage. Even after controlling for possible confounding variables, obese young adults will have a lower likelihood of entering cohabitation and marriage and will take a relatively longer time than non-obese young adults to do so. In this article, I demonstrate how the effect of obesity varies by gender, race, and age. To better interpret these findings, I also adopt survival analysis to see the association between obesity and the timing of cohabitation and marriage.

Chapter 2

LITERATURE REVIEW

Influential factors on the timing of union formation

It should not be surprising that the timing of union formation is influenced by many dimensions of life, including economic, social, and psychological factors. One of the most-often cited theories to explain the timing of union formation among sociologists is Oppenheimer's theory of marriage timing. With the use of a modified job-search theory, Oppenheimer (1988) demonstrated a conceptual framework to show that some factors influence marriage timing by either facilitating or impeding the dynamics of assortative mating. She argued that the age at marriage for both sexes will be heavily dependent on the timing of young men's entry into relatively stable occupational careers, given the paramount importance of men's economic role in the family. Later on, she and colleagues (1997) showed that changes in gender roles will lead to corresponding changes in the age at marriage.

There is substantial empirical evidence showing that educational enrollment tends to delay union formation (Michael and Tuma, 1985; Thornton, Axinn, and Teachman, 1995). Becker (1981) pointed out that education has a negative impact on marriage for women, and prolonged investments in human capital decrease women's gains from marriage. The rate of entrance into both cohabitation and marriage was substantially reduced by school enrollment after high school, although more so for marriage than for cohabitation and for both women and men (Goldscheider and Waite, 1986; Waite and Spitze, 1981; Thornton, et al., 1995). For men, years of schooling increase the rate of entrance into marriage while decreasing the rate of cohabitation, but

for women, the results are more ambiguous (Goldscheider and Waite, 1986; Teachman et al., 1987; Blossfeld and Huinink, 1991; Hoem, 1986; Thornton et al., 1995).

Furthermore, there are many scholars who report that, in addition to economic reasons, social norms generate the incompatibility between the youth role of being a student and the adult role implied by marital status. This incompatibility is one reason why enrollment in education delays entry into first union (Liefbroer and Corijn, 1999; Hoem, 1986; Blossfeld and Huinink, 1991). In fact, there is an interaction process between educational enrollment and union formation. Educational enrollment reduces rates of entry into union, while union entry delays or ceases educational enrollment. The decision an individual makes between educational enrollment and union entry will influence each other. It has been found that forming a union (Davis and Bumpass, 1976; McLaughlin et al., 1986; Bennett, Blanc, and Bloom, 1988) or having a child (Waite and Moore, 1978; Teachman and Polonko, 1988; Marini, 1984; Upchurch and McCarthy, 1990) are strong predictors of early dropout from school, and women are impacted more by union formation than men (Marini, 1978; Alexander and Reilly, 1981).

The linkage between religion and marriage has long been the subject of social scientific inquiry. A crucial and significant relationship has been established between religion and assortative mating (Johnson, 1980; Kalmijn, 1991). Young adults with high religiosity have lower rates of premarital sexual intercourse compared with their peers (Thornton and Camburn, 1989). Children's religiosity—both attendance and importance—also reduces cohabitation rates and increases marriage rates (Thornton et al., 1992). Using survey data from a nationally representative sample, Xu et al. (2005) demonstrated that Catholics, moderate Protestants, conservative Protestants, and

Mormons marry significantly earlier than their unaffiliated counterparts for both women and men.

Personal attitudes, values, and behavior also contribute importantly to union formation. Jansen and Kalmijn (2002) found that highly family-oriented individuals tend to choose educational and job careers that allow them to form a family quickly, while highly career-oriented people are more likely to favor educational and job careers that are less likely to allow them to form a family earlier. Positively correlated premarital sexual attitudes and experience are strongly related to the pace of union entry (Bumpass, Sweet, and Cherlin, 1991;Waite, 1995;Wu, 1999). Children who have positive attitudes toward cohabitation are less likely to marry and more likely to cohabit than others (Axinn and Thornton, 1993). Besides these factors, prior research has also documented determinants of union formation such as gender, ethnicity, (Ferguson, 1995; Sassler, 1997; Teachman, Tedrow, and Crowder, 2000), and affective disorders (Forthofer, Kessler, Story, and Gotlib, 1996).

Union formation usually is an intergenerational process in that parents are generally influential in decision-making. Many dimensions of the parental family influence the union formation experiences of their children. A rich body of empirical studies shows that there is a statistically significant and substantively important effect of family socioeconomic status on childhood union formation (Axinn and Thornton, 1992; Michael and Tuma, 1985; Waite and Spitze, 1981; Clarkberg, 1999).

Using longitudinal data, South (2001) argued that the effects of parental family resources on the timing of first marriage indeed vary over historical time periods and the individual life course. There is also evidence that the values and attitudes of parents influence the values and attitudes of their children, both male and female, including sexual behavior, cohabitation, and marital timing (Thornton, 1992; Axinn and

Thornton, 1996). In addition, a positive relationship between parents and children increases the likelihood of a strong similarity in values and attitudes between generations (Moore et al., 1986; Weinstein and Thornton, 1989).

Meanwhile, the union formation and dissolution experiences of parents are related to the cohabitation and marriage attitudes and experiences of their children (Axinn and Thornton, 1996; Amato and Booth, 1991; Miller et al., 1987; Lye and Waldron 1993; Moore and Stief, 1991). Children from disrupted families are more likely to be cohabitants. Premarital pregnancy and young age at marriage in the parental generation are associated with higher rates of union formation among children. Parental religiosity also plays a role young people union formation experiences. Thornton and Camburn (1989) reported that the religiosity of parents decreases the likelihood of their young adult children having sexual intercourse and the number of partners. Furthermore, there are significant associations between parental religiosity, as measured by both attendance at religious services and the importance of religion in one's life, and children's higher rates of marriage and lower rates of cohabitation for both female and male children (Thornton et al., 1992).

In summary, union formation is a dynamic process which has been mainly influenced by two groups of factors. One group is individual factors, such as education, religiosity, personal attitudes and gender. The other group of factors is social context or background, such as parental resources and parental behavior.

Consequences of obesity for cohabitation and marriage

Generally, the literature focusing on the effect of obesity on cohabitation and marriage comes from two traditions. The first comes from research focusing on the health consequences of obesity, and the second comes from research focusing on mate selection.

The literature on health consequences of obesity has been dramatically enriched by recognizing obesity as a social status in addition to a health status. Taking advantage of longitudinal cohort studies from the 1980s, Gortmaker et al. (1993) reported that marriage was substantially less frequent and socioeconomic attainment less great among the subjects who were overweight after they controlled for baseline differences in potentially confounding variables. Fu and Goldman (1996) suggested that health-related variables were important in the process of mate selection. They found that individuals with physical traits that have been linked to poor health status, such as obesity, and individuals participating in unhealthy behaviors, such as excessive drinking or drug use, were found to experience lower age-specific marriage rates than their healthier counterparts. By incorporating health variables into models of the marriage market, not only is a better understanding gained of the role of marriage selection in producing health differences by marital status, but more generally, understanding of the nature of the marriage process is enhanced.

Halpern et al. (1999) showed that among white girls and black girls with college-educated mothers, more body fat was associated with a lower probability of dating, even among non-obese girls. In another study, Pearce, Boergers and Prinstein (2002) found similar results. Their result suggested that obese adolescents are at greater risk for mistreatment by peers and may have fewer opportunities to develop intimate romantic relationships. Viner and Cole (2005) were not able to confirm previous reports that men and women who were obese in adolescence were less likely to get married. However, they found that women who were persistently obese were less likely to have a current partner.

In the literature on mate selection, researchers have tried to answer the question of how physical characteristics, including perceived attractiveness, stigma, and

stratification, may shape opportunities in mate selection (Byrne 1971). However, the topic concerning the impact of obesity on mate selection is not well-documented. Until recently, researchers have paid relatively little attention to how obesity affects mate selection, such as cohabitation and marriage.

Recently, people began to conduct research on BMI as a biological factor which influences mate selection. Tovee, Reinhardt, Emery, and Cornelissen (1998) studied how BMI and waist-to hip ratio (WHR) relate to attractiveness. They argued that BMI is much more closely related to health and fertility than WHR. Even small changes in BMI greatly changed the attractiveness ratings of the images used in their study. Torte and Cornelissen (2001) found that BMI was the number one predictor of attractiveness in both front view and in profile, and that there was no significant difference in the attractiveness ratings by male and female raters.

Why obesity affects cohabitation and marriage

A few theories have been developed to interpret the empirical findings. However, for cohabitation and marriage, the possible answers are still widely debated and researched. One possible explanation centers on the potential role of stigma and discrimination. Obesity has long been recognized as a target of stigma in many societies (DeJong 1980; Stunkard, LaFleur, and Wadden 1998). After controlling for a wide variety of other known causes of lower socioeconomic attainment, Gortmaker et al. (1993) still found a significant lower rate of marriage among people who are obese. They argued that this is possibly due to stigma and discrimination of obese people. Bell and Morgan (2000) suggested that the social and psychological difficulties that obese children face with marriage, schooling, and income may be related to the stigma and prejudice that obese children experience, which hinder their social development during childhood and adolescence.

Another possible explanation focuses on physical attractiveness. Berscheid and Walster (1974) suggested that obese individuals are perceived as less attractive. The experiment conducted by Harris (1990) showed that college students who were given pictures of obese and normal-weight individuals judged the obese persons as less attractive, less likely to be dating, and more deserving of an overweight, less attractive dating partner.

However, neither of those explanations outlines the mechanism of how obesity works on union formation. Also, none of them emphasize the issues of causality. As we know, the factors which relate to obesity, including those that mediate and moderate the relationship between various risk factors and obesity are numerous (Weinsier et al. 1998; Whitaker 2002; Bloomgarden 2002). For instance, individual factors such as gender, race and ethnicity, and family and community socioeconomic conditions influence obesity (Cristol, 2003; Karlsen and Nazroo, 2002; Sanjay, 2000; Wang, 2001). Even if we do not clearly understand how obesity relates to cohabitation and marriage, we could still argue that obesity interacts with many factors which affect cohabitation and marriage.

Chapter 3

METHOD

Data

The National Longitudinal Study of Adolescent Health (Add Health) is a nationally representative study that explores the causes of health-related behaviors of adolescents in grades 7 through 12 and their outcomes in young adulthood (Harris etc., 2003). Add Health seeks to explore how social contexts such as families, friends, peers, schools, neighborhoods, and communities, influence adolescents' health and risk behaviors. Beginning in 1994 under a grant from the National Institute of Child Health and Human Development (NICHD) with co-funding from 17 other federal agencies, Add Health is the largest, most comprehensive survey of adolescents ever undertaken. Data at the individual, family, school, and community levels were collected in two waves. Baseline data was collected in 1994, and follow-up data was collected in 1996. In 2001 and 2002, Add Health respondents were 18 to 26 years old, and they were re-interviewed in a third wave to investigate the influence that factors during adolescence had on young adulthood.

Wave I was conducted between September 1994 and December 1994, Wave II was conducted between April 1996 and August 1996, and Wave III was conducted between August 2001 and April 2002. The baseline sample that used in this analysis contains 20,774 observations. In Wave III, 2,858 (13.8%) and 5,987 (28.8%) individuals who reported having experienced the events of marriage or cohabitation.

Measures

The key independent variable in this study is obesity, which is measured as BMI.

BMI is a measure of body fat based on height and weight that applies to both adult men and women.

$$BMI = \frac{Weight(km)}{Height(m) * Height(m)}$$

However, children's body fat composition changes over the years as they grow. Girls and boys differ in their body fat composition. In children and teens, BMI is used to assess underweight, overweight, and risk for overweight. BMI for children is also referred to as BMI-for-age, which is gender- and age-specific (Hammer etc, 1991; Pietrobelli etc, 1998). Therefore, we calculate BMI-for-age for Wave II and classify people who have BMI-for-age lower than the 5^{th} percentile as underweight, people who have BMI-for-age from the 5^{th} to under 85^{th} percentile as normal weight, people who have BMI-for-age from the 85^{th} to under 95^{th} percentile as at risk of overweight, and people who have BMI-for-age at the 95^{th} percentile or over will be classified as overweight. BMI-for-age is measured as a categorical variable and is used to predict cohabitation and marriage at Wave III.

Cohabitation and marriage are measured in Wave III. Respondents were asked about their cohabitation and marriage history, including the start and end dates as well as living arrangements. This provides information on the event and timing of cohabitation and marriage. To simplify our study, we only define the first cohabitation and marriage as events which we are interested in.

A number of control variables are included in analysis, which are grouped into two categories, parental factors and individual factors.

For parental factors, we use variables measuring family socioeconomic status, family structure, parents' religiosity, and parents' attitudes on children's sexual behavior. Family socioeconomic status is measured by (a) the parents' highest educational attainment and (b) the highest of occupational status scales (Bearman et al.

2004). Education ranges in scale from 1 (“eighth grade or less) to 5 (“professional training beyond a four-year college or university”). Occupation ranges from 1 (“farm or fishery worker”) to 5 (“professional, such as doctor, lawyer, scientist”). Also, we use two dummy variables to indicate if the father or mother had received welfare during the last 12 months.

Family structure is measured with a categorical variable to indicate whether both parents reside together with the child, a single parent resides with the child, or the child lives with neither of his parents. Parents’ religiosity is measured with two dummy variables indicating whether a parent takes the child regularly to a religious service or church-related event. Parents’ attitudes on children’s sexual behavior is measured as (a) general opinion on sex at present (disapprove or approve) and (b) having sexual intercourse with a person with whom the child has a steady relationship with categories as both parents approve, only one of parent approves, or both of parents disapprove.

For individual factors, we use variables measuring educational attainment and expectation, religiosity, relationship with parents, physical activities, and sedentary behavior. Educational attainment is measured by standard GPA, which is calculated by summarizing a student’s grades in English, math, history, and science on a 4 point scale (A equals 4, B equals 3, and so on), and then standardizing that the scale. Educational expectation is measured with a five-point scale that reveals how much the respondent wants to go to college. Another educational variable is how often the respondent had skipped class, categorized as never, fewer than 10 times, and more than 10 times. Religiosity is measured as importance of religion to the respondent using four categories from “very important” to “not important,” as well as frequency of religious service attendance.

Relations with parents are measured with two dummy variables: whether the respondent feels close toward his/her parents and whether the respondent feels his/her parents care about him/her. Another variable is whether the respondent is satisfied with the relationship with his/her parents. Physical activities and sedentary behavior are measured with scales that are constructed using standardized frequency of physical activities and number of hours spent engaged in sedentary behaviors. Examples of physical activities are bicycling, playing a sport, or exercising, and examples of sedentary behaviors are watching television and playing computer games over the previous week. After the interview, the interviewer was asked to evaluate the physical and personal attractiveness of the respondent. This variable is used as a measurement of the respondent's attractiveness, with response categories of "unattractive," "fairly attractive," and "very attractive."

In addition, a standard set of control variables used by social scientists are also included, such as age, sex, and race.

Statistical Model

Since the analysis involves timing of union formation and a large number of individuals have not experienced the event of union formation by the end of the Add Health study, the most appropriate statistical model would be survival analysis. However, the assumption of the distribution of hazard is often a serious one that could be problematic. Two semi-parametric methods, the piecewise exponential model (also called the Poisson model) and the Cox model, have been developed to reduce the importance of this assumption. The model used in this analysis is the Cox model. The Cox model (Cox, 1972) is a semi-parametric proportional hazards model and assumes that there is no time-varying effect for explanatory variables; this assumption was released in later development. The hazard rate for the *i*th individual is

$$h_i(t) = h_0(t)\exp(\beta' x),$$

where $h_0(t)$ indicates the baseline hazard function. The baseline hazard function can be any hazard function, and β' are the covariates and regression parameters, which are assumed to be the same for all individuals. *x* is a collection of non-time-variant predictor variables. One of the advantages that the Cox model has is that it makes no assumptions about the underlying hazard function. It simply assumes that relative risks are constant across all times, thus why it is called proportional hazards." This is very attractive in our case because we know that one of the most influential factors for cohabitation and marriage is age. So the straightforward strategy to model hazard is to allow it change over age, but the assumption on parametric distribution of hazard often is problematic because there lacks a theoretical reason to justify that assumption.

Since the estimation of the Cox model uses partial likelihood, which is valid only for data in which no two events occur at the same time, the estimation for models using sample weight will be biased. Fortunately, there are several ways to deal with this problem, and the one we use here is the method which was developed by Kalbfleisch and Prentice (Kalbfleisch and Prentice, 1980; DeLong, Guirguis, and So 1994). Another problem we meet here is the dependence of observations. Since Add Health data collection was designed as a cluster sample in which the clusters were sampled with unequal probability, the observations are no longer independent. Therefore, the design effects and unequal probability of selection must be corrected to ensure that our results are nationally representative with unbiased estimates. The method we employ here is the robust sandwich estimate of Lin and Wei (1989) for the covariance matrix in the Cox model. All parameters that are estimated are tested using the robust sandwich estimate in the Wald tests for the global null hypothesis, and null

hypotheses of individual parameters.

We have a choice regarding which wave to use for the BMI measure. As we mentioned earlier, BMI for adolescents varies greatly across age. It is possible that the effect of BMI is confounded by age or an interaction between age and BMI. Because of this possibility, we choose to use the latest measure, BMI at Wave II, to predict the subsequent events of cohabitation and marriage. However, when we decide to use Wave II data, we are faced with another complexity. Since the measure of BMI for adolescents only applies to people under age 20, we must limit our analysis to people in that age interval. Therefore we exclude respondents who are over 20 and events that happened before Wave II.

Two separate statistical models are estimated to study the effect of obesity: one for the outcome of cohabitation and another for the outcome of marriage. All work is done by using SAS 9.1.3.

Chapter 4

RESULTS

Descriptive Statistics

Table 1 shows the descriptive statistics for the control variables. The distribution of BMI is skewed to the right, with a standard deviance of 30.26 for males and 29.52 for females. Consistent with the population in the United States, whites are the largest race/ethnic group (50 percent), and African Americans and Hispanics consist roughly 21 and 17 percent of our sample for both males and females. Based on the life table analysis presented blow, we divide our sample into three groups, age 13-15, 16-17, and 18-20. There is no large discrepancy between males and females except parental attitudes towards sexually related behaviors. The attitude that parents hold for females towards sexually related behaviors is much more conservative than the attitude for males. For example, the proportion of parental approval on sexual behavior for female is much lower than that for male. There are some other differences between males and females, such as the mean standard GPA, physical and sedentary activities, but these differences are minor.

Table 1. Descriptive statistics for the control variables above here

Life table estimates

It is known that patterns of cohabitation and marriage vary across gender, age group, and race. Therefore, conduct a life table analysis to see if the effect of BMI differs by these factors. The results of life table estimates reveal that the effect of BMI does vary across gender, age group, and race. As seen from Figure 1 and Figure 2 the

probability plot by gender, obese people are less favored for marriage, and for males, underweight people seem to be favored. It appears those overweight females are favored for cohabitation while the survival rate is almost the same for male across all BMI categories. A possible explanation is that since BMI does not differentiate the actual physical figure, such as whether a person is plump or muscular, it is possible that these females have good figures. Another explanation is that this is due to unobserved heterogeneity. For instance, overweight female may be more likely to cohabit for some other reason that is not included in the model.

Figure 1. above here

Figure 2. above here

The second group of figures reveals racial differences. The overall probability of marriage for Africa American is relatively lower than other races. For whites, underweight people are favored, while for Africa Americans the overweight group has the lowest survival rate. For both groups, the obese people have the highest survival rates. For whites, there is no discrepancy across body weight groups for cohabitation, but clearly for Africa Americans, the overweight group is favored.

Figure 3. above here

Figure 4. above here

Figure 5 and 6 show the age patterns. There are almost no marriage events for people ages 15-17. For other age groups, we see that the overweight group is favored, especially for ages 18-20, while the obese people are not. For cohabitation, this pattern does not hold true. No different patterns exist by age group across body weight categories.

Figure 5. above here

Figure 6. above here

The probability plots reveal a very interesting pattern that overweight people are favored, while in some cases, the obese people are not favored. Since we did not control the confounding variables which could play roles on both BMI and union formation and without assessing the significance of the effect, it is difficult to draw any concrete conclusions based on these results. In next step, we will use multivariate regression to address the question.

Regression Analysis

In the previous section, overweight people are favored in marriage, while under some circumstance the obese people are not favored for both cohabitation and marriage. To get a better understanding, we estimated separate models for cohabitation and marriage by adding control variables step by step. Using the overweight group as the reference category, model 1 includes only cohort[i] and BMI. Then, keeping all of the variables in model 1, we introduce gender and race into the model as model 2. The same strategy applies to the sequential models. Finally, twelve models are estimated for cohabitation and marriage, respectively. To make cross models compare possible, we generate an additional category 'missing' for all variables included in models to keep all sample size equal. Table 2 and 3 present a summary of all regression results.

Let us look cohabitation first. Since we use the cohort 18 to 20 as reference, all baseline hazards are positive, which means that compared with the cohort 18-20, the hazard for age group 13-15 and 16-17 to cohabit is higher. This is same the same pattern seen from the survival plots. Younger people have a higher average hazard for cohabitation. What we are interested in is the effect of BMI. As we have seen, the

obese group and normal group are associated with a lower hazard to cohabite compared to the overweight group. Obese and normal people are 88 percent and 89 percent, respectively, as likely as over weight people to cohabit. Since the overweight group has the highest risk of cohabitation, all coefficients for other weight groups are negative. This also confirms what we found from the life table.

After introducing gender and race, Model 2 shows similar results. The effect of BMI still holds: the obese and normal groups have lower hazard of cohabitation than the overweight group. Compared with females, males have a lower hazard of cohabitation. Whites have the highest hazard among racial groups. Education variables are introduced in Model 3, and personal religiosity variables are introduced in Model 4. The effect of BMI remains consistent in those two models. In Model 3, the expectation to go to college and GPA have a negative impact on the hazard of cohabitation, and people who skip class less frequently are more likely to cohabit. In Model 4, the hazards for people with the highest frequency of going to church and people who have the strongest statement on the importance of religion are associated with the lowest hazard to cohabit.

When we include variables which indicate relations with parents (Model 5), the significance of the effects of obese and normal still are consistent. Those who feel close to parents and be cared by parents have lower hazard to cohabit, while satisfaction with parental relationship does not have significant effect on hazard of cohabitation.

As we mentioned earlier, BMI is highly related with attractiveness (Torte and Cornelissen, 2001). And researchers try to use this to interpret why obesity has effect on marriage and cohabitation (Berscheid and Walster, 1974; Harris, 1990). After introducing Attractiveness (Model 6), we see that the significance of normal and

obese people does not change. Using physical attractive as reference category, only interviewer-rated unattractive people have significant lower hazard of cohabitation. There is no relationship between interviewer-rated personal attractiveness and hazard of cohabitation.

Activities variables are include in Model 7, but there is no significant effect compared with reference groups. Family SES (Model 8), Welfare (Model 9), Family Structure (Model 10), Parental Religiosity (Model 11), and Parental Attitudes (Model 12), are included in model sequentially. We found that those variables do have effect on the hazard of cohabitation, but none of them changes the significance of the effect of normal and obesity, although the effect size of normal is diluted.

As seen in the final model (Model 12), besides of the effect of BMI, the effects of cohort, gender, education, religiosity, physical attractiveness and parental variables still hold. Compared with older cohort, younger cohorts such as 13 to 15 and 16 to 17 have much higher hazard of cohabitation. Male have lower hazard to cohabit than female. Whites are much easier to cohabit than other racial groups. Those who skip class less frequently, or have lower GPA are easier to cohabit, while people who have relative lower expectation to go to college have higher risk to cohabit. Only people who rate religion as “very important” have lower hazard to cohabit compared with those who rate it as “not important”. People who feel close to parents and be cared by them have lower hazard to cohabit. The significance of interviewer-rated unattractiveness keeps in final model. We also find some parental variables have a negative impact on the hazard of cohabitation such as parental religiosity, family SES, and family structure.

Table 2 above here

Table 3. above here

The results for marriage are more interesting. The effects of normal and obesity are consistent across models; the hazard for normal and obese people to marry is about 76% and 64%, respectively, as likely as that for overweight people. In the final model, the hazards (70% and 60%, respectively) for normal and obese people to marry are even lower than the first model, holding all other variables in constant. Also, the final model reveals that there is a group of control variables that are associated with a significant effect on the hazard of marriage. Compared with cohort 18 to 20 years old, younger cohorts have much lower hazard to marry. Racial difference on marriage pattern also is revealed, Whites have higher hazard to marry than African American. Only those who skip class frequently have higher hazard to marry. The hazard to marry does not vary significantly across GPA, while it does vary across different level of expectation to go to college—roughly, lower expectation has higher hazard compared with highest value of expectation. Parental factors do have distinct effect on hazard to marry, such as parental education, occupation, family structure, and attitude toward children's sex behavior.

Chapter 5

DISCUSSION AND CONCLUSION

Our findings confirm the hypothesis. It is true that the probability of obese people to cohabitation and marry is consistently lower than that of overweight people even after introducing a large number of control variables, and the effect size of obesity is pretty robust across models.

As we mentioned earlier, there are two possible answers for why obesity affects cohabitation and marriage. Our findings appear to favor the first one. After controlling for a wide of variables which could affect cohabitation and marriage, we still find that obese people have consistently lower hazards for cohabitation and marriage. After controlling for both physical and personal attractiveness, we could argue that, at least in our sample, there is no evidence to convince us that the reason why obesity affects cohabitation and marriage is due to attractiveness, although we could not exclude the possibility that since our measurements of attractiveness may not be perfect. Attractiveness still could be a possible reason.

Another interesting argument we could make here is that we find the overweight people are favored for marriage and cohabitation. It may be due to the measure of BMI itself since it could not differentiate the actual figure. Another possible interpretation is negative selection. Since respondents in Add Health research were 18 to 26 years old in third wave, cohabitation and marriage we observed in Wave III could be an early pattern of those events. It is possible that overweight people in a long run have lower hazard of cohabitation or marriage, but in the early stage, such as relatively younger age, they have higher risk to marry or cohabitation. At this point, it

is still unclear why this happens, but this is an interesting finding. We need more information to see if it really the case.

There are several limitations or questions we could further work on for this study. First, we attempted to control for endogeneity, which is due to the fact that an independent variable included in the model is potentially a choice variable or personal character, correlated with an unobserved factor relegated to the error term, while the dependent variable is observed for all observations in the data by using two-step methods or instrumental variable. However, no additional controls were included to address this problem except controlling for attractiveness. It is possible that we have omitted several important variables which are correlated with both union formation and BMI and the model without controlling this correlation will be biased.

Second, we did not include any interaction terms in our model, such as time-dependent covariance. As we mentioned earlier, one of the key assumptions in the Cox model is the proportionality assumption, which means that the hazard function for an individual depends on the values of the covariates and the value of the baseline hazard, and the covariance effect is the same at all durations. However, the validity of this assumption may often be questionable. It seems natural and appropriate to use time-dependent covariance to explore associations and potentially causal mechanisms. Further work is needed here to see if explanatory variables are truly time-varying. Another possible modeling problem is that the age groups that we use here is possibly arbitrary. Actually, we try different cohorts and then find a best one. There is no concrete theoretical argument to support that.

Appendix.

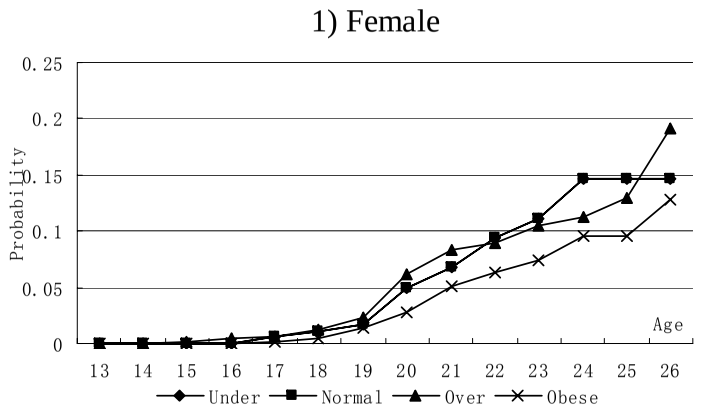
Table 1. Descriptive statistics for the controlling variables

	Proportion	
	Male	Female
BMI		
Under	4.61	3.89
Normal	68.88	70.72
Over Weight	12.79	13.99
Obese	13.72	11.40
Personal Factors		
Cohort: (13-15)	15.94	18.28
(16-17)	36.06	37.73
(18-20)	48.00	43.99
Race		
White	51.55	51.25
Black	19.42	21.01
Hispanic	17.02	16.42
Other	12.01	11.32
Missing		
Skip school		
No skip	60.79	66.35
Skip <=10	26.45	23.10
Skip>10	3.68	2.36
Missing	9.08	8.19
Cum. GPA		
0-2	26.20	17.69
3-5	26.38	26.53
6-9	29.00	36.81
Missing	18.42	18.97
Exp. to College		
1	5.88	3.21
2	3.65	2.78
3	12.21	9.18
4	14.91	12.24
5	60.66	68.71
Missing	2.69	3.89
Church Attendance		
1+ per week	35.38	39.25
1 per month	18.59	18.57
<1 a month	17.88	18.16
Never	12.56	10.57
Missing	0.00	0.00

	Proportion	
	Male	Female
Religion Importance		
very important	36.47	44.27
fairly important	36.17	32.99
fairly unimportant	7.23	6.05
Not important	4.50	3.16
Missing	15.63	13.53
Close to parents	25.75	17.24
Missing	30.98	33.73
Feel be cared	62.44	59.22
Missing	31.16	33.77
Satisfied with parents		
Both	54.07	45.72
One of them	17.00	24.29
None of them	0.98	2.10
Missing	27.95	27.89
Physical attractiveness		
Unattractive	6.24	3.95
Fairly attractive	49.68	39.79
Attractive	43.53	56.13
Missing	0.55	0.12
Personal attractiveness		
Unattractive	5.42	3.60
Fairly attractive	49.03	40.74
Attractive	45.44	55.54
Missing	0.11	0.12
Physical Activities		
Less activate	25.96	41.80
Moderate active	48.37	44.18
Highly Activate	25.68	14.02
Missing		
Sedentary Activities		
Less sedentary	56.64	67.00
Moderate sedentary	35.31	28.16
Highly sedentary	7.99	4.82
Missing	0.06	0.03
Parental Factors		
Parental Education		
No School	0.10	0.09
<High School	10.55	12.23
Some College	34.80	35.38
College +	49.26	47.07
Missing	5.29	5.24
Parental Occupation		
Unemployed	7.14	8.51

	Proportion	
	Male	Female
Physical	3.01	3.32
Skilled worker	12.12	12.28
Office worker	29.59	28.32
Technician	16.18	13.86
Professional	22.62	22.18
Missing	9.32	11.52
Welfare mom	8.30	9.11
Missing	8.20	7.57
Welfare dad	2.66	2.24
Missing	26.89	31.25
Family Structure		
With 2 parents	64.20	61.07
With 1 parent	28.96	30.54
With 0 parents	6.85	8.39
Religiosity mom	31.93	36.42
Missing	7.30	6.79
Religiosity dad	20.19	20.09
Missing	26.52	30.90
Parental Attitude toward sex		
2 approve	16.72	6.23
1 disapprove	26.11	29.21
2 disapprove	41.00	51.81
Missing	16.17	12.74
Parental Attitude toward sex with partner		
2 approve	23.21	10.48
1 disapprove	21.35	27.66
2 disapprove	36.13	45.49
Missing	19.31	16.37

Figure 1: Probability of Marriage by Gender



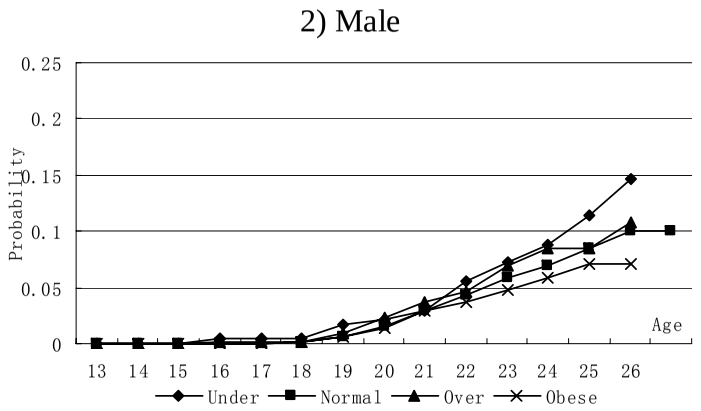
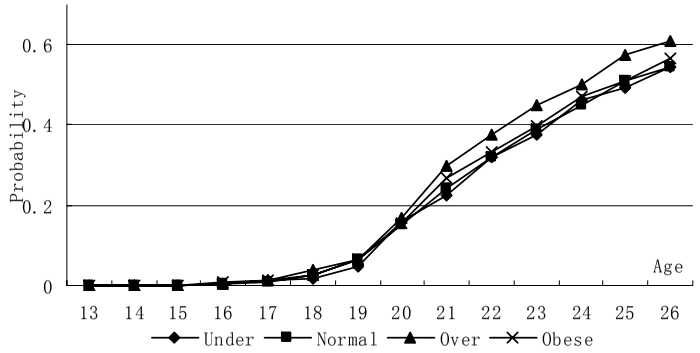


Figure 2: Probability of Cohabitation by Gender

1) Female



2) Male

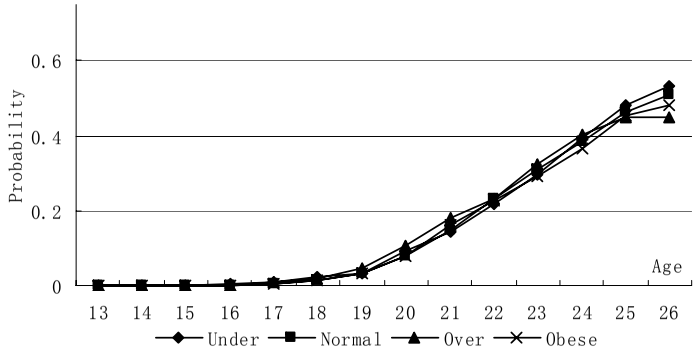
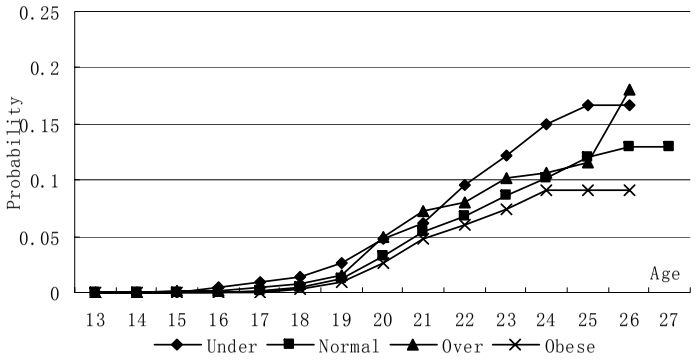
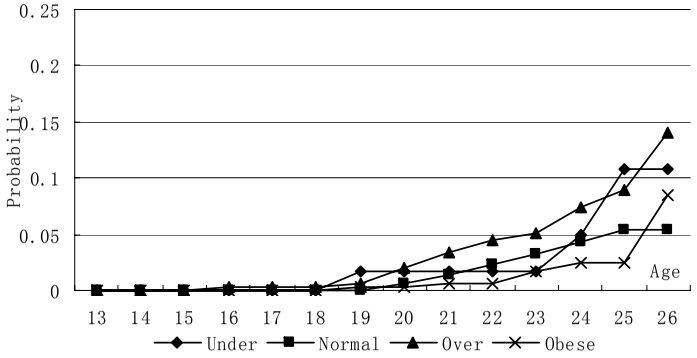


Figure 3: Probability of Marriage by Race

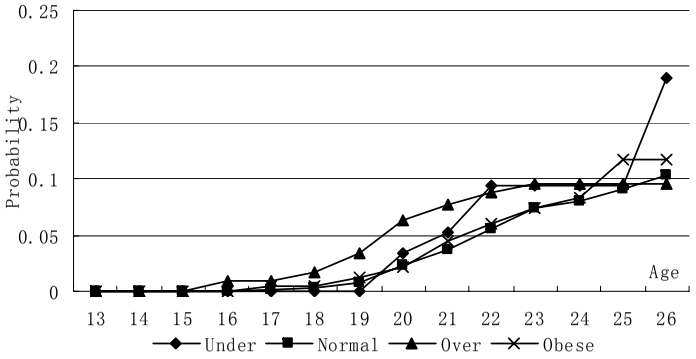
1) White



2) Africa American



3) Hispanic



4) Other

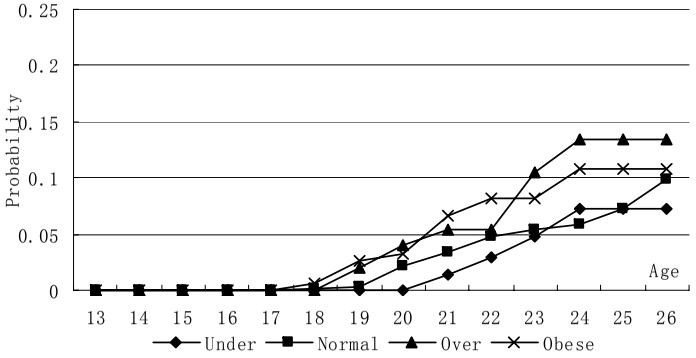
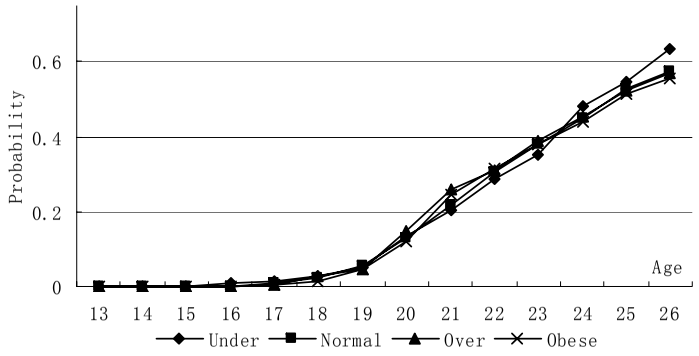
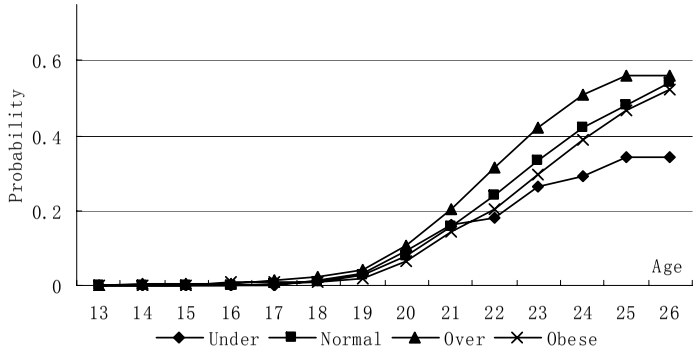


Figure 4: Probability of Cohabitation by Race

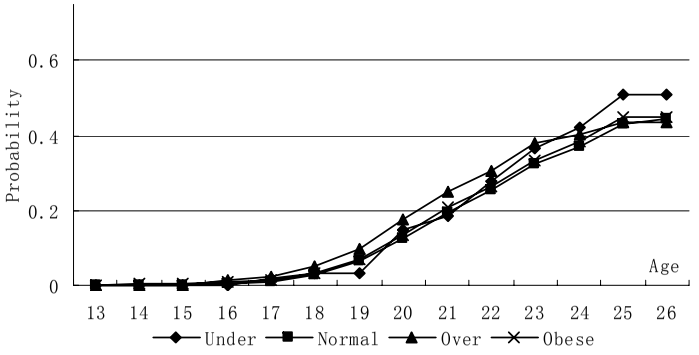
1) White



2) Africa American



3) Hispanic



4) Other

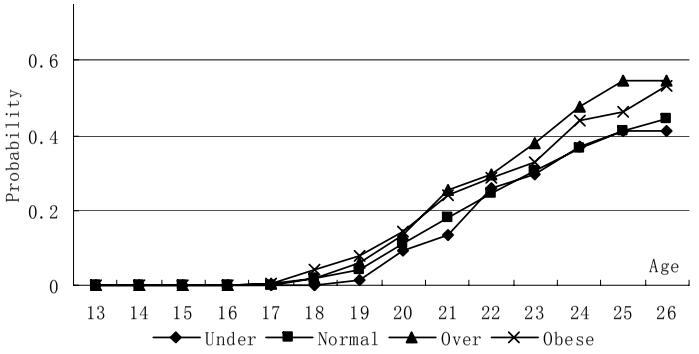
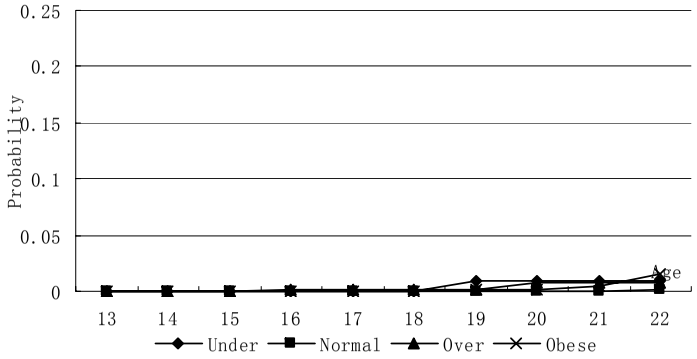
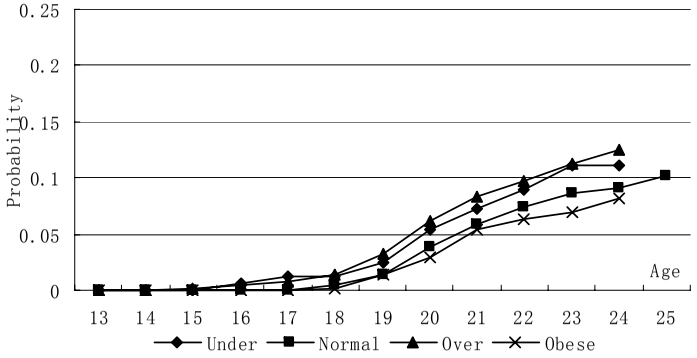


Figure 5: Probability of Marriage by Cohort

1) Age 13-15



2) Age 16-17



3) Age 18-20

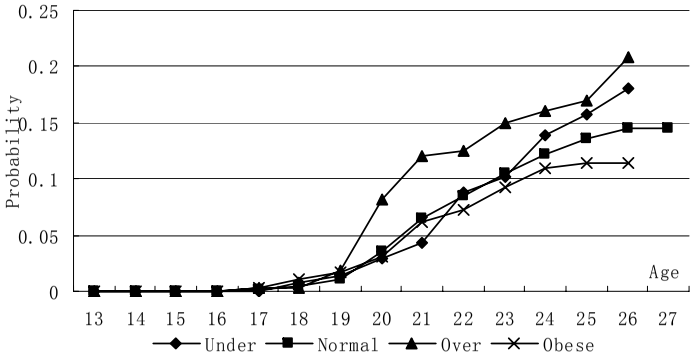
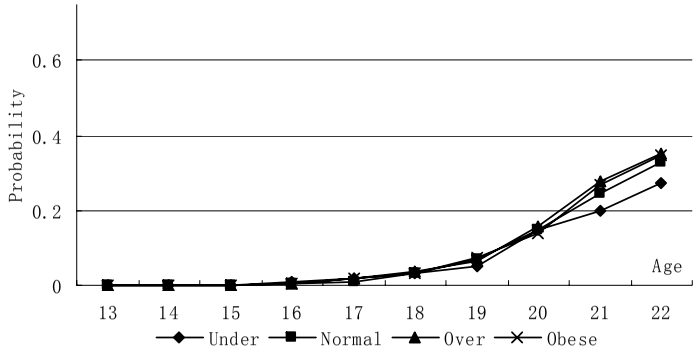
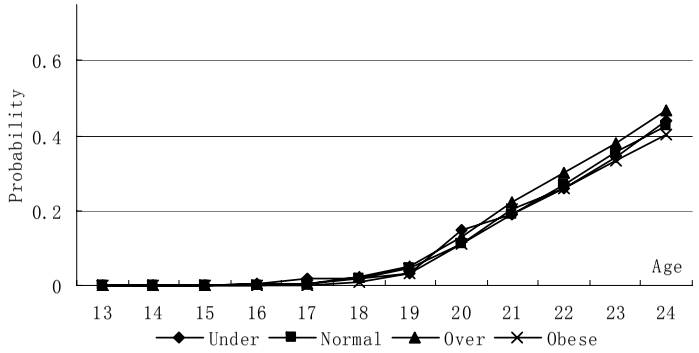


Figure 6: Probability of Cohabitation by Cohort

1) Age 13-15



2) Age 16-17



3) Age 18-20

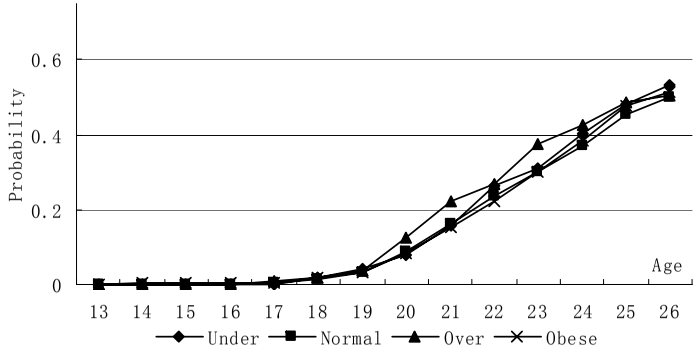


Table 2. Cox models of the Timing of Cohabitation—Add Health Wave II

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
BMI						
Over Weight	----	----	----	----	----	----
Under	-0.118(0.084)	-0.096(0.081)	-0.105(0.083)	-0.095(0.084)	-0.095(0.084)	-0.037(0.083)
Normal	-0.116(0.043)**	-0.106(0.041)**	-0.103(0.042)*	-0.101(0.043)*	-0.101(0.043)*	-0.072(0.044)+
Obese	-0.128(0.055)*	-0.178(0.054)***	-0.154(0.054)**	-0.142(0.054)**	-0.143(0.054)**	-0.148(0.054)**
Personal Factors						
Cohort: (18-20)	----	----	----	----	----	----
(13-15)	0.322(0.08)***	0.576(0.067)***	0.614(0.066)***	0.614(0.066)***	0.609(0.068)***	0.69(0.07)***
(16-17)	0.218(0.047)***	0.353(0.044)***	0.36(0.045)***	0.358(0.045)***	0.355(0.045)***	0.404(0.05)***
Male		-0.421(0.033)***	-0.408(0.033)***	-0.408(0.035)***	-0.412(0.037)***	-0.432(0.038)***
Missing		.	.	.	.	.
Race						
Other		----	----	----	----	----
White		0.191(0.105)+	0.175(0.09)+	0.178(0.09)*	0.179(0.089)*	0.159(0.085)+
Black		-0.031(0.093)	-0.045(0.081)	-0.049(0.082)	-0.054(0.083)	-0.123(0.084)
Hispanic		-0.137(0.089)	-0.124(0.092)	-0.12(0.092)	-0.12(0.092)	-0.204(0.096)*
Missing		.	.	.	.	.
Skip school						
No skip		----	----	----	----	----
Skip <=10		0.308(0.043)***	0.251(0.041)***	0.249(0.041)***	0.249(0.041)***	0.218(0.04)***
Skip>10		0.797(0.086)***	0.692(0.081)***	0.697(0.081)***	0.694(0.081)***	0.655(0.084)***
Missing		0.471(0.07)***	0.372(0.072)***	0.374(0.072)***	0.372(0.072)***	0.249(0.067)***
Cum. GPA						
12-16		----	----	----	----	----
0-8		0.528(0.059)***	0.452(0.057)***	0.453(0.056)***	0.452(0.055)***	0.376(0.055)***

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
9-11		0.345(0.047)***	0.301(0.046)***	0.301(0.046)***	0.3(0.046)***	0.255(0.044)***
Missing		0.451(0.057)***	0.388(0.059)***	0.387(0.059)***	0.385(0.059)***	0.312(0.057)***
Exp. to College						
5		----	----	----	----	----
1		0.278(0.074)***	0.177(0.076)*	0.181(0.077)*	0.182(0.077)*	0.05(0.081)
2		0.412(0.073)***	0.336(0.076)***	0.332(0.077)***	0.333(0.077)***	0.227(0.08)**
3		0.386(0.046)***	0.325(0.047)***	0.324(0.048)***	0.323(0.048)***	0.232(0.049)***
4		0.156(0.047)***	0.12(0.049)*	0.119(0.049)*	0.119(0.049)*	0.07(0.05)
Missing		-0.44(0.091)***	-0.442(0.092)***	-0.448(0.091)***	-0.45(0.091)***	-0.461(0.092)***
Church Attendance						
Never			----	----	----	----
1+ per week			-0.3(0.072)***	-0.3(0.071)***	-0.298(0.071)***	-0.042(0.07)
1 per month			-0.128(0.065)*	-0.129(0.065)*	-0.128(0.065)*	-0.006(0.065)
<1 a month			-0.041(0.064)	-0.043(0.063)	-0.042(0.063)	0.006(0.063)
Missing			.	.	.	.
Religion Importance						
Not important			----	----	----	----
very important			-0.195(0.096)*	-0.196(0.097)*	-0.196(0.097)*	-0.179(0.096)+
fairly important			-0.088(0.09)	-0.089(0.091)	-0.087(0.092)	-0.086(0.094)
fairly unimportant			-0.075(0.102)	-0.077(0.104)	-0.075(0.104)	-0.055(0.105)
Missing			0.046(0.102)	0.047(0.104)	0.047(0.104)	0.071(0.104)
Close to parents			-0.082(0.042)+	-0.077(0.042)+	-0.079(0.042)+	-0.072(0.042)+
Missing			0.537(0.455)	0.603(0.469)	0.608(0.468)	0.239(0.551)
Feel be cared			-0.232(0.074)**	-0.227(0.074)**	-0.229(0.075)**	-0.122(0.071)+
Missing			-0.563(0.456)	-0.63(0.471)	-0.638(0.47)	-0.758(0.523)
Satisfied with parents						

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
None of them			----	----	----	----
Both			-0.088(0.111)	-0.085(0.111)	-0.087(0.111)	-0.15(0.109)
One of them			0.047(0.11)	0.055(0.111)	0.053(0.111)	-0.001(0.109)
Missing			0.002(0.129)	0.015(0.129)	0.013(0.129)	-0.115(0.126)
Physical attractiveness						
Attractive				----	----	----
Unattractive				-0.155(0.075)*	-0.157(0.075)*	-0.164(0.077)*
Fairly attractive				0.061(0.041)	0.06(0.041)	0.059(0.041)
Missing				0.086(0.064)	0.091(0.062)	0.011(0.066)
Personal attractiveness						
Attractive				----	----	----
Unattractive				-0.053(0.086)	-0.051(0.086)	-0.03(0.083)
Fairly attractive				-0.003(0.039)	-0.004(0.039)	-0.017(0.038)
Missing				0.625(0.509)	0.611(0.509)	0.694(0.498)
Physical Activities						
Highly Activate					----	----
Less activate					-0.012(0.044)	-0.014(0.044)
Moderate active					-0.017(0.045)	-0.01(0.044)
Missing					.	.
Sedentary Activities						
Highly sedentary					----	----
Less sedentary					-0.074(0.066)	-0.037(0.064)
Moderate sedentary					-0.069(0.067)	-0.04(0.065)
Missing					0.765(0.511)	0.623(0.522)
Parental Factors						
Parental Education						

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
College +						----
No School						-0.043(0.484)
<High School						0.136(0.066)*
Some College						0.197(0.043)***
Missing						0.176(0.078)*
Parental Occupation						
Professional						----
Unemployed						0.144(0.084)+
Physical						0.234(0.1)*
Skilled worker						0.27(0.077)***
Office worker						0.182(0.053)***
Technician						0.019(0.048)
Missing						0.201(0.089)*
Welfare mom						0.145(0.06)*
Missing						0(0.165)
Welfare dad						-0.037(0.097)
Missing						-0.292(0.251)
Family Structure						
With 0 parents						----
With 2 parents						-0.38(0.085)***
With 1 parent						-0.102(0.094)
Religiosity mom						-0.133(0.046)**
Missing						0.078(0.204)
Religiosity dad						-0.283(0.067)***
Missing						0.348(0.249)
Parental Attitude toward sex						

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
2 disapprove						----
2 approve						0.196(0.088)*
1 disapprove						0.201(0.082)*
Missing						0.329(0.113)**
Parental Attitude toward sex with partner						
2 disapprove						----
2 approve						0.15(0.079)+
1 disapprove						0.015(0.083)
Missing						0.136(0.117)
N	11166	11166	11166	11166	11166	11166
-2LL	48364.14	47587.96	47323.71	47309.87	47306.97	47010.44

Notes: ***p<=0.001, **p<=0.01, *p<=0.05, +p<=0.10.

Table 3. Cox models of the Timing of Marriage—Add Health Wave II

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
BMI						
Over Weight	----	----	----	----	----	----
Under	-0.107(0.184)	-0.195(0.167)	-0.191(0.167)	-0.172(0.166)	-0.206(0.162)	-0.175(0.16)
Normal	-0.323(0.113)**	-0.343(0.111)**	-0.342(0.108)**	-0.338(0.113)**	-0.342(0.114)**	-0.361(0.115)**
Obese	-0.441(0.113)***	-0.461(0.117)***	-0.457(0.117)***	-0.443(0.113)***	-0.457(0.111)***	-0.51(0.105)***
Personal Factors						
Cohort: (18-20)	----	----	----	----	----	----
(13-15)	-15.665(0.146)***	-14.574(0.146)***	-18.147(0.967)***	-17.866(0.97)***	-17.766(0.965)***	-17.142(1.024)***
(16-17)	-0.742(0.109)***	-0.652(0.131)***	-0.643(0.132)***	-0.642(0.132)***	-0.604(0.132)***	-0.551(0.13)***
Male		-0.567(0.077)***	-0.54(0.075)***	-0.536(0.078)***	-0.483(0.08)***	-0.474(0.08)***
Missing		.	.	.	.	.
Race						
Other		----	----	----	----	----
White		0.39(0.134)**	0.407(0.142)**	0.407(0.143)**	0.401(0.14)**	0.376(0.134)**
Black		-0.631(0.172)***	-0.683(0.168)***	-0.682(0.169)***	-0.687(0.169)***	-0.778(0.174)***
Hispanic		0.036(0.14)	0.037(0.145)	0.045(0.148)	0.042(0.147)	-0.051(0.142)
Missing		.	.	.	.	.
Skip school						
No skip		----	----	----	----	----
Skip <=10		0.037(0.081)	0.026(0.084)	0.023(0.085)	0.018(0.085)	-0.002(0.091)
Skip>10		0.539(0.177)**	0.498(0.181)**	0.506(0.183)**	0.505(0.182)**	0.465(0.192)*
Missing		0.071(0.156)	0.029(0.16)	0.037(0.159)	0.037(0.161)	-0.155(0.171)
Cum. GPA						
12-16		----	----	----	----	----
0-8		0.282(0.132)*	0.254(0.132)+	0.267(0.132)*	0.254(0.132)+	0.176(0.135)

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
9-11		0.221(0.126)+	0.202(0.127)	0.214(0.128)+	0.211(0.127)+	0.163(0.128)
Missing		0.489(0.167)**	0.472(0.164)**	0.479(0.164)**	0.459(0.164)**	0.361(0.166)*
Exp. to College						
5		----	----	----	----	----
1		0.814(0.165)***	0.781(0.167)***	0.805(0.165)***	0.794(0.167)***	0.627(0.152)***
2		0.527(0.177)**	0.52(0.181)**	0.542(0.184)**	0.522(0.185)**	0.368(0.176)*
3		0.574(0.111)***	0.557(0.117)***	0.569(0.121)***	0.553(0.122)***	0.442(0.119)***
4		0.437(0.116)***	0.433(0.114)***	0.436(0.116)***	0.428(0.116)***	0.34(0.109)**
Missing		-0.1(0.216)	-0.089(0.216)	-0.088(0.216)	-0.088(0.218)	-0.146(0.229)
Church Attendance						
Never			----	----	----	----
1+ per week			-0.06(0.107)	-0.064(0.106)	-0.049(0.105)	0.055(0.125)
1 per month			-0.083(0.11)	-0.085(0.109)	-0.083(0.109)	-0.018(0.12)
<1 a month			0.035(0.116)	0.031(0.118)	0.035(0.118)	0.089(0.122)
Missing			.	.	.	.
Religion Importance						
Not important			----	----	----	----
very important			0.1(0.226)	0.092(0.228)	0.089(0.229)	0.101(0.247)
fairly important			-0.028(0.218)	-0.029(0.219)	-0.026(0.22)	-0.021(0.233)
fairly unimportant			0.053(0.223)	0.05(0.228)	0.04(0.231)	0.093(0.241)
Missing			-0.009(0.233)	0.002(0.232)	0.004(0.232)	0.033(0.245)
Close to parents			0.058(0.116)	0.063(0.117)	0.074(0.121)	0.057(0.126)
Missing			10.308(0.369)***	10.334(0.365)***	10.382(0.369)***	10.191(0.586)***
Feel be cared			-0.166(0.149)	-0.169(0.147)	-0.18(0.145)	-0.121(0.142)
Missing			-10.46(0.365)***	-10.504(0.363)**	-10.559(0.365)***	-10.635(0.359)***

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
				*		
Satisfied with parents						
None of them			----	----	----	----
Both			0.221(0.309)	0.224(0.31)	0.249(0.315)	0.141(0.312)
One of them			0.45(0.309)	0.469(0.308)	0.49(0.312)	0.394(0.32)
Missing			0.488(0.404)	0.515(0.405)	0.544(0.409)	0.261(0.413)
Physical attractiveness						
Attractive				----	----	----
Unattractive				-0.1(0.249)	-0.108(0.25)	-0.078(0.257)
Fairly attractive				0.158(0.101)	0.158(0.102)	0.144(0.104)
Missing				0.274(0.11)*	0.23(0.116)*	0.063(0.125)
Personal attractiveness						
Attractive				----	----	----
Unattractive				-0.309(0.265)	-0.314(0.259)	-0.33(0.265)
Fairly attractive				-0.186(0.086)*	-0.186(0.085)*	-0.206(0.084)*
Missing				-0.125(0.972)	-0.139(0.97)	0.132(0.905)
Physical Activities						
Highly Activate					----	----
Less activate					0.254(0.135)+	0.272(0.134)*
Moderate active					0.019(0.128)	0.039(0.126)
Missing					.	.
Sedentary Activities						
Highly sedentary					----	----
Less sedentary					-0.002(0.184)	0.021(0.179)
Moderate sedentary					-0.098(0.169)	-0.06(0.167)

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
Missing					-15.03(0.809)***	-15.169(0.825)***
Parental Factors						
Parental Education						
College +						----
No School						-14.987(0.641)***
<High School						0.163(0.142)
Some College						0.346(0.085)***
Missing						0.143(0.173)
Parental Occupation						
Professional						----
Unemployed						0.268(0.208)
Physical						0.698(0.187)***
Skilled worker						0.477(0.18)**
Office worker						0.197(0.143)
Technician						0.278(0.13)*
Missing						0.452(0.188)*
Welfare mom						0.155(0.146)
Missing						0.177(0.481)
Welfare dad						0.049(0.219)
Missing						-0.417(0.698)
Family Structure						
With 0 parents						----
With 2 parents						-0.291(0.151)+
With 1 parent						-0.448(0.176)*
Religiosity mom						0.026(0.113)
Missing						0.029(0.518)

	Model 1	Model 3	Model 5	Model 6	Model 7	Model 12
	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)	Beta(s.e)
Religiosity dad						0.025(0.134)
Missing						0.633(0.68)
Parental Attitude toward sex						
2 disapprove						----
2 approve						0.413(0.143)**
1 approve						0.362(0.121)**
Missing						0.682(0.215)**
Parental Attitude toward sex with partner						
2 disapprove						----
2 approve						-0.036(0.17)
1 approve						0.029(0.217)
Missing						-0.229(0.261)
N	10284	10284	10284	10284	10284	10284
-2LL	10673.81	10430.01	10413.28	10405.02	10393.48	10299.4

Notes: ***p<=0.001, **p<=0.01, *p<=0.05, +p<=0.10.

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[i] The reason why we include a "cohort" effect here is that the Add Health structure may confound the relationship between BMI and cohabitation and marriage. Add Health respondents were aged 13 and 19 at Wave II in 1995-6. The BMI at Wave II was thus related to the age at Wave II. Older teens tend to have higher BMIs. And older teens tend to cohabitate or marry by Wave II. To adjust for this potential confounding effect of Add Health data structure, we first analyzed the data in separate cohorts defined by narrow age differences. We analyzed respondents aged 14-15 at Wave II then respondents aged 16-17 at Wave II, and so on. We found that the effect of BMI on marriage and cohabitation does vary or be confounded by age. So, based on these findings, we include a 'cohort' effect in our models to control this potential confounding effect. It may be a better way to name this as the interaction of age and BMI instead of 'cohort' effect.