

EMBODIED AND COMPRESSED SPHERES:
THE INFLUENCES OF SOCIAL STRUCTURE
ON ADOLESCENT SEXUAL DEBUT
AND PREGNANCY

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CHAPTER I

INTRODUCTION

Schools are inherently sexual. In school classrooms and hallways we display ourselves to potential partners and competitors. We flex our muscles, announce our conquests, and compare our maturing physiques to those of our peers. We share notes and compare stories with our classmates and, through these interactions, we learn to identify who is desirable and who is not, how to make others aware of our interest in them, and what we should do if their interest is returned. We create a society within the school. We share values, norms, scripts, and roles with our classmates that are distinct from those of the larger, adult world (Coleman 1988), and frequently these norms and scripts are romantic or sexual. Even institutionalized and treasured school traditions such as proms are sexually charged. If the purpose of schools is preparation for the future, it is clear that romance and sexuality are part of the future for which students are prepared, both manifestly and latently.

As a society that enforces school attendance for virtually all teens and that sees adolescent sexuality as problematic, it is not surprising that schools become central to any discussion of teen sexuality and pregnancy. Unfortunately, such discussion focuses primarily on what form of sex education should be offered and largely bypasses other ways in which schools influence sexual behavior. This focus has remained in place even though twenty years of research has challenged the effectiveness of sex education of any kind (Anderson, Kann, Holtzman and

Arday et al. 1990; Bearman and Brückner 1999; Goodenow, Netherland and Szalacha 2002; Ku Sonenstein and Pleck 1992, 1993a; Longmore, Manning, Giordano and Rudolph 2003; Manlove, Ryan and Franzetta 2004; Miller, Forehand and Kotchick 2000; Raj, Silverman and Amaro 2000).

If sex education is not effective, the challenge becomes discovering what causes some teens to engage in sex early or to become pregnant while others do not. Researchers have proposed a myriad of models and demographic explanations. In 2005, Kirby, Lepore and Ryan summarized research into adolescent sexuality in their matrix of sexual risk and protective factors. This was updated in 2007 (Kirby and Lepore 2007). Research included in the matrices had to meet stated criteria¹, but even with the limitations they set, more than 400 studies were included, covering 530 proposed determinants. For each determinant, reports identifying that variable as a risk, protective, or nonsignificant factor are listed. Three hundred seventy-two proposed determinants had been researched by more than one study, but findings are contradictory for all but 47 variables. We obviously have a long way to go in identifying the “causes” of early debut and teen pregnancy.

But a larger problem faces researchers. If we are unsure of what the causes are, then we must pick a point from which to launch our research. Do we begin with the individual or is sexual behavior determined by larger social forces? Returning to the matrix provided by Kirby and Lepore (2007), it is clear that the majority of research assumes that the causes of teen sexual behavior lie primarily at the micro level. Only 87 of the 530 proposed variables reflect influences beyond the individual, dyad or family.² This assumption that teen sexual behavior is spurred or blocked by micro-level interactions or individual choice is not supported by any empirical evidence. At best, we might seek a sound method of parsing the variance in rates of sexual behaviors into that portion occurring at the individual level and that occurring at higher levels. Even without such measures, if sexual choices are strictly individual, then we should see certain demographic patterns. Choices should be fairly consistent across similar countries, across regions within the United States and across racial groups, for instance. Yet this is hardly what we find.

The United States has a higher birth rate than any other industrialized nation – one that is approximately four times that of most European nations (Darroch, Frost and Singh et al. 2001; Santelli and Melnikas 2010). Within the United States, teen birth rates vary dramatically with teens in Mississippi more than three times as likely to become pregnant than are teens in New Hampshire (Matthews et al. 2010). While the U.S. teen birth rate in 2008 was 41.5 (per 1,000 females aged 15-19), Asian/Pacific Islander teens display a birth rate of only 16.2. In contrast, the birth rate among black teens is 62.8 and among Hispanic teens it is 77.5 (Martin et al. 2010). These patterns indicate that teen sexual behavior is not simply a matter of individual choices, but is influenced by other aspects of society and social structure. In other words, the assumption that individual-level characteristics should be the target of our search for the causes of teen sexual behavior may be leading researchers in the wrong direction and preventing them from finding the most important influences.

The search for the causes of teen sexual behavior is important because of the implications for teens, their offspring, and society at large. Although the teen pregnancy rate has declined by well over 50 percent over the past 60 years (Hamilton, Martin and Ventura 2010), it remains high and with costs and consequences that pose serious social problems. Females who have children before the age of 20 are less likely to complete their education, suffer lower lifetime wages, spend more years as a single parent, and are more likely to rely on public support (see Hoffman and Maynard 2008; Maynard 1997; National Campaign to Prevent Teen Pregnancy 2006). Teen fathers suffer similar consequences, but the largest price may be paid by their offspring. Children born to teen parents are more likely to experience chronic physical, emotional, social, and cognitive disorders (see Hoffman and Maynard 2008; Maynard 1997; National Campaign to Prevent Teen Pregnancy 2006) are more likely to experience neglect; are less likely to be academically successful and as adults are more likely to become teen parents and to be incarcerated (see Hoffman and Maynard 2008; Maynard 1997; National Campaign to Prevent Teen Pregnancy 2006). As a result, U.S. citizens spend an estimated 20 billion dollars per year in direct and indirect costs (Hoffman and Maynard 2008) – enough money

to fund the government of the State of Oklahoma for more than three years (Fallin 2011). And, of course, this does not account for the noneconomic costs of broken families, incarceration, chronic illness and living in poverty. Teen child birth is not simply a social problem; it contributes to a multitude of other problems.

The stakes are high. Solving the problem of teen pregnancy will save U.S. taxpayers billions of dollars and improve the lives of millions of people. Failure to address the problem will perpetuate problems with significant financial and emotional costs. However, we cannot address the problem if we are looking in the wrong places. This means that, as a first step, we must consider the possibility that larger social structure significantly impacts teen decisions about sexuality. We can attempt to parse the variation in teen behaviors into the proportion due to individual choices and the proportion due to other levels of social structure. Since we are talking about teens, the social institution that is most immediate to their lives is the school, and, as described earlier, schools and sexuality are inextricably linked. If we are seeking an aspect of social structure that impacts teen sexual behavior, schools are a highly attractive place to begin.

This is the goal of my research: to explore the potential influence of social structure on teen sexual behavior by measuring the effect of schools on two aspects of teen sexuality: sexual debut and pregnancy. This research will allow us to test the assumption that variables affecting teen sexual behavior work primarily at the individual level. Using recently developed multi-level methods of analysis, I will be able to measure the amount of variability that can be attributed to students and schools. Even more, this research will allow us to compare the influence of sex education and other programs designed to combat teen pregnancy with other aspects of school organization and composition. Thus this research will provide much needed insight into how a serious social problem may be perpetuated or solved through social structure in general and through schools in particular.

This is not to imply that I will be overlooking individual-level variables. To say that social structure *affects* teen behaviors is not to say that it *dictates* them. Agency remains – indeed is central to the theoretical foundation I proposed in Chapter 2. I will use individual variables that have

consistently been indicated as significant or that are indicated by my theoretical basis, especially if those variables are related to schools.

In the following chapters I will describe the foundations, design, and findings of this research. In the next chapter, I will review current literature regarding teen sexual behavior, particularly debut and pregnancy. I will discuss trends and changes that create the social milieu today's teenagers experience and the myriad of costs and consequences associated with early sexual debut and teen pregnancy. Understanding both the context and the consequences associated with teen sexual decision making provides a clear lens through which previous research into sexual and other teen behaviors may be objectively and robustly viewed. As a final step in the literature review, I will review linkages between educational and adolescent research.

Along with a literature review, in Chapter 2 I will review and critique three broad categories of theory used in previous research. I will then describe the theoretical basis used throughout this research. My theoretical foundation synthesizes the work of Peter M. Blau with that of Michel Foucault into a model that links individual power with a social structure that constrains or expands the arenas in which any individual may exercise power. I contend that a restricted range of contexts in which power may be exercised increases the probability of exercising power through the body and that adolescent sexual behavior is an exercise of embodied power.

In Chapter 3, I will describe the data source, variables and analytic methods I employed. All data is based on Wave I (1994-1995) and Wave II (1996) of the National Longitudinal Study of Adolescent Health (Add Health). This study has followed a single cohort through four waves of data collection, the most recent in 2008. It is notable for its breadth of information, which includes in-school surveys of more than 90,000 students in Wave I and in-depth, in-home interviews at each wave, beginning with a Wave I subsample of over 20,000 students. These data are augmented by interviews with family, social network mapping, school administrator surveys, contextual data, and biometric data. As a result, more than 3,500 academic publications have been based on Add Health data (Add Health n.d.).

The rich data available through Add Health is complemented by robust analytic methods. In this research I utilize multi-level discrete time hazard analysis to investigate determinants of the timing of sexual debut. This method (described in Chapter 3) allows individual- and school-level variables to be entered into a single model, providing a means of identifying the amount of variance due to school factors. Hypotheses tested through this model and results are presented and discussed in Chapter 4.

In Chapter 5 I use a different analytic method, sequential logit, to examine individual and school factors associated with pregnancy. This method reflects the sequential nature of debut and pregnancy by limiting the equation representing pregnancy to the subsample of respondents who have experienced debut. In doing so, I can clearly contrast the effects of independent variables at each stage and identify similarities and differences. This method is also described in Chapter 3 while hypotheses tested and results are presented and discussed in Chapter 5.

In Chapter 6 I will bring all this information together and discuss the overall findings of this research, their implications, and indicated future research. In the end, we may have better insight into the effects of schools on adolescent sexual behavior that can aid further research and advise policy. We begin, however, with a look at where we are and what we know today.

END NOTES

1. For inclusion, research had to have been conducted in the United States, use one or more dependent variables (sexual debut, frequency of sex or sex during a specified period, number of sex partners, condom use, contraceptive use, pregnancy, child birth, or contraction of an STD), be based on a sample of teenagers, have a minimum sample size (100 for significant findings, 200 for nonsignificant findings), meet the standards of professional peer-reviewed journals, be published in 1990 or later, and use multivariate analysis.
2. Two variables represent time of year, five represent regions, 14 represent states, 41 measure community characteristics, and 21 reflect school characteristics.

CHAPTER II

LITERATURE REVIEW AND THEORETICAL BASIS

Sexuality and adolescence are very complex topics. The politicalization of adolescent sexuality has led to much discussion based on “common sense” and “common knowledge” rather than empirical data. Complex analyses are inaccurately reported and correlation is presented as causation. In this chapter, I will set a research basis by reviewing scientific research and articulating a clear theoretical foundation. Based on these, I will present a series of hypotheses and methods for testing them in the next chapter.

LITERATURE REVIEW

I begin with a brief review of current demographic trends and regional or international comparisons. However, to fully understand the implications of demographic trends, we must understand the consequences associated with adolescent sexual behaviors, so these will be reviewed as will variables that have been noted as risk or protective factors or behaviors that have been identified as likely to co-occur with debut or pregnancy. Schools are central to this research, so I will also review research associating the two or that associates schools with variables also associated with teen debut or pregnancy.

One weakness of past research has been a preponderance of data without theoretical direction (Goodson, Evans and Edmundson 1997). I offer as a theoretical basis a synthesis of the

works of Michel Foucault and Peter M. Blau. Although theory is often underdeveloped in previous research, I review three broad categories of theory that have been consistently proposed to explain adolescent sexual behavior. I will then review the works of Foucault and Blau. Finally, I will present my synthesis of these works, the Theory of Embodied Spheres of Power and present the implications of this theory.

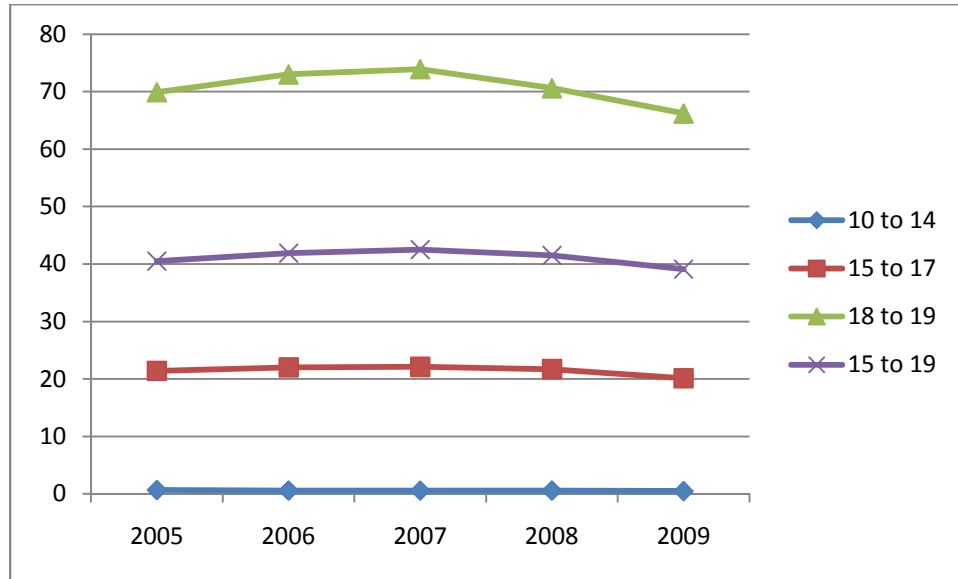
Current Demographic Trends

Preliminary data indicates that 2009 was a record-setting year (Hamilton, Martin and Ventura 2010a). U.S. births, the general fertility rate, and the total fertility rates all declined by three percent or more and both the total number of births and birth rates declined among all races and Hispanic groups. Teenagers contributed to this trend. The 2009 teen birth rate (39.1 per 1,000 females aged 15-19) was the lowest on record, with historic lows found among younger teens (ages 15-17), older teens (ages 18-19) and among blacks, whites, Hispanic, and Asian/Pacific Islanders (Hamilton, Martin and Ventura 2010). 2009 represents the second year of declines following a two-year rise in 2005 and 2006 (Figure 1) (Guttmacher Institute 2010; Hamilton, Martin and Ventura 2010). When viewed in a larger context, these declines add to continuous declines since the all-time recorded high of 96.3 in 1957 (Figure 2) (Hamilton, Martin and Ventura 2010a; National Campaign to Prevent Teen and Unplanned Pregnancies 2010). These figures indicate a relatively constant decline since the late 1950s that has reduced the teen birth rate by well over 50 percent.

Like teen birth rates, teen pregnancy rates have declined consistently, although increases were noted in 2006, the latest year for which information is available. In 1990, the teen pregnancy rate was 116.9 per 1,000 women 15-19 years of age. By 2005 that had been reduced by more than 40 percent to 69.5 per 1,000 (Guttmacher Institute 2010).

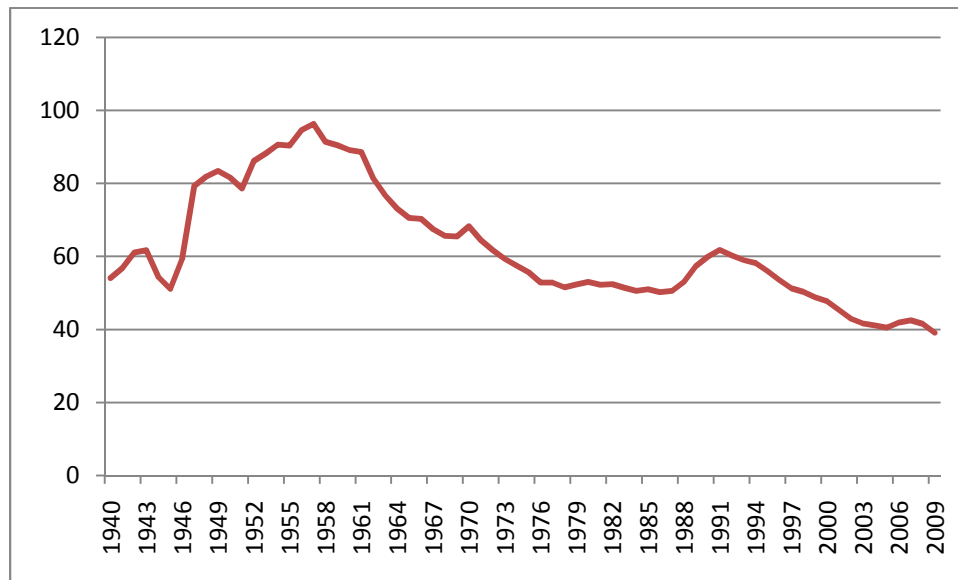
These changes have taken place amidst other changes associated with sexuality, marriage, and family formation. Like teen birth rates, teen pregnancy and abortion rates have

Figure 2.1: U.S. Teen Birth Rates by Age, 2005-2009



Source: Hamilton, Martin and Ventura 2010

Figure 2.2: U.S. Teen Birth Rates, 1940-2009



Sources: National Campaign to Prevent Teen and Unplanned Pregnancies 2010; Hamilton, Martin and Ventura 2010.

declined (Pazol, Zane, Parker and Hall et al. 2011). Cohabitation has increased and become a more normative relationship option (Smock 2000). Marriage has remained important to young people, but in a redefined form that occurs only after education is completed and a career is in place (Cherlin 2004).

Within these trends, additional changes are taking place. Despite convergence among racial groups (Guttmacher Institute 2010) distinct differences are still found. For example, black teens are more likely to be sexually active and to become parents than teens from other racial groups while white teens are more likely to rely on hormonal contraceptive than other teens (Cavazos-Rehg, Krauss, Spitznagel and Schootman 2009; National Campaign to Prevent Teen Pregnancy 2008).

Gender roles associated with sexual behavior remain in place, despite notable changes. Boys are more likely to report that they are sexually active and they report more partners than do high school girls (Centers for Disease Control and Prevention 2002). Boys also acknowledge that girls are more likely to be stigmatized by sexual behavior while boys are more embarrassed to admit they are virgins and more likely to report feeling pressured to have sex (Henry J. Kaiser Family Foundation and Seventeen Magazine 2002; National Campaign to Prevent Teen Pregnancy 2002, 2003a). On the other hand, male teens are as likely as female teens to say sex should only occur within a committed relationship and are more likely to report using a condom at last sex (CDC 2002; National Campaign to Prevent Teen Pregnancy 2003a).

Only about one in four teen males who received any health services in the previous year was advised about birth control although black males were approximately twice as likely to receive this guidance as white or Hispanic males (National Campaign to Prevent Teen Pregnancy 2006b). In contrast, 50 percent of female teens report receiving reproductive health services during the past year (National Campaign to Prevent Teen Pregnancy 2006c).

Two-thirds of teen pregnancies are unplanned and the obvious corollary is that one-third of teen pregnancies are, at least to some degree, intentional (Abma, Martinez, Mosher and

Dawson 2004). Even when standard calculations are adjusted and the rate of unintended pregnancy is limited to sexually active females, approximately 25 percent of adolescent pregnancies are intentional (Finer forthcoming). Beyond intended pregnancy, adolescents who engage in sexual intercourse have, at a minimum, accepted a level of risk which indicates choice (Abbott and Dalla 2008). The questions most crucial to researchers are why this level of choice is accepted and what characteristics make an adolescent more likely to accept those risks. Some research finds that parenthood allows teens to be excused from high-risk behaviors in which their peers are involved (Luker 1996). Qualitative research such as that completed by Duncan (2007) indicates that “many teenage mothers describe how motherhood makes them feel strong and marks a change for the better,” often leading to increased emphasis on education and training so they can fulfill the role of parenthood adequately. While these teens may derive benefits from pregnancy, research indicates that most teen parents face daunting challenges.

Consequences of Teen Pregnancy and Birth

Adolescent pregnancy has been associated with reduced educational attainment, lifetime earnings, marital success, and civic involvement throughout the parents’ life course. Children of teen mothers suffer increased incidence of medical and behavioral problems and learning disabilities, increased incidence of child neglect, greater likelihood of living in poverty and higher chances of incarceration and of becoming teenage parents themselves (Frisco 2008; Hoffman 2006, Hoffman and Maynard 2008; Hollander 1995; Maynard 1997; Pogarsky, Thornberry and Lizotte 2006; Sipsma, Biello, Cole-Lewis and Kershaw 2010; Spriggs and Halpern 2008; Ventura, Matthews and Hamilton 2001). Children born to women who are no longer teens but who initially gave birth as teens fare no better than their older siblings (Jutte, Roos, Brownell and Briggs 2010). In 2004, the annual estimated cost of adolescent pregnancy exceeded \$9 billion in direct costs with the estimate of indirect costs exceeding \$20 billion (Hoffman 2006). Moreover,

more than one in five teens who have a child will have a second child within 24 months (Crittenden, Boris, Rice and Taylor et al. 2009).

Although reproductive decisions are based on noneconomic considerations (Kelly and Grant 2007), most financial costs are borne by teenage mothers, with fathers of children contributing an annual average of only \$800, regardless of the father's age (Maynard 1997). Even so, fathers do not escape unscathed. Teenage fathers briefly enjoy an increase in income as they devote more hours to work than their peers do. As their peers complete additional education this difference is reversed and, like teen mothers, teen fathers show significantly lower earnings throughout their adult life (Duncan 2007; Maynard 1997).

The costs of sexual behavior, however, go beyond dollars and begin long before pregnancy. Early age of sexual debut has been strongly associated with an increased number of sexual partners, greater chance of STD contraction, and decreased contraceptive use leading to increased chance of pregnancy and birth (see Bearman and Brückner 1999; Kellog, Hoffman and Taylor 1999; Manlove, Terry-Humen, Ikramullah, and Moore 2006; Santelli, Brener, Lowry and Bhatt et al. 1999). Although American teens do not debut significantly earlier than do teens in other industrialized nations (Guttmacher Institute 2001), there are indications that teens are beginning sex earlier (ages 12-15) (Hamilton, Martin and Ventura 2009).

In considering these facts, we must recognize that attempts to track information regarding debut and behaviors among younger teens are fairly recent development and earlier data is extremely limited in scope. Calculations have not been consistent. For example, the 1960 U.S. Census (the most proximate to the highest recorded level of teen birth) only reports births to married teenage females. Even with this limitation, three percent of married teenage girls had three or more children and more than 1,700 married teenage girls had seven or more children, indicating that sex among youngest teens is not a new phenomenon.

We must also recognize that adolescent pregnancy intersects with larger social trends and structures. For example, teen mothers have lower educational levels and are thus locked into low

income jobs, in which the “motherhood penalty” is most severe (Budig and Hodges 2010). As their lack of education locks them into low-income jobs, access to health care becomes limited for themselves and for their children (DeNavas-Walt, Proctor and Smith 2009).

Previous Research on Teen Sexual Debut and Pregnancy

Identifying factors contributing to America’s teen pregnancy and birth rates has proven to be a difficult challenge. In a comprehensive review of proposed protective and risk factors Kirby, Lepore and Ryan of the National Campaign to Prevent Teen and Unplanned Pregnancy (2005) considered only research completed in the U.S. since 1990 and based on samples of people 18 or younger with at least 100 respondents for significant results or 200 for non-significant results. All research had to use multivariate analysis and methodology appropriate for peer-reviewed research journals. These same limitations were employed in an update by Kirby and Lepore (2007). Even with these limitations, they identified more than 500 factors associated with adolescent sexual debut, frequency, number of partners, use of condoms or contraceptives, pregnancy, birth or STD contraction. Of these, 85 percent were focused on issues of individual behavior, family, peers, and partners. Moreover, of the 74 risk or protective factors identified as “strongest and most consistent” only two (community percentage foreign born and level of community disorganization) approached a higher level of social structure. Clearly, research addressing teen pregnancy has remained mired at a micro-level of analysis although no comparison of micro and macro influences has been conducted and therefore no basis for concentration on micro-level factors has been established.

Despite researchers’ concentration on psychological, dyadic, and other micro-level aspects of adolescent sexual behaviors, clear macro-level trends are well documented, particularly those that result in strong national and regional differences in adolescent pregnancy and birth rates. The United States continues to significantly outpace other Western, industrialized nations with teen pregnancy and birth rates which are roughly double those of the second place United

Kingdom – which itself has a teen pregnancy and birth rate that is approximately double those of other European nations (Darroch et al. 2001). These differences exist even though there are no “appreciable” differences between European and American teens in terms of sexual activity (Darroch et al. 2001). Within the United States, teens in a broad swath through the South and Southwest are far more likely to become pregnant than are teens in the northern tier of states (Martin, Hamilton, Sutton and Ventura et al. 2009; Mathews, Sutton, Hamilton and Ventura 2010). Mississippi’s 2006 teen birth rate of 68.4 births per 1,000 girls aged 15-19 was almost four times New Hampshire’s rate of 18.7 (Kost, Henshaw and Carlin 2010). These geographic patterns have remained stable over the past 25 years, indicating a strong potential for powerful structural or cultural influences and a need for macro-level research. Macro-level influences are also indicated by stable findings of racial and class differences in teen pregnancy and birth rates and by higher levels of adolescent pregnancy among inner-city and rural teens (Rural Adolescent Pregnancy Project 1996).

In contrast to sexuality, other forms of juvenile deviance are frequently viewed in relation to structural constraints, often posited as forces that limit opportunities in a way that enhances the likelihood of deviant behavior (Schrek, McGloin and Kirk 2009; Shaw and McKay 1969). Significant correlations between early sexual debut, the number of sexual partners, teen pregnancy and teen birth and other risk behaviors including criminality and drug or alcohol abuse have been reported consistently (see Devine, Long and Forehand 1993; Harvey and Spigner 1995; Ketterlinus, Lamb, Nitz and Eister 1992; Pugh, DeMaris, Giordano and Grant 1990; Scarmella, Conger, Simons and Whitbeck 1998), although the latter is more likely to be framed in reference to structural influences.

Racial differences in adolescent sexual behavior are frequently noted. Pregnancy and birth rates are higher among black and Hispanic teens than among whites or Asians, although findings regarding Hispanics have been less consistent than those regarding blacks (Davis and Friel 2001; Gavin, MacKay, Brown, and Harrier et al. 2009; Hogan, Sun and Cornwall 2000;

Kost, Henshaw and Carlin 2010). Being Asian (as compared to white) significantly reduces risk (Miller 2003). These findings may have contributed to public and research concentrations on inner-city and minority teens. Urban teens are more likely to be sexually active and to get pregnant than are suburban teens, but there are indications that rural teens are more at risk than their urban counterparts. For example, in their analysis of upstate New York teens, Atav and Spencer (2002) found that sexual activity was more prevalent among rural teens (49 percent) than among urban (35 percent) or suburban (31 percent) where a wider range of family planning and abortion services are available (Loda, Speizer, Martin and Skatrud et al. 1997). Blum, Beuhring and Rinehart (2000) found that being African-American, being female, living in a single parent family, and income were all significantly associated with being sexually active by the eighth grade; however, the combination of these factors explained only 10.6 of the variance among younger teens and 2.9 percent of the variance among older teens, leading them to conclude that other, possibly structural, factors should be explored. Cavanaugh (2004) expanded on racial differences in sexual debut by identifying differences among racial groups in friendship linkages and posited that these differences reflected differences in the social construction of girlhood, resulting in differing ages of debut.

The number of foreign born residents and the level of community disorganization have both been shown to impact debut, pregnancy and birth (Billy, Brewster and Grady 1994; Lackey and Moberg 1998; Lanctot and Smith 2001). Other population characteristics frequently associated with social disorganization including race and income levels present conflicting findings. While being black or Hispanic is associated with disorganization (Mersky, Berger, Reynolds, and Gromske 2009) and adolescent sexual behaviors (Kost et al. 2010), income is not consistently associated with sexual behavior. Kirby et al. (2005) identified 31 reports of research into links between socioeconomic status and debut and 14 reports of research into links between SES and adolescent pregnancy. Twelve of the 31 studies focusing on debut found significant associations; 19 found none. Similarly eight reported significant links between SES and

pregnancy while five found no link and one found both. Baumer and South (2001) found that disorganization (with controls for household SES and demographic status) was significantly associated with the frequency of intercourse, number of sex partners, and contraceptive use, but not with age of debut,¹ and found little effect of any variables indicated by previous research.

Brooks-Gunn, Duncan, Klebanov and Sealand (1993) contrasted implications of contagion theory with those of collective socialization and found that reducing the number of affluent neighbors increased dropout rates and premarital childbearing among white, more affluent teens; however increasing the number of affluent neighbors among low-income youth did not have any effect. Their conclusion that “we need to view neighborhoods as a potent source of unequal opportunity” again indicates a potential link between childbearing and schools, particularly since neighborhood and school district boundaries are highly correlated. However, conflating school and neighborhood overlooks the “extent to which school practices are shaped by larger sets of institutional forces” such as racial segregation, resource inequality, curriculum variation, school-to-work transitions and school discipline (Arum 2000).

Income is also associated with changes in adolescent sexual behaviors we see in cultures experiencing shifts due to industrialization. As changes in human capital occur, changes in fertility patterns have been found such that increased levels of female earning potential lead to decreased fertility (Blum 1991; Greenwood, Seshadri and Vandenbroucke 2005). Fertility reductions are not equally distributed. Those with the widest range of opportunity (frequently through education) experience the greatest decline in fertility. Driscoll, Sugland, Manlove and Papillo (2005) extended this theory to investigate the relationship between community opportunities and adolescent pregnancy. Their finding that “teens in those groups from areas with little to offer them, who have modest expectations, are at high risk of becoming mothers by age 20,” highlights the influence of community structures, including education, on adolescent sexual behavior.

Debut and pregnancy are frequently associated with the same risk or protective factors (see Kirby and Lepore 2007) although several variables have been associated with one but not the other. For example, Moore and Chase-Lansdale (2001) found that the proportion of welfare recipients in an adolescent's community was associated with higher risk of pregnancy, but not with earlier debut. Attending a private religious school delays sexual debut, but does not reduce the chance of pregnancy (Resnick et al. 1998) while contraceptive information presented in school reduces pregnancy but does not delay debut (Raj et al. 2000). These patterns may be the consequences of differing social costs associated with sexual debut and pregnancy avoidance. For example, a private religious school might stress the moral imperative to maintain chastity in such a way that the public acknowledgement of sexuality necessary to purchase contraceptives might become prohibitive. Alternately, the curriculums of private, religious schools might emphasize contraceptive failure rates, resulting in lowered reliance on them once sexual debut occurs or the presentation in schools with comprehensive sex education programs of contraceptives as safe, accessible and inexpensive may reduce barriers to debut².

A wide variety of individual-level variables have been associated with adolescent debut and pregnancy. Consistently significant results indicate that individuals may be influenced by peers, romantic bonding, self-image, race, educational success, religious practices, risk-taking and involvement in activities outside school (see Kirby and Lepore 2007). Older peers, peers who hold pro-sexual attitudes, who are sexually experienced, are not educationally successful, or who engage in other risk-taking behaviors increase risk (Bearman and Brükner 1999; Blum et al. 2000; Cooksey, Mott and Neubauer 2002; Little and Rankin 2001; Robinson, Telljohann and Price 1999; Teitler and Weiss 2000). Working twenty hours a week or more increases risk as the teen adopts adult roles and identity. Among white teens, employment does not affect the risk of pregnancy; however, employment increases pregnancy risk for black teens and reduces pregnancy risk for Hispanic teens (Ku, Sonenstein and Pleck 1992; Resnick et al. 1998; Rich and Kim 2002). Simply having a romantic relationship significantly increases the chances of sexual

activity and pregnancy, particularly if that relationship is longer in duration or if the partner is older (Cooksey, Rindfuss and Guilkey 1996; Little and Rankin 2001; Meschke, Zweig, Barber and Eccles 2000). Cognitive development and internal locus of control have been associated with decreased risk; however, measures of self-esteem and self-concept are less clear. The majority of research finds that these are not significant predictors although some have found them to be protective. Others indicate interactions between age and gender such that self-esteem exerts greater force on younger girls than other teens (Spencer, Zimet, Aalsma and Moore 2002). Depression is a related focus, although the relationship between depression and engaging in sexual behavior is highly contested with some positing that depression results from being sexually active (Hallfors, Waller, Ford and Halpern et al. 2004), others claiming that depression leads to engaging in sex (Longmore, Manning, Giordano and Rudolph 2004) and still others claiming that the relationship is strictly correlational rather than causal (Mott and Haurin 1998). Along with depression, high levels of stress and suicidal thoughts have been identified as risk factors although suicide attempts has not (Brown, Tolou-Shams, Lescano, and Houck et al. 2006; Cooper, Shaver and Collins 1998; Hellerstedt 2001; Longmore et al. 2004).

Family relationships and structure have been noted as influential in adolescent sexual behavior. Living with both biological parents, higher educational attainment by parents, greater parental income, and higher levels of parental supervision have been associated with lower risk (Bearman and Brückner 1999; Brewster, Cooksey, Guilkey and Rindfuss 1998; Crowder and Teachman 2004; Forste and Haas 2002; Rosenthal, VonRansom, Cotton and Biro et al. 2001) while divorce or separation, domestic abuse, and substance abuse by parents or family members have been associated with increased risk (Brewster et al. 1998). Children of adults who were parents as teenagers or who model sexual risk-taking are at higher risk of early debut, pregnancy and birth as are the siblings of teens who have become pregnant or impregnated their partners (East 1996; East, Slonim, Horn and Trinh et al. 2009). Parental attitudes about sexuality and contraceptive use have also been shown as influential such that children of those espousing

permissive attitudes are at greater risk and children whose parents disapprove of adolescent sexual activity are at reduced risk (Abbott and Dalla 2008; Chapman and Werner-Wilson 2008; Dittus and Jaccard 2000; Resnick et al. 1998); however, these appear to be very nuanced forces, with differing views toward contraceptives, timing of conversations about contraceptive use, the gender of the teen, and the gender of the parent all affecting indicated outcomes (Kirby et al. 2005).

Religious embeddedness, self-identification as religious and frequency of religious attendance have been associated with delayed debut and with reduced frequency of sexual activity after debut (Abbott and Dalla 2008; Holder, Durant, Harris and Daniel et al. 2000; Nonnemaker, McNeely and Blum 2003). There are also indications that teens with strong religious convictions are less likely to seek medical care, to talk with an adult about their sexual behavior, or to use contraception, all of which increase the chance of pregnancy or STD contraction (Bearman and Brückner 2001; Brückner and Bearman 2005; Cooksey et al. 1996; Manlove et al. 2006).

Smoking, substance use, fighting, carrying weapons, gang involvement, and sensation-seeking behaviors have been strongly associated with one another, with early debut, with increased numbers of partners, increased frequency of sexual activity, and with pregnancy and birth (Armour and Haynie 2007; Bell 2009; Crosby, DiClemente, Wongood and Harrington et al. 2002; Harvey and Spigner 1995; Lammers 2000; Mott, Fondell, Hu and Kowaleski-Jones et al. 1996; Pierre, Shrier, Emans and DuRant 1998; Raine, Harper, Leon and Darney 2000; Ramisetty-Mikler, Caetano, Goebert and Nishimura 2004; Spingarn and DuRant 1996; Stanton, Li, Pack and Cottrell et al. 2002). These factors have also been closely associated with single-parent homes (Dornbusch, Carlsmith, Bushwall and Ritter et al. 1985) resulting in difficulty in identifying causal paths. Instead, these are often presented as a constellation of related behaviors.

Sexual Behavior and Schools

Schools are normally seen as beneficial to students and, indeed, teens who are successful in school, have positive views toward their school, and have plans for higher education display later sexual debut and lower rates of pregnancy and birth (Bearman and Brückner 2001; Bonnell, Allen, Strange and Copas et al. 2005; Scarmella et al. 1998). Participation in extra-curricular activities has been indicated as a further protective factor, particularly when females are active in sports programs. Girls who participate in such programs are more likely to delay debut, although athletics is less significantly associated with teen pregnancy (Halpern, Joyner, Udry and Suchindran 2000; Miller, Sabo, Farrell and Barnes et al. 1998). Those involved in organized activities beyond the school, such as through community organizations, are less likely to be sexually active, especially when this involvement gives them access to a mentor (Crosby, DiClemente, Wingood and Harrington 2002; Vesely, Wyatt, Oman and Aspy et al. 2004).

There are indications that school structure may also influence adolescent sexual behavior. For example, Adamczyk (2009) found that females who attended private religious schools were more likely to abort a premarital pregnancy than were those who attended public schools. Students in urban or rural schools are more at risk of deviant behaviors and pregnancy than those in suburban schools (Atav and Spencer 2002). Positive views toward the school have been linked to later debut and lowered rates of pregnancy and birth (see McNeely, Nonnemaker and Blum 2002), and with sex ratios in the schools (Bearman and Burns 1998). Dropout rates and associated deviant behaviors have been shown to be reduced when disciplinary policies are perceived as fair and individualized student-teacher learning is increased (Gullotta and Bloom 2003). School connectedness is associated with similar characteristics: positive school climate, higher levels of student participation in extracurricular activities, smaller schools and disciplinary policies that are perceived as fair (McNeely et al. 2002).

School structure and associated policies have also been implicated in educational research into lower levels of academic success among students living in poverty. Early research

such as Coleman et al. (1966) and Jensen (1969) indicated that poor academic performance resulted primarily from the individual students' weaknesses or inabilities. These findings were contested by later researchers (see Edmonds 1979 for review) who found greater effects in administrative leadership, faculty expectations, orderliness without oppression, emphasis on mathematics and reading (even at the expense of athletics or other areas), and effective monitoring.

Even with this evolution of educational research, African Americans are significantly more likely than white students to attend high-minority, high-poverty and overcrowded school. They are more likely to be in special education classes and are twice as likely to be designated as mentally retarded (Knaus 2007). Poverty is strongly associated with race (DeNavis-Walt et al. 2009); however, race is associated with other aspects of school policies and structure. School boundaries are often associated with racially-defined neighborhoods and funding of minority-majority schools is more likely to preclude adequate teaching tools and opportunities, resulting in lower levels of educational success (Greenwald, Hedges and Laine 1996). Race is also closely associated with discipline, with minorities (particularly black males) more likely to be subjected to "exclusionary discipline" that bars them from the classroom and labels them as troublemaking. Labeled students are more likely to be funneled into the juvenile justice system through what has been called the *school-to-prison pipeline* (Fenning and Rose 2007; Skiba, Michael, Nardo and Peterson 2002; Wald and Losen 2003).

In linking these to adolescent sexual behavior, we must note that the role of sex education in schools – and the fear that sex education would promote promiscuity – has been debated in America for more than 100 years (Carter 2001). Programs that have been effective tend to go beyond the realm of classroom instruction to include communication skills, community involvement, job opportunities and access to health care (see Carrera 1989; Gavin, Catalano, David-Ferdon, and Glopper 2010). In recognition of the broader range of influence schools might exert, Douglas Kirby (2002) challenged researchers to consider the school/sexuality link, stating

“there is relatively little research on the impact upon sexual behavior of school structure and non-sexuality-focused school programs.” Kirby suggested five mechanisms through which schools could impact sexual behaviors:

1. Structuring student time and limiting time available for sex.
2. Increasing interaction with adults who discourage risk-taking and sexual behavior.
3. Affecting the pool of potential friends and peer group options.
4. Increasing belief in the future, including educational and career goals.
5. Increasing “self-esteem, sense of competence, and communication and refusal skills.”

This review of extant literature clearly illustrates that adolescent sexual behavior is complex and our understanding of it contested. Factors that provide protection or increase risk are multifaceted and intricately linked to social structure through race, gender, class and other forms of social differentiation and stratification. Factors associated with other outcomes, such as delinquency, are also associated with sexual behavior. Moreover, schools are omnipresent in these findings. Even when they are not explicitly part of the model, they remain the center of adolescent society, providing peer-networking, role modeling, norm-setting, and opportunities to enter romantic relationships and learn dating behaviors, including sex. To consider that they might affect teen sexual behavior appears much more reasonable than to continue to assume that they do not.

THEORETICAL BASIS

From the previous review of literature, it is clear that research into adolescent sexual behavior has focused on causal relationships: what causes some teens to become sexually active? What causes some teens to use contraceptives? Which programs reduce teen pregnancy and birth rates? However, identifying causal relationships does not answer the underlying questions of why

those factors exert the influence they do or how those factors are linked to other aspects of our society and culture. These questions may be best addressed by theory, which then becomes the foundation of the research model.

In this section I will present a theoretical basis that is synthesized from the works of Michel Foucault and Peter M. Blau. I will demonstrate that this theory unifies previously presented theories regarding adolescent sexual behavior. Further, I will contend that the weakness shared by previous research and addressed through my proposed Theory of Embodied Spheres of Power is the failure to recognize a shared latent variable: empowerment. I begin with a review of previous theories, followed by a discussion of power and empowerment. I will then discuss how Foucault's operationalization of power, particularly his concept of spheres of power, can be used to expand our understanding of adolescent behaviors. Finally, I will link Foucault's views of power to Blau's definition of social structure as a distribution of opportunities among people (1994: 8-11) and propose that it is this link which provides an explanation of how empowerment serves as the latent variable underlying adolescent sexual behavior.

Previous Explanations

As noted earlier, theory is frequently underdeveloped in research discussions on teen sexual debut and pregnancy. Nevertheless, underlying agreement exists that (1) individuals are shaped by the structure and culture of the society and (2) the sexual behaviors of adolescents can shape or change society. Three broad perspectives are most frequently used to explain adolescent sexual behavior. I call these *the idealized family, risk as developmental, and rational pregnancy* perspectives.

The Idealized Family Perspective. One theoretical perspective shapes research and views on teen sexuality as a type of juvenile delinquency: idealized norms, traditional family values and the dynamics of family relationships.

This research most frequently uses a set of assumptions defining teenage sexual activity as a type of “social dysfunction”, as behavior that strays from idealized norms. This view is grounded in the popular culture and is highly politicized, as reflected in a recent Heritage Foundation communication regarding the importance of marriage and family :

“The family, centered on marriage, is the building block of society. When marriages and families are healthy, communities thrive and government is limited; when marriages break down, communities break down and government role expands. Research shows that good policy places marriage and the family at the center, working to promote and strengthen this long-established institution (Heritage Foundation n.d.).

This view paints a picture of contemporary society as straying from an idealized past. Behaviors that are contrary to such idealized norms are viewed as both resulting from dangerous social change and contributing to it.

The assumption of a “traditional” family was most effectively challenged by Stephanie Coontz, (2000 [1992]), using demographic and other empirical data to illustrate that this perspective reflects nostalgia more than fact. Like others who hold this point of view, Coontz recognizes that focuses on terminology embracing the “family” are code words for controlling (adolescent girls sexual behavior (2000: 38-39).

A closely-associated body of theory looks at why some students are able to resist becoming delinquent. Why is it that some people or families can endure hardship without resorting to delinquency – what makes them resilient? This research focuses on family relations, arguing that family unity, religious beliefs, optimism, flexibility, communication, and financial security (Hawley and DeHaan 1996; see also Black and Lobo 2008) reduce the likelihood of deviant behaviors. This perspective has been applied to adolescent sexuality (see Aronowitz and Morrison-Beedy 2004; Bradbury and Karney 2004,); however, it primarily maintains a view of family closely associated with the idealized traditional family³.

The Risk as Developmental Perspective. A second body of theory tries to explain why adolescents seek to prove their adult status by engaging in behaviors allowed for adults but prohibited to minors, including drinking alcohol and sex (Costa, Jessor, Donovan and Fortenberry 1995; Jessor and Jessor 1977). This body of theory acknowledges that adolescents are more likely to participate in risk behaviors than are people in other age groups using a perception of adolescence as a distinguishing life stage. These theories have been expanded and challenged to incorporate physiological, cognitive, peer, and socialization effects that explain behaviors (See Arnett 1992a). Although this body of theory acknowledges that society affects individual behaviors, social influences are constrained to the role of socializing agent with scant attention paid to other social forces.

Further, research utilizing these theories does not explain international differences in behaviors noted in the previous chapter, except to attribute socialization to a broad range of sources including media and government (Arnett 1992a, 1992b). However, with the inclusion of social institutions ranging from family to government and the role of peer influence, many of these theories fail to acknowledge how they are indirectly addressing social structure.

The Rational Pregnancy Perspective. Finally, a third (though somewhat smaller) body of research argues adolescent sexual behavior and child birth is logical among low-income groups (Hunt, Joe-Laidler and MacKenzie 2005; Lowenstein and Furstenberg 1991; Luker 1996; Musick 1993). This body of research asserts that pregnancy “excuses” a teen from social pressure to engage in other risk behaviors such as substance use or gang activities, allows them to escape school failure, and strengthens ties to a social network that serves as an emotional and financial safety net. As in the other categories, this perspective is contested (see Furstenberg 1991) and has been extended, in this case to a critique of policy and political exploitation (Luker 1996).

Comparison of Perspectives. All three categories share two fundamental assumptions: that adolescent sexual behavior is impacted by larger social forces and that sexual behavior is a form of power. Those referencing an idealized form of marriage associate risky adolescent behavior to social change, gender roles, religion, the institution of marriage, and socialization (including institutions such as media or government policy). Adolescent attraction to risk behaviors is also attributed to peer networks, socialization, and environmental effects on biology and cognition. Like those explanations based on an idealized form of marriage, research based on adolescent risk tends to emphasize socialization by broadly defining agents of socialization, to include government and the media. While those who see teen pregnancy as adaptive assume that class and status are intrinsically associated with pregnancy, and thus they, too, implicitly acknowledge the effect of social policy and institutions such as government. Thus, all three bodies of theory indirectly assume that social institutions and social structure impact adolescent sexual behavior.

A second shared assumption is that sexual behavior is way to exert power. The Heritage Institute passage quoted earlier goes so far as to say that “when marriages and families are healthy, communities thrive and government is limited.” As their view of a healthy marriage and family assumes sex and childbirth limited to the marital state, teens engaging in sex appear to have the power to imperil communities and expand government – an amazing amount of power for adolescents. Both those who strive for the ideal and those who decry that attempt, advocate individual choice programs based in empowerment of youth, such as to say “no” to sex before marriage (see Ohio Department of Health 2005) or to empower them to make an informed decision about sexual debut and safer sex (see Girl Revolution 2008). Moreover, both camps attempt to define and protect parameters of youth empowerment by implementing programs that will (hypothetically) steer youth behaviors to make decisions toward their desired goal.

Those who focus on adolescent inclination to engage in risk behaviors begin with the assumption that “risk behaviors” are to be avoided, supporting this by reciting financial and life costs (see Arnett 1992a). Left unstated is the assumption that such costs increase the costs of

social services and exert an unwanted influence on society as a whole. This acknowledges adolescent power to affect the larger society and imputing an ability for larger society to define and enforce the parameters of behavioral options youth are allowed.

Those who see adolescent sexuality as an adaptive strategy are most likely to articulate the role of power in adolescent choices and the most likely to link behavioral options with larger social structure, particularly class, as influencing decision making. Kristin Luker (1996:112) writes:

“if young parents would face essentially the same circumstances no matter when they had a baby (and if the baby would have the same limited range of future opportunities no matter when its parents brought it into the world), then there is no point in blaming teens for making choices that, although they may seem like bad ones from a middle-class point of view, have little in the way of real consequences for the young people involved.”

The view of childbearing as rational, however, requires the same assumption shared by the two earlier categories: that society determines the parameters of adolescent behaviors.

If all three perspectives share the assumption that society defines the range of options available to adolescents (either overtly or covertly), they also share an acknowledgement that at least some teens defy those limits and in doing so, affect the larger society. In short, all three agree on a conflict between society’s ability to exert power over teens and teen’s ability to exercise power by choosing to engage in proscribed behaviors, including sexual behaviors. Finally, all three of these previously discussed theoretical perspectives agree that social institutions and social structure are inherently linked to adolescent sexual behaviors, although all three⁴ tend to approach the problem by focusing on individual decision making rather than by ascertaining the degree of influence social structure asserts on those decisions (Goodson et al. 1997).

Power and Empowerment as a Latent Variable

By adopting these shared assumptions, all three perspectives tacitly employ power and adolescent empowerment as a latent variable. When empowerment is introduced into a model, it is usually through psychological facets “with which it is sometimes compared or confused” (Perkins and Zimmerman 1995). Indeed, the concept of empowerment is one for which a single definition has yet to be devised (Perkins and Zimmerman 1995). For the purpose of this research, I adopt the definition offered by Perkins and Zimmerman (1995): “a process by which people gain control over their lives, democratic participation in the life of their community, and a critical understanding of their environment.”⁵ Applying this definition to teens requires that the particular role of adolescents must be acknowledged.

Adolescence is a period in which “people gain control over their lives” as they transition from childhood to adulthood. During this period, two distinct transitions occur. The first is from child to adolescent and the second is from adolescent to adult (McAdams and Olson 2010). During both transitions, changes affecting the adolescent’s “participation in the life of their community and a critical understanding of their environment” occur (McAdams and Olson 2010). During the childhood to adolescent transition, students develop personality traits that tend to be relatively stable throughout life and to develop visions of what the rest of their life will be (Elkind 1981; Habermas and Bluck 2000; McAdams and Olson 2010). Concurrently, levels of self-esteem begin to diverge (McAdams and Olson 2010) possibly due to parental expectations and comparison to others. Most importantly, they begin to align their developing identity with constraints that are socially imposed. McAdams and Olson (2010) explain “they also begin to withdraw investment in goals that seem fruitless—goals for which their own skills and traits, or environmental contingencies and affordances, may be poorly suited.”

As youth make the transition from adolescence to adulthood, these “environmental contingencies and affordances” continue to exert influence. Again citing McAdams and Olson (2010):

“The movement through this developmental period is strongly shaped by class and education. Less-educated, working-class men and women may find it especially difficult to sustain steady and gainful employment during this period. Some get married and/or begin families anyway, but others may drift for many years without the economic security required to become a full stakeholder in society. Those more privileged men and women headed for middle-class professions may require many years of schooling and/or training and a great deal of role experimentation before they feel they are able to settle down and assume the full responsibilities of adulthood.”

Thus, as part of adolescent development, youth become aware of socially-imposed limitations and incorporate those into their own biography and life trajectory in a manner that incorporates both their power as an adolescent and the potential opportunities and levels of power they may one day hold as an adult.

Michel Foucault (1991 [1977]: 26-27) contends that power is a process rather than an asset.⁶ Power, according to Foucault, is present only when it is being exercised (1990 [1978]: 92-92). The exercise of power, in turn, is only possible in opposition to something else (1990 [1982]: 219). Thus, power becomes an active, emergent property. To examine power, Foucault traces the historical development of knowledge (2002 [1972], 1980 [1977]). Forms of knowledge create situations conducive to the exercise of power with different forms of knowledge resulting in and from different types of power (2000 [1972], 1980 [1977], 1990 [1978]).

Foucault identifies four distinct types of power: pastoral power, discipline, bio-power, and governmentality. *Pastoral power* results from the internalization of the role of the pastor, who embodies a specialized knowledge of good and evil (1990 [1982]). Pastoral power was developed through a process in which the scientific categories of humans were created (male and female for example) and the subsequent knowledge of these categories and their positions was first proclaimed and then internalized. *Discipline* results from control of the movement of the body and the time and space in which it is allowed to move. Discipline requires and demonstrates the actor’s knowledge of prescribed movements and constraints on that movement, but also introduces the surveillance by others who monitor disciplined movement, providing societies with the ability to monitor and control individual members and groups of members (1982). Once

internalized, individuals surveil themselves, ensuring a level of obedience without supervision of others. *Bio-power* is the collective strategies and techniques through which the biological functions of the body become incorporated into the political arena (Foucault 1990 [1978]: 104-44; see also Foucault 1980 [1977]: 55-62). Birth, sexuality, death, health and life-span are a few of the examples provided to illustrate that as these functions enter the political arena, specialized knowledges such as demographics, medicine and family sciences give rise to power over not only the individual (as in discipline), but instead over the corporate masses. *Governmentality*, the fourth of Foucault's power types, was introduced in his last lectures, and is thus less robustly described. In this form of power, government appears, both in terms of the government of the self and the government of others (Lemke 2000), what Foucault calls "the art of government" (1997 [1970]: 201). The concept and its relation to power is exemplified by governmental support of neoliberal economic theories, including the dissemination of knowledge that such a system is advantageous and "right," inculcation of citizens into the system, and the interweaving of political and economic systems" (Lemke 2000).

Michel Foucault – Spheres of Power

This complex understanding of power maps the manner in which power is discursively exercised, internalized, and self-imposed on individuals. Power, therefore, is neither held within an individual or a social structure. Instead, it is inherent in knowledge shared by both levels (Appelrouth and Edles 2007). In *Discipline and Punish: The Birth of the Prison* (1990 [1977]) and *The History of Sexuality, Volume 1* (1990 [1978]), Foucault introduces the concept of the *sphere of power*, those areas in which the actor may exercise power. These abstract realms are centered in knowledge that is privileged to members of that arena and power that is reflected in and exercised through discourse, as in psychology's power to define sanity (1978: 21-22). Foucault argues that power/knowledge is internalized, becomes embodied (1978). Even the

subjective self retains power and thus the body itself may be seen as a sphere of power with the subjective self retaining privileged knowledge of the body.

Distribution of Opportunity – Peter M. Blau

The introduction of privileged spheres of power/knowledge and the association of these spheres with distinct social institutions introduces social structure into our discussion. Structure was not a direct focus of Foucault's work (although his work is largely a deconstruction of it) and Foucault does not provide a definition of social structure. Although the concept of structure is central to sociological theory, the definition of structure remains contested with numerous proposed operationalizations and models (Prendergast and Knottnerus 1994). Among the many conceptualizations of structure, Peter M. Blau offers a perspective centered about the distribution social positions (Blau 1977a, 1977b, 1989, 1993, 1994). Blau's macrosociological analysis links the "influences of forms of differentiation in population structures on people's life chances" (1994:1) by considering *population structures* and *opportunity structures*.

The composition of a given population constitutes the population structure and provides opportunities to interact with people who are similar or different based on demographics and proximity (1994). A second structure, the opportunity structure, is the "multidimensional space of social positions among which a population is distributed" (1994:9). The opportunity structure represents a "matrix of life chances" and constrains chances that people will interact (1994: 8). Blau notes that the number of people who aspire to desirable social positions exceeds the number of positions available and therefore excess population must accept less desirable options and thus the opportunity structure is primarily determined by the population structure⁷ (1994: 8).

Blau posits that each individual actor holds a unique social position determined by the intersection of their position on a myriad of axes, each of which represents a characteristic of that individual (1994:4). Their position on each axis brings the actor into contact with others who hold that position or nearby positions and allows actors to differentiate among themselves on the basis

of nearness or distance between themselves and others (1994: 3-4). When correlations among distributions are high, “group boundaries and status distinctions are consolidated,” impeding social mobility (1994: 14).

Blau makes a passing but particularly salient observation about structure, noting that “historical developments that affected the existing population structure resulted from actions of individuals in the past” (1994: 7). Given Blau’s acknowledgement that the population structure exerts tremendous influence on the opportunity structure, we must conclude that the opportunity structure has also “resulted from actions of individuals in the past” and that adolescents enter a society with an opportunity structure that pre-exists and that constrains opportunities for some while enabling opportunities for others. Another way of stating this might be that the pre-existing opportunity structure gives some access to an expanded range of present and potential spheres of power while constraining others to a much more constrained range.

We must also acknowledge that this differentiation does not begin at adulthood, but at birth. Differences in access to cultural and social capital, role models, health care, adequate day care, and educational opportunity reflect the current social structure, and, following Blau, limit life chances and opportunities for interaction and mobility.

Levels of Social Structure

Blau posits that the effects of social dynamics may be measured by contrasting the effects at different levels of social structure (1994: 47-49). He acknowledges multiple levels of social structure ranging from the macro to the micro and the presence of emergent structural properties which extend vertically through all layers. Blau offers examples of such layers and assumes a nested arrangement in which higher layers subsume lower layers; however, he states that macro level structures cannot be construed as the sum of lower levels. Instead, he seeks to compare lower levels in order to measure the degree of penetration of macrostructures (1994: 47-49).

Thus, although Blau identifies macro-level influences as most salient, he is actually investigating micro-macro linkages.

Both Blau and Foucault present a model of structure as an emergent construct resulting from interaction (Blau) or discourse (Foucault). Moreover, both assume that structure is multi-layered and that macro-level forces influence individual behaviors and choices (macro-micro linkages). Individually, both Blau and Foucault can provide insight into the dilemma of adolescent pregnancy; however, either view becomes quickly limited. Blau's empirical studies of comparative interactions might give us insight into local differences that reflect overarching structural influences but cannot provide information about individual decision-making or policy and program formation. Foucault can provide rich insight into the influence of society on individual decision-making, but provides neither an articulated definition of structure nor a means of utilizing empirical demographic trends. The complexity of adolescent sexual behaviors and decision-making and the magnitude of the social and personal consequences of adolescent pregnancy demand that any comprehensive approach provide the differing aspects of micro-macro linkages understandable and usable only through a synthesis of the works of these two theorists.

Theory of Embodied Spheres of Power

If we accept Blau's contention that social structure is a distribution of opportunities, we must articulate what those opportunities are. Although opportunity is central to Blau's definition of social structure, he uncharacteristically fails to define opportunity and appears to use it in two distinct ways. The first is as a synonym for "chance" as seen in "proximity influences the choices of associates if there is contact opportunity" (1994: 30). The second appears to be associated with mobility, as in this sentence: "The same occupation may be looked upon as a great opportunity by some persons and as a misfortune by others, depending partly on whether it represents an improvement given their socioeconomic background or the opposite, and partly on personal and

other considerations” (1994: 90). Blau’s theory incorporates both uses, with contact opportunities (chance via population distribution) associated with expanded or constrained opportunities (mobility via social distribution).

Opportunity in this latter example is repeatedly equated with equality or inequality in Blau’s thesis (see Blau 1994: 118), and should be interpreted as incorporating not only economic or social mobility, but also the associated increase or decrease of individual power. *Expanded opportunity* thus must be interpreted as a wider range of options through which power may be exercised and *limited opportunity* interpreted as a constrained range of options through which power may be exercised. Restated, expanded opportunity must be interpreted as a wider range of spheres of power in which the actor might operate, while limited opportunity must be interpreted as a constrained range of spheres of power.

As this research is limited to adolescent behavior, it must be noted that adolescents share a range of spheres of power that is constrained by their non-adult status. However, if we recall that adolescents create visions of their future life, adjust their self-esteem through comparison to others, and begin to select out goals that are unlikely to be fruitful given their own traits or “environmental contingencies,” it is unlikely that all adolescents share the same age-related constraints. Instead, adolescent research indicates that some adolescents recognize that their range of spheres of power will always be limited while others recognize that adulthood will provide them access to a broad range of spheres of power (see McAdams and Olson 2010). Thus, for adolescents, expanded opportunity must be interpreted as a wider range of spheres of power in which the actor operates *now or in the future*, while limited opportunity must be interpreted as a constrained range of spheres of power *now or in the future*.

Regardless of the range of spheres, power remains an ever present potentiality. As something that cannot be accrued or saved, neither can it be stripped from the individual. Rather, the spheres in which it can be exercised may be constrained or expanded.⁸ Thus although

adolescent actors have before them different ranges of current or potential spheres of power, they do not have different amounts of potential power.

Those adolescents who enjoy an expanded range of spheres of power may exercise their power in any of those spheres; however the laws of probability predict that the chances they will exercise in any one sphere is reduced as the range of spheres is increased. Adolescents with a constrained range of spheres can only exercise power in the limited range of permitted spheres. As the range is more constrained, any exercised power must occur within a more limited range of options and thus the likelihood that power will be exercised within any permitted sphere is increased. The body is a sphere of power which cannot be separated from the actor and is available to all adolescents. Thus, as the range of spheres of power is constrained among some adolescents, the likelihood that power will be exercised within that sphere is increased.

Seen through this lens, adolescent sexual behaviors must be seen as an exercise of power with those who are most empowered (now or in the future) less likely to exercise power in that realm. Conversely, those who are least empowered (now or in the future) are more likely to exercise power that is embodied, such as sexual behavior.

If we accept this theory as true, we would expect that factors associated with adolescent sexuality occur not only at the individual level, but will also be found at higher layers of social structure. As the school is a social institution, we would expect to find the larger social structure replicated in and reinforced through the school and thus the range of spheres of power and the incumbent likelihood of exercising embodied power will be associated not only with individual actors, but will also be associated with structurally-created clusters, such as schools.

The goal of this research is to investigate the effect of schools (as a representative of social structure) on adolescent sexual behavior (debut and pregnancy), using the Theory of Embodied Spheres of Power to structure the research. In the next chapter I will introduce the

means by which this investigation will take place, including the hypotheses I will test, the data source I will use, and the analytic models that will be utilized.

END NOTES

1. Pregnancy was not measured.
2. Research has been quite consistent in finding that this is not the case; however, the debate over abstinence v. comprehensive education is beyond the scope of this paper.
3. This is not to imply that resilience research does not move beyond the traditional family to research into resilience in non-traditional family forms. For an example, see Litovich and Langhout 2004.
4. Although the adaptive framework explicitly acknowledges social influences and is used as a basis for proposed policy change, they advocate that adolescent decisions are rational, thereby continuing a focus on individual decision and choice.
5. In devising this definition, Perkins and Zimmerman cite Rappaport 1987 and Zimmerman, Israel, Schulz and Checkoway 1992.
6. Specifically, Foucault defines power as follows: "Now, the study of this micro-physics presupposes that the power exercised on the body is conceived not as a property, but as a strategy, that its effects of domination are attributed not to 'appropriation', but to dispositions, manoeuvres, tactics, techniques, functionings; that one should decipher in it a network of relations, constantly in tension, in activity, rather than a privilege that one might possess; that one should take as its model a perpetual battle rather than a contract regulating a transaction or the conquest of a territory. In short this power is exercised rather than possessed; it is not the 'privilege', acquired or preserved, of the dominant class, but the overall effect of its strategic positions – an effect that is manifested and sometimes extended by the position of those who are dominated. Furthermore, this power is not exercised simply as an obligation or a prohibition on those who 'do not have it'; it invests them, is transmitted by them and through them; it exerts pressure upon them, just as they themselves, in their struggle against it, resist the grip it has on them."
7. Blau acknowledges that agency, culture, and other factors must also be considered, but his focus is on structure. I reflect his acknowledgement by stating that the opportunity structure is "primarily" determined by the population structure and thus leaving open the opportunity for other influences.
8. This is not to imply that constraints or expansions are imposed on the individual. Indeed, Foucault (1978) insists that the individual actor internalizes and reproduces limitations and opportunities and self-surveils to ensure that limitations are not breached. Similarly, in one of the few acknowledgements of agency he provides Blau notes that people choose to socialize and link to others who are much like themselves (1994: 4).

CHAPTER III

DATA AND METHODS

Having introduced my topic, reviewed existing literature and proposed a theoretical basis, I will now outline my data and research methods. This research will use data from the National Longitudinal Study of Adolescent Health (Add Health) to contrast individual and school-level influences on sexual debut and teen pregnancy. Add Health provides data for an extremely broad range of variables and, as described earlier, hundreds of potential variables have been implicated in previous research, so I will describe how my models were derived and the analytical methods used.

My theoretical approach informs my data analysis and research methods by utilizing variables from both the individual and school level that might be associated with empowerment and/or access to an expanded or constrained range of spheres of power. Additionally, as both Blau and Foucault advise, I focus on the link between individual decisions and higher levels of social structure and the effect of structure on individual behaviors.

DATA

I begin with a general description of the data set used followed by the characteristics of this data set that make it useful to this research. I end with a more detailed description of the sampling strategy and study waves.

Add Health Purpose and Usefulness

This research uses data from the National Longitudinal Study of Adolescent Health (Add Health),¹ a study of a representative sample of U.S. youth who were in grades 7-12 in 1994-95 funded by 24 government agencies and private foundations.² Add Health was mandated by the

U.S. Congress through the National Institute of Child Health and Human Development (NICHD) as an effort to identify and measure factors associated with adolescent health (Udry 1998). Led by J. Richard Udry, the Add Health team began with the assumption that differences in health behaviors could be traced to three sources: (1) social environments “conceptualized at many levels of aggregation from the family to the community”; (2) health-related behaviors broadly defined to include “intelligence, predispositions, personality, skills, and physical characteristics”; and (3) vulnerabilities and strengths, defined as “robustness and degree of susceptibility, which can originate in differing experiences or genetic endowment” (Udry 1998). Using these broad conceptualizations, data represents a broad range of interests, including physical, psychological, time-use, romantic relationships, friendship networks, education, religious, and family variables. To date, more than 3,500 research publications are based on Add Health data.

Add Health data has several strengths that make it ideal for this study. The data set includes information on a number of sexual or sex-related behaviors,³ but also includes information on behaviors that previous research has identified as predictive of sexual behaviors (see Udry 1998). The longitudinal nature of the data allows me to measure change across time, and use Wave 1 variables to predict Wave 2 effects (Allison 1984).

Add Health also features the number of subjects and data at the individual and school levels necessary for multi-level analysis. At its broadest, Add Health offers data from 90,118 students. Administrator surveys from 164 included schools provide information about the school program and organization, faculty, and student body that can be associated with each individual. Thus Add Health provides individual data that is nested within schools, provides data for schools, and provides a sufficient number of cases at each level for regression analysis.

Finally, Add Health provides an opportunity to build on this research, expanding the research to incorporate the effects of teen pregnancy at later stages of life (through later waves),

the inclusion of other sexual behaviors such as contraceptive use, or the exploration of other aspects of social structure, such as region.

Sampling

Schools were selected from a stratified, random sample of all U.S. high schools with a minimum of 30 students and an 11th grade. If the school did not include 7th grade, a feeder school was identified and included. Schools were stratified into 80 clusters representing region, urbanicity, school size, school type, percent white, percent black, grade span and curriculum (Add Health n.d.).

From these schools, 90,118 students completed in-school surveys between September, 1994 and April 1995. Administrators at the 164 schools completed mail questionnaires during the same time period. In Stage 2 of the first wave, 27,000 adolescents were selected as a sample base for in-home interviews using computer-assisted personal interview (CAPI) and audio computer-assisted self interview (ACASI) protocols for more sensitive questions. The core sample of in-home interviews was drawn from those who had completed earlier in-school surveys; however, when necessary for oversampling of special populations, individuals from the same communities who did not complete in-school surveys were recruited. Special populations included disabled students, black students from well-educated families, Chinese, Cuban and Puerto Rican students and siblings representing twin, full sibling, half-sibling, non-related adolescents sharing a household, and siblings of twins relationships. Sixteen schools were identified for saturation sampling. 20,745 interviews were completed. In addition 17,669 parents completed parent specific components and 17,713 completed child specific components between April 1995 and December 1995 (Add Health n.d.).

In Wave II, the majority of respondents who were in 12th grade in Wave 1 were not included,⁴ and the disabled student sampling was not continued. Sample sizes were maintained by adding a “small number of adolescents who did not participate in the first wave” and no parent

interviews were conducted. A total of 14,738 in-home interviews were completed in Wave II (between April and August 1996) and 128 follow-up school-administrator questionnaires were collected.

Although this data is approximately fifteen years old, it provides a depth of information and robust sampling that is difficult to replicate and researchers continue to rely on Add Health data. Even so, several social changes occurring during the intervening years should be considered. The first is a change in the teen birth rate trends occurring about ten years after Add Health data was collected. Between the years of 2005 and 2009, the teen birth rate, which had been declining, remained fairly static (Abma, Martinez and Copen 2010). Similar patterns were found in teen pregnancy and abortion rates (Guttmacher 2010).

The second change is the reduction of public concern over HIV/AIDS. Add Health data was collected from students who came of age during a public panic over the disease. Public concern resulted in public school programs addressing HIV/AIDS prevention, even among elementary students, television commercials about the use of condoms, and (indirectly) the growth of the Gay Rights Movement (Kaiser Family Foundation 2011).

A third change in the intervening years regards changes to the American educational system. Funding for comprehensive sex education has been compromised by burgeoning funding availability and state mandates for abstinence education (Advocates for Youth 2007). These have occurred alongside educational programs that rely on mandated testing such as No Child Left Behind. Such programs target schools with low test scores, making faculty vulnerable to firings and schools subject to state takeover (see U.S. Department of Education).

Finally, the recent economic recession has been associated with changes in adult reproductive behaviors (Guttmacher 2009). Although I am unaware of any research linking the recession to changes in teen behaviors, the possibility for such an effect must be acknowledged. It must also be acknowledged that all these effects are structural.

Sexual Debut Analysis

In this section I will discuss the sample and variables used in the first set of analyses. These analyses investigated the effects of antecedents to sexual debut at the individual and school levels. The analytic method will be discussed later in this chapter. Every independent variable was taken from the Wave 1 data, whereas the dependent variable (debut) was taken from the Wave 2 data in order to establish the causal direction of the relationships.

Sample Restrictions

As discussed earlier, the first stage of Wave 1 resulted in data from over 90,000 in-school surveys. Preliminary analysis indicated a high frequency of missing data in response to survey questions. There was much less missing data in in-home interviews and either sample set would result in a similar number of cases in the subject pool. Previous research indicates that data collected through CAPI or other computer-assisted methods is more reliable than data collected through surveys, and I assume this is very likely in questions regarding adolescent sexual behavior. Therefore, the data pool was limited to those students (both male and female) who completed in-home interviews in Waves 1 and 2.

To maintain the temporal order necessary to establish a causal relationship, students who reported sexual debut before Wave 1 were dropped from the sample. A small number of cases reported no debut in Wave 1 but, in Wave 2, reported a date that preceded Wave 1. It was impossible to determine if this was the result of inaccurate response at Wave 1 or error in memory at Wave 2. To address these inconsistencies, those cases in which the time difference was less than six months, the subject was retained. Subjects reporting differences of six months or more were removed from the sample pool.

Age Groups

Subjects were initially placed in 11 stages, each representing a six-month age span (younger than 14, 14-14.5, 14.5-15, 15-15.5, 15.5-16, 16-16.5, 16.5-17, 17-17.5, 17.5-18, 18-18.5, 18.5 or older). Each subject provided an observation for each age group they progressed through between Wave 1 and Wave 2. However, once a student experiences sexual debut in a given age group, that student is not included in subsequent age groups because one can only experience sexual debut once.

Preliminary analyses indicated that behaviors among older teens differed from those of younger teens, and subjects were split into two groups. This is somewhat different from other research. CDC analysis recognizes three age groups. Youngest teens are those under the age of 15. Young teens are aged 15 through 17 and older teens are 17 to 19. Although these are replicated in other research (for example, select Add Health questions are only asked of subjects over the age of 15), I found no theoretical basis for division at those ages.

Instead, I separated the sample into two groups with the division at age 16. Separating groups at the age of 16 reflects the symbolic significance American culture attaches to that birthday. Sixteen is viewed as a point of disembarkation: the point at which childhood is clearly in the past and adulthood is approaching (Danesi 1994). As a result, many state laws concerning age of sexual consent (Drobac 2011), driving privileges (dmv.org n.d.), and employment (U.S. Dept. of Labor n.d.) reflect this cultural recognition of emerging adulthood by granting increased rights upon the 16th birthday.

The ritual of mandated school testing is also associated with demographic changes that appear at about the age of 16. Students who perform poorly on required tests in eighth grade are more likely to drop out of school in 10th grade (the grade in which students are most likely to turn sixteen), potentially at the encouragement of the school (Amrein and Berliner 2002; Clarke, Haney and Madaus 2000; Shriberg and Shriberg 2006).

Finally, the tipping point at which more than half of all U.S. teens have experienced sexual debut occurs after the 16th but before the 17th birthday (Cavazos-Rehg et al. 2009). In combination, these factors indicate that the behavior of and spheres of power available to teens over the age of 16 differ substantially from those of younger teens.

Missing Data and Sample Sizes

I handled missing data using casewise deletion at both the individual and school level. When indices were used, Chronbach's alphas were calculated. When alphas did not indicate that the index was reliable, selected questions were entered as separate independent variables.

A total of 15,448 observations resulted, with 8,331 observations among teens under the age of 16 and 7,117 observations among teens 16 or older. Schools that did not have any students in either of the age groups used were deleted from the analysis of that age group. As a result, 120 schools were included in the analysis of teens under the age of 16; 109 were included in those 16 or older. Students who reported being married in either wave or who reported debut before Wave 1 were excluded from the analysis.

Dependent Variable

The first dependent variable in this research is sexual debut. *Debut* was defined as first sexual intercourse experienced between Wave 1 and Wave 2. A single question asked at both waves was used: "Have you ever had sexual intercourse? When we say sexual intercourse, we mean when a male inserts his penis into a female's vagina." This question refines the standard question asked in research such as the National Youth Risk Behavior Surveillance System, "have you ever had sexual intercourse" (Centers for Disease Control 2011). This operationalization excludes same-sex contact, oral or anal sex, or other alternatives. It also does not distinguish between consensual and nonconsensual sex. The refined question used in Add Health has been subsequently adopted by other researchers (see McKee and Fletcher 2006).

Independent Variables

The large number of factors associated with adolescent sexual debut and pregnancy in earlier research and the broad range of data collected through Add Health required a high degree of selectivity in choosing variables, particularly at the individual level. To make the process as scientifically sound as possible, I began with the matrix of research offered by Kirby and Lepore (2007). Within this matrix, previous research into adolescent sexual behavior is cross-classified by independent variables considered and outcome variables including debut and pregnancy. Listings also identify each finding as risk (increasing chances of the dependent variable), protective (reducing chances of the dependent variable) or non-significant. If the number of risk or protective findings for any variable exceeded the number of findings in the opposing category plus the number of not significant findings, that variable was considered for inclusion. Due to the limits of this research, variables representing levels of analysis other than individual and school were dropped from the possible model.⁵ Theoretically implied variables were identified and included for consideration, regardless of previous research findings. Finally, these were compared to information available through Add Health data and a model was selected that represents both previous research and theoretical implications.

Level 1 Substantive Variables

As a result of the process described above, 24 substantive Level 1 variables were selected. Among the individual-level variables are nine indices (religiosity, depression, substance use, risk behaviors, connectedness to school, self-perception, time with mother and time with father, and negative parental attitudes toward adolescent sex). Thirteen variables were selected from proposed indices that failed to display acceptable Chronbach's alphas (skipped school, suspended, expelled, last English grade, last Math grade, desire to go to college, likelihood of going to college, likelihood of living to 35, likelihood of being killed by 21, likelihood of

catching HIV/AIDS, s. determines time home on weekends, s. determines who to hang out with and s. determines what to wear). Two additional variables (logged weekly respondent income and having had sex education) were also introduced. In this section I will briefly describe the coding of each Level 1 substantive variable and how it relates to my theoretical basis, beginning with indices, then variables from failed indices, and finally remaining independent variables.

Indices

Nine indices were constructed using series of Add Health questions. All questions used in these indices are listed in Appendix A. In the following section, I will discuss how each of these indices were compiled and how data was cleaned. All indices were confirmed using Chronbach's alphas, (Table 3.1). Descriptive statistics are listed in the next two chapters.

Table 3.1: Chronbach's Alphas for Included Indices

Index	Multilevel Discrete Time Hazard Analysis		Sequential Logit Analysis
	Under the Age of 16	16 or Older	
Religiosity	.72	.72	.75
Depression	.83	.85	.86
Self-perception	.85	.85	.85
Substance Use	.60	.59	.63
Risk Behaviors	.79	.73	.78
Connectedness to School	.75	.72	.75
Activities with Mother	.56	.55	.56
Activities with Father	.70	.68	.61
Negative Parental Attitudes toward Adolescent Sex	.77	.78	.74

Religiosity. The first index, religiosity, was indicated by previous findings that perceived importance of religion, frequency of prayer, and more frequent church attendance are protective factors (see Nonnemaker et al. 2003; Kirby and Lepore 2007). It is also also central to conservative assertions that religiosity empowers teens to “say no to sex” (Clapp 2006) or feminist critiques that organized religion disempowers girls and makes them subject to patriarchal

supervision (Greslé-Favier 2009). The index was compiled from four Add Health questions (Appendix A). All items were reverse coded and totaled, so higher values indicate higher levels of religiosity. Although some research indicates denomination impacts sexual behaviors (see Brewster et al. 1998; Lundberg and Plotnick 1995; Mauldon and Luker 1996), these were not considered in the Add Health study design and representative samples of given denominations cannot be assured, so no questions addressing denomination were used. As with all indices, separate Chronbach's alphas were calculated for each age group (Table 3.1)).

Depression and Self-perception. Depression has been inconsistently associated with adolescent sexual behaviors (see Kowaleski-Jones and Mott 1998; Lehrer Shrier, Gortmaker, and Buka 2006; Kirby and Lepore 2007). It also appears that factors influencing depression may be associated with empowerment. For example, the current online version of the American Psychological Association's *Diagnostic and Statistical Manual* notes that depression is influenced by both physical and social factors, including "lack of a support system, stress, illness in self or loved one, legal difficulties, financial struggles, and job problems" (Heffner n.d.). To measure the effects of depression, 18 of the 19 items in the Add Health Feelings Scale were used (Appendix A). One item, "you felt that you were too tired to do things" would inaccurately bias the result for students who held jobs, had children, or had other nonacademic demands and was not used. Four items were reverse coded (see Appendix A) and results for each item were totaled, with higher totals indicating greater evidence of depression.

Along with depression, several related psychological concepts have been inconsistently associated with teen sexual behavior.⁶ These include self-esteem, self-image, and self-concept (see Miller et al. 2000; Kirby and Lepore 2007; Plotnick and Butler 1991). I assume that, as images of the self and the value of the self, these constructs will reflect some degree of the actor's perceived social role and future opportunities. This links these constructs directly with empowerment. A series of seven questions were included in the scale (Appendix A). Answers

reflected strength of positive feelings, using a 5-point Likert-type scale (1=strongly agree, 3=neither agree nor disagree, 5=strongly disagree). All were reverse coded, resulting in higher scores reflecting stronger positive perceptions of the self. Chronbach's alphas indicated these could be collapsed into a single score (Table 3.1).

Substance Use and Risk Behaviors. Sexual behavior is frequently associated with a range of delinquent behaviors including substance use (see Chapter 2). In the previous chapter, I posited that sexual behavior is an exercise of embodied power. Substance use is an associated behavior that is also embodied and so may be more closely associated with sexual behaviors than are other, less embodied forms of deviance. To test this, I created separate indices of substance use and other risk behaviors. If embodiment is a factor, the correlation between sexual behaviors and substance use can be predicted to be higher than the correlation between sexual activities and other risk behaviors.⁷

One challenge was to identify parallel data regarding the six substances addressed in Add Health interviews (tobacco, alcohol, marijuana, cocaine, inhalants and other drugs). Although a series of questions were asked for more commonly used substances (alcohol, tobacco, and marijuana), the only data that could be consistently accessed for all substances was whether or not the student had ever used each substance, so I used different questions to create binary variables for each substance (Appendix A) that were totaled so that higher values indicate a wider range of substances used, but not the frequency or length of use.

I also had to operationalize what would be considered "use" of two variables. Tobacco use was defined as smoking at least one cigarette, so that options included the phrase "even just 1 or 2 puffs" were not used. Alcohol was operationalized as drinking (as opposed to taking a sip of someone else's drink) but was not limited to drinking when no adults were present.

Measures of other risk behaviors reflected frequency as well as whether or not the respondent had ever engaged in that activity. Fourteen risk behaviors were measured (see

Appendix B) and results were totaled so that higher results indicate greater participation in delinquent behaviors, both in terms of frequency and in the number of behaviors in which the actor had participated. Chronbach's alphas for both variables indicated they could be collapsed (Table 3.1).

Connectedness to School. The influence of schools is central to this research and one aspect indicated by previous research is connectedness to school, which has been shown to inhibit debut. If, as I proposed in the previous chapters, schools move some groups of teens toward success (expanded opportunities) but funnel other groups of teens toward failure, removal from the educational system, and/or incarceration (constrained opportunities), we should expect greater connectedness among those with more opportunities. As I predict that those with fewer opportunities are more likely to exercise in embodied power via sex, the correlation between connectedness to school and sexual behaviors should be strong.

The Add Health survey does not include a scale specifically measuring connectedness to school, but does ask a series of questions about the respondent's school experiences. Five of these questions were selected as likely to reflect connectedness. A single question asked during a different portion of the interview addressed student/teacher relations. All identified questions featured the same number of options and similar scales, so this question was added to the scale. One question was reverse-coded (see Appendix A for questions and reversal). Chronbach's alphas were calculated and indicated that these items were sufficiently correlated and could be collapsed into a single measure (See Chapters 4 and 5). Chronbach's alphas were calculated and indicated that these items could be collapsed into a single measure (Table 3.1).

Family Influences – Activities with Parents and Parental Attitudes. The final indices were the only measures of family influences. Although a wide range of family issues have been investigated and many have been consistently associated with teen sexual behavior (see Kirby

and Lepore 2007), family composition, dynamics, parental histories, etc. are beyond the scope of this research and might reflect a factor that is not strictly at the individual level.

One aspect of family that reflects some degree of actor agency (and therefore is more firmly an individual characteristic) is activities with parents. To allow for single parent families, parallel scores for activities with mother and activities with father were calculated. Each score is based on two Add Health questions in which a series of activities were presented and students identified those activities they and their mother or father had engaged in together during the past month. A binary variable was created for each activity and a total number of reported activities with each parent was calculated. Students were allowed to refer to a mother-figure or father-figure such as step-parent, foster parent, or “other” and no adjustments for these substitutions was made.

Family influences are also reflected in the final index, negative parental attitudes toward adolescent sex. To be more precise, these are student perceptions of their parents’ attitudes, and thus are also clearly individual-level variables. This has been identified as protective against debut but is not influential in regard to pregnancy (see Dittus and Jaccard 2000; Kirby and Lepore 2007; Miller et al. 2000).

Add Health includes a series of questions regarding parental attitudes toward adolescent sex and the entire set of six questions was used. Three questions address mother’s attitudes and three address father’s attitudes; however, I combined these to derive an overall measure of parental attitudes. To adjust for single parent families, I assumed that if a parent is involved in the student life, questions referencing that parent would be answered regardless of the parents’ marital status. I further assumed that if the student failed to answer questions about one parent, that parent was largely or totally absent from the student’s life. Finally, I assumed that in such cases, the attitudes of the present parent would be as influential as the shared influence of two parents. When students who provided information for only one parent (whether this was a biological parent or other parent-figure), those responses were also entered for the missing parent.

Variables Taken from Failed Indices.

Four additional indices were tested, but failed to show Chronbach's alphas sufficient to indicate a single measure was appropriate. Selected elements of these indices were introduced as independent variables, as described below. Questions used in failed indices are presented in Appendix B.

School Non-attendance. School attendance has been inconsistently associated with sexual behavior (see Hellerstedt Peterson-Hickey, Rhodes and Garwick 2006; Kaplan, Erickson and Juarez-Reyes 2002; Kirby and Lepore 2007). However, several factors make school attendance important to this research. As described in the previous chapter, those who are least empowered have been associated with school processes that remove them from the classroom. Being enrolled in school, connectedness to school, and better educational performance have been identified as protective factors (Kirby and Lepore 2007) that are less likely if attendance is compromised, including those instances in which attendance was compromised through processes associated with the school-to-prison pipeline. Based on this, I created a scale reflecting whether or not the student had ever skipped classes, been suspended, or been expelled (Appendix B). When the alpha failed to display a sufficient correlation, each of these was entered separately.

School Success. Another aspect of school success is grade point average. Add Health collects grades for four subjects: English, Math, Social Studies, and Science (Appendix B). These failed to reach sufficient levels of reliability; however the questions asked referenced the most recent grading period and a large amount of missing data was found, presumably due to students who had not taken those classes during the referenced period. The two variables with the most complete data, English and Math grades, were entered as separate variables.

Perception of the Future. Personal expectations were addressed through five Add Health questions (Appendix B). Perceived opportunity (the expanded or constrained range of present or potential spheres of power available to an actor) should be indicated by these questions and thus they should be strongly correlated with sexual behaviors. One item from the Add Health series (What do you think the chances are that you will be married by age 25?) was omitted because it was impossible to characterize this as a positive or negative outlook. When correlations were too low for use as a single scale, remaining items were entered as separate independent variables. Since these were separate variables rather than an index, an additional question (On a scale of 1 to 5, where 1 is low and 5 is high, how much do you want to go to college?) was also added. This will provide contrasting measures between desire to attend college and likelihood of being able to do so, which might provide insight into the effect of constrained spheres of power.

Self-determination. The final failed scale measured respondent self-determination, taken from questions about parent/respondent relationships. Add Health features a list of seven questions that delimit decisions parents allow the student to make for themselves (Appendix B). When Chronbach's alphas were too low for collapsing into a single measure, I selected three of the seven variables (choosing own time home on weekends, who to hang out with, what to wear) based on previous research that links lower levels of parental supervision, peer influence, and an older appearance with increased risk of debut and pregnancy (see Kirby and Lepore 2007). Each was coded as a binary variable representing student ability to make the decision.

Other Substantive Independent Variables.

Only two other variables were introduced, the first of which is having had sex education⁸ and the second reflects student income.

Sex Education. I constructed a binary variable based on the question “This set of questions are about whether the schools you’ve attended have covered certain health and safety topics during classes. Please tell me whether you have learned about each of the following things in a class at school: (option 7) Pregnancy.” This provides a measure of the dominant strategy employed in the United States delivered via schools. Note that other aspects of sex education (HIV/AIDS, STD contraction, etc.) are not reflected in this variable, nor does it reflect whether abstinence, comprehensive, or something between the two was presented. Thus the interpretation of this variable is limited to whether or not the subject has been taught about pregnancy.

Student Income. The second represents respondent income for student income, using the open-ended question “How much money do you earn in a typical non-summer week from all your jobs combined?” Respondents who had answered that they did not have a job in the previous question were recoded from legitimate skip to \$0 in earnings. Results were recoded ($x = x+1$) to avoid the undefined log of zero and results were log-transformed to account for positive skew in the income distribution.

Level 1 Control Variables

Three Level 1 control variables were introduced: gender, nativity, and race. Gender was a binary variable based on interviewer observation and (if necessary) confirmation: “Interviewer, please confirm that R’s sex is (male) female. (Ask if necessary).” Original coding was male=1, female=2 which was recoded to male=0 female=1, allowing me to control for being female.

Nativity was a binary variable based on a single item: “Were you born on the United States?” (0=no, 1=yes) that was recoded to indicate foreign birth (0=native born, 1=foreign born).

Race was identified through a series of questions. The first is “What is your race?” with white, black/African American, Alaskan Native/American Indian, Asian/Pacific Islander, and other as options. Due to the low number of responses, Alaskan Native/American Indian was

recoded as other. Each racial group was created as a binary variable, with 1=identified that race and 0=did not identify that race. An additional binary variable was based on the question, “Are you of Hispanic or Latino origin?”. If a respondent indicated Hispanic origin in the latter question, their answer to the former question was recoded to 0. In analysis, white served as the reference group. After recoding, I include the following race/ethnicity binary variables: non-Hispanic white (reference), non-Hispanic black, non-Hispanic Asian, Hispanic, and other race.

Level 2 Substantive Variables

In this section I will describe Level 2 variables and coding. Level 2 represents school-level variables, with students nested within schools. Fifteen Level 2 substantive variables were introduced into the model with data taken from Wave 1 school administrator surveys, (with five exceptions to be discussed below). As in individual-level data, missing data resulted in case-wise deletion

School Organization: Grades, Type and Size.

The first set of Level 2 variables reflects the school’s organization and setting (number of grades in the school, type of school, average class size and school size). The number of grades in the school is based on the question “Check each grade level included in your school. (If your school is ungraded, check the grade levels that are comparable to the levels taught in your school.)” Sixteen options are offered: Prekindergarden, kindergarden, grades 1-13, and 13+. Positive responses were counted, providing a total number of grades offered by each school.⁹ To date, no research on teen sexual behavior using this variable has been conducted; however, two aspects of previous literature make it of interest. The first is that students who are in a romantic relationship with an older partner are more likely to engage in sexual behaviors (Darroch, Landry and Oslak 1999; Kaestle, Morisky and Wiley 2002; Kirby and Lepore 2007; Marin, Coyle, Gómez and Corvajol 2000). Schools with a wider range of grades are expected to provide access

across a wider range of ages and may thus facilitate these relationships. A second indication is that schools including a wider range of grades are assumed to occur more frequently in rural areas where (1) pregnancy rates are high and (2) funding and educational opportunities may be limited (Dayton 1998; Rural Adolescent Pregnancy Project 1996).

School type (public, private religious or private nonreligious) was based on a variable created by the Add Health team which identified all schools as either public (=1) or private (=2). A second question, “Which of these characterize your school? Mark all that apply. (Circle one answer on each line)” includes an option “Private school, no religious affiliations.” Any school labeled as private in the original question that selected the “private school, no religious affiliations” option was recoded in the original question as private nonreligious (=3). The original option was then recoded into three binary variables representing public, private religious and private nonreligious. If my theory holds, those in private nonreligious schools (which are likely to represent class distinctions and a wide range of opportunity) will be less likely to be engaging in sexual behaviors than those in public or private religious schools. Private religious served as the reference group in all analyses.

Average class size was determined by using the open-ended question “What is the average class size in your school (not counting study hall, band, etc.)?” School size was provided by an Add Health created variable. Schools were identified as small if they 400 or fewer students, medium if they 401-1000 students, and large if they had 1001 or more students. Medium schools served as the reference. Bickel, Weaver, Williams and Lange (1997) established that larger schools increase risk of pregnancy; moreover, “quality” schools are frequently identified by exclusivity and low student/teacher ratios. If my theory holds true, we should expect to find higher class sizes and larger schools among groups with fewer opportunities, and thus higher rates of debut and pregnancy.

Student Body and Faculty Composition

The second group of Level 2 variables represents the composition of the student body and faculty. Very little research on the effects composition of the faculty or student body has been completed (for exceptions see Manlove 1998; Rosenbaum and Kandel 1990); however, research on community level variables indicate the gender and race proportions do impact teen sexual behaviors (see Ku, Sonenstein and Pleck 1993). These variables provide a more accurate picture at the school level without conflating community and school.

Variables in this category include the proportion of the student body that is female, proportion of the student body that is black and proportion black squared. Proportion female and proportion black were created by aggregating individual-level binary data (female and black) and calculating the mean for each school. The result is a mean somewhere between 1 and 0 with, with 1 indicating all female or all black. In the case of racial composition, I included proportion black and proportion black squared to test for nonlinear relationships.

Additional measures of the school faculty were created, measuring the percent of teachers who are black, female or hold an advanced degree. There is a large body of research on the effects of teacher characteristics (particularly race and gender) on student success. Recently schools have emphasized hiring teachers who can serve as role models for male and minority students (Dee 2005). Despite some evidence of student success, these trends have organized faculty in a hierarchy along race and gender lines, reifying those forces (Dee 2005; Sevier and Ashcroft 2007). The result is that schools remain reflective of social structure, with those with greater opportunity having access to the most qualified teachers and those whose opportunities are limited increasingly likely to have teachers who share reified characteristics. Data for these questions came from single-items in the Wave 1 administrator survey. Percent of teachers who are black was determined by using the question: "Approximately what percentage of your full-time classroom teachers are of each of the following races?" and the option "Black or African American." Percent of teachers who are female was taken from the question: "Approximately

what percentage of your full-time classroom teachers are women?” Percent of teachers with master’s degree or higher was based on “Approximately what percentage of your full-time classroom teachers hold Master’s degrees or higher?” Aside from case-wise deletion, no recoding of this data was necessary.

Academic Success: Dropout Rates and Testing Performance

As noted earlier, school success has been associated with sexual behavior at the individual level, but higher average educational level have also been associated at the community and state levels (Brewster et al. 1993; Kirby, Coyle and Gould 2001; Liao, Wang and Laymon 1999). To test the effect of school success at the school level, I considered average dropout rates and the percent of students testing at or above grade level. Administrators were asked to provide the dropout rate for each grade through the question: “On average, what percentage of the students in each grade, who were enrolled in your school at the beginning of the school year in 1993, dropped out of school before the end of the school year?” Administrators were instructed not to include students who transferred to another school or who were expelled. They were also instructed to provide an estimate if an exact count was not available. Although data was collected for all grades, I limited the variable to 7th grade or higher. Rates for all grades (above 6th) were totaled and divided by the number of grades 7 or above offered at that school.

In Add Health data, the percent of students testing at or above grade level was assessed using three variables collected through a single question: “According to standardized achievement tests, approximately what percentage of all students at this school are testing: at grade level, one or more grades below level and one or more grades above grade level.” The percent testing at grade level and the percent testing above grade level were totaled, providing the variable used.

Sex Education and Health Programs

Finally, I assessed the influence of current programs addressing teen sexual behavior by creating a binary reflecting whether or not the school offers sex education and the number of sex or health related programs offered through the school. Sex education was assessed using the question “Does your school offer sex education, or family life education, or education about human sexuality and/or AIDS or other sexually transmitted diseases?” Those who answered “yes” were coded as 1.

The number of sex or health related programs was assessed using a series of questions, sharing the stem: For each of the following health-related services, please indicate whether it is provided at your school, is provided by your school district but not at your school, referred to other providers, or neither provided nor referred. (If a service is not applicable to your student body—for example, prenatal/postpartum health care—indicate that it is “neither provided nor referred.”) Services listed included athletic physical, non-athletic physical, treatment for minor illnesses and injuries, diagnostic screening (e.g., sickle cell anemia, sexually transmitted diseases), treatment for sexually transmitted diseases, immunizations, family planning counseling, family planning services, prenatal/postpartum health care, drug awareness and resistance education program, drug abuse program, nutrition/weight loss program, emotional counseling, rape counseling program, physical violence program (e.g., family violence, partner abuse), day care for children of currently enrolled students, and physical fitness/recreation center. For each service, administrators were asked to identify them as provided on school premises, by district at another school, referred to other providers, or as neither provided or referred.

Each service was listed as a separate variable. Each service variable was recoded to reflect whether or not it was offered in any way (neither provided or offered = 0, else = 1). A Chronbach’s alpha was calculated, indicating that a single scale was appropriate. Binary variables were totaled, providing a scale from 0 to 17 representing the number of services offered.

Level 2 Control Variables

To isolate the effect of substantive variables, three Level 2 control variables were introduced into the model: setting, region, and average household income. Setting was taken from a set of dummy variables constructed by the Add Health team that identified the school setting as urban (reference), suburban or rural.¹⁰ Region was similarly presented as a set of dummy variables based on census regions that identified each school as being in the South (reference), West, Midwest, or Northeast, using U.S. Census Bureau regional definitions.

To determine average household income, I used responses to the question “About how much total income, before taxes did your family receive in 1994? Include your own income, the income of everyone else in your household, and income from welfare benefits, dividends, and all other sources” from the parent interviews. For each school, an average of parent responses was calculated. To adjust for positive skew, the variable was recoded as $x = x + 1$ and a log transformation was used.

Pregnancy Analyses

Pregnancy is the outcome variable in Chapter 5. In this section I will describe the sample, variables and data preparation.

Sample

As in the previous research, Waves 1 and 2 of Add Health were used, with independent variables drawn from Wave 1 and the dependent variables (debut and pregnancy among those who have experienced debut) and drawn from Wave 2 in order to provide the desired temporal order. The nature of the outcome variable did necessitate several changes, particularly in regard to sample restrictions.

Restrictions

Operationalizing pregnancy was more complex than was the case with debut and so I implemented several limitations, based on theory and available data. In addition, the analysis used for pregnancy required an operationalization of debut that varied somewhat from that discussed earlier. I will discuss the operationalization of pregnancy first, then discuss changes in the operationalization of debut. As I discuss operationalizations, I will also detail sample restrictions.

The first complexity regarding pregnancy is that whereas all teens can experience debut, only females can become pregnant. Research indicates that fertility rates based on male reports differ substantially from those based on female reports (Poston and Chang 2005), and thus including both may result in skewed results. Instead, I follow the protocol of most research and limit the sample to females (see Brückner and Bearman 2004; Fiscella, Kitzmen, Cole, and Sidora et al 1998; Jaccard 2002).

To isolate the effects of independent variables, the sample was again limited to those who had not experienced debut by Wave 1. It was further limited to those who reported never being married during both interviews. This limitation on the sample ensures the temporal order necessary for establishing a causal relationship.

As a result, the sample is limited to (1) female teens who (2) completed Wave 1 and Wave 2 in-home interviews and (3) did not report debut before Wave 1 and (4) had not been married during either interview. These restrictions make separating the sample into two age groups unwarranted, given the analytic method used (described below).

Dependent Variables

In addition to the distinctions discussed above, I had to consider the relationship between debut and pregnancy in defining dependent variables. Specifically, I had to consider the chronological relationship between them. Pregnancy cannot precede debut; debut must occur

before pregnancy. An analysis using pregnancy as a single dependent variable ignores this relationship, unless the sample is limited to sexually active teens.

To address this limitation, I use an analysis that includes debut as a stage preceding pregnancy, thus there are two dependent variables. In this analysis, debut is defined as a positive response to the question “Have you ever had sexual intercourse?” at Wave 2. Pregnancy is defined as a positive response to the question “Have you ever been pregnant?” at Wave 2. As a result, *debut* is operationalized as (1) female teens who (participated in in-home interviews in Waves 1 and 2, (3) had not experienced debut at Wave 1, but (4) reported debut at Wave 2. *Pregnancy* is operationalized as (1) female teens who (2) participated in in-home interviews in Waves 1 and 2, (3) did not report a debut at Wave 1, but (4) did report a pregnancy at Wave 2.

Independent Variables, Missing Data and Sample Sizes

To provide consistency between analyses, the same independent variables and data cleaning techniques used in the debut analyses were used in this analysis (see above). After cleaning, the analysis uses data from 1,479 respondents clustered in 115 schools.

METHODS

Debut Analysis

In attempting to examine possible causes of adolescent sexual debut and pregnancy, Add Health data has several strengths. It is longitudinal, has a high number of subjects, and an outstanding breadth of data. In contrast, it also presents analytical challenges, particularly explanatory variables that are not time-constant. For example, it is reasonable to assume that just as religiosity might impact sexual debut, becoming sexually active might affect an adolescent’s involvement in their church. The inclusion of consequential information may result in bias that is unavoidable using multiple regression to predict an outcome (Allison 1984:9-11).

A collection of methods to address issues such as this, data loss, and censored dependent variables has arisen. These methods, collectively referred to as an event-history analysis, address the issue of time and focus on specified events to track population patterns while allowing for variations reflecting whether or not events are repeatable, whether outcome variables represent a single outcome or multiple “types” of the outcome, whether or not a parametric distribution can be assumed, and whether time can be seen as a continuous or discrete variable (Allison 1984:10-14; Blossfeld, Golsch and Rohwer 2007). This research will use multilevel proportional hazards (discrete time).

What Multilevel Discrete Time Proportional Hazards Models Are

Multilevel discrete time proportional hazards models use recently developed methods to synthesize hazard analysis with multilevel models (Barber, Murphy, Axinn and Maples 2000). Both types of analysis provide insight important to sociological research. Hazard models allow researchers to measure the influence of variables across changes over time, including those that do not occur gradually (Allison 1984:9; Barber et al. 2000). Researchers using multilevel models can explore micro-macro linkages such as the effect of school variables on individual outcomes (Guo and Zhao 2000; Raudenbush and Bryk 2002). In synthesis, they provide the ability to estimate the effects of individual and contextual influences on individual-level change over time.

To fully describe the model used, I will first briefly describe multilevel models. After that I will discuss hazard models, including the use of discrete time and proportional hazards. In the next section I will discuss the advantages of using a synthesis of the two.

Multilevel Models

Society is arranged in a hierarchy, with individuals or other lower-level units being nested in higher level units. For example, individual students are nested within schools that are nested in school districts. Traditionally, information from one level may be analyzed at another

level through aggregation or disaggregation. These methods present statistical challenges as information is lost through aggregation or exaggerated through disaggregation (Hox 2010). Assuming a single level of analysis also presents conceptual problems in interpretation, potentially leading to the ecological or atomistic fallacy (Diprete and Forristal 1994; Hox 2010).

Multilevel methods address these concerns by allowing data to be analyzed at its natural level, recognizing that lower level units are nested in higher levels. Because they are nested, lower-level cases within each higher level unit are more likely to be similar to one another than they will be to cases in other higher level units. For example, students from one school likely share more similar socioeconomic statuses with one another than with students from other schools. In effect, the individual is the sum of individual effects (including error) and group effects (including error). Most regression methods assume that all cases are independent, but the nested and hierarchical nature of society means that this assumption is likely to be violated. When violated, standard errors are artificially small and Type I errors may occur (Barber et al. 2000; Guo and Zhao 2000; Hox 2010).

Recognizing this degree of homogeneity within groups, multilevel methods provide measures *within* each group and *across* all groups. Within each group, a slope and intercept can be determined for each independent variable. Although the same equation is used for each group, the values of the slope and intercept will differ among groups (random coefficients). We assume that the distributions are normal, have a mean of 0 and constant variance (Raudenbush and Bryk 2002; Hox 2010).

At Level 2, separate equations represent the slope and intercept across groups. Error is now represented by Level 1 error, Level 2 slope error and Level 2 intercept error, with Level 2 slope and intercept assumed to have 0 means. The variance of each and their covariance represent variance/covariance after controlling for variables in the model (conditional variance-covariance components). Although it is possible to have random level 1 slopes, all of the slopes are fixed in the models presented in this dissertation. Slope error is also adjusted by group mean centering

Level 1 variables. After centering, the intercept represents the unadjusted mean for group j and Level 2 error variance is now the variance among group means (Raudenbush and Bryk 2002; Hox 2010). Additionally, group-mean centering removes any correlation between Level 1 and Level 2 variables.

By substituting the resultant equations for Level 2 slope and intercept into the Level 1 equation, we derive an equation that can be used to measure Level 1 effects, Level 2 effects, and cross-level interactions.

Hierarchical methods also allow us to attribute variance to one level or the other. When we look across groups, we must recognize that part of the variance is due to Level 1 factors and part is due to Level 2 factors (Raudenbush and Bryk 2002). For example, if we were looking at performance in standardized tests, part of the variance will be due to the individual student and part of the variance will be due to the school. These different variances can be parsed apart using the intra-class correlation coefficient (ICC), which identifies the proportion of total variance that is between (rather than within) Level 2 units.

Discrete Time Proportional Hazards

These methods focus on an event, “a qualitative change that occurs at a specific point in time” in contrast to gradual change (Allison 1984:9). Multilevel discrete time proportional hazards may be seen as a link between parametric and nonparametric methodology. Like parametric analysis, proportional hazards specified a regression model and functional form; however, like nonparametric analysis, the form of the event time distribution is not specified (Allison 1984:14, 34; Blossfeld, Golsch and Rohwer 2007:223). Instead, it is assumed that the ratio of risk between any two subjects at any point of time remains constant. This results in a model that can be extended to analysis of time-varying independent variables (Allison 1984:34). In the version employed, events are seen as nonrepeatable and time was measured in discrete, six-month intervals.

The hazard rate, “the probability that an event will occur at a particular time to a particular individual, given that the individual is at risk at that time,” (Allison 1984:16) was calculated by dividing the number of events within each period by the number of subjects who reached that age without experiencing sexual debut. This hazard rate was then used in logit analysis to determine the effects of independent variables (Allison 1984:16-18) at the individual and school levels. The effects of variables are constant across the stages (or age groups), which is due to the assumption of “proportional hazards.”

Why Multilevel Discrete Time Proportional Hazards Models are Necessary

The goal of this research is actually to examine the relationship between two distinct processes. The first is the effect of a social institution (school) on individual behavior (debut), but the second is the movement of individuals from a chaste state to sexual activity via the event, sexual debut. Multilevel models allow investigation into the former; discrete time proportional hazards models allow the latter. Recently developed methods allow the synthesis of the two (Barber et al. 2000). Using this method, discrete time intervals are defined and each subject provides an observation for each stage they experience.

Stages, Model, and Interpretation

For interpretation purposes, I estimated the binary multilevel discrete-time hazards models using a complementary log log link function. Using this link, the exponent of the coefficient for an independent variable is interpreted as the factor change in the hazard rate (or predicted probability of debut conditional on not experiencing debut before that stage) (Rabe-Hesketh and Skrondal 2008: 356). Time is measured in discrete, six month intervals. Those who experienced debut in any given stage were removed from calculations for subsequent stages, thus the outcome may be interpreted as the (multiplicative) factor change in the hazard (or conditional likelihood) of debut in a given stage, given that debut has not already occurred.

Pregnancy Analysis

As noted earlier, the smaller sample available for pregnancy forces some constraints on the model, particularly concerning cluster size at Level 2. As a result, a somewhat simpler model was used. The sample was also limited to females who were not sexually active by Wave 1 and were never married.

What Sequential Logit Models Are

Sequential logit is a specialized ordinal model using a stage approach. Stage approaches compare “the probability of being at a given point” to “the probability of being beyond that point” (Fullerton 2009). In effect, separate logit regressions are simultaneously performed for each stage, with the sample limited to those who have progressed from the previous stage. Thus, the dependent variable is divided into a separate equation for each transition between stages (M-1) and the sample is progressively smaller as it moves from beginning to later stages.

The stage approach is appropriate for outcomes that (1) are an irreversible, ordered series of steps that (2) have identifiable start and end points (Fullerton 2009). In these models, one must pass through Stage A before reaching Stage B. For each stage, the conditional probability (“the probability of being in a given category given that you have progressed to that stage”) is calculated (Fullerton 2009).

Sequential logit is distinct from other models using a stage approach in that it relaxes the parallel regression assumption for all variables. Relaxing this assumption allows the effects of variables to vary across stages (Fullerton 2009).

Why Sequential Logit Models are Necessary

When outcome variables are part of a staged progression (as debut and pregnancy obviously are), failure to recognize a stage can skew results by averaging the effects of two stages. At higher levels, the sample is narrowed and neglecting to recognize the staged nature of

the variable can introduce a confound into the model (Buis 2009). Conflating the debut and pregnancy thus weakens the reliability of some findings using pregnancy as an outcome variable. Even when the stage is recognized by limiting the sample to sexually active teens (see Kaplan et al. 2002), usefulness is compromised. The effects of variables associated with pregnancy included in the model with a limited sample cannot be effectively compared to the effects of the same variable on debut unless the same model is used as each variable controls for the effect of other variables.

Moreover, the relaxation of the parallel regression assumption in this analysis will allow changes in the effects of independent variables to be observed. Thus the use of a sequential logit model allows me to contrast the effects of variables on debut with their effects on pregnancy once debut has occurred. This will provide a clearer picture of the path from virginity to pregnancy.

Sample Selection and Stage Definitions

As discussed earlier, this sample is limited to females who completed Wave 1 and Wave 2 in-home interviews and who did not report debut at Wave 1 and who were never married at both waves. Outcome categories were defined as (1) no debut, (2) debut without pregnancy, and (3) pregnant (see definitions of debut and pregnancy above). Sequential logit calculates M-1 equations, so two outcome variables will be used: debut (Stage 1: c2 or 3 vs. 1) and pregnancy (Stage 2: 3 vs. 2).

Clustering within Schools

I used robust standard errors that were adjusted for clustering within schools because multilevel models for sequential logit are not currently available. Sample selection bias remained a possibility. To address this potential limitation, I conducted Heckman probit analyses and obtained insignificant Rho coefficients (not shown), indicating that I could assume bias was not present in the sample.

Interpreting the Results

Results are presented in odds ratios, which should be interpreted as the ratio of the odds of moving to the next stage to the odds of not moving to the next stage, given that the current stage has been reached.

Using the data set and methods described in this chapter, analyses were conducted. In the next two chapters, the results of these analyses are presented. In the next chapter I will present findings from the multilevel discrete time hazard analysis using debut as the dependent variable. In Chapter 5, I present findings from the sequential logit analysis. In both chapters I will briefly review literature and hypotheses applied to that analysis, present and interpret the findings, and present conclusions. This will be followed by a final chapter that ties all the findings together and discusses what can be learned through this research.

END NOTES

1. All information regarding the sampling and design of Add Health is taken from the Add Health website hosted by Carolina Population Center, The University of North Carolina at Chapel Hill available at <http://www.cpc.unc.edu/projects/addhealth>. At the time this research was undertaken, Add Health was managed by the Carolina Population Center, but it has since been transferred to the Inter-University Consortium for Political and Social Research (ICPSR) and additional information on the data set is available at <http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/21600> or at <http://www.icpsr.umich.edu/icpsrweb/DSDR/studies/21600>.
2. Funding agencies are: National Center for Health Statistics, Centers for Disease Control and Prevention, DHHS; National Institute of General Medical Sciences; National Institute of Mental Health; National Science Foundation; Office of the Director, National Institute of Health; Office of Minority Health and Health Disparities, Centers for Disease Control and Prevention, DHHS; Office of Minority Health, Office of Public Health and Science, DHHS; Robert Wood Johnson Foundation. In addition, Wave IV Funding Partners are: Eunice Kennedy Shriver National Institute of Child Health and Human Development; National Cancer Institute; National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, DHHS; National Center for Minority Health and Health Disparities; National Institute of Allergy and Infectious Diseases; National Institute on Deafness and Other Communication Disorders; National Institute of Nursing Research; National Institute on Aging; National Institute on Alcohol Abuse and Alcoholism; National Institute on Drug Abuse; Office of AIDS Research, NIH; Office of the Assistant Secretary for Planning and Evaluation, DHHS; Office of Behavioral and Social Sciences Research, NIH; Office of Population Affairs, DHHS; Office of Research on Women's Health, NIH; MacArthur Foundation.
3. Sensitive questions about sexual behavior were only asked of students 15 years of age or older; however, questions about debut and pregnancy were asked of all in-home interview respondents.
4. Those who were part of a genetic pair (i.e. twins) were retained.
5. I did include variables that might be considered reflective of higher levels of social structure, particularly religion, school, and family. In each case I attempted to use only variables that reflected individual attitudes or behaviors. For example, religiosity measures do not include denomination or family participation, but only individual church attendance, frequency of prayer, strength of belief, and youth group participation. The one exception to this is the inclusion of parental attitudes toward adolescent sexuality. Arguably, this reflects family rather than individual-levels of social structure; however, data was drawn from student interviews rather than parent interviews and therefore reflect teens' perceptions of parent attitudes rather than parental attitudes themselves
6. Although these have resulted in inconsistent findings and did not reach the criteria for inclusion as a risk or protective factor, they remain among the most

frequently investigated antecedents and were included in the model due to their close relationship to empowerment as defined in this research.

7. Please note that I do not contend that other risk behaviors are not embodied, but only that they are less embodied.
8. As alluded to in the previous chapter, proponents of both abstinence and comprehensive sex education claim that their form empowers teens. Determining which does so is irrelevant as instruction provided by most teachers appears to stress abstinence but include contraceptive information regardless of mandates (Landry, Darroch, Singh and Higgins 2003). Thus, if either perspective provides empowerment, it should be reflected in overall findings and, if sex education is effective, should be negatively correlated with sexual behaviors.
9. A second variable was also created counting only the number of secondary grades (7-13) that will be used in creating variables to be discussed below.
10. Urban was defined as central cities of a Consolidated Metropolitan Statistical Area (CMSA) or Metropolitan Statistical Area (MSA) with a population of 250,000 or more or a central city of a CMSA or MSA but not designated as a large city. Suburban was defined as a place within the CMSA or MSA of a large central city, within the CMSA or MSA of a mid-size central city, not within a CMSA or MSA but with a population of 25,000 or more and defined as urban or a place not within a CMSA or MSA with a population of at least 2,500 but less than 25,000. Rural was defined as a place not within a CMSA or MSA and designated as rural or a place within a CMSA or MSA designated as rural.

CHAPTER IV

ADOLESCENT SEXUAL DEBUT

In this chapter we move from “what I am going to do” to “what I found”. The first outcome variable to be addressed is sexual debut. In this chapter I will report findings and present an interpretation of those findings; however, I begin by placing analysis of sexual debut in a social context.

The timing of adolescent sexual debut is closely tied to the moral fabric of American society. Just as Americans value individuality, they view adolescent sexual behavior as the result of an individual choice. This makes solving the problem of adolescent pregnancy seem to be a simple issue: if more teens say “no” to sex we can eliminate unplanned pregnancies. However, by labeling adolescent sexual activity as solely caused by individual choice or moral weakness, we obscure the complex structural factors beyond the control of any single person. This emphasis on individual-level factors is often the underlying logic behind tactics to prevent adolescent childbirth, particularly those based on the single factor of adolescent chastity.

Historically, attempts to prevent adolescent and premarital pregnancy have ranged from restricting young women’s personal freedom, surveillance of young couples by chaperones, and segregation of young males and females to using medical procedures to inhibit sexual urges in

youth (Burst 1979; Gollahar 1994; Slack 1988). Today, debate rages over the merits of comprehensive versus abstinence education or how to control sexual behavior and prevent pregnancy either through self-control (abstinence) or access to information about contraception (comprehensive) (Kirby 2008). The result is a complex array of locally-driven policies and programs that make it difficult to identify and interpret national trends.

Although adolescent sexual behavior is part of the American culture wars and is highly politicized, comparisons with other industrialized nations provide insight into patterns of debut and the influences of schools and other social institutions, particularly when schools and/or medical care are nationalized. In comparisons with Sweden, France, Canada and Great Britain, Darroch et al. (2001) found that American teens are no more likely to be sexually active than other teens with the exception of those whose debut occurred before they were fifteen, which is more likely to happen in the U.S. than in any of the other countries considered (Table 4.1)¹.

Table 4.1: Percent of adolescent females who ever had sex, percent who had sex before a given age, and median age at first sex in five industrialized countries²

<u>Country</u>	<u>Percent ever had sex</u>			<u>Percent who had sex before a given age</u>			<u>Median age of first sex</u>
	<u>15-19</u>	<u>15-17</u>	<u>18-19</u>	<u>15</u>	<u>18</u>	<u>20</u>	
Sweden (1996)	Na	Na	80.3	12.2	65.2	85.6	17.1
France (1992, 1994)	49.3	37.9	67.1	7.4	50.1	82.5	18.0
Canada (1996)	50.9	37.4	70.9	9.1	53.4	75.2	17.3
Great Britain (1990-1991)	61.1	40.9	78.5	4.1	63.8	84.8	17.5
United States (1995)	51.3	38.3	70.7	14.1	63.1	80.6	17.2

The large percent of American teens who have had sex and the high American teen birth rate (see Chapter 2) must lead us to ask what factors are driving adolescent sexual debut. In this chapter, I will present the findings of this research pertaining to adolescent sexual debut, but first I will briefly review the trends, consequences and factors associated with sexual debut (as

opposed to those associated with other aspects of adolescent sexual behavior). As noted earlier, research on debut has focused almost exclusively on the individual, with virtually no research beyond the level of family or peer relationships. This research will contribute to our understanding of early sexual debut by searching beyond commonly held assumptions about the primacy of micro-level interactions when studying adolescent sexual behavior. I will also present a series of hypotheses regarding sexual debut before presenting research findings.

CONSEQUENCES AND CAUSES OF SEXUAL DEBUT

Proponents of both abstinence and comprehensive education agree that preventing adolescent sexuality is crucial to reducing teen pregnancy and birth. Research indicates that adolescents who experience early debut (usually defined as debut before the age of 15) are less likely to use contraceptives or to use them correctly (Jones, Darroch and Henshaw 2002; Manning, Longmore and Giordano 2000). Koyle, Jensen, Olsen and Cundick (1989) found that by age 19, those who had earlier sexual debuts had more sexual partners, had older sexual partners and had sex more frequently. Females with early debut have higher rates of STDs and atypical cervixes (Andersson-Ellströma, Forssman and Milsom 1996).

Likewise, abstinence and comprehensive sex education advocates recognize that early sexual debut is associated with reduced educational achievement (Frisco 2008; Small and Luster 1994; Spriggs and Halpern 2008; Steward, Farkas and Bingenheimer 2009;) increased likelihood of engaging in other deviant acts, including substance use (Armour and Haynie 2007; Gibbs 1984; Joyner and Udry 2000; Rosenbaum and Kandel 1990).³ Some research has indicated that teens who experienced early sexual debut were also more likely to suffer depression (Hallfors et al. 2004); however, others argue a different causal relationship, that depression is more likely a cause rather than a result of early sexual debut (Longmore et al. 2004). Still other researchers argue that the relationship between delinquency and debut is correlational rather than causal

(Mott and Haurin 1998; Rodgers and Rowe 1990; Rowe, Rogers, Meseck-Bushey, and St. John 1989).

Though numerous variables have been presented as causing early debut (for reviews see Bearman and Bruckner 2001; Goodson et al. 1997; Kirby and Lepore 2007) factors most consistently linked to early debut include parent attitudes and religiosity (Abbott and Dalla 2008; Browning, Leventhal and Brooks-Gunn 2005; Hutchinson 2002; Manlove, Terry-Humen, Ikramullah, and Moore 2006; Resnick, Bearman, Blum and Bauman et al. 1997), school success and/or connectedness (McNeely, Nonnemaker and Blum 2002), being born in a foreign country and acculturation (Weiss and Tillman 2009; Woo, Brotto and Gorzalka 2010), race (see Cavazos-Rehg et al. 2009) and peer influences (Abbott and Dalla 2008; Santelli, Kaiser, Hirsch, Radosh et al. 2004). Proportional hazards survival analysis (see Chapter 3) stratified by age and gender indicated that two-parent families, higher socioeconomic status, school performance, religiosity, parental attitudes, closeness to parents and body pride were indicated as significant protective factors along with living in a rural area and having concerns about the community in all age groups and both genders (Lammers, Ireland, Resnick and Blum 1999).

Most first partners were initially friends who began to identify themselves as a couple before engaging in sex, although these trends were stronger among white or Hispanic teens than among black, among females than males, and among those who delayed debut until after the age of fourteen (National Campaign to Prevent Teen Pregnancy 2003b). The route to sexual activity often include behaviors such as oral sex in order to maintain “technical virginity;” (Brückner and Bearman 2005; Lindberg, Jones and Santelli 2007; Uecker, Angotti and Regnerus 2007). Those youth who identify as religious are more likely to avoid any type of sexual contact or be completely abstinent while those who employ technical virginity are more motivated by avoiding pregnancy and/or STDs (Uecker, Angotti and Regnerus 2007). There also appears to be a seasonal aspect to this process, with summertime debuts more likely to occur with nonromantic partners (Levin, Xu and Bartkowski 2002). This may be associated with the finding that the

second most common type of partner for first sex is someone who was “just met” (25 percent for males and 14 percent for females) (Abma et al. 2010).

Besides individual-level behaviors, structural or macro-level causal factors include neighborhood monitoring, poverty, neighborhood levels of perceived efficacy, a rural setting (Atav and Spencer 2002; Browning et al. 2004, 2005; Brumbach, Figueredo and Ellis 2009; Milhausen, Crosby, Yarber, and DiClemente et al. 2003; Upchurch, Aneshensel, Sucoff and Levy-Storms 1999). For example, Browning et al. (2004) found that sexual debut among African Americans was associated with neighborhood factors such as poverty and neighborhood levels of perceived efficacy; however, they did not find similar patterns among whites or Hispanics. Baumer and South (2001) also found a significant association between neighborhood disadvantage and debut, but only in bivariate analysis. When poverty is defined as receipt of welfare, no link between poverty and debut is present (Moore, Morrison and Gleib 1995). In research limited to girls age 13-15, Harris, Duncan and Boisjoly (2002) found that early debut was associated with a belief that limited life opportunities made the perceived consequences of debut relatively acceptable.

Research on the link between schools and sexual debut usually focuses on sex education rather than the school itself. More than 90 percent of American schools offer some form of sex education and an overwhelming majority of Americans support such programs (NPR/Kaiser/Kennedy School 2004). Within the large body of research on sex education are insights important to this research. For example, the most effective education programs⁴ targeted younger adolescents and changed behaviors associated with early debut include the consistent and correct use of contraceptives (Frost and Forrest 2011; Mueller, Gavin and Kulkarni 2008). Even a comparison of students in seventh and eighth grades resulted in significant differences (Santelli et al. 2004).

Beyond age, further links between school and debut are evident in research into sex education programs, particularly in programs using a strategy known as “positive youth

development” (PYD). Although the criteria for PYD programs are debated, there is consensus that the programs “help youth strengthen relationships and skills, embed them in positive networks of supportive adults, and help them develop a more positive view of their future by providing academic, economic, and volunteer opportunities” (Gavin, Catalano, David-Ferdon and Gloppen et al. 2010). In a comparison of effective and ineffective PYD programs, Gavin et al. (2010) found that successful programs were more than seven times as likely to offer school-based opportunities and experiences and were more likely to feature stated goals that might be associated with empowerment such as social competence, self-determination, self-efficacy, a clear and positive identity, and a belief in the future.

The limited research that has sought to more directly link school structure to sexual debut has indicated that school characteristics may be significantly associated with debut; however, such research is limited in two distinct manners (for example, see Harris et al. 2002). First, measures representing schools tend to rely solely on aggregated individual measures rather than on measures of the actual school. While aggregated measures of student household incomes or attitudes may be of interest (and are included in this research), measures of the school structure itself are necessary to achieve a complete understanding of how schools influence teen sexual behavior. Without these measures, effects of the school are conflated with those of the neighborhoods served by the school. The second limitation is a lack of clear comparisons between individual-level and higher-level units of analysis. As discussed in previous chapters, this research utilizes multilevel, discrete time hazard analysis which allows a more complete comparison of individual and school-level variables on the timing of the debut event. I also employ a theoretical basis that focuses on the role of empowerment in adolescent sexual behaviors. Further, I assume that a school structure affects empowerment and therefore affects adolescent behaviors, including sexual debut. In this analysis I seek to measure the influence of school structure on sexual debut and to identify variables associated with debut at both the

individual and school levels among two age groups: those who are fifteen or under and those who are sixteen or older (See Chapter 3).

HYPOTHESES

Using this understanding of the current body of knowledge and the theoretical basis proposed, I offer several hypotheses regarding sexual debut. The fundamental assumption of all predictions is that adolescent empowerment is based in the range of spheres of power in which actors operate or anticipate operating as adults. The range of spheres of power in which an actor may exercise power is limited by social structure, using Blau's definition of social structure as the distribution of opportunities. Further, those who are or anticipate experiencing a constrained range of spheres of power are more likely to enact power through the body. Finally, one means of enacting embodied power is to engage in early debut and/or pregnancy. In this research, I attempt to link these dynamics to social structure through schools, which are social institutions assumed to replicate and perpetuate higher levels of social structure after controls for setting, region, and logged average household income.

Although the focus of this research is at the school level, the proposed theory may also be tested at the individual level. One of the most frequently reported findings is that being black or Hispanic is associated with earlier debut (see Kirby and Lepore 2007). If we accept that social structure has already constrained or expanded present or future spheres of power among adolescents, we should expect to see individual-level patterns reflecting well-documented axes of inequality in American culture. Characteristics associated with privileged social positions (which are assumed to offer access to a wider range of spheres) should reflect reduced risk of debut while those associated with lower social positions (which are assumed to be associated with a more constrained range of spheres) should reflect increased risk. This leads me to hypothesize:

H₁: Being black or Hispanic (compared to white) will be associated with higher risk of debut.

The proposed theory also predicts that as the range of spheres of power is constrained the potential that embodied power will be exercised increases. Sexual behavior is only one possible form of embodied power; another is substance use. Both sexual behavior and substance use are part of a nexus of delinquent behaviors that are frequently associated with one another (see Kirby and Lepore 2007). Other delinquent behaviors associated with both sexuality and substance use (theft, vandalism, etc.) are included in this nexus but are less embodied. As a result, theory predicts that:

H₂: Embodied delinquency (substance use) will be significantly and positively associated with debut.

At the school level, I will measure variables associated with four aspects of school structure: the school's organization, faculty characteristics, average student success rates, and school programs associated with health and sexuality. These are expected to exert distinct effects such that school characteristics associated with a student body that does or will enjoy an expanded range of spheres of power will also be associated with reduced risk of debut or pregnancy. Conversely, school characteristics associated with a student body that does or will be constrained to a narrow range of spheres of power will be associated with increased risk of debut or pregnancy. This leads me to the following hypotheses:⁵

H₃: Teens attending private nonreligious schools will be at less risk of debut than will teens attending public schools or private religious schools.

H₄: Teens attending schools with higher proportions of female or black students will be at higher risk of debut or pregnancy than those attending schools with lower proportions.

In recent years, educators have also debated another way in which race and gender may affect student outcomes. According to some theorists, students benefit by having teachers provide role models that “look like me,” emphasizing the importance of male and minority teachers (Dee 2005). These have been contested by those who assert that attaining faculty that matches the racial makeup of the student body reifies social stratification, particularly among schools with high levels of minority students (Dee 2005; Sevier and Ashcroft 2007). If faculty composition reifies social inequalities, then the theory presented predicts that a faculty made up largely of those who have traditionally had access to a constrained range of spheres of power will be associated with earlier debut. On the other hand, faculty with access to a wider range of spheres of power may provide empowering role models and be associated with lower rates of early debut. Thus I predict:

H₅: Teens attending schools with a higher proportion of teachers who are black or female will be at greater risk of debut.

H₆: Teens attending schools with a higher proportion of teachers with masters degrees or high will be at reduced risk of debut.

Previous research has also indicated a link between school success and debut (Bearman and Brückner 2001; Billy et al. 1994; Halpern et al. 2000). The finding mirrors what theory would predict, as academic success is expected to be associated with the perception of a wider range of future spheres of power. Thus I predict:

H₇: Schools with greater levels of student success as reflected in lower dropout rates and a higher proportion of students testing at or above grade level will be associated with lower risk of debut.

I also test the currently acknowledged role of the school in addressing teen sexual behavior, which is largely limited to some form of classroom-based sex education. Additionally, sexuality may be addressed through school-based health services which may range from basic first aid to a wide range of counseling, testing, and health services delivery. Thus, I present two hypotheses concerning current school-based interventions:

H₈: Schools offering sex education classes will be associated with reduced risk of debut.

H₉: Schools offering a greater number of health and sexuality related services will be associated with lower levels of risk of debut.

AGE GROUPS

As noted in Chapter 3, I divided this sample into two age groups: under the age of 16 and age 16 or older. The age of 16 has great symbolic meaning in American culture and is associated with access to legal rights prohibited to younger teens. I interpret these as symbolic and legal recognition that teens 16 or older are approaching adulthood and are entering more adult roles, including access to more adult spheres of power. If the range of spheres of power a teen enjoys or anticipates affects sexual behavior, the influence of individual and school level variables are likely to differ between the two age groups. Moreover, as older teens gain access to more adult spheres of power, the influence of schools is likely to diminish. These can only be tested by

dividing the sample into age groups based on the changes in status associated with the 16th birthday.

RESULTS – YOUNGER TEENS

Data from 5797 observations across 5 stages (<14 years of age, 14-14.5, 14.5-15, 15-15.5, and 15.5-16) of teens below the age of 16 who participated in in-depth interviews as part of the National Longitudinal Study of Adolescent Health (Add Health), and from 76 participating school administrators was examined. Thirty individual-level and 22 school-level variables were selected based on previous research and theoretical appropriateness (Table 4.2) (See Chapter 3 for details on variable selection). Among the individual-level variables are nine indices (religiosity, depression, substance use, risk behaviors, connectedness to school and self-perception, activities with mother, activities with father, and negative parental attitudes toward adolescent sex). Thirteen variables were selected from proposed indices that failed to display acceptable Chronbach's alphas (skipped school, suspended, expelled, last English grade, last Math grade, desire to go to college, likelihood of going to college, likelihood of living to 35, likelihood of being killed by 21, likelihood of catching HIV/AIDS, s. determines time home on weekends, s. determines who to hang out with and s. determines what to wear).

Most Level 2 variables were drawn from surveys completed by administrators participating in Add Health; however, additional variables were drawn from contextual data compiled by the Add Health team (urban, rural, and suburban school designations; region; and small, medium, and large school sizes). Remaining variables were constructed from survey results by totaling responses to a series of questions (total students testing at or above grade level, health and sex-related services), or averaging rates provided for each grade offered by the school (average dropout rate). The economic level of the student body was measured by drawing on parent interviews. Household income reported by parents was averaged for each school and logged income was included in the model.⁶ The proportion of students who are black, proportion

of students who are black squared and proportion of students who are female were also aggregated from individual-level data. These were entered into a series of multilevel discrete-time hazard analyses.⁷ (See Chapter 3 for detailed discussion).

An Intra-class Correlation Coefficient (ICC) of .08 ($p = .006$) was calculated based on the fully unconstrained model.⁸ This indicates that 92 percent of model variance occurs at the individual level and eight percent of model variance occurs at the school level.

Relatively few variables were indicated as having a significant effect on sexual debut (Table 4.3). At Level 1, being female, black, Hispanic, substance use, receiving high grades in English, not having a weekend curfew, and negative parental attitudes toward adolescent sex all reached a level of significance in one or more models. At Level 2, being in the West (compared to the South) and the percent of teachers who are black reached significance in at least one model.

Race has been frequently associated with debut (see Cavazos-Rehg et al. 2009). Being black is a significant risk factor at the .01 level in all but Model 1 and is significant at the .05 level in this minimal model (Table 4.3). In models that incorporated school-level variables, (Models 3-7), being black increases the hazard rate (or conditional likelihood) by more than 95 percent. Being Hispanic was also a significant risk factor three of seven models; however never to the same level as being black. Introducing school-level variables increased the significance of being black (Table 4.3). The proportion of teachers who are black ($p \leq .01$) was also significant, indicating that factors beyond the race of the individual may be influential.

Being female increases the hazard rate by almost 50 percent in all models (Table 4.3). When teacher characteristics are introduced into the model, significance drops to the .01 level; however, being female remains one of the strongest predictors of early debut.

No variable was as significantly associated with early debut than substance use ($p \leq .001$ in all models) (Table 4.3), which was a measure of the number of substances used rather than of age of first use or frequency. The use of one additional substance increases the hazard rate by almost 50 percent in all models, holding all else constant. In contrast, other forms of less

Table 4.2: Individual and School-Level Variables in Analysis of Sexual Debut among Teens under Age 16

Variable	Mean	S.D.	Min.	Max.	Description
<i><u>Dependent Variable</u></i>					
Debut	.04	.20	0	1	Had sexual debut by Wave 2 (yes=1; else=0)
<i><u>Level 1 Control Variables</u></i>					
Female	.57	.49	0	1	
Foreign born	.05	.22	0	1	Born outside U.S. (yes=1; else=0)
Race ^a					
White (reference)	.62	.49	0	1	Race (white=1; else=0)
Black	.20	.40	0	1	Race (black=1; else=0)
Asian	.06	.24	0	1	Race (Asian=1; else=0)
Hispanic	.13	.33	0	1	Race (Hispanic=1; else=0)
Other	.04	.19	0	1	Race (other=1; else=0)
<i><u>Level 1 Substantive Variables</u></i>					
Sex Education (Ind.)	.84	.37	0	1	S. has had sex education (yes=1; else=0)
Religiosity Index	13.09	2.82	4	16	4-item scale religiosity scale (0=low, 10=medium, 16=high) alpha=.72
Depression Index	8.65	6.21	0	40	18-item depression scale (0=low, 36=medium, 72=high) alpha=.84
Substance Use Index	.77	1.06	0	6	6-item inventory of illicit drugs used (0=low, 6=high) alpha=.62
Risk Behaviors Index	2.47	3.55	0	42	14-item inventory of risk behaviors excluding substance use (0=low, 28=medium, 56=high) alpha=.78
Skipped school	.10	.30	0	1	Ever skipped school (yes=1; else=0)
Suspended	.15	.36	0	1	Ever been suspended (yes=1; else=0)
Expelled	.02	.13	0	1	Ever been expelled (yes=1; else=0)
Connectedness to school Index	15.64	2.42	6	23	6-item index of connectedness to school (0=low; 12=medium, 24=high) alpha=.76
Last English grade	1.99	.90	1	4	4-point scale (1=D or below; 4=A)
Last Math grade	2.13	.98	1	4	4-point scale (1=D or below; 4=A)
Desire to go to college	3.66	.78	0	4	Single-item (0=low; 4=high)
Likelihood of going to college	3.38	.94	0	4	Single-item (0=low; 4=high)
Likelihood of living to 35	3.51	.78	0	4	Single-item (0=low; 4=high)
Likelihood of being killed by 21	3.47	.74	0	4	Single-item (0=low; 4=high)
Likelihood getting HIV/AIDS	3.59	.69	0	4	Single-item (0=low; 4=high)
Self-perception Index	22.27	3.93	2	28	7-item index (0=low, 18=medium, 35=high) alpha=.87
S. determines time home on weekend	.22	.41	0	1	Single item (yes=1; else=0)
S. determines who to hang out with	.82	.38	0	1	Single item (yes=1; else=0)

Variable	Mean	S.D.	Min.	Max.	Description
Log of S. income during non-summer week	1.22	1.60	0	6.40	Weekly earnings (range \$0 to \$900) logged
Activities with mother	4.18	1.99	1	10	9-item inventory of activities (0=low; 9=high) alpha=.49
Activities with father	2.49	2.12	0	10	9-item inventory of activities (0=low; 9=high) alpha=.64
Negative parental attitudes toward adolescent sex	19.59	4.39	0	24	6-item inventory of parental attitudes (0=low; 15=medium; 30=high) alpha=.76
<i><u>Level 2 Control Variables</u></i>					
Setting					
Urban (reference)	.31	.46	0	1	City size (Urban=1; else=0)
Suburban	.51	.50	0	1	City size (Suburban=1; else=0)
Rural	.18	.39	0	1	City size (Rural=1; else=0)
Region					
South (reference)	.42	.49	0	1	Region (South=1; else=0)
West	.22	.41	0	1	Region (West=1; else=0)
Midwest	.22	.41	0	1	Region (Midwest=1; else=0)
Northeast	.14	.35	0	1	Region (Northeast=1; else=0)
Logged aggregated household income	1173.43	659.10	38.53	5725.71	Aggregated mean of household incomes, by school income
<i><u>Level 2 Substantive Variables</u></i>					
Number of grades in the school	5.08	3.69	1	14	Totaled number of grades in school
School Type					
Private religious (reference)	.09	.28	0	1	Non-public schools with religious basis (yes=1; else=0)
Public	.89	.32	0	1	Public school, no religious affiliation (yes=1; else=0)
Private nonreligious	.03	.16	0	1	Non-public school, no religious affiliation (yes=1; else=0)
Average class size	25.55	5.42	13	38	Average class size (disregarding band, study hall)
School Size					
Medium sized school (reference)	.55	.50	0	1	School size (Medium=1; else=0)
Small school	.26	.44	0	1	School size (Small=1; else=0)
Large school	.19	.39	0	1	School size (Large=1; else=0)
Proportion of student body that is female	.52	.06	.01	1	Number of female participants divided by number of Add Health participants
Proportion of student body that is black	.22	.26	0	1	Number of black participants divided by number of Add Health participants
Proportion of student body that is black (squared)	.12	.22	0	1	Number of black participants divided by number of Add Health participants (squared)
Percent of teachers who are black	11.10	18.29	0	100	Single survey item
Percent of teachers who are female	63.82	16.32	23	100	Single survey item

Variable	Mean	S.D.	Min.	Max.	Description
Percent of teachers who have masters degrees	40.20	22.60	0	95	Single survey item
Average dropout rate	1.45	2.57	0	12.5	Sum of dropout rates per secondary grade divided by number of secondary grades alpha=.76
Percent of students testing at or above grade level	3.69	.67	1	4	Percent testing at or above grade level (0-25%=1; 26-50%=2; 51-75%=3; 76-100%=4)
School offers sex education	.93	.26	0	1	Single survey item (yes=1; else=0)
Number of health or sex related services offered	11.89	4.11	1	17	Sum of the number of listed health or sex related services identified as offered by the school or school district (0=low; 17=high) alpha=.78

a Respondents were allowed to report more than one racial group, resulting in a total greater than 100 percent.

embodied risk behavior (theft, vandalism, running away from home, etc.) were not significant in any model (Table 4.3). School attendance that might be seen as indicators of deviance (skipping school, being suspended, and being expelled) failed to reach significance in any model.

Two somewhat unexpected findings were the influences of English grades and the lack of a curfew. Making better grades in English is associated with more than a 25 percent increase in the hazard rate in all models ($p \leq .01$) (Table 4.3). This must be contrasted with Math grades, which had a higher mean (indicating a higher average grade) (Table 4.2) but exerted a smaller and insignificant increase in the hazard rate. Younger teens who do not have a curfew enjoy a protective factor that lowers the hazard rate by 40 percent or more ($p \leq .01$), although this may reflect other individual differences such as curfews being imposed on students who spend more unsupervised time with friends while no curfew is imposed on students who tend to stay home.

Negative parental attitudes toward adolescent sex were significantly associated with reduced risk ($p \leq .05$); however, the result is only about a four percent drop in the hazard rate. Family influences appear to be quite nuanced. Even though parental attitudes have a significant influence, time spent with mother results in an increase in the hazard rate of almost eight percent ($p \leq .05$ in 4 of 5 models) while time spent with father results in a nonsignificant decrease in the hazard rate of five percent (Table 4.3).

Table 4.3: Factor Change and (Standard Error) of Influences on Adolescent Sexual Debut among Teens under Age 16

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>Level 1 Control Variables</i>							
Female	1.45** (.20)	1.47** (.23)	1.47** (.23)	1.47** (.23)	1.46* (.23)	1.47** (.23)	1.40* (.23)
Foreign born	.76 (.27)	1.13 (.42)	1.11 (.42)	1.10 (.42)	1.12 (.42)	1.12 (.42)	1.11 (.42)
Race (reference = white)							
Black	1.60* (.35)	1.92** (.45)	1.96** (.46)	2.00** (.47)	1.99** (.47)	1.98** (.46)	1.96** (.46)
Asian	.48 (.21)	.56 (.25)	.53 (.26)	.50 (.25)	.53 (.26)	.53 (.26)	.53 (.25)
Hispanic	1.68* (.41)	1.58 (.40)	1.64 (.42)	1.67* (.44)	1.69* (.44)	1.64 (.43)	1.60 (.42)
Other	1.28 (.41)	1.03 (.34)	1.04 (.34)	1.01 (.44)	1.05 (.34)	1.04 (.34)	1.05 (.34)
<i>Level 1 Substantive Variables</i>							
S. had sex education		.93 (.18)	.93 (.18)	.92 (.18)	.91 (.17)	.92 (.18)	.93 (.18)
Religiosity Index		.96 (.02)	.96 (.02)	.96 (.02)	.96 (.02)	.96 (.02)	.96 (.02)
Depression Index		1.00 (.01)	1.00 (.01)	1.00 (.01)	1.00 (.01)	1.00 (.01)	1.00 (.01)
Substance Use Index		1.51*** (.10)	1.52*** (.10)	1.53*** (.10)	1.53*** (.10)	1.52*** (.10)	1.52*** (.10)
Risk Behaviors Index		1.02 (.02)	1.03 (.02)	1.03 (.02)	1.03 (.02)	1.03 (.02)	1.03 (.02)
Skipped school		1.38 (.25)	1.38 (.25)	1.38 (.25)	1.40 (.26)	1.39 (.25)	1.39 (.25)
Been suspended		1.04 (.19)	1.05 (.20)	1.04 (.19)	1.04 (.19)	1.06 (.20)	1.05 (.20)
Been expelled		1.38 (.58)	1.41 (.60)	1.45 (.62)	1.39 (.58)	1.40 (.60)	1.42 (.61)
Closeness to School Index		.98 (.03)	.98 (.03)	.98 (.03)	.98 (.03)	.98 (.03)	.99 (.03)
Last English grade		1.27** (.11)	1.27** (.11)	1.26** (.11)	1.27** (.11)	1.27** (.11)	1.27** (.11)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Last Math grade		1.03 (.08)	1.04 (.08)	1.04 (.08)	1.04 (.08)	1.04 (.08)	1.04 (.08)
Desire to go to college		1.06 (.12)	1.06 (.12)	1.06 (.12)	1.06 (.12)	1.06 (.12)	1.06 (.12)
Likelihood of going to college		1.10 (.11)	1.11 (.11)	1.11 (.11)	1.11 (.11)	1.11 (.11)	1.10 (.11)
Likelihood of living to 35		1.07 (.10)	1.07 (.10)	1.08 (.10)	1.08 (.10)	1.08 (.10)	1.07 (.10)
Likelihood of being killed by 21		1.01 (.10)	1.01 (.10)	1.01 (.10)	1.01 (.10)	1.01 (.10)	1.01 (.10)
Likelihood of catching HIV/AIDS		1.01 (.11)	1.01 (.11)	1.01 (.11)	1.01 (.11)	1.01 (.11)	1.00 (.11)
Self-perception Index		1.01 (.02)	1.01 (.02)	1.01 (.02)	1.08 (.02)	1.01 (.02)	1.01 (.02)
S. determines time home on weekends		.60** (.11)	.60** (.11)	.60** (.11)	.59** (.11)	.60** (.11)	.60** (.11)
S. determines who to hang out with		1.07 (.20)	1.07 (.20)	1.08 (.20)	1.06 (.19)	1.08 (.20)	1.08 (.20)
S. determines what to wear		1.12 (.23)	1.11 (.23)	1.09 (.23)	1.10 (.23)	1.11 (.23)	1.11 (.23)
Log of s. income in a non-summer week		1.08 (.04)	1.08 (.04)	1.08 (.04)	1.08 (.04)	1.08 (.04)	1.08 (.04)
Activities with mother		1.07 (.04)	1.07* (.04)	1.07 (.04)	1.07* (.04)	1.07* (.04)	1.07* (.04)
Activities with father		.95 (.04)	.95 (.04)	.95 (.04)	.95 (.04)	.95 (.04)	.95 (.04)
Negative parental attitudes toward sex		.96* (.02)	.96* (.02)	.96* (.02)	.96* (.02)	.96* (.02)	.96* (.03)
<u>Level 2 Control Variables</u>							
Setting (reference = urban)							
Suburban			1.17 (.86)	1.07 (.23)	1.13 (.20)	1.18 (.22)	1.16 (.21)
Rural			1.03 (.25)	1.12 (.30)	1.09 (.26)	1.03 (.25)	.97 (.25)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Region (reference = South)							
West			.66□ (.15)	.77 (.20)	.77 (.20)	.64* (.15)	.65 (.15)
Midwest			1.01 (.24)	1.03 (.23)	1.27 (.28)	1.04 (.22)	1.07 (.23)
Northeast			1.04 (.13)	1.16 (.28)	1.26 (.34)	1.01 (.24)	.95 (.23)
Log of average household income			1.01 (.13)	1.04 (.13)	1.03 (.13)	1.00 (.13)	1.02 (.14)

Level 2 Substantive Variables

Number of grades in school				.95 (.03)			
School type (reference = private religious)							
Public				1.20 (.47)			
Private nonreligious				2.12 (1.27)			
Average class size				.98 (.02)			
School size (reference = medium)							
Small				1.09 (.25)			
Large				1.32 (.29)			
Proportion of student body female				3.81 (5.60)			
Proportion of student body black				.45 (.48)			
Proportion of student body black (squared)				5.32 (6.02)			
Percent of teachers who are black					1.01** (.00)		
Percent of teachers who are female					1.00 (.01)		
Percent of teachers with masters degrees					1.00 (.00)		

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Average dropout rate						1.02 (.13)	
Percent of students testing at or above grade level						1.03 (.13)	
School offers sex education classes							1.01 (.33)
Number of sex or health related services through school							1.02 (.02)

Level 1 observations = 5897; Level 2 N = 76; $\bar{F} p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Perhaps most notable is the range of Level 1 variables that do not appear to exert any significant influence on debut: nativity, having had sex education in school, individual religiosity, depression, closeness to school, three forms of absences, desire for college, perceptions of the future and self-perception all failed to display any significant influence on age of debut.

At the school level, only the percent teachers who are black ($p \leq .01$) and being in the West rather than the South rose to a level of significance. In every model, living in the West rather than the South reduced the hazard rate, with reductions ranging from 13 percent (Models 4 and 5, not significant) to 36 percent (Models 6, $p \leq .05$). Schools located in the West, rather than the South, provided protective factors that approached significance in models that included only Level 1 variables and Level 2 control variables (urbanicity, region, and aggregated income). Significant protective factors were found in models that included variables associated with student success (Model 6) (Table 4.3). Significance was lost in models reflecting school type (Model 4), teacher profiles (Model 5), and sex education or health services (Model 7). No significant difference in debut was found when schools from the South, which has the highest teen pregnancy rate, are compared to those from the northeast, which has the lowest (Abma et al. 2010).

Like Level 1, the most important finding may be the lack of influence of key variables, most notably the lack of significant links between debut and schools that offer sex education or

other health or sex related services such as in-school clinics and counseling. Similarly student success, and dropout rates the education level of teachers, school and classroom size as well as school setting and type were not significantly associated.

RESULTS – OLDER TEENS

Data from 4324 observations across 6 stages (16-16.5 years of age, 16.5-17, 17-17.5, 17.5-18, 18-18.5, 18.5 or older) and from 69 schools was examined through procedures mirroring those used for younger teens. The same 30 individual-level and 22 school-level variables were used (Table 4.4) (See Chapter 3 for details on variable selection).

An Intra-class Correlation Coefficient (ICC) of .02 ($p = .09$) was calculated based on the fully unconstrained model. This indicates that approximately 98 percent of model variance occurs at the individual level and two percent of model variance occurs at the school level. This must be contrasted with the .08 ICC among younger teens, indicating that school influences are stronger among those who have not acquired the symbolic and legal rights associated with the 16th birthday.

As in the case of younger teens, relatively few of the variables introduced into the model rose to the level of significance. For the most part, variables significant in the model for younger teens were also significant for older teens. Being female ($p \leq .01$ in Models 2-7, not significant in Model 1), substance use ($p \leq .001$ in all models), and negative parental attitudes toward adolescent sex ($p \leq .001$ in all models) were level 1 variables that were significant in both age groups (Table 4.5).

Being black or Hispanic was a significant risk factor for younger teens, but not for older teens, indicating that white and Hispanic debut rates converge during the later years of education. Higher English grades were significant across all models for younger teens, but lose significance

Table 4.4: Individual and School-Level Variables in Analysis of Sexual Debut among Teens 16 or Older

Variable	Mean	S.D.	Min.	Max.	Description
<i>Dependent Variable</i>					
Debut	.07	.25	0	1	Had sexual debut by Stage 2 (yes=1; else=0)
<i>Level 1 Control Variables</i>					
Female	.52	.50	0	1	
Foreign born	.15	.36	0	1	Born outside U.S. (yes=1; else=0)
Race ^a					
White (reference)	.55	.50	0	1	Race (white=1; else=0)
Black	.13	.34	0	1	Race (black=1; else=0)
Asian	.13	.33	0	1	Race (Asian=1; else=0)
Hispanic	.19	.39	0	1	Race (Hispanic=1; else=0)
Other	.03	.18	0	1	Race (other=1; else=0)
<i>Level 1 Substantive Variables</i>					
Sex Education (Ind.)	.91	.29	0	1	S. has had sex education (yes=1; else=0)
Religiosity Index	12.76	2.88	4	16	4-item scale religiosity scale (0=low, 10=medium, 16=high) alpha=.74
Depression Index	9.86	6.69	0	45	18-item depression scale (0=low, 36=medium, 72=high) alpha=.85
Substance Use Index	.98	1.13	0	6	6-item inventory of illicit drugs used (0=low, 6=high) alpha=.60
Risk Behaviors Index	2.35	3.12	0	26	14-item inventory of risk behaviors excluding substance use (0=low, 28=medium, 56=high) alpha=.72
Skipped school	.17	.38	0	1	Ever skipped school (yes=1; else=0)
Suspended	.13	.34	0	1	Ever been suspended (yes=1; else=0)
Expelled	.01	.11	0	1	Ever been expelled (yes=1; else=0)
Connectedness to school Index	15.85	2.24	5	23	6-item index of connectedness to school (0=low; 12=medium, 24=high) alpha=.72
Last English grade	1.96	.89	1	4	4-point scale (1=D or below; 4=A)
Last Math grade	2.26	1.01	1	4	4-point scale (1=D or below; 4=A)
Desire to go to college	3.63	.83	0	4	Single-item (0=low; 4=high)
Likelihood of going to college	3.37	.95	0	4	Single-item (0=low; 4=high)
Likelihood of living to 35	3.43	.77	0	4	Single-item (0=low; 4=high)
Likelihood of being killed by 21	3.36	.75	0	4	Single-item (0=low; 4=high)
Likelihood getting HIV/AIDS	3.53	.69	0	4	Single-item (0=low; 4=high)
Self-perception Index	21.53	3.93	2	28	7-item index (0=low, 18=medium, 35=high) alpha=.85
S. determines time home on weekend	.35	.48	0	1	Single item (yes=1; else=0)
S. determines who to hang out with	.87	.34	0	1	Single item (yes=1; else=0)
S. determines what to wear	.90	.30	0	1	Single item (yes=1; else=0)

Variable	Mean	S.D.	Min.	Max.	Description
Log of S. income during non-summer week	1.84	2.04	0	6.69	Weekly earnings (range \$0 to \$900) logged
Activities with mother	4.12	1.94	1	10	9-item inventory of activities (0=low; 9=high) alpha=.47
Activities with father	2.60	2.03	0	10	9-item inventory of activities (0=low; 9=high) alpha=.60
Negative parental attitudes toward adolescent sex	17.86	4.63	4	24	6-item inventory of parental attitudes (0=low; 15=medium; 30=high) alpha=.78
<u>Level 2 Control Variables</u>					
Setting					
Urban (reference)	.24	.43	0	1	City size (Urban=1; else=0)
Suburban	.53	.50	0	1	City size (Suburban=1; else=0)
Rural	.23	.42	0	1	City size (Rural=1; else=0)
Region					
South (reference)					Region (South=1; else=0)
West	.33	.47	0	1	Region (West=1; else=0)
Midwest	.25	.43	0	1	Region (Midwest=1; else=0)
Northeast	.13	.34	0	1	Region (Northeast=1; else=0)
Logged aggregated household income	1198.28	522.82	40	3098.98	Aggregated mean of household incomes, by school
<u>Level 2 Substantive Variables</u>					
Number of grades in the school	5.16	3.26	1	14	Totaled number of grades in school
School Type					
Private religious (reference)	.20	.29	0	1	Non-public schools with religious basis (yes=1; else=0)
Public	.88	.33	0	1	Public school, no religious affiliation (yes=1; else=0)
Private nonreligious	.03	.17	0	1	Non-public school, no religious affiliation (yes=1; else=0)
Average class size	27.42	6.96	15	38	Average class size (disregarding band, study hall)
Medium sized school (reference)	.29	.45	0	1	School size (Medium=1; else=0)
Small school	.12	.33	0	1	School size (Small=1; else=0)
Large school	.59	.49	0	1	School size (Large=1; else=0)
Proportion of student body that is female	.50	.08	0	1	Number of female participants divided by number of Add Health participants
Proportion of student body that is black (squared)	.07	.15	0	1	Number of black participants divided by number of Add Health participants (squared)
Proportion of student body that is black	.17	.20	0	1	Number of black participants divided by number of Add Health participants
Percent of teachers who are black	7.43	11.96	0	100	Single survey item
Percent of teachers who are female	53.24	13.81	23	99	Single survey item
Percent of teachers who have masters degrees	36.95	27.79	0	95	Single survey item

Variable	Mean	S.D.	Min.	Max.	Description
Average dropout rate	3.23	2.74	0	12.50	Sum of dropout rates for each secondary grade divided by number of secondary grades alpha=.81
Percent of students testing at or above grade level	3.74	.62	1	4	Percent testing at or above grade level (0-25%=1; 26-50%=2; 51-75%=3; 76-100%=4)
School offers sex education	.98	.15	0	1	Single survey item (yes=1; else=0)
Number of health or sex related services offered	11.03	4.55	1	17	Sum of the number of listed health or sex related services identified as offered by the school or school district (0=low; 17=high) alpha=.82

a Respondents were allowed to report more than one racial group, resulting in a total of greater than 100 percent.

for older teens in all models (Table 4.5). Similarly, the absence of a curfew reduced risk among younger teens, but was not significant among older teens.

Parental relations were substantially different between the two groups. Negative parental attitudes toward adolescent sexual behavior is more influential among older teens (Table 4.5) than among younger teens (Table 4.3) both in terms of significance ($p \leq .05$ among younger teens v. $p \leq .001$ among older teens) and in terms of hazard rate reduction (approximately 4 percent among younger teens and approximately 5 percent among older teens). Moreover, the significant influence of activities with mother is lost (Tables 4.3, 4.5). In both cases, an increase in the number of activities the teen and a parent do together is associated with a nonsignificant increase in risk.

Significant effects of school setting were found at Level 2, most notably the finding that schools in a rural setting were associated with a significantly higher risk of debut in two models. When only Level 1 variables and Level 2 control variables are introduced into the model (Model 3), risk of debut is increased by 62 percent ($p \leq .01$). When variables regarding student body composition and school organization, teacher composition, and student success are entered, risk remains increased, but is not significant (Models 4-6). When these variables are removed and sex education/ health resources are introduced (Model 7), significance and risk return (Table 4.5).

Table 4.5: Factor Change and (Standard Error) of Influences on Adolescent Sexual Debut among Teens 16 or Older

	Model 1	Model 2	Model3	Model 4	Model 5	Model 6	Model 7
<i><u>Level 1 Control Variables</u></i>							
Female	1.24 (.15)	1.53** (.22)	1.52** (.22)	1.53** (.22)	1.52** (.22)	1.52** (.22)	1.52** (.22)
Foreign born	1.13 (.25)	1.30 (.29)	1.29 (.29)	1.31 (.30)	1.29 (.29)	1.29 (.29)	1.30 (.29)
Race (reference = white)							
Black	1.12 (.26)	1.23 (.30)	1.21 (.29)	1.22 (.29)	1.21 (.29)	1.21 (.29)	1.20 (.29)
Asian	.62 (.19)	.76 (.24)	.73 (.24)	.71 (.24)	.73 (.24)	.73 (.24)	.73 (.24)
Hispanic	1.10 (.28)	1.17 (.30)	1.14 (.30)	1.15 (.30)	1.14 (.30)	1.14 (.30)	1.14 (.30)
Other	.95 (.33)	.95 (.33)	.95 (.33)	.94 (.33)	.95 (.33)	.95 (.33)	.95 (.33)
<i><u>Level 1 Variables</u></i>							
S. had sex education		.13 (.25)	1.11 (.25)	1.12 (.25)	1.11 (.25)	1.11 (.25)	1.11 (.25)
Religiosity Index		.96 (.02)	.96 (.02)	.96 (.02)	.96 (.02)	.96 (.02)	.96 (.02)
Depression Index		1.01 (.01)	1.01 (.01)	1.01 (.01)	1.01 (.01)	1.01 (.01)	1.01 (.01)
Substance Use Index		1.23*** (.07)	1.23*** (.07)	1.23*** (.07)	1.23*** (.07)	1.23*** (.07)	1.23*** (.07)
Risk Behaviors Index		1.03 (.02)	1.03 (.02)	1.04 (.02)	1.03 (.02)	1.03 (.02)	1.03 (.02)
Skipped school		1.01 (.16)	1.01 (.16)	1.01 (.16)	1.01 (.16)	1.01 (.16)	1.01 (.16)
Been suspended		1.31 (.24)	1.29 (.24)	1.28 (.24)	1.28 (.24)	1.29 (.24)	1.29 (.24)
Been expelled		1.59 (.66)	1.60 (.66)	1.61 (.66)	1.53 (.63)	1.59 (.66)	1.58 (.65)
Closeness to School Index		1.01 (.03)	1.01 (.03)	1.01 (.03)	1.01 (.03)	1.01 (.03)	1.01 (.03)

	Model 1	Model 2	Model3	Model 4	Model 5	Model 6	Model 7
Last English grade	.89 (.07)	.89 (.07)	.89 (.07)	.89 (.07)	.88 (.07)	.89 (.07)	.88 (.07)
Last Math grade	1.09 (.07)	1.09 (.07)	1.09 (.07)	1.09 (.07)	1.09 (.07)	1.09 (.07)	1.09 (.07)
Desire to go to college	1.02 (.10)	1.03 (.10)	1.03 (.10)	1.03 (.10)	1.02 (.10)	1.03 (.10)	1.02 (.10)
Likelihood of going to college	1.00 (.09)	1.00 (.09)	1.00 (.09)	1.00 (.09)	1.00 (.09)	1.00 (.09)	1.00 (.09)
Likelihood of living to 35	.97 (.08)	.97 (.08)	.98 (.09)	.97 (.08)	.97 (.08)	.97 (.08)	.97 (.08)
Likelihood of being married by 25	1.07 (.10)	1.07 (.10)	1.07 (.10)	1.07 (.10)	1.07 (.10)	1.07 (.10)	1.07 (.10)
Likelihood of being killed by 21	1.05 (.10)	1.05 (.10)	1.05 (.10)	1.05 (.10)	1.05 (.10)	1.05 (.10)	1.05 (.10)
Self-perception Index	.96 (0.2)	1.00 (.02)	.99 (.02)	1.00 (.02)	1.00 (.02)	1.00 (.02)	1.00 (.02)
S. determines time home on weekends	.94 (.12)	.93 (.12)	.93 (.12)	.93 (.12)	.93 (.12)	.93 (.12)	.93 (.12)
S. determines who to hang out with	1.11 (.23)	1.11 (.22)	1.10 (.22)	1.11 (.22)	1.11 (.22)	1.11 (.22)	1.12 (.23)
S. determines what to wear	.87 (.19)	.87 (.19)	.86 (.19)	.87 (.19)	.87 (.19)	.87 (.19)	.87 (.19)
Log of s. income in a non-summer week	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)
Activities with mother	1.02 (.04)	1.02 (.04)	1.02 (.04)	1.02 (.04)	1.02 (.07)	1.02 (.04)	1.02 (.04)
Activities with father	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)	1.04 (.03)
Negative parental attitudes toward sex	.95*** (.01)	.95*** (.01)	.95*** (.01)	.95*** (.01)	.95*** (.01)	.95*** (.01)	.95*** (.01)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>Level 2 Control Variables</i>							
Setting (reference = urban)							
Suburban			1.18 (.21)	.79 (.18)	1.18 (.21)	1.18 (.22)	1.18 (.21)
Rural			1.62** (.30)	1.28 (.34)	1.54 (.29)	1.63 (.32)	1.61* (.32)
Region (reference = south)							
West			.66* (.12)	.96 (.28)	.79 (.18)	.66 (.12)	.65* (.13)
Midwest			.68* (.12)	.80 (.18)	.82 (.17)	.68 (.12)	.70* (.13)
Northeast			.93 (.18)	1.08 (.23)	1.08 (.23)	.93 (.18)	.96 (.19)
Log of average household income			1.05 (.13)	1.16 (.17)	1.05 (.13)	1.05 (.13)	1.08 (.14)
<i>Level 2 Variables</i>							
Number of grades in school				.88* (.05)			
School type (reference = private religious)							
Public				1.20 (.41)			
Private nonreligious				.82 (.44)			
Average class size				.98 (.02)			
School size (reference = medium)							
Small				2.04 (.85)			
Large				.65 (.12)			
Proportion of student body that is female				.60 (.64)			
Proportion of student body that is black				1.03 (1.03)			

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Proportion of student body that is black (squared)				1.16 (1.37)			
Percent of teachers who are black					1.01 (.00)		
Percent of teachers who are female					1.00 (.01)		
Percent of teachers with masters degrees					1.00 (.00)		
Average dropout rate						1.00 (.02)	
Percent of students testing at or above grade level						1.02 (.11)	
School offers sex education classes							.69 (.25)
Number of sex or health related services through school							1.00 (.02)

Level 1 observations = 4324; Level 2 N = 69; † p ≤ .10; *p ≤ .05;; *p ≤ .01; *p ≤ .001

Similar patterns were found when region was considered, with schools in the West and Midwest being significantly more protective than those in the South, but only when factors of school organization, student body composition, faculty characteristics, and student success were removed from the model. Schools in the Northeast were not significantly different from schools in the South despite substantially different birth rates.

The number of grades in the school inhibited debut such that adding one grade reduces risk by approximately 12 percent (Table 4.5).

DISCUSSION

This research sought, in part, to challenge assumptions that variations in sexual behavior were based more on individual factors rather than on social structure. The intra-class correlations coefficients (ICC) represent an attempt to empirically measure the comparative effects of individual-level variables to those of larger social structures. This measure is particularly important in that it does not reflect the influence of introduced variables, but instead partitions variance into Level 1 and Level 2 groups, in this case individuals as Level 1 and schools as Level 2 (Hox 2010: 17). With ICCs indicating that schools account for eight percent of variation among younger teens and two percent of variation among older teens, the assumptions that research should focus on individual-level variables and that schools are benign institutions are clearly challenged for younger teens.

The sparsity of significant findings at Level 2 does not challenge the finding that schools exercise a significant influence on sexual debut. Instead, the lack of significance indicates that the models proposed here – based in large part on previous research focused on individual characteristics – are badly fit to the phenomena of interest. Stated more simply, by focusing on the small picture, previous research has missed a major influence.

This is not to be interpreted as a criticism of previous research. Rather, it is a salient recognition that research into adolescents is complex and contradictory, as is any research into human sexuality. When these are combined, searching for simple answers is Quixotic at best.

It must be noted that although the theoretical basis of this research is focused on empowerment and many of the variables in this model were selected because they were assumed to reflect some facet of empowerment, empowerment itself was not directly measured. Indeed, it is unlikely that empowerment can be directly measured or fully operationalized. Instead

empowerment must be viewed as a broad latent variable that might be reflected in overall model patterns rather than the significance of single variables. Moreover, the theoretical basis of this work links empowerment to access to a broad or constrained range of spheres of power. These must be considered as schools are linked to debut.

The few significant findings do give us glimpses into such linkages. The findings among both age groups that embodied risk in the form of substance use is highly significant and increases the hazard rate of debut by 23 to 53 percent is important, particularly when contrasted to the nonsignificant effects of less embodied forms of delinquency (Tables 4.3, 4.5). These findings support Hypothesis 2 and strengthen my proposed theoretical foundation.

The impact of race is also worth noting. Hypothesis 1 predicted that being black or Hispanic would be associated with higher risk, which was supported with limitations. Among younger teens, being black or Hispanic significantly increased risk in all models by up to 100 percent (blacks) or 69 percent (Hispanic). Among older teens, being black or Hispanic failed to reach significance in any model. This likely indicates that racial rates of debut converge as teens age and are most influential among younger teens.

At the school level, I posited that higher proportions of student bodies comprised of traditionally disempowered groups (blacks and females) would be associated with increased risk (Hypothesis 4) and that higher levels of black faculty would be similarly associated with risk (Hypothesis 5). Findings were again insignificant in all but one case (percent of teachers who are black (Group 1)).

Schools are also divided by school types. In Hypothesis 3, I posit that private nonreligious schools will represent access to a expanded range of future spheres of power and will thus be more protective than public or private religious schools. Although these comparisons failed to reach significant levels in either age group, findings were in the expected direction. No support for this was found in either group (Hypothesis 6).

The nuanced nature of the relationship between schools and debut is also evident in the effect of English grades as compared to grades in Math. Although school success and grades have been noted as significant (see Kirby and Lepore 2007), Math grades were higher than English grades but only English grades were significantly associated with debut. English grades were significant in all models for younger teens but were not significant for older teens. Finally, rather than protective, higher grades in either Math or English increased risk. It is difficult to explain this (and I will not attempt to do so); however, it appears that simply comparing GPA to debut will not provide a clear picture. Subject matter and age must also be considered, adding a level of complexity to the simple model proposed by previous research.

At the school level, student success (Hypothesis 7), sex education (Hypothesis 8) and sex/health programs (Hypothesis 9) appear to be unrelated to debut. Neither of the variables reflecting average student success (dropout rates and percent of students testing at or above grade level) were significant in either group. Similarly, schools offering sex education or an expanded menu of sex or health related services evidenced no delay in debut in any model or in either age group. Clearly, no support was found for Hypotheses 8 or 9, challenging the assumption that early debut can be effectively addressed through in-school educational programs and associated services.

The two age groups presented important differences in the influences of race and parental attitudes as well as region, urbanicity, and the effect of faculty racial compositions (Tables 3, 5). At a minimum, these findings underscore how important it is for researchers to consider age groups rather than studying teens as a unitary population. Perhaps more importantly, most American school districts divide students into programs roughly parallel to these age groups. It is possible that the age group changes we see are also related to school structures or programs that co-occur.

While it is tempting to extend the theory of embodied spheres of power to findings such as the hazard rate reduction associated with the absence of a curfew, such conclusions cannot be

substantiated by this research. It is possible that the absence of a curfew is an aspect of empowerment, but the absence of a curfew does not imply that the individual has a variety of spheres in which power may be exercised. It is more likely that the absence of a curfew is enjoyed by a large number of teens who are minimally supervised or who simply do not go out on the weekends often enough to require a curfew.

Instead, conclusions drawn from this research must highlight the powerful effect of schools and the potential that we are missing robust opportunities to address adolescent debut by limiting the role of schools to sex education, which this research indicates is ineffective. It is difficult to identify which variables might account for a school's influence, although several might serve as worthwhile subjects for future research. As noted earlier in this chapter, those programs which have been shown as most effective in delaying adolescent sexual debut provide assistance and opportunities beyond those normally found in schools and which might be associated with empowerment but are not necessarily associated with sex education or pregnancy prevention. Future research on school structure should identify programs such as after-school tutoring or volunteer opportunities and measure their effects on adolescent debut.

A second aspect of school structure that might be considered is the school's policies affecting student socializing. Research might consider whether or not students are allowed to leave campus, how much time is allowed between classes, what students are or are not allowed to do before classes start in the morning or after they end, and whether or not the school provides space for socializing. It should also recognize that teen peer networks are largely defined by school district boundaries, meaning that individual friendship choice is largely constrained by school structures.

The role of the school must be recognized before it can be retooled as an effective means of delaying adolescent debut. This research indicates that schools play an important role in determining when first sex occurs. Moreover, this research makes a strong statement about how schools have been and should be utilized in addressing adolescent sexuality. To date, the focus of

school involvement has been the introduction of sex education classes which failed to exert influence at either the individual or school level. However, a large proportion of variance in sexual debut is centered at the school level, particularly among younger teens. Clearly, some aspect of school life is contributing to adolescent decision-making regarding sexuality and thus is available as a tool for combating the problem of teen pregnancy, especially among younger teens. By identifying this relationship we strengthen our ability to improve our society and the lives of adolescents and their offspring. Conversely, continuing to assume that the schools' role is limited to classroom education is to perpetuate the risk of early debut and pregnancy and the associated costs.

These findings should be compared to the analysis in the next chapter, which uses sequential logit models to identify factors associated with debut and then with pregnancy (given that debut has already occurred). In this next analysis the sample is somewhat different, as will be described. Through the comparison of these two analyses, a more complete understanding of the effects of schools on adolescent sexual behavior will be possible.

END NOTES:

1. Darroch et al. relied on measures of respondents in their twenties who reported on their sexual behavior during their teens rather than on self-reports of current teens.
2. Data was synthesized from the following sources. Sweden: National Swedish Survey (1996), Swedish Family Survey (1992-3), and surveys of two towns in Northern Sweden (1986; 1991). France: Survey of Sexual Behavior of Young People (1994); Survey of Sexual Behavior (1992); Survey on Families and Employment (1994). Canada: General Social Survey (1995); National Population Health Survey (1996). Great Britain: National Survey of Sexual Attitudes and Lifestyles (1990-1991). United States: National Survey of Family Growth (Cycle 5) (1995); National Survey of Adolescent Males (1995). Percent who had sex before given age and median age at first sex reflect retrospective reports by participants 20-24 years of age. Swedish percent who ever had sex were based on 1996 National Swedish Population Survey, which only includes data for 18 and 19 year olds. French estimates of percent of 15-19 year olds who ever had sex "is synthetic, obtained by combining results on 15-17-year-olds from the 1994 Survey of Sexual Behavior of Young People and results on the 18-19-year-olds from the 1992 Survey of Sexual Behavior, and applying these proportions to the 1995 populations for both age-groups. British figures for percent who ever had sex were drawn from data using different age groups (16-19 rather than 15-19; 16-17 rather than 15-17).
3. Although the works cited indicate that delinquency is a result of early sexual debut, other research indicates that chances of early debut are increased by delinquent behaviors. As a result, these are frequently presented as co-occurring phenomenon (Coker, Richter, Valois and McKeown 1994; Costa et al. 1995)
4. They reviewed five programs reporting atypically high success rates: Postponing Sexual Involvement, Reducing the Risk, School/Community Program, Self Center and Teen Talk. Three of the five (School/Community Program, Self Center, and Teen Talk) incorporated community and/or health services and personnel; however all five programs were designed for school-based dissemination. Only four of the five measured the program's effect on sexual debut. In all four cases, debut was significantly delayed.
5. Not all Level 2 variables are reflected in hypotheses. Those omitted from hypotheses include the number of grades in the school, class size and school size. These were introduced into Model 4 (school organization) on an exploratory basis.
6. This figure does not reflect the average household income of all school students nor does it reflect the average household income of all Add Health participants. Instead, it represents the average of the subset of student participants who had parents willing to be interviewed. Other options for measuring income include reliance on student reports of household income, use of census block or tract data regarding income of the surrounding neighborhood or community, or use of student reports of welfare receipt. Aggregated parent reports of household

income were assumed to be more accurate and more likely to represent income variation represented in the student body, and so were selected.

7. A single model was contraindicated by the limited number of observations at Level 2.
8. In accordance with Rabe-Hesketh and Skrondal (2008: 360, 362) a pseudo ICC was calculated assuming the presence of a latent variable and substituting a level 1 variance of $\pi^2/6$. The resultant formula is:

$$\text{ICC: } \rho = \tau_{00} / (\tau_{00} + (\pi^2 / 6))$$

CHAPTER V

ADOLESCENT PREGNANCY

Ultimately, it's pregnancy that changes everything. When pregnancy occurs during teen years, it is associated with long-term and wide ranging consequences. Regardless of the outcome, it represents a turning point in the lives of both parents. The teens, their children, their families, and society at large is affected, making it a serious social problem. In this section, I will distinguish pregnancy from debut, briefly recap research into adolescent pregnancy and the theoretical basis of this research, describe the variables, and hypotheses. I will review the sequential logit method used in this research and discussed in Chapter 3. I finish this chapter by presenting and discussing the findings.

Debut v. Pregnancy

In distinguishing pregnancy from debut, there are some rather obvious differences that bear a moment of our attention. First, although anyone can experience debut, only females can experience pregnancy. Certainly teenage fathers can and do participate in raising their children even before birth (Beers and Hollo 2009; Parra-Cardona, Wampler and Sharp 2006; Paschal, Lewis-Moss and Hsiao 2011; Percheski and Wildeman 2008).

However, more than 80 percent of teenage births are to unmarried females (as opposed to only 14% in 1955) (Hamilton et al. 2010). Even pregnancy rates vary substantially depending on whether they are based on male or female self-reports with men reporting fewer pregnancies than women (Poston and Chang 2005). Consequences of teen pregnancy are also more severe for females than for males, with females spending more years as a single parent (Hotz, McElroy and Sanders 1997) and males contributing an average of only \$800 per year (Brien and Willis 1997). These facts illustrate that there are differences in the ways male teens and female teens experience pregnancy and in this research our focus will be limited to females.

A second difference involves attempts to count or measure pregnancy as compared to debut. Debut is measured through self-reports collected through representative samples, either nationally or among identified groups. When we move to pregnancy, self-report remains a primary means of estimation; however, estimates can also be based on objectively countable events such as the number of teen childbirths and abortions. Counts of pregnancies, abortions, fetal deaths, and miscarriages (see Adolescent Pregnancy Prevention Campaign of North Carolina 2009; CDC 1999; Ventura, Abma, Mosher and Henshaw n.d.) can be totaled or can represent previously estimated ratios (such as live births to pregnancies) allowing an estimated pregnancy rate. This leads to some variation in reported teen pregnancy rates, based on the model utilized. In this research, I rely on student reports of pregnancy.

Finally, I must note that the pregnancy rate is not a measure of how many teens are having sex. The pregnancy rate can increase if more teens have sex, but it can also increase if fewer teens have sex but do so without contraceptives.¹ Even among those

who have experienced debut, the chances of pregnancy are influenced by the frequency of sex, the consistency and correct use of contraceptives and the length of time during which they've been sexually active (Brückner, Martin and Bearman 2004; Raine et al. 2000; Resnick et al. 1998). Pregnancy rates are simply the rate at which teens become pregnant and must not be perceived as anything more. This observation challenges research that measures the influence of variables on pregnancy without accounting for associated behaviors. Simply measuring pregnancy without considering debut conflates these distinct behaviors and may fail to identify factors that affect the behaviors in different ways. Given these clarifications, I move on to reviewing what we know about teen pregnancy.

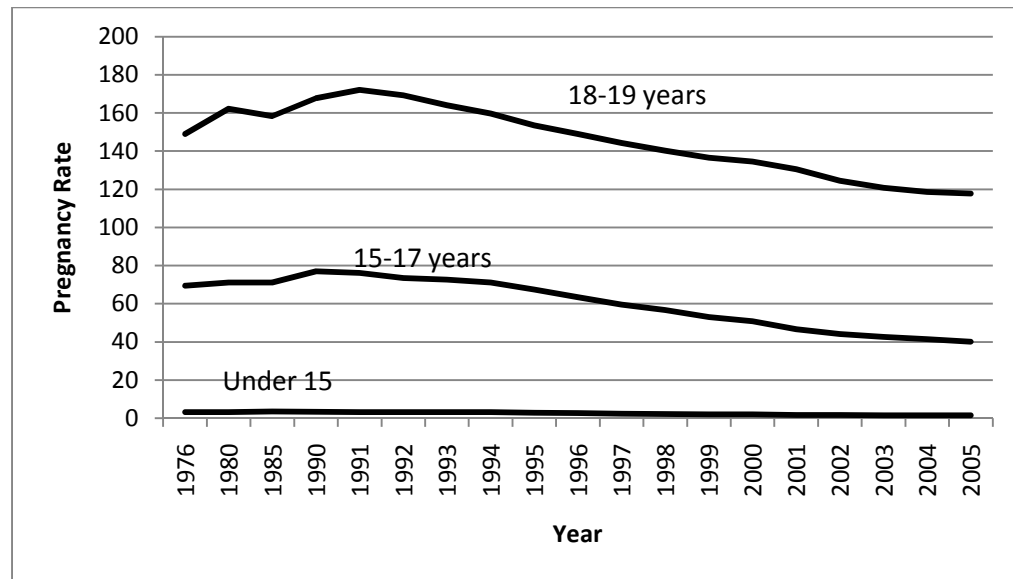
Teen Pregnancy Trends and Research

America's teen pregnancy rate in 2006 was 71.5 (per 1,000 females aged 15-19), which was down considerably from the late 1990's high of 116.9² (Guttmacher Institute 2010); however, it is estimated that more than 750,000 teens became pregnant in 2006 – roughly seven percent of women in that age group (Guttmacher Institute 2010). About 60 percent of all teen pregnancies result in a birth, 27 percent result in abortion and 14 percent in miscarriage (Kost et al. 2010). When limited to a sample of sexually active teens, the pregnancy rate is 152.8 per 1,000 sexually active females aged 15-19 (Kost et al. 2010).

Teen pregnancy rates are highly influenced by age, with oldest teens (18-19) much more likely to become pregnant (see Figure 1) (Child Trends n.d.). Strong racial differences in pregnancy rates are present. In 2006, white teens displayed a pregnancy

rate of 44 per 1,000 females 15-19. Native American teens had a slightly higher rate (54.7) and Asian/Pacific Islander a lower rate (17). In contrast, Hispanics had a rate of 126.6 and blacks had a rate of 126.3 (Kost et al. 2010).

Figure 5.1. U.S. Teen Pregnancy Rate by Age Group 1976-2005



Source: Child Trends n.d.³

As in the case of debut, numerous variables have been suggested as predictors of pregnancy (Kirby and Lepore 2007). More research into the effects of social structure on pregnancy has been conducted than can be found regarding debut. State policies and programs that address teen pregnancy in a coordinated manner reduce the risk of teen pregnancy (Moore et al. 1994) but restrictive laws regarding contraceptive use increases risk (Lundberg and Plotnick 1990; 1995). Higher levels of education at the state (Liao et al. 1999) and local (Kirby et al. 2001) levels have been identified as protective factors. Higher income rates that might be associated with higher education levels have not been

consistently identified as a protective factor, although no research has associated higher income with increased risk (Kirby and Lepore 2007).

Employment and income patterns are unclear. Kirby et al. (2001) found that levels of female employment increased risk, but found that higher employment levels among males had the same effect. If higher employment is a risk factor, logically higher unemployment should be a protective factor, possibly allowing for more parental supervision. Instead, no significant relationship was found (Ku et al. 1993), nor has a consistent relationship been found between community levels of welfare receipts and teen pregnancy (Kirby and Lepore 2007).

Community quality of life factors have also been associated with teen pregnancy such that higher crime rates or community stress levels increase pregnancy risk (Moore et al. 1994; Lanctot and Smith 2001) and lower levels reduce risk (Crowder and Teachman 2004). Age and gender demographics also affect pregnancy so that communities with more never-married females aged 15-25 have lower teen pregnancy rates than communities with fewer women that age who have never been married. (Kirby et al. 2001).

At a school level, higher levels of crime are associated with higher risk of pregnancy (Chandy, Harris, Blum and Resnick 1994). Risk is reduced when the school program is more intensely focused on academic learning (Kasen, Cohen and Brook 1998) or when contraceptive instruction is offered (Raj et al. 2000). Sex education, HIV/STD education, (Beier, Rosenfeld, Spitalny and Zansky et al. 2000) and condom distribution did not appear to have any significant effect on pregnancy (Bearman and Brückner 1999; Blake, Ledsky, Goodenow and Sawyer et al. 2003; Manlove et al. 2004; Oettinger 1999).

Although community levels of education are associated with teen pregnancy rates, school dropout rates are not (Ku et al. 1993).

Individual-level variables that have been associated with pregnancy are wide ranging (see Kirby and Lepore 2007) and quite similar to those associated with debut. At the individual level being black or Hispanic rather than white increases risk (Crowder and Teachman 2004; Hogan, Sun and Cornwell 2000; Zavodny 2001). Among Hispanics, greater acculturation results in increased risk (Kaplan et al. 2002). Positive attitudes toward school (Plotnick 1992) and higher educational aspirations (Lancot and Smith 2001; Plotnick 1992) is protective but being behind in school increases risk (Ku et al. 1993; Stouthamer-Loeber and Wei 1998). Risk behaviors (Crosby DiClemente, Wingood and Harrington et al. 2002; Kasen et al. 1998; Voisin, Salazar, Crosby and DiClemente et al. 2004) and substance use (Crosby et al. 2002; Miller-Johnson, Winn, Cole and Malone et al. 2004; Raj et al. 2000) have been repeatedly associated with greater likelihood of pregnancy. Individuals with an internal locus of control are less likely to become pregnant, possibly due to greater ability to negotiate first sex and contraceptive use (Plotnick 1992; Young, Turner, Denny and Young 2004). Like debut, more positive attitudes toward contraception reduce pregnancy (Zabin, Astone and Emerson 1993) and perceiving parenthood as “easy” increases risk (Holden and Nelson 1993). However, believing that pregnancy will have negative consequences reduces the likelihood of pregnancy but does not have an effect on debut (Blum and Rinehart 1997). Fear of HIV/AIDS does not affect debut, but reduces the likelihood of pregnancy (Boyer, Tschann and Shafer 1999; Newcomb, Locke and Goodyear 2003) possibly through increased use of condoms.

Theoretical Basis

As discussed earlier, this research uses a synthesis of the works of Michel Foucault and Peter M. Blau as a theoretical foundation. According to this synthesis, *social structure* is defined as a distribution of opportunity. *Opportunity* is in turn defined as a range of spheres in which actors are allowed to exercise power, which is viewed as an emergent and oppositional process rather than a commodity. I predict that as the range of spheres of power to which an adolescent has access (either now or anticipated in the future) is expanded, the probability that power will be exercised in any one sphere are reduced. However, as the range of spheres of power is constrained, the probability that power will be exercised in any one sphere is increased. Moreover, I posit that the body is a sphere of power that cannot be separated from the actor and thus, as the range of spheres of power is constrained, the probability that power will be exercised through the body increases. From these, I predict that sexual behavior is an embodied exercise of power that is more likely to occur among those with a limited range of spheres of power. As a social institution, schools are predicted to replicate and reinforce the distribution of opportunity afforded by society and therefore schools will impact outcomes of embodied power, including the chances of adolescent pregnancy.

ANALYSIS

In this section I will move from the background on which this research is based to the process of analysis and the findings. First I will review the variables included, then the hypotheses presented. Finally, I will present the results and discuss the findings.

Variables

Although there are some distinctions between debut and pregnancy (as discussed earlier), research into both aspects of sexual behavior tends to consider the same antecedents and finds similar results (see Kirby and Lepore 2007). If we accept the theory upon which this research is based, both debut and pregnancy must be interpreted as exercises of embodied power; however, they are distinct behaviors. Obviously, one can become sexually active without becoming pregnant, but one cannot become pregnant without first becoming sexually active. Indeed, for many teens, pregnancy will block access to future spheres of power by limiting access to education, employment and earnings or through the loss of social capital and status.

Nevertheless, it is the range of current or future spheres of power that is predicted to increase or decrease the likelihood of embodied power, whether it is exercised through debut or pregnancy. Thus, I use the same variable set utilized in the analysis of debut with one exception (see Table 5.1). As noted before, to exercise embodied power through pregnancy, a teen must first exercise power through debut and some teens may lose access to potential spheres of power through the stigma of teen pregnancy.

The variable skipped school was also modified. In the reconfigured sample (described below), approximately 20 percent of respondents refused to answer the question about whether or not they had ever skipped school. To maintain a sufficient sample size, the variable skipped used in the debut analysis was divided into those who reported never skipping school (reference), those who admitted skipping school, and those who refused to answer the question.

Table 5.1: Individual and School-Level Variables in Analysis of Adolescent Pregnancy

Variable	Mean	S.D.	Min.	Max	Description
<i><u>Dependent Variables</u></i>					
Debuted	.02	.12	0	1	Had sexual debut by Wave 2 (yes=1; else=0)
Pregnancy	.20	.40	0	1	Pregnant at Wave 2 or Between Waves 1 and 2 (yes=1; else=0)
<i><u>Level 1 Control Variables</u></i>					
Foreign born	.10	.30	0	1	Born outside U.S. (yes=1; else=0)
Race					
White (reference)	.57	.50	0	1	Race (white=1; else=0)
Black	.18	.39	0	1	Race (black=1; else=0)
Asian	.08	.27	0	1	Race (Asian=1; else=0)
Hispanic	.17	.38	0	1	Race (Hispanic=1; else=0)
Other	.03	.18	0	1	Race (other=1; else=0)
<i><u>Level 1 Substantive Variables</u></i>					
Sex Education (Ind.)	.88	.32	0	1	S. has had sex education (yes=1; else=0)
Religiosity Index	12.78	3.03	4	16	4-item scale religiosity scale (0=low, 10=medium, 16=high) alpha=.80
Depression Index	10.07	7.14	0	45	18-item depression scale (0=low, 36=medium, 72=high) alpha=.88
Substance Use Index	.90	1.16	0	6	6-item inventory of illicit drugs used (0=low, 6=high) alpha=.67
Risk Behaviors Index	2.34	3.42	0	34	14-item inventory of risk behaviors excluding substance use (0=low, 28=medium, 56=high) alpha=.78
Skipped school					Ever skipped school (yes=1; else=0)
Never skipped (ref.)	.83	.37	0	1	Never skipped school (yes=1; else=0)
Admitted skipping	.11	.32	0	1	Admitted skipping school (yes=1; else=0)
Refused to answer	.05	.23	0	1	Refused to answer (yes=1; else=0)
Suspended	.12	.32	0	1	Ever been suspended (yes=1; else=0)
Expelled	.01	.11	0	1	Ever been expelled (yes=1; else=0)
Connectedness to school Index	15.69	2.37	6	23	6-item index of connectedness to school (0=low; 12=medium, 24=high) alpha=.75
Last English grade	1.90	.89	1	4	4-point scale (1=D or below; 4=A)
Last Math grade	2.20	.99	1	4	4-point scale (1=D or below; 4=A)
Desire to go to college	3.66	.80	0	4	Single-item (0=low; 4=high)
Likelihood of going to college	3.42	.93	0	4	Single-item (0=low; 4=high)
Likelihood of living to 35	3.44	.81	0	4	Single-item (0=low; 4=high)
Likelihood of being killed by 21	3.37	.79	0	4	Single-item (0=low; 4=high)
Likelihood getting HIV/AIDS	3.57	.70	0	4	Single-item (0=low; 4=high)
Self-perception Index	21.33	4.16	2	28	7-item index (0=low, 18=medium, 35=high) alpha=.61
S. determines time home on weekend	.25	.43	0	1	Single item (yes=1; else=0)

Variable	Mean	S.D.	Min.	Max	Description
S. determines who to hang out with	.84	.36	0	1	Single item (yes=1; else=0)
S. determines what to wear	.88	.32	0	1	Single item (yes=1; else=0)
Log of S. income during non-summer week	1.45	1.81	0	6.69	Weekly earnings (range \$0 to \$900) logged
Activities with mother	4.40	1.98	1	10	9-item inventory of activities (0=low; 9=high) alpha=.45
Activities with father	2.28	2.02	0	10	9-item inventory of activities (0=low; 9=high) alpha=.64
Negative parental attitudes toward adolescent sex	19.39	4.24	0	24	6-item inventory of parental attitudes (0=low; 15=medium; 30=high) alpha=.71
<i>Level 2 Control Variables</i>					
Setting					
Urban (reference)	.30	.46	0	1	City size (Urban=1; else=0)
Suburban	.52	.50	0	1	City size (Suburban=1; else=0)
Rural	.19	.39	0	1	City size (Rural=1; else=0)
Region					
South (reference)	.36	.48	0	1	Region (South=1; else=0)
West	.26	.44	0	1	Region (West=1; else=0)
Midwest	.23	.42	0	1	Region (Midwest=1; else=0)
Northeast	.15	.36	0	1	Region (Northeast=1; else=0)
Logged aggregated household income	6.96	.56	3.14	8.65	Aggregated mean of household incomes, by school
<i>Level 2 Substantive Variables</i>					
Number of grades in the school	5.05	3.54	1	14	Totaled number of grades in school
School Type					
Private religious (reference)	.08	.27	0	1	Non-public schools with religious basis (yes=1; else=0)
Public	.89	.31	0	1	Public school, no religious affiliation (yes=1; else=0)
Private nonreligious	.03	.16	0	1	Non-public school, no religious affiliation (yes=1; else=0)
Average class size	26.44	6.38	13	38	Average class size (disregarding band, study hall)
School Size					
Medium sized school (reference)	.44	.50	0	1	School size (Medium=1; else=0)
Small school	.21	.41	0	1	School size (Small=1; else=0)
Large school	.35	.48	0	1	School size (Large=1; else=0)
Proportion of student body that is female	.52	.06	0	.67	Number of Add Health participants divided by number of female participants
Proportion of student body that is black	.21	.24	0	1	Number of Add Health participants divided by number of black participants
Proportion of student body that is black (squared)	.10	.20	0	1	Number of Add Health participants divided by number of black participants (squared)
Percent of teachers who are black	10.05	16.71	0	100	Single survey item

Variable	Mean	S.D.	Min.	Max	Description
Percent of teachers who are female	59.32	15.83	23	100	Single survey item
Percent of teachers who have masters degrees	38.98	25.18	0	95	Single survey item
Average dropout rate	2.19	2.76	0	12.5	Sum of dropout rates per secondary grade divided by number of secondary grades alpha=.77
Percent of students testing at or above grade level	3.68	.68	1	4	Sum of students testing at grade level and students testing above grade level
School offers sex education	.95	.22	0	1	Single survey item (yes=1; else=0)
Number of health or sex related services offered	11.55	4.38	1	17	Sum of the number of listed health or sex related services identified as offered by the school or school district (0=low; 17=high) alpha=.84

A second change was required by the sequential logit method used. In order to estimate sequential logit models that could also be estimated using Heckman probit (to account for sample selection bias), I had to include some variables in the debut equation that were excluded from the pregnancy equation in order to identify the Heckman probit model. Based on results for the earlier analyses, I removed logged student income, average household income and the Depression Index from the pregnancy equation (although they appear in the debut equation).

Hypotheses

In the debut chapter I outlined a series of 9 hypotheses, which I also applied to my analysis of pregnancy. Hypotheses 1 through 7 are based on the theoretical basis presented earlier; Hypotheses 8 and 9 reflect current social assumptions reflected in the primary school-based strategies for addressing teen pregnancy and early debut. These hypotheses are:

- H₁: Being black or Hispanic (compared to white) will be associated with higher risk of pregnancy.
- H₂: Embodied delinquency (substance use) will be significantly and positively associated with pregnancy.
- H₃: Teens attending private nonreligious schools will be at less risk of pregnancy than will teens attending public schools or private religious schools.
- H₄: Teens attending schools with higher proportions of female or black students will be at higher risk of debut or pregnancy than those attending schools with lower proportions.
- H₅: Teens attending schools with a higher proportion of teachers who are black or female will be at greater risk of pregnancy.
- H₆: Teens attending schools with a higher proportion of teachers with masters degrees or high will be at reduced risk of pregnancy.
- H₇: Schools with greater levels of student success as reflected in lower dropout rates and a higher proportion of students testing at or above grade level, will be associated with lower risk of pregnancy.
- H₈: Schools offering sex education classes will be associated with reduced risk of pregnancy.
- H₉: Schools offering a greater number of health and sexuality related services will be associated with lower levels of risk of pregnancy.

These nine hypotheses will be tested using a subsample of Add Health participants and sequential logit . Both are described in the sections below.

Sample

Like debut, this analysis uses data from in-home interviews collected during Waves 1 and 2 of the National Longitudinal Study of Adolescent Health along with school administrator data and contextual data.

Two dependent variables were used. *Debut* was defined as reported debut by Wave 2 (recalling that the sample is limited to those who had not experienced debut before Wave 1). *Pregnancy* was defined as a binary variable with those who became pregnant after Wave 1 but before Wave 2 coded as 1.

The sample used in this analysis was somewhat different, primarily in that the sample was limited to females. The sample was further limited to those who reported that they had not experienced debut by Wave 1 and had not been married at either wave. Due to the smaller sample size, respondents of all ages are included in a single analysis with three models: individual variables only, individual variables with school variables representing the school's setting and organization, and individual variables with variables representing the school's faculty and student body composition.

Method of Analysis

Limitations noted above substantially reduced the size of the subject pool. This was particularly evident at Level 2. Forty-five schools presented no cases of pregnancy and 56 had fewer than ten cases. As a result, Level 2 cluster sizes were too small to allow

for multilevel models. Therefore, I use a single-level model (sequential logit) and adjust the standard errors for clustering within schools.

The sequential nature of debut and pregnancy does allow for other means of analysis that make it possible to separate the effects of debut and pregnancy. Sequential logit, a form of nested logit, can be applied to processes that are “a nested sequence of decisions or steps” (Buis 2009), with each step usually representing a binary decision (Liao 1994). Decisions are irreversible, meaning the order of the steps cannot be reversed and they cannot be taken out of order. Each step is seen as a result of the previous and is based on a subsample of those who successfully made the transition from the previous stage (Liao 1994). In this case, debut constitutes the first stage. The second stage is pregnancy given that sexual debut has occurred.

In sequential logit, binary logit equations are estimated simultaneously for each stage and results are similar to running separate binary logits for each stage with the sample limited in each stage to the subsample indicated by the previous stage (Fullerton 2009). Sequential logit relaxes the “parallel regression assumption” that the effects of independent variables are constant across stages (Liao 1994; Fullerton 2009; Fullerton and Dixon 2009), allowing distinct coefficients for each stage. I include individual- and school-level variables in the models and adjust for the clustering of observations within schools with robust standard errors.

Results

I have a final sample of 2635 female adolescents participating in Wave 1 and Wave 2 in-home Add Health interviews who had not experienced sexual debut or pregnancy by Wave 1. They comprised 78 school clusters.

Table 5.2: Sequential Logit of Debut and Pregnancy (Given that Debut has Occurred) – Odds Ratios and (Robust Standard Errors)

<i>Individual Variables</i>	Model 1		Model 2		Model 3	
	Debut	Preg.	Debut	Preg.	Debut	Preg.
Foreign born	2.11*** (.16)	1.05 (.86)	2.11*** (.16)	1.06 (.83)	2.10*** (.17)	1.05 (.86)
Race (reference = white)						
Black	.63** (.16)	.80 (.45)	1.73*** (.15)	1.30 (.54)	1.63** (.18)	1.09 (.77)
Asian	.96** (.18)	.99 (.59)	.92 (.20)	1.42 (.70)	.85 (.21)	1.63 (.78)
Hispanic	1.11 (.17)	.39 (.35)	1.37 (.22)	1.68 (.49)	1.31 (.12)	1.74 (.52)
Other	1.26 (.27)	.87 (.12)	1.22 (.27)	.62 (1.11)	1.20 (.27)	.62 (1.16)
S. had sex education	.97 (.19)	1.02 (.57)	1.22 (.19)	.83 (.62)	1.20 (.19)	.34 (.62)
Religiosity Index	1.00* (.02)	.98 (.06)	1.00* (.02)	1.00 (.07)	1.00* (.02)	1.00 (.07)
Depression Index	1.00 (.01)		1.00 (1.01)		1.00 (.01)	
Substance Use Index	1.02*** (.05)	1.00 (.16)	1.03*** (.06)	.98 (.18)	1.03*** (.06)	.98 (.15)
Risk Behaviors Index	1.00 (.03)	1.46 (.04)	1.00 (.03)	1.00 (.97)	1.00 (.03)	1.00 (.04)
Skipped School (Reference = no)						
Answered yes	1.36* (.16)	1.68 (.45)	1.40* (.16)	2.55* (.44)	1.40* (.16)	2.67* (.49)
Refused to answer	1.56 (.25)	1.68 (.52)	1.69* (.26)	2.20 (.53)	1.68* (.25)	2.03 (.56)
Ever been suspended	1.33 (.16)	1.76 (.35)	1.37* (.15)	1.50 (.36)	1.35* (.15)	1.52 (.35)
Ever been expelled	1.19 (.39)	.31 (1.14)	1.19 (.38)	.12 (1.29)	1.28 (.38)	.30 (1.02)
Closeness to School Index	1.00 (.03)	1.00 (.05)	1.00 (.03)	1.00 (.06)	1.00 (.03)	.99 (.06)

<i>Individual Variables</i>	Model 1		Model 2		Model 3	
	Debut	Preg.	Debut	Preg.	Debut	Preg.
English grade	1.01* (.07)	1.02 (.16)	1.01* (.07)	1.02 (.17)	1.01 (.07)	1.02 (.16)
Math grade	1.01 (.07)	1.06 (.23)	1.01 (.06)	1.07 (.23)	1.01 (.06)	1.07 (.24)
Desire to go to college	.98*** (.06)	.95 (.20)	.99*** (.06)	.95 (.19)	.98*** (.06)	.96 (.22)
Likelihood of going to college	1.01** (.06)	1.02 (.21)	1.01** (.06)	1.02 (.20)	1.01** (.06)	1.00 (.21)
Likelihood of living to 35	1.00 (.10)	.97 (.22)	1.00 (.10)	.97 (.86)	1.00 (.10)	.96 (.25)
Likelihood of being killed by 21	1.00 (.10)	1.01 (.22)	1.00 (.10)	1.00 (.98)	1.00 (.10)	1.03 (.26)
Likelihood of getting HIV/AIDS	1.00 (.07)	.97 (.20)	1.00 (.07)	.98 (.20)	1.00 (.07)	.97 (.19)
Self-perception Index	1.00 (.01)	1.00 (.38)	1.00 (.01)	1.00 (.04)	1.00 (.01)	1.00 (.04)
S. determines time home on weekends	.77* (.13)	.76 (.40)	.78* (.13)	.77 (.43)	.78* (.13)	.84 (.46)
S. determines who to hang out with	1.01 (.13)	1.09 (.56)	1.02 (.13)	1.04 (.61)	1.02 (.13)	1.05 (.62)
S. determines what to wear	1.01 (.16)	1.19 (.44)	.98 (.16)	1.20 (.46)	.99 (.16)	1.25 (.48)
Log of S. income during non-summer week	1.00*** (.03)		1.00** (.03)		1.00** (.03)	
Activities with mother	1.00 (.03)	1.00 (.10)	1.00 (.03)	1.00 (.11)	1.01 (.28)	1.00 (.10)
Activities with father	1.00 (.03)	.98 (.12)	1.00 (.03)	.98 (.14)	1.00 (.03)	.98 (.13)
Negative parental attitudes toward adolescent sex	1.00*** (.01)	1.00 (.04)	1.00*** (.01)	1.00 (.04)	1.00*** (.01)	1.00 (.04)

<i>Individual Variables</i>	Model 1		Model 2		Model 3	
	Debut	Preg.	Debut	Preg.	Debut	Preg.
<i>School Variables</i>						
School setting (Reference = urban)						
Suburban			1.51*	.78	1.38□	1.51
			(.18)	(.41)	(.17)	(.56)
Rural			1.71*	1.97	1.41	3.09
			(.23)	(.49)	(.21)	(.64)
School region (Reference = South)						
West			.55***	.85	.49**	2.16
			(.18)	(.43)	(.24)	(.66)
Midwest			1.02	1.40	.88	2.83
			(.22)	(.48)	(.23)	(.60)
Northeast			1.05	.70	.91	1.83
			(.24)	(.61)	(.26)	(.74)
Logged aggregated household income			.92		.91	
			(.14)		(.12)	
School type (Reference = private religious)						
Public			.77	1.14****a		
			(.23)	(.65)		
Private nonreligious			1.06	1.81		
			(.36)	(1.44)		
School size (Reference = medium)						
Small			.81	.22*		
			(.24)	(.64)		
Large			.96	.34**		
			(.18)	(.38)		
School offers sex education			.74	.34□		
			(.24)	(.55)		
Number of health or sex related services offered			1.00	.57		
			(.01)	(.04)		
Proportion of student body that is female					1.16	1.08 ^a
					(1.53)	(4.65)
Proportion of student body that is black					.61	57.09
					(.93)	(2.44)
Proportion of student body that is black squared					2.76	0.00
					(1.07)	(2.99)

<i>Individual Variables</i>	Model 1		Model 2		Model 3	
	Debut	Preg.	Debut	Preg.	Debut	Preg.
Percent of teachers who are black					1.00 (.01)	1.00* (.02)
Percent of teachers who are female					1.00 (.01)	1.00 (.01)
Percent of teachers with master's degree or higher					1.00 (.00)	1.00 (.01)
Average dropout rate					1.00 (.03)	1.00 (.08)
Percent of students testing at or above grade level					.99 (.11)	1.10 (.32)
<i>Constant</i>	-1.07 (.88)	-.78 (1.83)	-.12 (1.29)	-13.25*** (1.88)	.45 (1.57)	-7.43* (3.77)

N=2635 in 78 clusters □ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$; Note: a: Coefficient and SE / 100 for presentation purposes.

Individual Level Variables

Results (see Table 5.2) indicate few significant relationships between independent variables and pregnancy, but more significant results for debut. Being foreign born, black, Asian, higher levels of religiosity, substance use, refusing to answer the question about skipping school, ever having been suspended, better English grade, the desire to go to college, perceived likelihood of going to college, student income and negative parental attitudes toward adolescent sex were individual-level variables significantly associated with debut but not pregnancy. Skipping school was the only individual-level variable significantly associated with both debut and pregnancy; no individual-level variable was significantly associated with pregnancy but not debut.

At the school level, being in a rural school was significantly associated with debut but not pregnancy. No variable was significantly associated with both debut and

pregnancy. Four variables, being a public school (as compared to a private religious school), being a small or large school (as compared to a medium sized school) or being in a school that offers sex education were significantly or marginally significantly associated with pregnancy but not debut.

Being foreign born increased the odds of debut by more than 100 percent ($p \leq .001$), although no corresponding findings resulted from the previous analyses. This may be due to differences in the methods, but is more likely the result of changes in the sample. In this analysis, the sample is limited to females.

The nuanced nature of race becomes very clear when the results of this analysis are compared to those of the previous analyses. When males and females under the age of 16 are considered, being black significantly increases the odds of debut, although the odds is lower when school-level variables are not included in the model (Table 4.3). When males and females over the age of 16 are considered, there is no significant effect of being black. When all ages are considered but the sample is limited to females, being black is significantly associated with increased odds when school-level variables are included in the model, but is significantly reduced when only individual-level factors are included.

Being Hispanic was significantly associated with increased odds of debut in three of seven models among younger teens; but was not significantly associated with increased odds when the sample was limited to older teens or females (Tables 4.3, 4.5, 5.2). Being Asian significantly reduces chances of debut in this analysis, but only when school-level factors are removed from the model.

Religiosity was not significant in either of the previous analyses. It reached significance in all three of these models, but the increase or decrease in odds rounds to zero. Logged student earnings and negative parental attitudes toward adolescent sex resulted in nearly identical findings. This is quite similar to findings in the previous analyses (Tables 4.3, 4.5) in which parental attitudes were strongly and significantly associated with debut, but resulted in no more than a five percent reduction in the odds.

Also mirroring the previous analyses, substance use was highly significant in its effect on debut but less embodied forms of deviance did not show a significant level of influence. Higher English grade were significant in two of the three models. In the earlier analyses, higher English grades were significant for younger teens but not older teens (Tables 4.3, 4.5). In this analysis, they are less consistently significant and only rise to the .05 level, possibly due to the wider range of ages in this sample.

Five individual-level variables resulted in findings that were substantially different from those in the earlier analyses. In all five cases, variables that were not significant in either of the previous results were consistently significant in this analysis, indicating a very strong possibility of gender influence.

The desire to go to college significantly but minimally reduced the odds of debut while the perceived likelihood of going to college significantly but minimally increased the odds of debut. Perceived likelihood of going to college ($p \leq .01$) was less significant than the desire to go to college ($p \leq .001$) although there was little difference in the resultant odds.

Larger effects were found in the second pair, which measured responses to the question of whether or not the subject had ever skipped school. In all three models

presented, student who reported that they had skipped school experienced a significant increase in the odds of debut over those who reported that they had not. Odds were increased from 36 to 40 percent (Table 5.2). Students who refused to answer the question experienced significant increases of more than 65 percent in both models including school variables. These findings are particularly notable for two reasons. First, skipping school was not significant in either of the earlier analyses, indicating a strong likelihood of a gender effect. Second, answering that they had skipped school is the only variable significant for both debut and pregnancy. In fact, it is the only individual-level variable that significantly predicted pregnancy. When only individual-level variables are included in the model, reporting previous skipping was not significant; however, when school-level variables are introduced into the model, answering “yes” more than doubles the odds of pregnancy (Table 5.2). Ever having been suspended significantly predicted debut. Being suspended increases the odds of debut by approximately 35 percent; however it does not appear to contribute to the odds of pregnancy.

School Level Variables

Distinct differences between debut and pregnancy were evident in the results associated with school-level variables. These results also provide the strongest evidence yet that school organization and structure impacts teen sexual behaviors. Three variables (suburban or rural settings and being in the West) significantly predicted debut; five (being public, small, large, offering sex education or having a higher percentage of faculty who are black) significantly predicted pregnancy.

Suburban schools (compared to urban schools) had significantly higher odds of debut when variables reflecting school organization and structure were included in the model ($p \leq .05$) and marginally significantly higher odds of debut when student body and faculty composition were included ($p \leq .10$). Similar findings were not present in the earlier analyses. Being in a rural setting rather than urban increased the odds of debut by 71 percent when variables associated with school organization were included in the model, but lost significance when student body and faculty composition were considered.

Several aspects of school setting and organization were significantly associated with pregnancy. Being in the West as compared to the South decreased the odds of debut by approximately 50 percent in both models including school-level variables. Very similar findings were present in the previous analyses. Being in a public school rather than a private religious school significantly increased the odds of debut; however, the somewhat limited number of students in private schools casts some shadow on these findings. Both small and large schools had lower odds of debut than medium-sized schools. Small schools enjoyed a 78 percent reduction in the odds of debut and large schools enjoyed a 66 percent reduction. Schools that offer sex education enjoyed a marginally significant reduction in the odds of debut. It must be noted, however, that individuals who had received pregnancy education did not enjoy similar protection.

Only one aspect of student body or faculty composition was associated with either outcome variable. The percent of teachers who are black significantly predicted odds of pregnancy; however, the effect rounds to zero ($p \leq .05$; odds ratio = 1.00).

Discussion

This analysis presented some of the strongest support for the hypotheses presented, although findings were mixed. Hypothesis 1, that being black or Hispanic will be associated with higher risk of pregnancy, was not supported although a strong body of research reports much higher pregnancy rates among black and Hispanic teens. In this research, pregnancy is a sequential stage following debut. This means that the odds of pregnancy among black or Hispanic teens is not the rate at which teens in those racial groups become pregnant, as might be represented in demographic reports. Instead, this analysis presents the odds of pregnancy *given that debut has occurred*. Both racial designations were significantly associated with debut; neither was associated with pregnancy. In other words, it is likely that higher pregnancy rates among black and Hispanic teens are actually reflective of earlier debut, but that once debut has occurred, they are no more likely to become pregnant than are white teens.

Hypothesis 2 (that substance use will be significantly associated with pregnancy) was not supported, although substance use does significantly predict debut in all models. No significance was found to be associated with other, less embodied risk behaviors. This might indicate that embodied use of power is associated with having sex, but not with pregnancy.

The hypothesis that teens attending private nonreligious schools will be at less risk of pregnancy than those attending public or private religious schools (Hypothesis 3) was not supported. Those attending public schools had significantly higher odds of debut than those attending a private religious school. Those attending private nonreligious schools had higher (though insignificant) odds of debut.

Hypothesis 4, that teens attending schools with a higher proportion of female or black students would be more likely to become pregnant was unsupported and Hypothesis 5, that teens attending schools with a higher proportion of female or black faculty resulted in mixed findings. The percent of teachers who are female was not associated with either outcome variable. Higher levels of black faculty members was significant, but resulted in an odds ratio of one, making the direction of the relationship impossible to determine and indicating there is no effect. Hypothesis 6, that higher levels of faculty members with a Master's degree or higher did not result in significant findings.

Student success (Hypothesis 7) was not associated with debut or pregnancy through school-level variables, although several individual-level variables that might be associated with school success were significant, including higher English grades, the desire to go to college, and the likelihood of going to college. Although all three were significant, odds ratios indicate very little effect. On the other hand, skipping school was significantly associated with both debut and pregnancy and increased the odds of debut by up to 40 percent and pregnancy by up to 167 percent. Interestingly, connectedness to school was not associated with either dependent variable, indicating that students who skip school may not be any less invested in the school. More research into this complex set of relationships is clearly indicated.

The ways in which schools are currently used to address teen pregnancy, sex education (Hypothesis 8) and health or sex related services (Hypothesis 9) were also tested. Health and sex related services do not appear to impact debut or pregnancy. Sex education does significantly reduce pregnancy at the .05 level, but only at the school level. Sex education does not affect sexual debut, in agreement with the earlier analysis.

Further, in no model in either analysis does having had sex education affect an individual's chances of debut or pregnancy. This finding is somewhat difficult to interpret given that no information on the nature of the sex education offered by schools or taken by individuals is included in Add Health data.

An important finding in this research is the difference between variables associated with debut and those associated with pregnancy, given that debut has already occurred. Only one variable was significant for both outcomes. These patterns make it clear that pregnancy must be regarded as the result of a series of decisions. Analytic methods that allow for asymmetry will allow researchers to go beyond simply identifying a list of variables, many of which are contested (see Kirby and Lepore 2007). Instead, we will be able to associate factors with the unique stage in which they are influential. The lack of analysis that frames pregnancy as the result of a series of decisions represents a weakness in the existing body of literature.

Overall, the results of this research are mixed. Some evidence of school influence was found, although not to the level required for definitive conclusions. Instead, further research should be conducted, particularly research that further explores differences in school settings and sizes and research into school non-attendance. The interactions of connectedness to school, suspension, and skipping should be more closely researched to determine if attendance policies can be revised to reduce debut.

Although findings were mixed, there was clear evidence that schools are linked to teen sexual behavior. Moreover, this analysis allows me to fine tune the picture. Rather than looking at pregnancy, I looked specifically at the effect on debut and on pregnancy once debut has occurred. What this research tells us is that they are two separate

processes, with different, if overlapping, predictors. Moreover, we can see that after debut has occurred, schools influence the odds of pregnancy.

Identifying the full effect of schools on adolescent sexual behavior requires that these findings be compared to those from the previous chapter. In the next chapters, I will discuss both analyses, identify the major findings of this research, and discuss the implications for future research.

END NOTES:

1. Although contraception is a logical third step between debut and pregnancy, questions concerning contraceptive use were reserved for older Add Health participants, so this step was omitted from the model.
2. Pregnancy data has only been maintained since the 1970s, in contrast to teen birth data that has been collected since the 1940s.
3. Trends data for 1976-1989 from Ventura, Mosher, Curtin and Abma et al. 2000. Data for 1990-2005 from Ventura, Abma and Mosher 2009.

CHAPTER VI

CONCLUSION

The purpose of this research was to investigate the predictors of adolescent sexual behavior (debut and pregnancy), based on the role of empowerment as predicted by the theory used. I also challenged the assumption found in most research literature that teen sexual behavior is influenced by primarily individual-level factors. Finally, I sought to identify those aspects of schools and school structure that impact teen sexual behavior and decision-making. In doing so, I challenge our reliance on sex education and potentially identify other aspects of school that might be used to address the problem of teen pregnancy and child birth.

In this final chapter, I will bring together all the information presented earlier and discuss what it means and how the implications might affect how we address the problem of teen pregnancy and child bearing. I begin by recapping the information presented and linking it together. From these, I will present insights gained through this research. I will discuss limitations of this research and future research that is indicated. Finally, I will discuss the limitations of previous research and how this research should be applied.

Linking It All Together

This work opened with a reminder that schools are sexualized institutions, even though policy makers tend to treat them as benign, asexual entities. By ignoring the latent sexual nature of school cultures, pundits are able to address only the schools' manifest purpose of education, institute sex education programs, debate the content of those courses, and ignore evidence that the programs are ineffective. Further, they are able to align their understanding of teen sexuality with capitalistic values of individuality and attributing failure to moral weakness (see Sylvester 1995).

This individualization has extended to research, which has focused predominantly on individual-level variables despite evidence that macro-level variables exert powerful influences on teen sexual behaviors, including pregnancy. Longstanding regional and racial patterns provide the first evidence of macro influences. Although race is an individual characteristic, its meaning is based in broader social values and stereotypes associated with the social construct of race. The agreed upon meanings of race and long-standing race-based inequalities distinguish race from many other individual characteristics and make it a force at a broader, higher level of society.

Another indicator that macro-level forces affect teen sexual behavior is the body of consistent findings of links between teen sexual behavior and other behaviors (substance use, risk taking, criminality) that are often explained as the result of structural factors (see Devine et al. 1993; Harvey and Spigner 1995; Ketterlinus et al. 1992; Pugh et al. 1990; Scarmella 1998). Teen sexual behaviors and other aspects of delinquency are correlated and previous research has identified common causal factors, including urbanicity and living in a single parent family. Poverty and income are often, but inconsistently, related to this nexus. Race is consistently linked, but particularly when nuanced aspects of race are ignored and race is introduced as a simple demographic variable.

Within macro-level research a subtle but repeated association between reproduction and empowerment begins to emerge. Brooks-Gunn et al. (1993) encouraged researchers to consider

neighborhoods – which are frequently the basis of school district boundaries - as “potent source[s] of unequal opportunity”. Opportunity was also a key feature of observations that as emerging nations industrialize and women attain employment opportunities, fertility rates drop with the largest drops among women who have greatest access to earned income (Blum 1991; Greenwood et al. 2005). Driscoll et al. (2005) applied this finding to American teens and found that, like their international counterparts, teens living in neighborhoods that offered the fewest opportunities have the greatest chance of teen parenthood.

Schools are social institutions that also serve as the environment in which children and adolescents spend considerable time. They become the context in which social values are reinforced and individual behaviors are shaped. Research has repeatedly linked aspects of schools to teen sexual behavior (see Kirby and Lepore 2007), but has also linked schools to empowerment (see Cleary and Zimmerman 2004; Danns 2002). School success and positive views toward schools inhibit both debut and pregnancy, but all teens do not have equal access to school success. School boundaries reflect and reinforce spatial divisions between class and racial groups. Schools in poor neighborhoods and communities are poorly funded, not as well maintained, and do not offer the same opportunities for academic exploration. Black students are more likely to be assigned to remedial and special education classes and are more likely to attend overcrowded and underfunded schools (Knaus 2007).

Gender intersects with these forces. Black males are particularly subject to disciplinary policies that remove them from the classroom and label them as criminal. Once labeled, their chances of escaping incarceration and completing school diminish. Females are less likely to be funneled into the prison system; however, poor females – especially poor females of color – have traditionally been stereotyped as sexually promiscuous. If they do become pregnant, they are further stigmatized as “welfare mothers.” In both cases, opportunities for gainful employment are severely limited, and they become symbols of moral and economic dangers that conservatives pose as threats to our society as a whole. The work of researchers such as Fenning and Rose

(2007), Skiba et al. (2002), and Wald and Losen (2003) have documented the school to prison pipeline among males. It is not difficult to envision a co-existing school-to-pregnancy pipeline among poor teenage girls. Nor is it possible to overlook the importance of opportunity in such structures.

Opportunity is a principal consideration in the theoretical basis I propose, but it is also the key difference between my theoretical explanation and explanations from other studies of adolescent sexual debut and pregnancy. In most studies, opportunity is overlooked, but might be approximated by income, race or other variables representing axes of inequality. These provide the numbers necessary for analysis, but I contend that they fail to accurately represent the latent variable that ultimately creates or destroys opportunity: empowerment.

I conceptualize empowerment as “a process by which people gain control over their lives, democratic participation in the life of their community, and a critical understanding of their environment” (Perkins and Zimmerman 1995). If schools do not provide equal access to academic success, funnel some males into the prison system (and thereby deny them the ability for economic self-sufficiency) and potentially do the same to select females, can the affected people every “gain control over their own lives”?

The answer is not as simple as it may appear. Peter M. Blau tells us that social structure is a distribution of opportunity (1994), with some having access to more opportunities than others. Michel Foucault offers a related concept: spheres of power, which are those arenas in which an actor is allowed to build knowledge and exercise power (Foucault [1978]1990). In synthesis, I argue that the opportunities Blau speaks of may be defined as the range of spheres of power available to an actor. Broad opportunity is opportunity to exercise power in a wide range of spheres; limited opportunity is the condition of only being allowed access to a narrow range of spheres. Further, I use

Foucault's definition of power as a diffuse, emergent property. As an emergent property, power is always potentially present and therefore can never be stripped from the actor. Yet, as Foucault artfully illustrates, power can be limited by relegating the exercise of power to those areas in which an actor (or group of actors) has knowledge. Regardless of the range of spheres – the opportunities – a person enjoys, power remains constant, only the range of spheres can be expanded or constrained.

I apply this to teen sexual behavior by proposing that the body is a sphere of power (1) for which the teen has special knowledge and (2) which cannot be separated from the actor. As such, even those with constrained opportunities retain the ability to exercise embodied power. Further, I propose that as greater opportunities are available (the range of spheres of power is expanded), potential power is diffused and the probability of power being exercised in any one sphere is decreased. Conversely, as the range of spheres of power is constrained (opportunity is limited), power is more concentrated and the probability of power being exercised in any one sphere is increased. So, for teens with the fewest opportunities, the likelihood that power will be exercised through the body increases.

The answer to the question I posed earlier - if schools do not provide equal access to academic success, can the affected people every “gain control over their own lives”? is yes. They can gain control over their own lives within the limited spheres available to them through sex.

The vital ingredient is not poverty, family structure or morals. It is opportunity and schools are a social institution that replicates and reinforces the broader social structure in a way that expands or contracts the opportunities available to students,

meaning schools make some students more likely to become pregnant and protects others.

Results

The most exciting and perplexing finding of this research was the intra-class correlation calculated through the multi-level discrete time hazard analysis. This finding indicated that among younger teens eight percent of the variance in sexual debut occurs at the school level and among older teens, two percent of the variance occurs at that level. Although in both age groups more than 90 percent of the variance occurs at the individual level, the assumption that teen sexual behavior is the result of only micro-level interactions and decision making must be rejected (especially for younger teens). Schools affect teen sexuality, providing us an exciting realm of potential for addressing these problems. If we control schools and schools affect teen sexual behavior, we have the ability to shape schools that will protect teens - and their children.

On the other hand, the low number of significant variables in all analyses make the finding that schools exert such influence quite perplexing. The variables in these models reflect areas of previous research and include some of the most often researched characteristics. Despite their repeated research, these variables have explained only minimal amounts of variance. In other words, we know that schools exert influence, but have yet to figure out how that influence is exerted. If these variables explain so little, what aspect of schools do we need to explore? What have we missed? Unfortunately, the school variables we have explored are not the right ones. But clearly, as we search for variables with greater explanatory power, we cannot afford to dismiss macro level forces.

Given the substantial and long-term consequences of teen pregnancy, identifying variables is not simply an academic exercise. We are not just looking for variables, we are looking for variables we can use to address a social problem. That means we are really searching for variables we can manipulate and change. We're looking for the thing(s) we can use to address a problem. The fact that most schools are publicly financed and that policies linking funding to sex education programs already exist, such changes could be made efficiently as well as effectively. But what changes should be made? This research gives us preliminary directions, through the hypotheses tested, although results were mixed.

Hypotheses, Results and Interpretations

I offered nine hypotheses, based on previous research and my theoretical basis. Six of the nine received support in at least one analysis, but only one received support in all three. Three hypotheses received no support. Findings regarding these hypotheses are discussed in more detail below.

Sex Education and Health Services. An important finding was the effect of sex education and health services – the strategies most commonly employed in American schools - on debut and pregnancy (Hypotheses 8 and 9). In all analyses, there was no relationship between an individual having had sex education and his or her sexual behaviors, nor was there any relationship between the number of health services offered and debut or pregnancy. At the school level, offering sex education had no effect on debut in any analysis and was significant only for pregnancy, where it appears to have a protective

effect. Add Health data was collected during the period of time in which states were moving away from active HIV/AIDS education that stressed the use of condoms and toward abstinence education (Santelli, Ott, Lyon and Rogers et al. 2005). No data concerning sex education mandates or content was collected from school administrators. Even if such information had been collected, research indicates that sex education teachers tend to deliver content that differs from mandates (Forrest and Silverman 1989), making it impossible to judge any impact of the type of education offered. However, the lack of impact on debut decidedly challenges the wisdom of abstinence education. If the effect of sex education lies at the stage of pregnancy, it is pregnancy prevention after debut that should be addressed.

A second lesson regarding sex education is that the effect occurs at the school level rather than the individual level. Perhaps the acknowledgement that students are sexually active and can be sexually responsible affects what I previously called the hallway culture. In *Promiscuities*, Naomi Wolf (1998) argues that when females were only allowed to say “no,” that word had to convey a wide range of meanings. Only when they gained the opportunity to say “yes,” could “no” only mean no. Perhaps a similar process occurs when schools offer sex education. In any case, the assumption that individual teens in the heat of passion will recall something a teacher said in sex education class and abruptly halt whatever is going on is clearly rejected.

Academic Success. I predicted that the percent of students testing at or above grade level and the average dropout rate would predict sexual behavior. Neither was found to be predictive in any analysis.

These should be compared to variables at the individual level that measure desire to go to college, likelihood of going to college, closeness to school, and last grades in English and Math. Only the last English grade resulted in significant results in the multilevel discrete time proportional hazards analysis. In the sequential logit, English grades, the desire to go to college and the perceived likelihood of going to college were all significant. Previous research indicated a relationship between GPA and sexual behavior; however, Chronbach's alphas for the four subjects included in Add Health data indicated that grades cannot be collapsed into a single index variable. Math grades are not associated with debut or pregnancy; however, higher English grades appear to increase the likelihood of debut among teens under the age of 16. Further research will be required to interpret this unexpected finding. In the final analysis, the desire to go to college was associated with reduced risk, as the theory I am employing would predict. However, perceived likelihood of going to college is associated with increased risk, contradictory to my theory. Although both were significant, neither indicated much effect on the odds.

Student Body and Faculty Composition. Schools were also assessed based on their student and faculty composition. These measures should be considered exploratory, but are based in the recognition that schools reflect neighborhood composition and research noted earlier that neighborhoods with lower levels of opportunity displayed higher levels of teen pregnancy (Driscoll et al. 2005).

Individual-level results for race indicated some important complexity. Black and Hispanic teens were more likely to experience debut than white teens in all models, but differences were not significant among older teens, indicating that racial convergence

occurs as teens age. More importantly, there was no statistical difference in the likelihood of pregnancy *given previous debut*. This means that the higher rates of pregnancy among black and Hispanic teens are not the result of a greater chance of pregnancy, but of earlier sexual debut. It also means that the lower rates of pregnancy among white teens is actually the result of later debut.

Faculty composition appears to have some effect on debut, but again, in a complicated manner. The proportion of teachers who are black significantly impacts debut among younger students ($p \leq .01$) with approximately a one percent increase in the odds of debut for each one percent increase in black faculty. The percent of the faculty that is black also significantly affected pregnancy, given debut although the effect was smaller. If low income schools tend to have higher percentages of minority teachers and lower percentages of teachers with advanced training, then my contention that school structure impacts teen sexual behavior is supported (Knaus 2007).

Substance Use and Risk Behaviors. The link between sexual behaviors and embodiment was tested by contrasting substance use (an embodied behavior) to less embodied forms of delinquency such as theft or vandalism. Substance use was much more significant than other, less embodied forms of Pregnancy was not, perhaps indicating that pregnancy is not an exercise of embodied power, but sex is.

Other Variables. Though not addressed in any hypotheses, several other variables bear some discussion. The average income of student households is not associated with either debut or pregnancy, but income earned by the student increased risk of debut in both

analyses. The wide range of income reported (from \$0 to \$900 per week)¹ indicates that this variable should be interpreted with some caution. Caution is also indicated by the lack of information included in these models. For example, there is no measure of the nature of the work, the number of hours worked, or the age or gender of coworkers. The result is in conflict with my theory, which would predict that increased income results in decreased likelihood of sexual behavior; however, in light of these limitations, no conclusions about the finding can be drawn.

Parental influence was surprisingly limited. Negative parental attitudes toward adolescent health significantly reduced the risk of debut in all analyses; however risk was never reduced by more than five percent (among older teens). When the sample is limited to females but no age divisions are introduced, parental attitudes are statistically significant but do not measurably affect the odds of debut. They are not significantly associated with pregnancy. Spending time with one's mother and father was also considered, but it was insignificant with the exception of activities involving mothers and younger teens. This influence increases rather than decreases the likelihood of debut.

Religion is a frequently invoked variable when teen sexuality is considered, especially among those who utilize a family supremacy position and/or advocate abstinence education. In these analyses, the only significant effects of religion were found among older teens in the analysis of debut. As described earlier, those in the older group are more likely to have experienced debut than not, so strength of religious views should be seen as a factor that allows teens to resist entering a behavior *after* their peers are engaging in it. Once they do experience debut, religion has no influence on the chance of pregnancy.

Other Conclusions

I proposed that schools impact teen sexual behavior, but also sought to explain this influence through different ranges of opportunity that represented empowerment. My contention was that students with a wider range of opportunity would be less likely to exercise power through sex while those who with a constrained range of opportunity would be more likely to do so. As I defined it, empowerment is a latent variable and can only be indirectly measured. This research does not allow me to say my theory was supported, but it does not allow the theory to be rejected, either. Instead, it suggests that proxies for the latent variable empowerment must be more carefully articulated and further research is required, as will be discussed below.

A final, but important, conclusion indicated by this research involves the methods of analysis used when investigating teen sexual behaviors. Recall that this research relied heavily on the work of Kirby, Lepore and Ryan (2005) and Kirby and Lepore (2007) who created matrices of research on risk and protective factors. Seven criteria had to be met for inclusion, but only one addressed the method of analysis: that it be multivariate. Even this requirement was waived in cases that “involved new and interesting factors” (Kirby and Lepore 2007). These analyses provided information that would be more difficult to assess using only that requirement. The multi-level, discrete time hazard analysis allowed insight into the effect of age and a measure of the amount of variance attributed to the individual and school levels. This measure was an important finding and is only available through multi-level analysis.

Similarly, the sequential logit reflects an aspect of teen sexuality that is frequently overlooked and not at all addressed by Kirby and Lepore's criteria: the staged nature of adolescent sexual behavior. Debut and pregnancy presented very different sets of significant predictive factors. Traditional multivariate models with pregnancy as the outcome variable that do not carefully limit the sample may have identified factors as predictive of pregnancy when their actual impact is on debut – as I found in the cases of being black or Hispanic.² At a minimum, samples should be restricted to those who have progressed through preceding stages. The actual stage of influence has important policy implications and should be more rigorously explored.

Strengths and Limitations

The use of hierarchical linear models and sequential logit were obvious strengths of this research. By using them, I was able to disentangle forces and processes that would have been less apparent using traditional multivariate methods. The research was also strengthened by the separation of age groups at a meaningful point – age 16 – rather than the traditional but arbitrary ages of 15 or 17. Sixteen represents an acquisition of rights and a change in social status that should be reflected in age comparisons. The use of Add Health data provided a large, nationally representative sample with stringent data collection protocols and high reliability. Finally, the use of a robust theoretical model provides a solid foundation and guidance for analysis.

A major limitation of the research was the low number of cases in some schools that prohibited the use of multi-level analysis of pregnancy. Although the calculation of

and ICC for pregnancy is very desirable, it was impossible with this sample and will probably be impossible for any sample that includes small schools.

A second limitation was the use of schools as the only measure of the influence of social structure. While schools are a logical starting point, schools themselves are set in neighborhoods, communities, states, and regions. Each of these also exert influence that remains unmeasured.

Finally, my theory emphasizes the role of empowerment; however, empowerment is a latent variable that must be measured through proxies. The choice of proxies was limited to those available through Add Health data, and thus these models are likely to provide a partial test of the theory at best. Further research might consider ways social structures limit power such as discipline policies, unequal access to college preparatory courses, or the use of metal detectors and other security devices. It might also consider opportunities for students to interact with the larger community through volunteer programs, internships, and in-school volunteer programs.

Future research should contrast these findings to data from other national representative longitudinal measures and should be expanded to include other levels of social structure. Using both Add Health and other data sets, research should track the effects through later stages. For example, including data collected during Wave 3 (completed approximately six years after Wave 1) would provide a more complete picture of childbearing, education completion, marital success and financial self-sufficiency.

A second area of indicated research involves the role of sex education. As discussed earlier, no information was available on the instruction students received, but it

is very unlikely that the nature of the instruction, the age at which it occurred and other factors have no influence on its effect. Potentially the effect could be measured using sequential logit or similar methods to measure the effect of sex education (for those who have never had sex) on debut and the effect on pregnancy once debut has occurred. Separate analyses could be conducted on those who receive sex education after debut, possibly to measure the effect on contraceptive use.

Research should also be conducted to further explore the operationalization of empowerment with a goal of creating an effective measure of this latent variable. Methods such as structural equation modeling might allow us to identify facets of empowerment and more clearly define and operationalize it. Also among the indicated tasks is clarifying how empowerment is associated with psychological concepts such as self-perception, self-esteem, and locus of control. Research should also reflect how students perceive and define their opportunities. Qualitative research may provide the needed insight and be helpful in developing a more accurate measure.

Closing Remarks

This work opened with a discussion of the culture that fills the hallways and classrooms of American schools. This was an attempt on my part to recreate the visceral link between sex and schools that American teens experience. Recalling those experiences makes it extremely difficult to view schools as benign, asexual institutions. Yet this is the view we find among policy makers who continue to believe that teen pregnancy can be effectively combatted through classroom instruction of one kind or another. Perhaps it is time to consider that the most responsible choice we can make is to implement programs that address the schools themselves.

It is also difficult to justify submitting teen parents – and their children – to lifelong consequences if society at large contributes to the decisions that result in their status positions, particularly if adjusting one publicly funded social institution could reduce public costs, both financially and in terms of quality of life. Teen pregnancy is a serious problem with serious costs. One thing this research makes clear is that the “cause” is not simple, nor will the answer be. In the words of Michael Carrera, it is not a problem we cannot teach our way out of, but it is a problem we should attempt to solve.

END NOTES:

1. I recoded this as logged income for the analysis.
2. Although one could also estimate separate models for debut and pregnancy (among those who have debuted), sequential logit is more efficient because it estimates the two binary equations simultaneously. In addition, one can constrain the effects of certain variables to be the same in each stage, which is essentially a partial continuation ratio model (Fullerton 2009). Although a Heckman probit model may also be appropriate for the study of debut and pregnancy, the selection effect (i.e., ρ) was not statistically significant in any of the models that converged.

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APPENDICES

APPENDIX A: INDICES

Religiosity Index (All items reverse coded)

1. In the past 12 months, how often did you attend religious services?
 - a. Once a week or more
 - b. Once a month or more, but less than once a week
 - c. Less than once a month
 - d. Never
 - e. Recoded as missing (and dropped)

2. How important is religion to you?
 - a. Very important
 - b. Fairly important
 - c. Fairly unimportant
 - d. Not important at all
 - e. Recoded as missing (and dropped)

3. How often do you pray?
 - a. At least once a day
 - b. At least once a week
 - c. At least once a month
 - d. Less than once a month
 - e. Recoded as missing (and dropped)

4. Many churches, synagogues, and other places of worship have special activities for teenagers – such as youth groups, Bible classes, or choir. In the past 12 months, how often did you attend such youth activities?
 - a. Once a week or more
 - b. Once a month or more, but less than once a week
 - c. Less than once a month
 - d. Never
 - e. Recoded as missing (and dropped)

Depression Index (Items 4, 7, 10 and 14 Reverse Coded)

1. You were bothered by things that usually don't bother you.
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)
2. You didn't feel like eating, your appetite was poor.
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)
3. You felt that you could not shake off the blues, even with help from your family and your friends.
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)
4. You felt that you were just as good as other people. (Reverse coded)
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)

5. You had trouble keeping your mind on what you were doing.
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)

6. You felt depressed.
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)

7. You felt hopeful about the future. (Reverse coded)
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)

8. You thought your life had been a failure.
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)

9. You felt fearful
 - a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)

10. You were happy. (Reverse coded)
- a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)
11. You talked less than usual.
- a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)
12. You felt lonely.
- a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)
13. People were unfriendly to you.
- a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)
14. You enjoyed life. (Reverse coded)
- a. Never or rarely
 - b. Sometimes
 - c. A lot of the time
 - d. Most of the time
 - e. Recoded as missing (and dropped)

15. You felt sad.
- Never or rarely
 - Sometimes
 - A lot of the time
 - Most of the time
 - Recoded as missing (and dropped)
16. You felt that people disliked you.
- Never or rarely
 - Sometimes
 - A lot of the time
 - Most of the time
 - Recoded as missing (and dropped)
17. It was hard to get started doing things.
- Never or rarely
 - Sometimes
 - A lot of the time
 - Most of the time
 - Recoded as missing (and dropped)
18. You felt life was not worth living.
- Never or rarely
 - Sometimes
 - A lot of the time
 - Most of the time
 - Recoded as missing (and dropped)

Perception of Self Index (All reverse coded)

- You have a lot of good qualities.
 - Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree
 - Strongly disagree
 - Recoded as missing (and dropped)

2. You are physically fit.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Recoded as missing (and dropped)

3. You have a lot to be proud of.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Recoded as missing (and dropped)

4. You like yourself just the way you are.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Recoded as missing (and dropped)

5. You feel like you are doing everything just about right.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Recoded as missing (and dropped)

6. You feel socially accepted.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Recoded as missing (and dropped)

7. You feel loved and wanted.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Recoded as missing (and dropped)

Substance Use Index

1. How old were you when you smoked a whole cigarette for the first time? If you have never smoked a whole cigarette, enter "0". (Recoded to binary)
 - a. Never smoked a whole cigarette
 - b. Recoded as smoked:
 - i. One year
 - ii. Two years
 - iii. Three to four years
 - iv. Five years
 - v. Six years
 - vi. Seven years
 - vii. Eight years
 - viii. Nine years
 - ix. Ten years
 - x. Eleven years
 - xi. Twelve years
 - xii. Thirteen years
 - xiii. Fourteen years
 - xiv. Fifteen years
 - xv. Sixteen years
 - xvi. Seventeen years
 - xvii. Eighteen years
 - xviii. Nineteen years
 - xix. Twenty years
 - xx. Recoded as missing (and dropped)

2. Have you had a drink of beer, wine, or liquor – not just a sip or a taste of someone else’s drink – more than 2 or 3 times in your life?
 - a. No
 - b. Yes
 - c. Coded as missing (and dropped)

3. How old were you when you tried marijuana for the first time? If you never tried marijuana, enter “0”.
 - a. Never tried marijuana
 - b. Recoded as tried marijuana:
 - i. One year
 - ii. Two years
 - iii. Three to four years
 - iv. Five years
 - v. Six years
 - vi. Seven years
 - vii. Eight years
 - viii. Nine years
 - ix. Ten years
 - x. Eleven years
 - xi. Twelve years
 - xii. Thirteen years
 - xiii. Fourteen years
 - xiv. Fifteen years
 - xv. Sixteen years
 - xvi. Seventeen years
 - xvii. Eighteen years
 - xviii. Nineteen years
 - xix. Twenty years
 - xx. Recoded as missing (and dropped)

4. How old were you when you tried any kind of cocaine – including powder, freebase, or crack cocaine – for the first time? If you never tried cocaine, enter “0”.
 - a. Never tried cocaine
 - b. Recoded as tried cocaine:
 - i. One year
 - ii. Two years
 - iii. Three to four years
 - iv. Five years
 - v. Six years
 - vi. Seven years
 - vii. Eight years
 - viii. Nine years
 - ix. Ten years
 - x. Eleven years
 - xi. Twelve years
 - xii. Thirteen years
 - xiii. Fourteen years
 - xiv. Fifteen years
 - xv. Sixteen years
 - xvi. Seventeen years
 - xvii. Eighteen years
 - xviii. Nineteen years
 - xix. Twenty years
 - xx. Recoded as missing (and dropped)

5. How old were you when you tried inhalants, such as glue or solvents, for the first time? If you never tried inhalants such as these, enter "0."
 - a. Never tried inhalants
 - b. Recoded as tried inhalants:
 - i. One year
 - ii. Two years
 - iii. Three to four years
 - iv. Five years
 - v. Six years
 - vi. Seven years
 - vii. Eight years
 - viii. Nine years
 - ix. Ten years
 - x. Eleven years
 - xi. Twelve years
 - xii. Thirteen years
 - xiii. Fourteen years
 - xiv. Fifteen years
 - xv. Sixteen years
 - xvi. Seventeen years
 - xvii. Eighteen years
 - xviii. Nineteen years
 - xix. Twenty years
 - xx. Recoded as missing (and dropped)

6. How old were you when you first tried any other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, heroin, or pills, without a doctor's prescription? If you never tried any other type of illegal drug, enter "0."
 - a. Never tried any other type of illegal drug
 - b. Recoded as tried other type of illegal drug:
 - i. One year
 - ii. Two years
 - iii. Three to four years
 - iv. Five years
 - v. Six years
 - vi. Seven years
 - vii. Eight years
 - viii. Nine years
 - ix. Ten years
 - x. Eleven years
 - xi. Twelve years
 - xii. Thirteen years
 - xiii. Fourteen years
 - xiv. Fifteen years
 - xv. Sixteen years
 - xvi. Seventeen years
 - xvii. Eighteen years
 - xviii. Nineteen years
 - xix. Twenty years
 - xx. Recoded as missing (and dropped)

Risk Behaviors Index

1. In the past 12 months, how often did you paint graffiti or signs on someone else's property or in a public place?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

2. In the past 12 months, how often did you deliberately damage property that didn't belong to you?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

3. In the past 12 months, how often did you lie to your parent or guardian about where you had been or whom you were with?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

4. How often did you take something from a store without paying for it?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

5. How often did you get into a serious fight?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

6. How often did you hurt someone badly enough to need bandages or care from a doctor or nurse?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

7. How often did you run away from home?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

8. How often did you drive a car without its owner's permission?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

9. In the past 12 months, how often did you steal something worth more than \$50?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

10. How often did you go into a house or building to steal something?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

11. How often did you use or threaten to use a weapon to get something from someone?
 - a. Never
 - b. 1 or 2 times
 - c. 3 or 4 times
 - d. 5 or more times
 - e. Recoded as missing (and dropped)

12. How often did you sell marijuana or other drugs?
- Never
 - 1 or 2 times
 - 3 or 4 times
 - 5 or more times
 - Recoded as missing (and dropped)
13. How often did you steal something worth less than \$50?
- Never
 - 1 or 2 times
 - 3 or 4 times
 - 5 or more times
 - Recoded as missing (and dropped)
14. In the past 12 months, how often did you take part in a fight were a group of your friends was against another group?
- Never
 - 1 or 2 times
 - 3 or 4 times
 - 5 or more times
 - Recoded as missing (and dropped)
15. How often were you loud, rowdy, or unruly in a public place?
- Never
 - 1 or 2 times
 - 3 or 4 times
 - 5 or more times
 - Recoded as missing (and dropped)

Closeness to School Index (Item 6 Reverse Coded)

1. (If interview was conducted during the school year) Since school started this year, how often have you had trouble getting along with your teachers?
(If interview was conducted during the summer) During the 1994-1995 school year, how often did you have trouble getting along with your teachers?
- Never
 - Just a few times
 - About once a week
 - Almost everyday
 - Everyday
 - Coded as missing (and dropped)

2. How much do you agree or disagree with the following statement:
(If interview was conducted during the school year) You feel close to people at your school.
(If interview was conducted during the summer) Last year, you felt close to people at your school.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Coded as missing (and dropped)

3. How much do you agree or disagree with the following:
(If interview was conducted during the school year) You feel like you are part of your school
(If interview was conducted during the summer) Last year, you felt like you were part of your school.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Coded as missing (and dropped)

4. How much do you agree or disagree with the following:
(If interview was conducted during the school year) You are happy to be at your school.
(If interview was conducted during the summer) Last year, you were happy to be at your school.
 - a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Coded as missing (and dropped)

5. How much do you agree or disagree with the following:
(If interview was conducted during the school year) The teachers at your school treat students fairly.
(If interview was conducted during the summer) Last year, the teachers at your school treated students fairly.
- a. Strongly agree
 - b. Agree
 - c. Neither agree nor disagree
 - d. Disagree
 - e. Strongly disagree
 - f. Coded as missing (and dropped)
6. How much do you feel that your teachers care about you? (Reverse coded)
- a. Not at all
 - b. Very little
 - c. Somewhat
 - d. Quite a bit
 - e. Very much

Activities with Mother/Activities with Fathers Indices

Which of the things listed on this card have you done with your (mother/adoptive mother/stepmother /foster mother/etc.) in the past 4 weeks?

OR

Which of the things listed on this card have you done with your (father/adoptive father/stepfather /foster father/etc.) in the past 4 weeks?

1. Gone shopping
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)

2. Played a sport
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)

3. Gone to a religious service or church-related event
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)
4. Talked about someone you're dating, or a party you went to
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)
5. Gone to a movie, play, museum, concert, or sports event
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)
6. Had a talk about a personal problem you were having
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)
7. Had a serious argument about your behavior
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)
8. Talked about your school work or grades
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)
9. Worked on a project for school
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)
10. Talked about other things you're doing in school
 - a. Yes
 - b. No
 - c. Recoded as missing (and dropped)

Negative Parental Attitudes toward Sex

Parents often have certain feelings toward their child's sexual activity. The next few questions ask how you think your parents would feel toward your sexual activity.

Regardless of whether you have done these things or not, how would your mother feel about each of the following things: (If respondent had identified a mother-figure in previous questions, this was added): I mean, the mother you live with.

1. How would she feel about your having sex at this time in your life?
 - a. Strongly disapprove
 - b. Disapprove
 - c. Neither disapprove nor approve
 - d. Approve
 - e. Strongly approve
 - f. Recoded as missing (and dropped)

2. How would she feel about your having sexual intercourse with someone who was special to you and whom you knew well – like a steady (girlfriend/boyfriend)?
 - a. Strongly disapprove
 - b. Disapprove
 - c. Neither disapprove nor approve
 - d. Approve
 - e. Strongly approve
 - f. Recoded as missing (and dropped)

3. How would she feel about your using birth control at this time in your life?
 - a. Strongly disapprove
 - b. Disapprove
 - c. Neither disapprove nor approve
 - d. Approve
 - e. Strongly approve
 - f. Recoded as missing (and dropped)

Regardless of whether you have done these things or not, how would your father feel about each of the following things: (If respondent had identified a father-figure in previous questions, this was added): I mean, the father you live with.

4. How would he feel about your having sex at this time in your life?
 - a. Strongly disapprove
 - b. Disapprove
 - c. Neither disapprove nor approve
 - d. Approve
 - e. Strongly approve
 - f. Recoded as missing (and dropped)

5. How would he feel about your having sexual intercourse with someone who was special to you and whom you knew well – like a steady (girlfriend/boyfriend)?
 - g. Strongly disapprove
 - h. Disapprove
 - i. Neither disapprove nor approve
 - j. Approve
 - k. Strongly approve
 - l. Recoded as missing (and dropped)

6. How would he feel about your using birth control at this time in your life?
 - m. Strongly disapprove
 - n. Disapprove
 - o. Neither disapprove nor approve
 - p. Approve
 - q. Strongly approve
 - r. Recoded as missing (and dropped)

APPENDIX B: FAILED INDICES

***Items introduced into the model as independent variables.**

School Non-attendance

1. (Open ended) How many times (have you skipped/did you ski) school for a full day without an excuse? (Response range from 0 to 99)*
2. Have you ever received an out-of-school suspension from school?*

 - a. No
 - b. Yes
 - c. Coded as missing (and dropped)

3. Have you ever been expelled from school?*

 - a. No
 - b. Yes
 - c. Coded as missing (and dropped)

Grades

1. At the (most recent grading period/last grading period in the spring), what was your grade in English or the language arts?*

 - a. A
 - b. B
 - c. C
 - d. D or lower
 - e. Coded as missing (and dropped)

2. And what was your grade in mathematics?*

 - a. A
 - b. B
 - c. C
 - d. D or lower
 - e. Coded as missing (and dropped)

3. And what was your grade in history or social studies?
 - a. A
 - b. B
 - c. C
 - d. D or lower
 - e. Coded as missing (and dropped)

4. And what was your grade in science?
 - a. A
 - b. B
 - c. C
 - d. D or lower
 - e. Coded as missing (and dropped)

Personal Expectations

1. On a scale of 1 to 5, where 1 is low and 5 is high, how likely is it that you will go to college?*

 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5
 - f. Coded as missing (and dropped)

2. What do you think are the chances that each of the following things will happen to you?*

 - a. Almost no chance
 - b. Some chance, but probably not
 - c. A 50-50 chance
 - d. A good chance
 - e. Almost certain
 - f. Coded as missing (and dropped)

3. You will be married by age 25.*
 - a. Almost no chance
 - b. Some chance, but probably not
 - c. A 50-50 chance
 - d. A good chance
 - e. Almost certain
 - f. Coded as missing (and dropped)

4. You will be married by age 25.
 - a. Almost no chance
 - b. Some chance, but probably not
 - c. A 50-50 chance
 - d. A good chance
 - e. Almost certain
 - f. Coded as missing (and dropped)

5. You will be killed by age 21.*
 - a. Almost no chance
 - b. Some chance, but probably not
 - c. A 50-50 chance
 - d. A good chance
 - e. Almost certain
 - f. Coded as missing (and dropped)

6. You will get HIV or AIDS.*
 - a. Almost no chance
 - b. Some chance, but probably not
 - c. A 50-50 chance
 - d. A good chance
 - e. Almost certain
 - f. Coded as missing (and dropped)

Self-determination

1. Do your parents let you make your own decisions about the time you must be home on weekend nights?*
- a. No
 - b. Yes
 - c. Coded as missing (and dropped)

2. Do your parents let you make your own decisions about the people you hang around with?*
- a. No
- b. Yes
- c. Coded as missing (and dropped)

3. Do your parents let you make your own decisions about what you wear?*
- a. No
- b. Yes
- c. Coded as missing (and dropped)

4. Do your parents let you make your own decisions about how much television you watch?
- a. No
- b. Yes
- c. Coded as missing (and dropped)

5. Do your parents let you make your own decisions about which television programs you watch?
- a. No
- b. Yes
- c. Coded as missing (and dropped)

6. Do your parents let you make your own decisions about what time you go to bed on week nights?
- a. No
- b. Yes
- c. Coded as missing (and dropped)

7. Do your parents let you make your own decisions about what you eat?
- a. No
- b. Yes
- c. Coded as missing (and dropped)

VITA

Vicky L. Elias

Candidate for the Degree of

Doctor of Philosophy

Thesis: EMBODIED AND COMPRESSED SPHERES: THE INFLUENCES OF SOCIAL STRUCTURE ON ADOLESCENT SEXUAL DEBUT AND PREGNANCY

Major Field: Sociology

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Completed the requirements for the Doctor of Philosophy/Education in Sociology at Oklahoma State University, Stillwater, Oklahoma in July, 2011.

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Completed the requirements for the Bachelor of Arts in Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2003.

Experience:

Assistant Professor, Texas A&M – San Antonio, 2011

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OSU Distinguished Graduate Fellowship – 2009, 2010, 2011

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Phi Kappa Phi National Honors Society – 2007

Professional Memberships:

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Pages in Study: 208

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Scope and Method of Study: In this research, data from Waves I and II of the National Longitudinal Study of Adolescent Health (Add Health) were used to test predictions based on a synthesis of the theories of Michel Foucault and Peter M. Blau. Using this synthesis, I propose that society is hierarchically arranged such that those in higher social positions will have access to a wider range of spheres of power while those in lower social positions will have access to a more constrained range of spheres of power. Using Foucault's conceptualization of power as an emergent process based in knowledge and discourse, I further propose that as the range of spheres of power to which an actor has access (today or in the anticipated future) is constrained, the probability that power will be exercised in any available sphere is increased. The body is a sphere of power that cannot be separated from the actor, and thus those teens with a constrained range of spheres of power are more likely to exercise embodied power through sexual behaviors. As a social institution, schools are expected to replicate and reinforce social hierarchies and are thus expected to influence teen sexual behaviors such as debut and pregnancy, which serve as my dependent variables. Analyses were completed using multilevel discrete time hazard analysis and sequential logit models. Nine hypotheses are proposed and tested.

Findings and Conclusions: Although findings addressed in the hypotheses were mixed, clear indications of the role of schools as predicted by the proposed theory were found. Schools exert an influence on adolescent sexual behavior, particularly among younger teens. Intraclass Correlation Coefficients indicate among teens under the age of sixteen, eight percent of variance in sexual debut is due to schools. School level variables associated with debut include the proportion of the faculty that is black and being a rural school. School size and being a public school were significantly associated with pregnancy. Sex education was significantly associated with pregnancy at the school level, but had no effect at the individual level or on debut. These findings indicate the complex and nuanced nature of research into adolescent sexuality and illustrate the importance of a strong theoretical basis and the use of robust statistical methods.

ADVISER'S APPROVAL: Dr. Jean Van Delinder

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