BUNDLE OF JOY: PREGNANCY, COPING, AND DEPRESSIVE SYMPTOMS
IN ADOLESCENT GIRLS
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Using the stress process model, the relationship between pregnancy and depressive symptoms among adolescent girls was investigated. This model posits that stress resulting from social location and related disruptive life events may indirectly affect health by eroding coping, mastery, or social support mechanisms. The effect of low income, minority status and pregnancy on coping processes in adolescent girls was hypothesized and tested. Communication with parents, involvement in activities, and success in school were examined as positive coping strategies. Smoking tobacco, heavy alcohol use, and drug use were examined as negative coping.

Data from the National Survey on Drug Use and Health were analyzed. After combining the available cases from the 2006, 2007, and 2008 datasets, selecting girls aged from 12 to 17 years, and removing missing cases; the sample consisted of a total of 22,854 adolescents. A series of binary logistic regression models were estimated. Findings included that coping strategies partially mediate the relationship between pregnancy and depressive symptoms. In particular, success in school, smoking tobacco, and drug abuse played a mediating role. When coping was accounted for, the relationship between pregnancy and depressive symptoms was reduced and became only marginally significant. Implications of the study include a focus on policy that promotes early intervention assisting at-risk adolescents with the development of coping strategies that may help them adjust to unexpected life events, such as pregnancy.
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By

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I could not have accomplished this alone. I owe so much to so many that the thought of it is overwhelming. To my committee members, past and present, I am first and foremost grateful. They opened doors that were closed to me. They have sacrificed their time and energy under conditions where they had little to spare. They have provided models of professionalism and mentorship that I take with me throughout my career. I am in their debt and thankful beyond words that they have been a part of my life.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGMENTS</th>
<th>iii</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAPTER 1 INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Adolescent Pregnancy in the US</td>
<td>3</td>
</tr>
<tr>
<td>Socio-cultural Problems Associated with Adolescent Pregnancy</td>
<td>4</td>
</tr>
<tr>
<td>Health Outcomes Associated with Adolescent Unprotected Sex</td>
<td>5</td>
</tr>
<tr>
<td>Physical Health Implications of Adolescent Pregnancy</td>
<td>6</td>
</tr>
<tr>
<td>Mental Health Consequences of Adolescent Mothering</td>
<td>8</td>
</tr>
<tr>
<td>Depression during Pregnancy</td>
<td>8</td>
</tr>
<tr>
<td>Intersecting Risk</td>
<td>10</td>
</tr>
<tr>
<td>Stress and the Stress Process Model</td>
<td>12</td>
</tr>
<tr>
<td>The National Survey on Drug Use and Health</td>
<td>15</td>
</tr>
<tr>
<td>Objectives of the Present Study</td>
<td>16</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>18</td>
</tr>
<tr>
<td>Outline of the Dissertation</td>
<td>23</td>
</tr>
<tr>
<td>CHAPTER 2 THE STRESS PROCESS MODEL</td>
<td>25</td>
</tr>
<tr>
<td>Stressors: Chronic Strain</td>
<td>26</td>
</tr>
<tr>
<td>Stressors: Life Events</td>
<td>28</td>
</tr>
<tr>
<td>Psychosocial Resources: Mediators</td>
<td>29</td>
</tr>
<tr>
<td>Health Outcome</td>
<td>33</td>
</tr>
<tr>
<td>Conclusion</td>
<td>34</td>
</tr>
<tr>
<td>CHAPTER 3 REVIEW OF THE LITERATURE</td>
<td>35</td>
</tr>
<tr>
<td>Pregnancy, Depression, and the Stress Process: Deriving a Research Model</td>
<td>35</td>
</tr>
<tr>
<td>Chronic Strains: Minority Status and Low Family Income</td>
<td>38</td>
</tr>
<tr>
<td>Life Event: Pregnancy</td>
<td>41</td>
</tr>
<tr>
<td>Psychosocial Mediators: Positive Coping Strategies</td>
<td>44</td>
</tr>
<tr>
<td>Psychosocial Mediators: Negative Coping Strategies</td>
<td>51</td>
</tr>
<tr>
<td>Connecting Depressive Symptoms to Coping Strategies</td>
<td>59</td>
</tr>
<tr>
<td>Contribution of this Dissertation to the Literature</td>
<td>63</td>
</tr>
<tr>
<td>Conclusion</td>
<td>64</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

While story books and movies often portray pregnancy as a time when women glow and happily anticipate their bundle of joy, research demonstrates that for a significant portion of mothers, carrying a child also involves coping with depression. As many as one in eight women experience depression during pregnancy (Division of Reproductive Health, 2014; Le Strat, Dubertret, & Le Foll, 2011; Oppo, 2009). As many as one in four women experience pregnancy-related psychological distress of some kind, either during pregnancy or post-partum (Hopkins, Marcus, & Campbell, 1984; Grote & Bledsoe, 2007). Research suggests that women who experience depression during pregnancy are predisposed to suffer depression postpartum and throughout the lifespan (Eberhard-Gran, Tambs, Opjordsmoen, Skrondal, and Eskild , 2004; Figueiredo, Pacheco, & Costa, 2007; Lovisi, Lopez, Coutinho, & Patel, 2005; Oppo, 2009).

A growing body of evidence suggests that the shift to the role of parent itself is a stressor that affects the health trajectory of mothers throughout their lifespan. Both during pregnancy and after the birth of a child, mothers are at greater risk of experiencing psychological distress. Evenson and Simon (2005), analyzing data from the National Survey of Families and Households, found that simply being a parent raises the likelihood of depression throughout the lifespan. They compared depression scores for parents living with young children, adult children, empty nest parents, parents who have young children they do not live with, parents who live with stepchildren, and nonparents. There were no individual categories of parents reporting fewer depressive symptoms than nonparents once socio-demographic factors such as race, employment,
education, and income were controlled. All parents, as a social category, had significantly higher levels of depression than nonparents once these demographic factors were held constant.

The adjustment to life as a parent can be physically and mentally exhausting. This is no less true for expectant adolescents. Those who struggle with the everyday demands of work and relationship obligations must learn to juggle more obligations once this new role comes along. Attending to an infant entails certain responsibilities, including commitments of time, money, mental energy, and physical labor. Awareness of and attention to these commitments may pose a challenge to well-being by placing a strain on the individual’s psycho-social resources.

The expectation of a child is, in short, a tremendous source of stress under ordinary circumstances. Adolescent parenting brings with it a host of extraordinary circumstances. Research has demonstrated that stress caused by the transition to parenthood takes a toll on parents’ mental health, with mothers more likely than fathers to experience negative mental health consequences related to the arrival of a child (Aneschensel, Frerichs, & Clark, 1981). Research has also demonstrated that adolescent mothers are more likely than adult mothers to exhibit depressive symptoms both during pregnancy and, subsequently, postpartum (Figueiredo, Pacheco, & Costa, 2007). Questions arise, however, regarding which adolescents experience depressive symptoms. Why is it that girls in difficult circumstances sometimes thrive, while others in seemingly similar conditions experience mental health problems?

The purpose of this dissertation research was to gain a better understanding of depression during pregnancy in adolescent girls. In particular, the goal was to better
understand the factors that mediate the relationship between social environment, pregnancy, and depressive symptoms. Positive and negative coping strategies were especially focused upon. The chapters that follow discuss the stress process model, including chronic stressors, life events, presumed mediators, and negative health outcomes. The work then turns to a review of the literature related to the dissertation research, followed by a discussion of the methods that were used in this investigation. Finally, this work ends with a concluding chapter which makes connections and discusses implications for policy and recommendations for future research. But first, this introductory chapter presents an overview of the issues surrounding adolescent pregnancy and pregnancy-related depression, beginning with a discussion of the scope of adolescent pregnancy in the United States.

Adolescent Pregnancy in the US

According to a recent report issued by the United States Department of Health and Human Service (Hamilton, Martin & Ventura, 2013), the birth rate among adolescents has steadily declined since the year 1970. While this news is encouraging given the risk factors associated with adolescent pregnancy, it nevertheless reflects a reality that more than 448,500 adolescent girls between the ages of ten and nineteen gave birth in 2012. Approximately 29 of every 1,000 adolescent girls gave birth during 2012, and the US continues to have one of the highest adolescent birth rates among developed countries (Hamilton, Martin & Ventura, 2012; Martin et al., 2009).

Research conducted by Figuieredo, Pacheco, and Costa (2007), suggests that adolescent mothers are more likely to be depressed than adult mothers, both during
pregnancy and in the first few months postpartum. What are the consequences, then, for the population when there is the persistence of a relatively high adolescent birth rate? The following discussion focuses on the socio-cultural impact of adolescent pregnancy.

Socio-cultural Problems Associated with Adolescent Pregnancy

There are a host of negative socio-cultural outcomes related to adolescent pregnancy and motherhood. First, regarding their education and economic outlook, adolescent mothers, especially minorities, have been shown to be more likely to experience difficulties in school, to drop out of high school, and to forego college (Basch, 2011). Further, adolescent mothers are more likely to be single mothers, bearing the costs of raising a child on their own shoulders (Martin et al., 2009).

The National Council on Teen Pregnancy (2014) estimates that the public pays approximately $9.4 billion in costs related to adolescent pregnancy. Some of this cost, the National Council argued, is in lost tax revenue due to the lower lifetime earnings of adolescent mothers. Mothers who have children in their adolescent years, they argue, are also more likely to require intervention from social services and more likely to need support from public food, housing and health assistance programs. Furthermore, the National Council suggests the cost of jail for the children of adolescent mothers is also relatively high. The sons of adolescent mothers are over two times more likely to be incarcerated than other males (National Council, 2014). While these statements may seem to be farfetched, they echo findings put forth by the US Department of Health and Human Services’ Office of Adolescent Health (2014) in its report on Teen Pregnancy

Jail is one of several problems children of adolescent mothers have been found to be more likely to encounter. They have been shown to have lower cognitive ability as they enter kindergarten compared to their peers (Martin et al., 2009; 2013). They have also been found to be more likely to have behavioral problems and chronic health issues (US HHS Office of Adolescent Health, 2014). When they reach adulthood, the children of adolescent mothers have been found to have higher rates of unemployment than other children (Martin et al., 2009). The children of adolescent mothers are more likely themselves to give birth to children in their adolescent years (Martin et al., 2009), potentially repeating the cycle of disadvantage.

In addition to the socio-cultural impact of adolescent pregnancy on the mother, her child, and society in terms of public welfare costs and lost taxable wages, there are also physical and mental health consequences associated with adolescent pregnancy and its necessary precursor, adolescent unprotected sexual activity. What follows is a discussion of those issues.

Health Outcomes Associated with Adolescent Unprotected Sex

Based on analysis of state and local case reports, the US Centers for Disease Control and Prevention (CDC, 2013a, 2014b) determined that adolescents and young adults, aged 15 to 24, account for close to half of the new cases of sexually transmitted infections each year. This constitutes approximately ten million cases per annum. One in four gonorrhea cases reported by the CDC occurred in children and adolescents.
under the age of twenty. About a third of all chlamydia cases occurred in this same age group (CDC, 2014b).

Forhan et al. (2009), found that nearly four in ten sexually active, adolescent girls contracted at least one life-threatening sexually-transmitted infection. These included gonorrhea, chlamydia, herpes, trachomoniasis, and any of several high-risk strains of human papillomavirus (HPV). Each of these diseases carries a risks for health complications, ranging from infertility, stroke, reproductive cancers, and other life threatening conditions (CDC, 2013a, 2014b). While most of these cases are treated, and some even resolved on their own, the cost of treatment is close to $16 billion dollars to the public (CDC, 2013a, 2014b). In addition, diseases such as HPV have been shown to have serious health consequences that present much later in life (CDC, 2013a, 2014b).

Certainly an unavoidable risk associated with adolescent unprotected sex is pregnancy. Pregnancy in adolescence is associated with several negative physical health outcomes. These outcomes is now discussed in detail.

Physical Health Implications of Adolescent Pregnancy

The health risks associated with adolescent pregnancy are numerous. Foremost among these is the increased risk of death for both mother and child. Early and current research has shown adolescent mothers to have a notably higher maternal mortality rate than older mothers, both in the United States and globally (Nove, Matthews, Neal, & Comacho, 2014; Menken, 1972; United Nations Population Fund, 2005; World Health Organization, 2001). Babies of adolescent mothers have been found to have a higher
risk of preterm birth, low birth weight infants, and a higher infant mortality rate than babies born to mothers who are twenty years of age or older (Martin et al., 2009; Hamilton, Martin & Ventura, 2009; Ventura, Curtin, & Abma, 2012).

In addition to maternal and infant mortality risks, recent studies have shown that girls who were pregnant during adolescence are at greater risk for poor health later on in life. Patel and Sen (2012) analyzed data from the National Longitudinal Survey of Youth. This survey began examining adolescents in 1978 and has followed their progress on several measures through present day (US Department of Labor, 2014). The authors found that adolescent girls who were pregnant before age eighteen reported lower measures of health, both mental and physical, in adulthood. The authors controlled for factors like drinking, smoking, and drug use when young, as well as demographic factors like poverty and race/ethnicity.

In their study, Patel and Sen (2012) found that the increased risk for negative mental and physical health held even when comparing the girls who had gotten pregnant to girls who had engaged in unprotected sex but not gotten pregnant. The authors' findings suggest is that it was not simply risky sexual behavior that led to negative health outcomes, but some experience specific to pregnancy. Interestingly, girls who became pregnant but did not give birth were shown to be even more likely to have low mental and physical health scores than those who did give birth. The authors note that theirs is one of the first known studies to examine the impact of pregnancy during adolescence on mental and physical health later in life (Patel & Sen, 2012), suggesting a scarcity of research on adolescent pregnancy and its relationship to health later in life. With those considerations in mind, what follows is a discussion of
specifically the mental health factors that have been found to be related to pregnancy and especially adolescent pregnancy, with a particular emphasis on depression.

Mental Health Consequences of Adolescent Mothering

Several studies have found that adolescents are at greater risk for mental health complications immediately after the birth of a child (Birkeland et al., 2005; Figuieredo, Pacheco, and Costa, 2007; Hoffman, 2006). Figuieredo et al. (2007) suggest that adolescent mothers are more likely to be depressed than adult mothers, both during pregnancy and in the first few months postpartum. Birkeland et al. (2005) found that levels of depression were highest among adolescent mothers who reported social isolation, low levels of maternal competency, or body image concerns.

Additional research suggests that pregnancy in youth raises the likelihood of mental health problems throughout the lifespan (Bernazzani and Bifulco, 2003; Jaffee 2001). Jaffee (2001) found that early parenthood places adolescents at risk for low socio-economic standing, poor mental health, and increased interpersonal difficulties in young adulthood. Jaffee found this to be particularly true for adolescent parents who were already placed at risk by other problems, such as low IQ scores, difficulty in school, and a history of conduct disorder. Liberatos' (2007) study of predominantly African American and Latina low-income adolescent mothers found stress to have a direct impact on both the child’s and mother’s mental health.

Depression during Pregnancy

While postpartum depression has often been the focus of mental health studies
among women and adolescent girls, other research has focused on the causes and consequences of depression that occurs during pregnancy (Bennet, Boon, Romans & Grootendorst, 2007; Eberhard-Gran, Tambs, Opjordsmoen, Skrondal & Eskild, 2004; Hughes, Turton, & Evans, 1999; Lovisi, Lopez, Coutinho, & Patel, 2005; Singh et al., 2004; Skouteris, Wertheim, Rallis, Milgrom & Paxton, 2009).

Research conducted in Norway by Eberhard-Gran, Tambs, Opjordsmoen, Skrondal, and Eskild (2004) found that depression was as prevalent during pregnancy as it was in the first four months postpartum. They note, however, that the prevalence of depression varies over the course of the pregnancy. Depressive symptoms were least prevalent in the first trimester of pregnancy and beyond one year after giving birth. The prevalence of depression among the women in the second- and third- trimesters of their pregnancy was not statistically different from the entire first year postpartum. The researchers found the similarity between depression levels in mid- to late-pregnancy and the first year postpartum to hold true even after controlling for selected life events, prior depression, and poor partner relationship.

Adolescent mothers, moreover, have been found to be at greater risk than older mothers of depressive symptoms during pregnancy (Figueiredo, Pacheco, & Costa, 2007). As Eberhard-Gran et al. (2004) report, research on the outcomes of depression during pregnancy has largely focused on postpartum depression and the well-being of the baby. These studies continue to find that depression during pregnancy is strongly correlated to an increased risk of postpartum depression in mothers (Bernazzani & Bifulco, 2003; Dietz et al., 2007; Figueiredo, Pacheco, & Costa, 2007; Lovisi, Lopez, Coutinho, & Patel, 2005).
Maternal depression during pregnancy has also been found to be associated with negative outcomes for the babies born. Misri and Kendrick (2008) found that depression during pregnancy interfered with maternal-child bonding in infancy, which likely impacted the child’s social, psychological, and cognitive well-being. Hay, Pawlby, Waters, & Sharp (2008) further found that depression during pregnancy was directly related to reduced cognition among offspring. Pearson et al. (2013) conducted a large, longitudinal cohort study and found that maternal depression during pregnancy increases the risk of depression in their offspring at age eighteen (Pearson et al., 2013). These findings suggest that depression during pregnancy has serious mental health implications for both mother and child. Given that adolescent mothers have been found to have a greater risk of depression during pregnancy (Figueiredo, Pacheco, & Costa, 2007), the adolescent experience bears further study.

**Intersecting Risk**

The preceding sections of this chapter have discussed the high incidence and prevalence of adolescent pregnancy in the United States, relative to other western nations. It has also elucidated findings of risk associated with adolescent unprotected sexual activity and adolescent pregnancy. These include physiological, socio-cultural, cognitive, and mental health risks to the adolescent mother and her children. Further, this chapter outlined the equally serious outcomes associated with depression during pregnancy for women of all ages. The concerns which drive the research conducted for this dissertation are at the intersection of each of these findings.
Taking into account the sources enumerated above, given, first, that unprotected sex in adolescence has been associated with negative outcomes, given, second, that pregnancy during adolescence has been found to be related to very serious issues later in life, and given, thirdly, that depression during pregnancy and postpartum has been found to be associated with a host of negative outcomes, it follows that adolescents who are pregnant or were recently pregnant and who exhibit symptoms of pregnancy-related depression would be at very high risk for negative outcomes. More specifically, with the understanding that both adolescent pregnancy and depression during pregnancy have been found to be related to postpartum depression, it can be expected that adolescents who are depressed while pregnant would have a very high risk of depression, both postpartum and beyond.

This presumed increased risk is of particular concern when the findings of Bylund & Reed (2007) are taken into account. Bylund and Reed (2007) found that depression is harder to treat among adolescents. Not only are adolescents in this set of circumstances more likely to be depressed, it is more difficult to treat them for depression. In their study, Bylund and Reed found that children and adolescents respond differently to antidepressants than adults. Children are more likely to experience negative side effects of antidepressants, and are more likely to experience a “lack of efficacy” when prescribed anti-depressant medication (Bylund and Reed, 2007).

What all of these findings underscore is the need to understand the processes that lead to depression in pregnant adolescent girls. Research suggests some adolescents are able to bear the stress associated with pregnancy in relative stride,
while others succumb to depression. What are the forces at play that lead to this
difference?

This dissertation research was undertaken to shed light on the mechanisms
which link pregnancy to depressive symptoms in adolescent girls. It sought to address
whether pregnancy itself acts as a stressor that erodes the pregnant adolescent’s ability
to maintain her psychological well-being. The focus throughout the study was on
understanding the degree to which access to social resources and coping strategies
mediate the relationship between adolescent pregnancy and depressive symptoms.

Stress and the Stress Process Model

An examination of the relationship between pregnancy and adverse mental
health outcomes would be not complete without attempting to understand why this
relationship exists. Perhaps no model for understanding the mental health outcomes of
social situations is more prominent than the stress process model put forth by Pearlin,
Menaghan, Lieberman, and Mullan (1981). These authors were the first to use the term
“the stress process model” (Pearlin, 1999a, 1999b). This model argues that social
stress takes a heavy physical, emotional, and social toll on human beings. In particular,
stress caused by social disadvantage and stress in the form of increased role strain and
role conflict taxes an individual’s ability to cope and maintain social support. To
understand this process, it is necessary to first understand the nature of stress.

The impact of stress on physical and emotional well-being was first demonstrated
in the pioneering studies of Cannon (1935), and Selye (1956). Cannon proposed that
homeostasis is a state characterized by the absence of discomfort or want. A
A homeostatic organism is neither too hot nor cold. It is neither hungry nor overly full. It is neither tired nor overexcited. It is in balance.

Cannon (1935) found that when homeostasis is disrupted, a psycho-physiologic response occurs. He was the first to use the term fight-or-flight to refer to this response. To return to balance, he argued, an additional psycho-physiologic response must take place. He asserted that the efforts the organism must go through to repair damage done by a disruption to homeostasis may challenge a living being’s ability to function (Pearlin, 1999a).

Selye (1956), testing Cannon’s theory of homeostasis, was the first to use the term “stress” in a scientific study. Selye documented the physical stages of stress response, demonstrating, in essence, that stress raises susceptibility to physical and mental illness and may thereby shorten an individual’s lifespan (Selye, 1956).

Cannon and Selye’s findings suggest that the cumulative effort to repair damage done by chronic or continuous stress exhausts a living being’s ability to function properly. Likewise, there exist certain singular events that may overwhelm an individual’s ability to maintain equilibrium, in that their stress response is overly taxed and cannot meet the challenge the environment poses upon them (Cannon, 1935; Pearlin, 1999a, 1999b; Pearlin et al., 1981; Selye, 1956).

The stress process model, as conceptualized initially by Pearlin et al. (1981) and later discussed in detail by Pearlin (Pearlin, 1999a, 1999b), argues that an individual’s negative placement in the social system combined with the addition of role obligations to an individual’s role set constitute social stress. A visual representation of the stress process model is provided in Figure 1.
Pearlin (1999a, 1999b) argues there are two sources of social stress. The first is chronic strain, which he likens to Merton’s (1957) concept of anomie. Chronic strain occurs when an individual is at a disadvantage due to her placement in a social system that is broken or strained—a system that sets forth one goal for all, but does not grant equal...
opportunity to achieve that goal. Chronic strain, then, includes such ongoing experiences as being economically or racially disadvantaged.

Life events are the other source of social stress (Pearlin, 1999a, 1999b; Pearlin et al., 1981). Life events are events that alter a person’s role set or their place in the social system (Pearlin, 1999a, 1999b). Life events may include the loss of a family member or, in the case of this study, the addition of a family member in the form of pregnancy.

The stress process model posits that stressful social conditions lead to poor health outcomes through a particular pathway. Social stress, the model suggests, can overwhelm a person’s ability to fulfill expected role obligations and maintain positive social support and coping strategies. This damage to social support and coping mechanisms in turn challenges a person’s ability to respond to stress in a positive way (Pearlin, 1999a, 1999b; Pearlin et al., 1981). Ultimately, by identifying the ways in which social support affects health, the goal is to contribute to interdisciplinary efforts to understand causes of illness and ideally target, prevent and treat problems (Pearlin, 1999a, 1999b).

A detailed discussion of the stress process model and its relationship to the research conducted for this dissertation is discussed further in later sections. Next an introduction of the data set examined for this study and a discussion of its objectives are discussed.

The National Survey on Drug Use and Health

The analysis conducted for this research used data from the National Survey on
Drug Use and Health (NSDUH), conducted by the US Department of Health and Human Service’s Substance Abuse and Mental Health Services Administration (SAMHSA). The survey is conducted annually, and the questions are largely identical each year for comparison purposes, though the inclusion of particular topical modules of targeted interest may vary year-to-year. For this research, three adjacent years of data were pooled for analysis: 2006, 2007, and 2008, years which have identical methods of data collection.

The NSDUH is conducted using computer-assisted interviewing techniques that include participant and survey administrator interviews in combination with computer-assisted self-interviewing software in order to provide respondents with privacy on potentially sensitive questions.

The NSDUH targets non-institutionalized persons living in the United States, age twelve or older. Participants from all fifty states are chosen using multistage area probability sampling. Youth, aged twelve to seventeen, and young adults age eighteen to twenty-five, were oversampled.

An additional, more detailed discussion of the NSDUH is included in the methods discussion of this dissertation. At this time, the discussion now turns to the objectives of the present study.

Objectives of the Present Study

This research contributes to literature examining the mechanisms through which pregnancy affects symptoms of depression in adolescent girls. Much research has focused on mother’s mental health after the birth of an infant, and more particularly on
post-partum depression (c.f. Gjerdingen & Yawn, 2007; Halbreich & Karkun, 2005; O'Hara, Nuenaber, & Zekoski, 1984). Further research has shown that depression during pregnancy may predispose mothers to postpartum depression or other negative mental health outcomes in the months after the child is born (c.f. Robertson, Grace, Wallington, & Steward, 2004). However, little is known about the mental health impact of pregnancy on adolescent girls specifically. Given the continued prevalence of adolescent pregnancy in the US (Hamilton, Martin & Ventura, 2012; Martin et al., 2009), the need to understand its impact on adolescent mental health is critical.

This study explored the social conditions within which pregnancy contributes to negative mental health outcomes in adolescent girls. In the process, it sought to determine whether pregnant adolescents were at greater risk for depressive symptoms when compared to non-pregnant girls in similar social conditions. In addition to identifying the fundamental social conditions which may predispose pregnant adolescents to stress outcomes, the mediating forces that affect the likelihood of pregnancy-related negative mental health outcomes among adolescents are outlined. In particular, this research used the stress process model for mediators to investigate the manner in which social forces impact the likelihood of experiencing extended feelings of sadness, emptiness, or depression in adolescent girls while determining whether pregnancy raises the likelihood of these feelings. The stress process model for mediators was first set out by Pearlin et al. (1981), and has since been a key instrument for defining the social forces that influence mental health (Aneshensel & Phelan, 1999b; Pearlin, 1999a, 1999b; Pearlin et al., 1981).
This study utilized national data (NSDUH 2006, 2007, 2008) to achieve several objectives. First among these was to determine whether pregnancy was associated with disadvantaged social positions. Secondly, the study examined whether national data on adolescents would indicate that pregnancy was related to an increased risk of depressive symptoms. Third, it investigated the factors that may mediate the pregnancy-depression relationship. Finally, it examined the influence of these mediators on the pregnancy-depression relationship (see Appendix for a concise list of hypotheses). Once these relationships were investigated, the study turned to an examination of the findings, questions for future research, and implications for public policy.

Throughout the study, a series of specific terms were employed. This chapter now presents those definitions.

Definition of Terms

Several key terms were used throughout this research. In order to maintain clarity and consistency, a list of terms foundational to the research and brief discussion of the origins of each, where appropriate, is included. The following terms were utilized in this research:

- Adolescent: The World Health Organization (WHO) defines adolescence as the period between childhood and adulthood, spanning the years of age ten to age nineteen (World Health Organization, 2014). While the biological development into an adult is largely the same across cultures, the social development varies greatly depending on the particular society a child is raised within. The United States Centers
for Disease Control (CDC), in its recent report, *Adolescent Health in the United States* defines adolescence as “the period of life from puberty to maturity,” (MacKay & Duran, 2007), and also emphasizes that there are both biological and socio-cultural changes associated with maturation. The CDC, like the WHO, suggests that adolescence occurs primarily during the ages of ten to nineteen, while stating that the changes associated with maturation may affect these boundaries due to biological variation as well as socio-cultural conditions germane to the United States. The CDC notes that definitions of the term adolescence vary widely, but particularly mentions several markers of adulthood common in the US that mark the end of adolescence, including gaining the legal status of an adult, graduation from high school, and subsequent enrollment in military service, college, or the adult work force (MacCay & Duran, 2007). Given these two resources, for the purposes of this research, the term adolescent refers to youth who fall between the ages of ten and nineteen.

- Youth and youth, aged 12-17: Respondents to the NSDUH, the dataset that was utilized for this study, who were between the ages of 12 and 17 were administered a youth questionnaire (US Department of Health and Human Services, 2008). This questionnaire contained questions specific to schooling and relationships with parents. This subset of adolescents reflects socio-cultural specific boundaries, such as entry into middle school, the onset of age of legal adulthood, the age to register for selective service, and the end of high school for many youth at age eighteen. Participants in the study are therefore often referred to as youth or specifically youth, aged 12-17, to distinguish them from older study participants.
Stress: The American Psychological Association (2014b) and American Centers for Disease Control and Prevention (2014a) define stress as a response or reaction to disruptive forces. Stress is the state of being upset, in all its many forms, and may result in a variety of negative outcomes (APA, 2014b; CDC, 2014a). These outcomes range from difficulty concentrating to feelings of sadness, frustration and helplessness (CDC, 2014a). Stress can be a reaction to an acute trauma or threat, or it can be chronic or ongoing (APA, 2014).

The stress process model: The stress process model suggests that social stress in the form of chronic strains and life events challenge a person’s ability to maintain health by affecting a person’s coping, social support, or mastery systems (Pearlin, 1981; Pearlin 1999a, 1999b). The term “stress process” first appears in Pearlin, Menaghan, Lieberman, and Mullan’s (1981) article of the same name (Pearlin, 1999a, 1999b), and has appeared in many other publications (cf. Grant, et. al, 2003; Lindsay, 2004; Pearlin, 1999a, 1999b; Pearlin, Aneshensel & LeBlanc, 1997; Pearlin et al., 1981; Truchon, Cote, Filion,Arsenault, & Dionne, 2008; Turner & Lloyd, 1999).

Schwartz (2002) notes that hundreds of articles exist utilizing the stress process model in some form, examining either mental or physical health outcomes. The stress process model is described in detail in Chapter 2 of the dissertation.

Chronic social strain: Chronic social strain, or simply chronic strain, is an ongoing state of living which challenges homeostasis or balance. Chronic strain is based on the notion that disadvantage associated with negative or undesirable social location erodes the ability to maintain wellbeing. Pearlin (1999a; Pearlin, 1999b) likens chronic strain to being “a captive of a role,” that is, being trapped in a position where
one is unable to fulfill the expectations of society due to a broken social system, very
directly likening chronic social strain to Merton's (1957) conceptualization of social strain.

- **Life event:** Pearlin (1999a; Pearlin, 1999b) defines a life event as a single, impactful, traumatic event that alters people's lives. Examples include the loss of a loved one (Pearlin, 1999a, 1999b), or loss of a job (Pearlin et al., 1981). In the case of this study, the onset of pregnancy constitutes a life event (cf Lindsay, 2004). Chronic strain and life events are collectively referred to as stressors, reflecting the notion that they are sources of stress that can contribute to negative health outcomes.

- **Mediators in the stress process model:** Resources which are affected by social stress, and in turn have an effect on wellness. Pearlin (1999a, 1999b), in his discussion of the stress process model, asserts that mediators like social support, coping strategies, or mastery are affected by chronic social strain or life events. Once these mediators are diminished in strength, the ability to maintain health is reduced (Pearlin, 1999a, 1999b).

- **Coping:** Pearlin and Schooler (1978), define coping very specifically, stating that the word coping is used to “refer to any response to external life-strains that serves to prevent, avoid, or control emotional distress” (p. 3). Coping, then, refers to behaviors and beliefs the individual adopts to minimize the impact of stressors (Pearlin, 1999a, 1999b; Pearlin, 1991; Pearlin & Aneschensel, 1986). Coping strategies help a person deal with the strains of life (Pearlin & Schooler, 1978). Coping is learned. That learning process is social. The absence of social resources may then damage a person's ability to cope (Pearlin & Schooler, 1978). For the purposes of this research, positive coping strategies are those that are expected to be associated with reduced depressive
symptoms. Negative coping strategies are presumed to be associated with little change or negative change in depressive symptoms (cf. Lee, Nezu, & Nezu, 2014; Lindsay, 2004).

- Social support: Turner and Turner (1999), argue effectively that the concept of social support stems originally from Durkheim’s studies of suicide. In Suicide (1951), Durkheim found that a lack of bonds to significant others and ties to the community raises the risk of suicide. Other foundational research on social support includes Harlow’s “Love in Infant Monkeys” (1959) and Bowlby’s (1969) studies of attachment, both of which point to the importance of parenting and primacy of attachment to the parent in the wellbeing of offspring. Perhaps the keystone piece of social support research was presented by Cobb (1976), who defines social support as, “information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations” (p.300). Thus, much like Durkheim, Cobb iterates that social support includes a sense of mattering to someone and being a part of a larger community. Finally, Pearlin et al. (1981), provide a definition of support that agrees with Cobb. Social support, they argue, includes a deeper level of “involvement and concern” (p. 340). Interactions with others in the way of family, friend or community networks do not guarantee social support. Support happens when a close bond exists.

- Mastery: Pearlin (1999a; Pearlin, 1999b) refers to mastery as a person’s belief that they have the ability to control their own lives. Ross and Sastry (1999) note that this concept is very closely related to locus of control and self-efficacy. Mastery, Ross and Sastry argue, is a learned concept, a sense a person has that the world around her is of her own making.
Depression: The American Psychological Association defines depression as a condition characterized by symptoms such as feelings of sadness, worthlessness, guilt, and suicidal thoughts (APA, 2014a). Additional symptoms may include loss of energy, lack of enjoyment in daily activities, weight fluctuations, sleep disturbances, and an inability to focus (APA, 2014a). The APA (2014a) asserts that depression is very common and treatable. However, as it relates to this study and as mentioned above, Bylund and Reed (2007) found that adolescents are more likely to experience negative side effects from traditional treatment or to find their treatment to be ineffective.

These definitions are intended to provide clarity in the chapters that follow. The next section presents an outline of those chapters.

Outline of the Dissertation

In Chapter 1, an introduction to the social dynamics surrounding the problem of pregnancy among adolescents and associated depressive symptoms was presented. Definitions utilized in this research and the dissertation was also discussed. Chapter 2 contains a detailed examination of the stress process model, as presented primarily by Pearlin et al. (1981) and Pearlin (1999a, 1999b), and selected iterations are addressed. The connections of the stress process model to major theoretical cannons in sociology are expounded upon. The various components of the model are described individually.

Having laid the foundation discussing the components of the stress process model, Chapter 3 then presents a review of the literature, connecting the research on the experiences of pregnant adolescents to each element of the stress process model. The discussion turns at times to literature related to the experiences of pregnant adult
women, or the impact of recent pregnancy, particularly in cases where research on the experiences of this particular subset of adolescents is lacking. Where research falls short, these shortcomings are noted.

Chapter 4 of the dissertation presents a discussion of the hypotheses that guide this study, and a case is made for mediation. A description of the dataset that was examined for this study is outlined. The reasoning behind the utilization of this data set is discussed, and the strengths and weaknesses of the data set are addressed. A detailed description of the research methods used for this study is presented, using the framework of the stress process model.

Chapter 5 begins with an in-depth discussion of the findings related to the hypotheses under study. The dissertation ends with Chapter 6, which presents conclusions regarding the application of the stress process model as a means to better understand how pregnancy is related to pregnancy and coping in adolescent girls. The final sections of Chapter 6 contain discussions of the limitations of this study, its implications, and suggestions for future research.
CHAPTER 2
THE STRESS PROCESS MODEL

The previous chapter presented an overview of the issues surrounding adolescent pregnancy and pregnancy-related depression. It provided an introduction to the stress process model as a mechanism for understanding the relationship between social forces and depressive symptoms among pregnant adolescent girls. It also provided a list of definitions of terms relevant to the work at hand.

This chapter of the dissertation delves into the stress process model in greater detail, with a focus on the model's origins and more recent illuminations from the model's primary author, Leonard Pearlin (Pearlin, 1999a, 1999b; Pearlin et al., 1981). At the heart of the stress process model is the notion that stress from social forces contributes to mental illness by eroding the individual's ability to maintain equilibrium (Pearlin, 1999a, 1999b; Pearlin et al., 1981).

The stress process model that guides this research is composed of three primary elements: social stressors, psychosocial conditions that mediate the impact of stressors, and health outcomes (Pearlin, 1999a; Mirowsky, 1999; Lindsay, 2004). Figure 1 presents a conceptual diagram of the essential elements of the stress process model for mediation. This model is based on the writings of Pearlin et al. (1981), Pearlin (1999a, 1999b), and interpretations of the model put forth by Mirowsky (1999), and Lindsey (2004). Mirowsky's 1999 work was chosen in part for its focus on the role of mediators and the use of progressive adjustment to test for mediation, discussed later in this dissertation. Figure 2 presents the application of the constructs in Figure 1 to this research. Lindsay (2004) is drawn upon as well. Lindsay's research examined
pregnancy and positive and negative coping strategies, as did this research, though in a much different context. This chapter now turns to a discussion of the stress process model for mediators derived from these scholars and presented in Figure 1. It begins with a discussion of social sources of stress.

Stressors: Chronic Strain

Stressors are defined as “any condition having the potential to arouse the adaptive machinery of the individual” (Pearlin, 1999b, p. 163). Social stressors include difficulties related to negative social status, social roles, and unsettling events. Pearlin et al. (1981) and Pearlin (1999a, 1999b) therefore delineate two types of stressors: chronic stressors and life events.

Chronic stressors are long-term problems faced by the individual on a daily or frequent basis (Pearlin, 1999a, 1999b; Pearlin et al., 1981). Chronic stressors take one of two forms: status strains and role strains. Status strains are the result of social status or one’s position in the social system. Status strain comes about particularly as a result of experiencing a disadvantaged position within the social system. It is related to and results from belonging to a minority class, a class of society with less power, property, or prestige (Pearlin, 1999a, 1999b).

Pearlin (1999a) traces the concept of status strains back to Merton’s (1968) strain theory. Merton suggests that a group’s social position and a lack of access to resources can lead to a state of frustration, which he termed anomie, or normlessness. Anomie occurs amongst a social class when it has no acceptable means through which it can achieve cultural goals. In other words, when an entire class in society has been
presented with a set of social goals it is expected by society to attain, but at the same time given access only to a systematically reduced set of opportunities to obtain those goals, there is no way for that group to meet the cultural norm. It is in a state of anomie (Merton, 1968). To use the language of Cannon (1935), and Selye (1956), membership in such a class, ipso facto, presents challenges to equilibrium (Pearlin, 1999a, 1999b; Pearlin et al., 1981). It follows, then, that social disadvantage in the form of belonging to a minority class, whether it be racial/ethnic minority or economic minority, constitutes status strain, and therefore a chronic stressor.

The other type of chronic strain mentioned by Pearlin (1999a, 1999b), is role strain. Drawing from Merton’s (1968) work once again, Pearlin argues that role strain occurs, in part, when an individual is unable to satisfy the demands of one role because those demands conflict with the demands of another. Pearlin refers to this using Merton’s terminology as interrole conflict. Role strain also occurs when an individual experiences role overload, that is, when she simply does not have the resources to meet role obligations (Pearlin, 1999a, 1999b). In addition, a role may be undesirable, either to the individual or to society, which may result in feelings of entrapment, or role captivity (Pearlin, 1999a, 1999b). Interrole conflict, role overload and role captivity are presumed to present social role-related challenges over time to the individual’s ability to maintain well-being (Pearlin, 1999a, 1999b; Pearlin et al., 1981). Thus, they are characterized as chronic strain in the form of role strain. For this research, minority status and low family income are both considered as sources of chronic strain.
Stressors: Life Events

Understanding, then, that chronic stressors are a series of events that persist over time, either in the form of status strain or role strain, the discussion turns to life events. Life events are characterized by sudden, disruptive, or traumatic events (Pearlin, 1999a, 1999b; Pearlin et al., 1981). These may consist of relatively isolated, individual occurrences, such as the death of a loved one. They may also be events influenced to a more discernible degree by social structural forces, such as loss of a job. Life events are conceptualized as sources of stress, because they present change to the individual’s immediate position in society and the resources which they may need to draw to bear. These changes are not planned. They are not wanted (Pearlin et al., 1981; Pearlin, 1999a, 1999b).

Life events differ from chronic stressors in that life events present stress in one fell swoop, a discrete event knocking an individual out of balance or homeostasis (Pearlin et al., 1981). Life events range in severity from extreme trauma to what may to an outsider seem like a minimally problematic event (Pearlin et al, 1981). Pearlin et al. (1981) note that an individual’s ability to remain balanced after a life event is dependent upon her level of chronic strain and the psychosocial resources at her disposal (1981).

As an example of a life event, Pearlin (1999a) discusses the experience of taking on the role of caregiver to a sick family member. The introduction of the new role, further combined with the loss of a contributing family member, constitutes a life event. This experience is very similar to taking on the role of parent. The individual has a new collection of obligations to add to their already existing role set. The research conducted for this dissertation examined pregnancy and the advent of a new child as a life event.
Life events and chronic strains are often very closely intertwined (Pearlin et al., 1981; Pearlin, 1999a, Pearlin, 1999b). Life events are catalysts for change. A life event can put an individual in a position to experience additional chronic strain, such as a divorce that throws a family into poverty. On the other hand, chronic stressors can increase risk of life events. For example, an impoverished marriage may be more inclined to end in divorce. There is, in essence then, a feedback loop. Pearlin refers to the recursive nature of the relationship between chronic strains and life events as stress proliferation (Pearlin, 1999a, 1999b; Pearlin, Aneshensel, & LeBlanc, 1997). In this dissertation, however, the focus is on the chronic strain→life event part of the loop. In other words, the dissertation examined the effects of chronic strain, represented by racial/ethnic and economic minority statuses, on one life event, pregnancy.

Psychosocial Resources: Mediators

The stress process model seeks not only to establish that stress from social forces erodes health, it seeks to define the process through which that erosion occurs. Pearlin (1999a, 1999b) and Pearlin et al. (1981), present several psychosocial resources that are presumed to mediate the relationship between stressors and health. Pearlin (1999b), noting that these resources have been researched in multiple combinations, suggests this is neither an obligatory list nor an all-inclusive list of psychosocial resources. Pearlin (1999b) further argues that resources do not exist in a vacuum. Resources are provided by society (Pearlin and Schooler, 1978). A person’s ability to deal with problems may in effect be altered by the very stressors they face.
Pearlin lists three commonly researched categories of mediators: coping, social support, and mastery (Pearlin, 1999a, 1999b).

**Coping**

First, coping strategies are fundamental to the individual’s ability to mediate stressors. In their article, “The Structure of Coping,” Pearlin and Schooler (1978) define coping as “the things people do to avoid being harmed by life-strains” (Pearlin & Schooler, 1978, p.2). Coping is presumed to be either active behavior or the adoption of a belief or outlook. Coping helps the individual prevent, avoid or minimize the impact of stress.

Pearlin and Schooler (1978) found evidence for seventeen different forms of coping in their research. They divided these into three types. First, coping consisted of behavior that was undertaken to actually address or remove the stressor. This form of coping led to change in the situation. The authors note it requires knowledge of how to solve problems and access to the resources to do so. This type of coping included, for example, seeking the advice of a significant other, such as a spouse or parent.

The second form of coping involved changing the meaning of the situation or substituting rewards. In this form, respondents changed how they interpreted their stressors. They made comparisons between their situation and those of others less fortunate, at times turning to axioms such as “count your blessings” (p. 6). They effectively engaged in “selective ignorance,” (p. 6), where the best aspects of the situation were focused on, and the negatives were downplayed. In short, if they were
unable to alter the stressor, they adapted by changing their goals to fit the resources available to them.

Finally, Pearlin and Schooler (1978) found that respondents engaged in behavior that helped them manage stress rather than eliminate stressors. These stress management techniques, the authors mentioned, included denial and “magical thinking” (p. 7). They also included escapist behaviors like withdrawal from loved ones, drinking alcohol or watching television.

In sum, then, coping was found to be present in three forms: modifying the situation, changing the meaning of the situation in order to reduce the perception of a problem, or utilizing techniques that help manage the symptoms of stress (Pearlin & Schooler, 1978). For the purposes of this study, behavior that is undertaken to positively change stressful situations or help the individual adjust to them without the doing further harm are referred to as positive coping strategies (cf. Lindsay, 2004). Behaviors that are undertaken with the outcome of ignoring or escaping stressors, or even compounding their impact, are herein referred to as negative coping strategies (cf. Lindsay, 2004). Positive coping is presumed to lessen depressive symptoms, negative coping to increase them. Having discussed coping, the discussion now turns to social support.

Social Support

A second psychosocial resource is social support (Pearlin, 1999a, 1999b; Pearlin et al., 1981). The extent to which an individual has people to turn to when new challenges arise greatly determines how she weathers those challenges. Pearlin and McCall (1990), found that the following were some of the elements present in supportive
husband and wife relationships: listening to the problem as the spouse described it, asking about the situation from which the problem arose, and validating the concerns of the spouse with comforting gestures and supportive verbal feedback. These stand as examples that carry over into other interactions. In essence, social support constitutes the availability of someone in the individual’s life who conveys the feeling that the individual “matters” to them (Pearlin, 1999a).

Having discussed coping and social support, the discussion of the mediators often examined in research on the stress process model now turns to mastery.

*Mastery*

The final category of resources that are presumed to play a part in mediating the effects of stressors on health is mastery. Mastery is the individual’s sense of control over the events in her life (Pearlin, 1999a, 1999b; Pearlin et al., 1981). Mastery is a self-concept. As such, like the other mediators, it is subject to change as an individual is socialized over the course of the lifespan (Pearlin, 1999a). Mastery may be helpful in two ways. First, those with a high level of mastery may view the world as less threatening. Second, expectations shape outcomes. The perception of control may lead a person to take assertive action, which is more likely to produce results. In other words, high mastery may be part and parcel with more proactive behavior.

Having discussed each category of mediators presented in the stress process model (Pearlin 1999a, 1999b), this next section of this chapter presents a discussion of health outcomes.
The final element of the stress process model is the health outcome. The stress process model is intended to provide knowledge related to the ways in which social stress contributes to conditions which lead to poor health (Pearlin, 1999b). The initial article on the stress process (Pearlin et al, 1981), focused on the outcome depression. Since that time, a host of studies have utilized the model to investigate a variety of mental health outcomes, as discussed in the analysis presented by Schwartz (2002), who argues for careful consideration of mental health outcome measures when conducting research.

On this point, Pearlin (1999a) presents a discussion of sociological measures of mental illness, drawing sharp comparisons between the end goals of sociological research and psychiatric research. Psychiatric research is done for the purpose of identifying the particular individuals who need treatment. Patients present themselves on a case by case basis. A clinician must be able to draw out symptoms and match them to established illness criteria in order to ensure that patient receives the appropriate treatment for her disease, and no other. For this reason, specific diagnostic criteria are laid out and very precisely delineated to carefully select those who need treatment and deliver that treatment that ultimately, it is hoped, provides relief to the individual in distress (Pearlin, 1999a).

Sociological research, on the other hand, is conducted for the purpose of understanding the social conditions which contribute to the incidence and prevalence of mental illness, Pearlin (1999a) argues. The end goal is to “treat” society, in essence, by identifying the social conditions that contribute to illness, en masse, to improve the life
chances of the population. In so doing, the hope is to avoid or prevent these social conditions from occurring. If social stressors cannot be prevented, the next best step is to help improve an individual’s ability to deal with stressors (Pearlin, 1999a). It is because of this divergence of goals that sociological indicators of mental illness do not rely exclusively on the diagnostic categories presented by the psychiatric community (Pearlin, 1999a). The sociologist, in measuring mental health outcomes, is not out to diagnose the individual, but to pinpoint larger social conditions that may jeopardize wellness for the population (Pearlin, 1999a).

Conclusion

The stress process model is a guideline for research. It is a framework upon which hypotheses can be constructed and tested for understanding the social causes of illness. Certainly there have been several variations of the stress process model put forth in research. Since the term “the stress process” was first coined by Pearlin et al (1981), numerous and very diverse iterations of the stress process model have been put forth (Pearlin, 1999a; Schwartz, 2002). The conditions that contribute to and mediate the impact of stressors are, without doubt, as “highly complex and variable” as social life itself (Pearlin, 1999a, p. 395).

With these understandings of the stress process model in mind, the next chapter presents an examination of the literature on pregnancy-related depression and its correlates, with a focus on depression during pregnancy in adolescence. The chapter begins with a discussion of the manner in which the information presented in the literature review relates to the stress process model.
CHAPTER 3
REVIEW OF THE LITERATURE

The stress process model for mediators, as discussed in the prior chapter, is a vehicle for conceptualizing the elements in society that may contribute to illness, and the factors that may mediate that relationship. The stress process model has been applied to a host of mental health outcomes (Schwartz, 2002). This dissertation is dedicated to investigating how the stress process model might shed light on the relationship between adolescent pregnancy and depressive symptoms.

Chapter 3 presents a review of the literature related to the problem of depression during pregnancy among adolescent girls. A selection of variables was chosen to be investigated for this research, based in large part on the prominence of each variable in the literature. That literature is presented in this chapter, working from one variable to the next. The variables are discussed in the order they are presented in the proposed model depicted in Figure 2, starting at the top and proceeding downward. This chapter begins, however, with an introductory discussion of how the proposed model depicted in Figure 2 was derived from the structure of the basic stress process model presented in Figure 1.

Pregnancy, Depression, and the Stress Process: Deriving a Research Model

Hundreds of stress process models have been put forth in the literature (Pearlin, 1999a; Schwartz, 2002). In essence, there are as many possible variations and
Figure 2. Research Model depicting the hypothesized relationships between chronic strains, pregnancy, coping strategies, and depressive symptoms in adolescent girls.
iterations of the stress process model as there are human experiences (Pearlin, 1999a, 1999b). Indeed, a review of the characteristics of the many iterations of the stress process model is presented by Schwartz (2002). Mirowsky (1999), Chronister and Chan (2006), Lindsay (2004), and Truncheon, Cote, Fillion, Arsenault, and Dionne (2008), among many others, have contributed iterations of the stress process model which account for the relationship between chronic strains, life events, and health outcomes. What all of these stress process models have in common is their inclusion of social location, a stressful event or situation, intermediary resources, and health outcomes. Investigators have used different combinations of variables and a variety of measures.

Figure 1 represents the elemental structure of the stress process model based on the description provided by Pearlin and others (Lindsay, 2004; Mirowsky, 1999; Pearlin, 1999a, 1999b; Pearlin et al., 1981). The model offers many possible areas of concentration and is indeed applicable to a host of life’s circumstances. By combining the stress process model with the discussion of coping presented in Pearlin and Schooler (1978) and implemented by Lindsay (2004) on the study of pregnancy as a stressor, this research investigated the ways in which positive and negative coping strategies help to mediate the effects of pregnancy on depressive symptoms while taking minority status and low family income into account.

The overarching goal of this research was to provide illumination on the role of coping strategies in mediating the relationship between disadvantaged social position and pregnancy and depressive symptoms in adolescent girls. Mirowsky (1999) particularly expands on the role of mediation and discusses the use of progressive
adjustment to test for it, which is detailed in later chapters of this work. Figure 2 shows the research model that was derived from Pearlin’s model, including the variables selected for this study. This chapter now turns to a discussion of the literature that influenced the inclusion of each of these variables and their placement in the research model.

Chronic Strains: Minority Status and Low Family Income

Regarding the relationship between minority status and pregnancy among adolescents, the CDC conducts annual assessments of birth rates in the United States. While birth rates have declined in the past twenty years over all, their findings suggest that there is a persistent and enduring race gap in birth rates (Hamilton, Martin, and Ventura, 2013). Data collected for the year 2012 suggest that among adolescents, Hispanic and African Americans have significantly higher rates of pregnancy than whites. Asians were found to have the lowest adolescent birth rates.

With regards to low family income and pregnancy, the current CDC bulletin, “Preventing Teen Pregnancy: 2010-2015” has identified children from low income families as at risk for pregnancy in adolescence (CDC 2014c). The bulletin further states that adolescent mothers are at greater risk for poverty due to pregnancy.

Minority racial or ethnic status and low family income have also both been found to be risk factors for a host of mental health issues, certainly including depression. Dohrenwend and Dohrenwend (1969) were among the first to posit that social location acts as a stressor on mental health. In a time when very little was understood about the experiences of mental illness and its sociocultural links, their inquiries laid the
groundwork for viewing social position as a contributor to mental illness (see also Dohrenwend & Dohrenwend, 1974; Dohrenwend, 1975).

Since then, through the process of scientific inquiry, many strides have been gained in understanding the link between social position and mental health outcomes. Currently, several professional and governmental organizations regularly conduct large scale research to better understand the prevalence of mental disorders by race/ethnicity and by income. For example, members of racial and ethnic minority groups have been identified as groups at high risk for depression in research conducted by the US CDC (Pratt & Brody, 2008). After conducting large-scale research, the CDC found that 8% of non-Hispanic whites reported experiencing depression or depressive symptoms within the two weeks prior to their contact with interviewers. Rates for racial/ethnic minorities were significantly higher, with 13% of non-Hispanic blacks and 12% of Hispanics reporting depression during the same time frame. Among other non-white, non-Hispanics, 11% reported depressive symptoms in the past two weeks.

While this particular report (Pratt & Brody, 2008) did not specifically examine income, it did examine employment status. Reportedly, 7% of employed respondents reported depressive symptoms in the past two weeks. By comparison, 22% of unemployed respondents and fully 39% of respondents who were unable to work reported recent depressive symptoms. With specific regards to income, more recent reports (CDC, 2012), have found that persons living below the poverty threshold were up to three times more likely to report symptoms of psychological distress compared to higher income groups.
While Pratt & Brody (2008) mention that women were found to have higher rates of depression than men, the experiences of pregnancy-related depression was not explored in their research. A current report from the Division of Reproductive Health (2014a) notes that low income, unemployment, and minority status are risk factors for depression among women of child-bearing age. While this would include pregnant women, certainly the experiences of pregnant women are not compared in depth to those of non-pregnant women. Further, the experiences of adolescents are not fully investigated.

Some additional targeted studies shed light on these experiences, particularly regarding socio-economic status as a risk factor for depression, but certainly also at times referring to minority status. Lovisi, Lopez, Coutinho, and Patel (2005) found financial hardship to be a risk factor for depression during pregnancy. Research conducted by Nunes & Phipps (2013), found that among adolescents, minorities and respondents with low socio-economic status have higher rates of depression postpartum. Bernazzani and Bifulco (2003) found that low material wealth during pregnancy actually predicted depression in later life, regardless of whether the pregnancy ended in a birth or a miscarriage. Foss, Chantal and Hendrickson (2004) note that rates of depression among mothers with children aged anywhere from birth to twenty-five were higher among foreign-born mothers than native-born mothers, suggesting ethnicity is a key factor in understanding depression.

These and other research findings suggest that minority and economically disadvantaged women, both during and after pregnancy, are at greater risk for depression. However, no research has been found that utilizes national-level data to
demonstrate whether minority and low income status affects the relationship between pregnancy and depressive symptoms in adolescent girls while taking mediators into account. The research conducted for this dissertation was undertaken to provide further illumination along these dimensions.

Because minority status and low income have both been found to be related to both pregnancy and depression in prior research, the present study includes these variables as predictors of depression in the model. These same variables are alluded to in Pearlin's (1999b) discussion of the stress process model. He refers to them as sources of chronic strain that impact life events. Likewise, they are carried over as chronic strains in this research. The discussion now turns to pregnancy as it constitutes a life event.

**Life Event: Pregnancy**

This study was undertaken to understand whether pregnancy itself, among adolescent girls, increases the risk of depressive symptoms. It was also undertaken to determine whether the relationship between pregnancy and depressive symptoms is mediated by coping strategies. As this study stated on its first page, the arrival of a child is often presented by society as a source of elation and wonder. However, a child’s arrival also brings about a host of challenges, many of which were documented in the introductory chapter of this dissertation.

The research undertaken for this dissertation made three key suppositions, related to pregnancy in adolescence, each of which was dictated by the stress process model put forth by Pearlin (1999b). First, pregnancy is related to depressive symptoms,
even when minority status and low family income are taken into account. Second, there are factors which mediate the relationship between pregnancy and depressive symptoms, namely positive and negative coping strategies. Thirdly, though the impact of pregnancy on depressive symptoms may be lessened by other variables, pregnancy continues to be related to depressive symptoms even when all else is taken into account (see Appendix). This research is the first of its kind to attempt to make this stepwise connection between chronic stressors, pregnancy, mediators and the outcome of depressive symptoms among adolescent girls. This discussion turns first to minorities and risk of pregnancy.

With respect to the notion that minority status and low income are associated with increased risk of pregnancy in adolescence, data from the US CDC (2014c; Hamilton, Martin, & Ventura, 2013) indicates that non-Hispanic whites have lower adolescent birth rates than Native Americans, Hispanics, or African Americans. The report notes that birth rates for all races have declined over the past decade, with the decline being greatest among Hispanic adolescents. Nevertheless, the difference in adolescent birth rates by race continues to persist.

Another recent governmental report on pregnancy prevention among adolescents notes that both minority status and low socioeconomic status are risk factors for pregnancy in adolescence (Department of Reproductive Health, 2014b). As a result of these findings, they stress the importance of targeting minority and low income youth in outreach programs.

Regarding the conceptualization of pregnancy itself as a stressor, Ko, Farr, Dietz, and Robbins (2012) recently compared pregnant to non-pregnant adult women,
controlling for age and other social characteristics. They examined data from the National Survey on Drug Use and Health (NSDUH), compiling data from 2005-2009. The NSDUH is also the dataset used for this present research. They found that pregnant adult women were less likely to have experienced a major depressive episode in the past twelve months (Ko et al., 2012). Among women, 8% of pregnant women fit the criteria for a major depressive episode, while 11% of non-pregnant women fit these criteria. However, they exclusively researched adults, aged 18 and older. They did not control for other factors that might influence this relationship due to the nature of their study. In addition, they looked exclusively at respondents who met the requirement for a major depressive episode, a measure that would pick up only those in the most extreme psychological distress.

As noted in at the very outset of this dissertation, several studies have found that pregnancy in adolescence, and indeed parenting in general, are related to increased risk for mental health problems, both during pregnancy and at every other stage of life (Birkeland et al., 2005; Eberhard-Gran, Tambs, Opjordsmoen, Skrondal, and Eskild, 2004; Figueiredo, Pacheco, & Costa, 2007, Hoffman, 2006; Jaffee 2001; Lovisi, Lopez, Coutinho, & Patel, 2005; Oppo, 2009). Further, adolescents are at greater risk for depression (Bylund & Reed, 2007).

The findings presented by Ko et al (2012) beg the question: How do pregnancy adolescents compare, even when utilizing the same data set? Many of the studies mentioned above compared adolescents who were pregnant to adults who were pregnant. Alternately they looked exclusively at pregnant versus non-pregnant adults. They did not necessarily present findings comparing pregnant adolescents to non-
pregnant adolescents. Would adolescents’ increased risk for depression or depressive symptoms and their increased risk of pregnancy-related depression be substantial enough to flip the findings presented by Ko et al. (2012)? How does coping figure into all of this? This research was undertaken in part to answer these questions.

The last facet of research conducted for this dissertation entails the assumption, as dictated by the application of the stress process model (1999b), that the relationship between the life event, pregnancy, and the outcome, depression, is mediated by psychosocial forces. This research particularly focused on coping strategies engaged in by adolescent youth, both positive and negative, based in large part on the discussion of coping presented by Pearlin and Schooler (1978). A discussion of those adolescent coping strategies and information regarding to their relationship to depression as an outcome, and to pregnancy as a predictor, is presented in the next section of this chapter.

Psychosocial Mediators: Positive Coping Strategies

As discussed in the introductory chapter of this work, Pearlin and Schooler (1978), define coping as any response to social conditions that has the outcome of enabling the individual to prevent distress or minimize its impact. Further, as noted in prior sections of this chapter, coping behaviors observed by Pearlin and Schooler were varied. They included behaviors aimed at directly solving the problem, such as seeking out others for support or counsel. When stressors were encountered, redirecting attention to other life-goals was also found to be a common coping strategy. Finally,
stress management behavior, including denial and escapist behavior like drinking were discussed as prominent coping strategies Pearlin and Schooler (1978).

What follows is a discussion of the coping strategies chosen for this research and their relationship to other variables in the research model (Figure 2). The focus is on adolescents wherever possible. The discussion is broken up into two segments: positive and negative coping. Positive coping strategies are presumed to be associated with reduced depressive symptoms. Negative coping strategies are presumed to exacerbate depressive symptoms (cf. Lee, Nezu, & Nezu, 2014; Lindsay, 2004). Positive coping strategies investigated for this research were communication with parents, engagement in activities, and academic success. The negative coping strategies examined in this research were smoking, heavy alcohol use, and drug use. This chapter now turns to a discussion of each in turn.

*Communication with Parents*

Communication with parents was found to be strongly intertwined with adolescent pregnancy and its necessary precursor, unprotected sex. Keeping an open line of communication with parents, particularly about sex, condoms, and other facets of sexual activity among teens has been found to be a key component of preventing pregnancy in adolescence (Division of Reproductive Health, 2014). When a teen begins to take on romantic relationships, conflict with parents as the adolescent attempts to assert autonomy may arise, making it difficult for the pregnant adolescent to adjust to stressors (Laursen, Coy, & Collins, 1998). Does an open flow of communication with
parents, then, help cope with the stress of pregnancy once a pregnancy has come about?

Robl, Jewell, and Kanotr (2012) found that when parent-child communication was poor, “problematic social behavior” was more likely (p. S287). Their research was conducted from the point of view of the parents. They concluded that poor communication with children made it more difficult for parents to effectively model desirable behaviors. In other words, difficulties with verbal communications affected the ability to transfer information through modeling.

Persike and Seiffge-Krenkel (2012), measured communication with parents by asking respondents whether they agree with the statement, “I can’t talk with my parents.” They conceptualize poor communication with parents as a stressor itself, however. They found that respondents who had difficulty talking to parents reported the highest engagement of strategies like seeking other social support, withdrawing, denial, or finding and emotional outlet.

It should be noted that several studies have investigated the effect of interactions with additional significant others, namely intimate partners, on pregnancy-related depressive symptoms and other mental health outcomes (cf. Bernazzani and Bifulco, 2003; Bliszta et al., 2008; Feldman, Sussman, and Zigler, 2004; Grote and Bledsoe, 2007; Lovisi, Lopez, Coutinho, and Patel, 2005; Nunes and Phipps, 2013). The consensus among these studies was that the ability to turn to an intimate partner lowers the risk of poor mental health outcomes. However, these studies largely focused on the role of husbands. Median age of first marriage in the US is 29 for men, 27 for women (Census, 2013). This is well beyond the age of adolescents, the subjects of the
research at hand. Further, not all adolescents, even strictly considering those who are pregnant, are heterosexual. Even those who are may not find it beneficial to foster an intimate partner relationship with the father of the baby. Regardless, questions assessing relationship status or communication with intimate partners were not asked in the NSDUH. Instead, the focus was on relationship with parents, as presumably primary significant others in adolescent life.

Taken together, the studies of communication with parents suggest that keeping lines of communications open with parents would likely reduce the effect of pregnancy as a stressor on mental health outcomes. For this reason, communication with parents is included as a measure of coping in the dissertation study. Communication was measured using a question from the NSDUH that is a hybrid of questions used by two other groups of researchers (Persike & Seiffge-Krenkel, 2012; Robl, Jewell, and Kanotr, 2012). Their studies focused on parent-child arguments as a measure of parent-child cohesion, as does this research. This discussion now turns to research related to engagement in activities.

Engagement in Activities

Involvement in activities has been shown in research to be related to positive outcomes. Reis and Diaz (1999) found that adolescent girls point to involvement in extracurricular activities as a means to make meaningful connections with high-achieving friends and role models. Dworkin, Larson, & Hansen (2003), and Smith (2003) found, that indeed students built stronger bonds with peers and adults while engaging in extracurricular activities. Eccles and Gootman (2002) argue that
adolescents who lack supportive peers and adult mentors and fail to develop a sense of belonging that involvement in social groups and extracurricular activities provide were at greater risk of negative outcomes.

Feldman and Matjasco (2005), however, note that engagement in activities is conditioned, in large part, on the adolescent’s social environment. For example, students who attend schools in troubled neighborhoods, with high risk of victimization, may feel less safe becoming involved in extracurricular activities. Often times, extracurricular activities are sponsored by teachers. Teachers may be less available to mentor students through activities in struggling schools, lowering the opportunities to engage in activities. Such schools are more likely to be found in impoverished areas, which are disproportionately minority. In so noting, Feldman and Matjasco (2005), make the connection between minority status and income and involvement in extracurricular activities. However, they conducted a literature review. They suggest further investigation, which this research attempted to provide.

Given all of the above, more information is needed regarding whether pregnancy actually affects the likelihood of being engaged in activities. To what degree does minority status and race/ethnicity affect engagement in activities? Are girls who are pregnant less likely to engage in social activities, perhaps due to social stigma, as Williams, Gorman, and Hankerman (2014) might suggest? Furthermore, does involvement in activities help reduce levels of depression? For this study, involvement in activities is measured by counting the number of activities in which the adolescent stated she was involved. Activities related to school, church or faith-based organizations, and other activities were counted. Girls who reported involvement zero to one activity
were compared against all others. As per the research model, involvement in activities was presumed to be related to a lower risk of depressive symptoms. This discussion now turns to success in school, the next positive coping strategy listed in the research model.

Success in School

The model that guides this research suggests that success in school is influenced by chronic strains, including minority status and low family income. The model also presumes that pregnancy influences the risk of lower academic achievement, and that academic achievement in turn influences risk of depressive symptoms. These presumptions are based on research such as that presented by Basch (2011), who demonstrated that minority adolescent mothers were more likely to experience difficulties in school, to drop out of high school, and to not attend college. However, additional data is available.

First, regarding minority status, the National Center on Education Statistics (NCES), a division of the Department of Education, tracks data on academic achievement. Reports show a persistent and enduring performance gap between whites and minority students on standardized test scores (NCES, 2014). In particular, whites were found to have higher tests scores, on average, than Hispanics, African Americans, and Native Americans/Alaska Natives in Reading, Math, and Writing standardized test scores. Asians have the highest scores, among all racial/ethnic groups, for all of the years in which their data is presented in Math. However, reading and writing scores were mixed. Among those students who took the SAT, the same rankings held, with
African Americans, Hispanics, and Native Americans trailing whites and Asians in each subject area, comparing group averages.

Income for school students was measured by NCES by comparing students who receive full priced lunches to students who receive reduced price or free lunches. This measure is utilized given that students qualify for reduced price or free school lunches based on family income. These data also show a persistent and enduring performance gap, with students who receive free or reduced price lunch scoring lower than their full-priced peers (NCES, 2014). Regarding SAT performance, the SAT does ask test-takers to report family income. Income categories are listed in $20,000 increments, ranging from “Less than $20,000” per year to “More than $200,000.” With each incremental increase in reported income, SAT scores rise. Total difference in average scores between the lowest earning bracket and the highest earning was over 120 points in every subject. These findings indicate that students who come from families with low income have lower academic achievement than their higher income peers.

Pregnant girls have also been found to have lower academic achievement than their non-pregnant peers. Several sources note that pregnancy is related to lower educational attainment. The CDC, for example, notes adolescent pregnancy as a significant risk factor for dropping out of school (CDC, 2014c). Several specific studies have found a relationship between adolescent pregnancy and difficulties with school (Department of Reproductive Health, 2014b; Manlove, 1998; Nash and Dunkle, 1989; Persike and Seiffge-Krenkel, 2012; Henry, 2012).

In large part, these studies do not demonstrate whether pregnancy is related to poorer academic performance in girls who stay in school. In addition, it is not made
clear the degree to which school performance might mediate the effects of pregnancy on depressive symptoms. With the understandings of those limitations, the discussion turns now to a consideration of negative coping strategies, and present findings in literature related smoking, heavy alcohol use, and drug use.

Psychosocial Mediators: Negative Coping Strategies

Not all coping strategies have the outcome of promoting health. This section of the dissertation examines substance abuse as a negative coping strategy that mediates the relationship between placement in the social system, life events, and mental health outcomes. Pearlin and Schooler (1978) conceptualize substance abuse as akin to escapist behavior, referring to substance abuse as essentially a stress management technique or avoidance strategy. Given Pearlin’s grounding of his concepts in the work of Merton in this (Pearlin & Schooler, 1978) and other works (Pearlin, 1999a, 1999b), this conceptualization has its roots in Merton’s (1957) adaptations to strain. Merton referred to substance abusers as retreatists. When society presents a set of goals that people in disadvantaged positions in society are told they must achieve, but no means by which to achieve these goals, they adapt by abusing substances to retreat from the pressures of society.

The research conducted for this dissertation used data collected by the National Survey on Drug Use and Health. This particular data set was chosen in part to gain a better understanding of the role substance abuse plays in mediating mental health outcomes among pregnant adolescents. Does substance abuse as a negative coping strategy mediate the relationship between pregnancy and depressive symptoms? The
substances under examination in this study were namely smoking, heavy alcohol use and drug abuse. In order to show mediation, substance abuse must be related to the chronic strains minority status and low income, the life event pregnancy, and the outcome depressive symptoms. A review of related literature is therefore presented, with an emphasis on adolescent experiences.

*Smoking Tobacco*

Smoking been shown to be related to minority status and low income among adolescents. The US CDC collects data annually on smoking among middle and high school students. Students are asked about use of everything from cigarettes and cigars to electronic cigarettes and hookahs. Data from the most recent CDC report (2013b) suggests that white students in middle school and high school have higher overall rates of tobacco use than black and Hispanic students. Minorities reported higher levels of usage in a few specific types of tobacco use. African Americans were more likely to smoke e-cigs and hookahs than whites. Both African American students and Hispanics were more likely to smoke cigars than whites. This data suggests there are racial/ethnic differences in smoking patterns. Beyond these findings, Kong et al. (2012) found differences in the experiences of smoking cessation by race, indicating that the process of quitting smoking was different by race, with blacks being more successful in quitting when racial pride was invoked.

What these findings suggest is that there is a complex relationship between smoking behaviors and race. If smoking is an escapist strategy or a form of self-medication, it would be expected to be present more in minorities, following the logic
presented by Pearlin (1999a). Minorities are at a greater disadvantage in society. By
definition, that is what makes them minorities. However, there is another factor to
consider, and that is funding. It is possible that among adolescents who are low income,
tobacco use is cost prohibitive.

Research into the relationship between income and smoking is complex as well.
Young-Hoon (2012) investigated the relationship between smoking and income. In
particular, the author examined National Population Survey data collected in Canada.
This was a longitudinal survey. The author examined fifteen years of data, from 1994 to
2009. The author looked at how many cigarettes were smoked per day, whether
smoking was stopped, and whether the family’s income fell under the poverty threshold.
The author found that as a household moved above the poverty line, likelihood of
smoking went down. The longer the household stayed above the poverty line, the lower
the likelihood of smoking.

However, how might these findings be applied to adolescents, and in particular to
tobacco is used more during pregnancy than any other substance. They also note the
serious consequences of smoking during pregnancy, including birth defects and
behavioral problems in the child’s later life. They present various findings suggesting
that rates for smoking among pregnant teens ranged from 20% to 50%, compared to
12% rate of smoking among pregnant adult women.

These findings corroborate the data presented by Kakuszi, Bácskai, Gerevich,
and Czobor (2013), who studied pregnant adolescents in Norway. They found that
pregnant teens had a higher prevalence of smoking than pregnant adults. They also
found that as income increased, pregnant teens were more likely to smoke. The reverse was true for pregnant adult women—among women, as income increased, the likelihood of smoking declined. Additionally, Seamark and Gray (1998), conducting a study of adolescent girls in the United Kingdom, found that a history of smoking was more likely among pregnant teens than non-pregnant teens.

Certainly, more data is needed. The relationship between smoking and these variables is complex. No study was found that examined national-level differences in the United States comparing pregnant to non-pregnant teen girls that also accounted for minority status and low family income. No study was found that looked at smoking as a coping strategy that mediates the relationship between pregnancy and depressive symptoms.

The research for this dissertation examined smoking behavior in the past thirty days. Adolescent girls who reported smoking all or part of at least one cigarette were considered against all others. Having discussed smoking and its relationship to stressors, heavy alcohol use and its relationship to social stressors is reviewed.

*Heavy Alcohol Use*

Among adolescence, heavy alcohol use is recognized as a problem that cuts across class and race. For this study, heavy alcohol use is defined as drinking five or more drinks on the same occasion on each of five or more days in the past 30 days. However, as with the other variables presented here, studies have shown a relationship between race/ethnicity and heavy alcohol use. Studies have also shown the experiences of adolescent girls to be unique.
Specifically, among girls, CDC (2013c), findings from the Behavioral Risk Factor Surveillance System (BRFSS) and Youth Risk Behavior Survey (YRBS), indicate that heavy drinking is highest among white and Hispanic girls, with 22% of girls in both racial/ethnic groups reporting episodes of heavy drinking. Ten percent of girls who were African American reported heavy drinking. Seventeen percent of girls in all other racial categories combined reported heavy drinking. Rates among adolescent girls were considerably higher than reported heavy drinking rates for women beyond the age of twenty-four (CDC, 2013c).

Contrary to the CDC findings, Amaro, Zuckerman, and Cabral (1989) found that among pregnant adolescents, heavy alcohol use was more prevalent in African American girls, than whites. Pregnant Hispanic adolescents also had an increased risk for alcohol abuse compared to whites. Other studies have shown heavy drinking to be more common among Native Americans, as compared to whites (Akins, 2013; Chen, Blalan, and Price, 2012).

Further complicating the issue, a report from the NIH's National Institute on Alcohol Abuse and Alcoholism (Windle, 2003) indicates that among adolescents, minority status may be a risk factor for alcohol abuse among eighth graders, but a protective factor for tenth graders and seniors. Whites in the older two age groups reported higher rates of heavy drinking in the past thirty days. The report does not present cross-sectional data for girls specifically. However, it does present data on female college students. In that case, white female college students had higher rates of heavy alcohol use than Hispanics, with African Americans having the lowest rates (Windle, 2003).
These sources combined suggest a complex relationship between race/ethnicity and drinking. Interestingly, the CDC (2013c) data indicated that adult women who were financially better off were less likely to drink heavily. However, the report does not present findings for adolescent girls or pregnant adolescents related to income. Likewise, Windle’s (2003) report from the NIH’s National Institute on Alcohol Abuse and Alcoholism indicates that discretionary income may affect adolescent rates of alcohol use, but does not report specific differences in heavy alcohol use rates between adolescents with and without discretionary income. Windle (2003) also presents findings suggesting that students who attend “at risk” schools have significantly higher heavy alcohol use rates, suggesting both racial/ethnic minorities and low income are at increased risk for alcohol abuse.

Researchers in Australia, however, investigated the relationship between access to spending money and alcohol use in Australia (Jean & Ife, 2008). They note that adolescents with extra spending money were significantly more likely to try alcohol, suggesting that they would then be more likely to abuse it (Jean & Ife, 2008). These findings suggest that teens from wealthier families are more likely to consume alcohol.

The Australian report echoes a similar report from California, which indicated that affluent adolescents were more likely to report heavy drinking than other adolescents (Louie, 2007). Heavy drinking rates among teens in affluent neighborhoods were reportedly twice as high as teens living in other areas. The author attributes these differences to simple purchasing power. Affluent teens not only have greater ability to afford the alcohol, they can also purchase fake identification. In addition, the author notes that heavy drinking is perceived as cool, particularly among boys, in affluent
areas (Louie, 2007). In poorer neighborhoods, youth may see more of the problems associated with heavy drinking and therefore be more prone to avoid it (Louie, 2007).

These studies are limited in that they do not necessarily focus on girls, nor do they focus on the relationship between these behaviors and the sexual behaviors that lead to adolescent pregnancy. Rome, Rybicki & Durant (1998) compares the alcohol use rates of pregnant and non-pregnant adolescents. They find that pregnant adolescents actually have lower rates of alcohol use.

None of these studies examines heavy alcohol use as a mediator, as a coping strategy, that falls between pregnancy and mental health outcomes. The studies also examine largely a single instance of heavy drinking in the past thirty days. Given the reportedly high rates of heavy drinking among teens, it would for this particular study be useful to understand the experiences of pregnant adolescents who repeatedly engaged in heavy drinking as a coping strategy.

For this study, heavy alcohol use is considered as a mediator. Heavy alcohol use is defined as drinking five or more drinks in a single occasion for five or more days in the past thirty days. An occasion is defined as the span of a couple of hours. This discussion now considers factors related to drug use among adolescents.

**Drug Abuse**

With distributions very similar to that of heavy alcohol use, drug use has been found to be related to race. Amaro, Zuckerman, and Cabral (1989) found that among pregnant adolescents, drug users were more likely to be black. In other research, Native
Americans were reported to have higher drug use rates than whites (Akins, 2013; Chen, Blalan, and Price, 2012).

Consistent with some of the research on alcohol, affluence and spending money has been found to be tied to increased likelihood of drug use among adolescents (Jean and Ife, 2008; Louie, 2007). Adolescents in Australia, for example, with $21 to $60 in spending money were 60% more likely to try drugs in the past year compared to those with less than $20 (Jean & Ife, 2008). Adolescents with more than $60 were over twice as likely to try drugs (Jean & Ife, 2008). This same research also found that Australian ethnic minorities were more likely to use drugs.

In the US, studies comparing teens living in affluent areas to others again note that affluent teens are more likely to purchase drugs. Money, again, enables the actual purchase, and affluent teens were presumed to be more likely to think of using drugs as edgy or cool (Louie, 2007).

Regarding the relationship between pregnancy and drug use, a number of studies have found a strong positive correlation between drug use and pregnancy in adolescence (Mensch and Kandel, 1992; Rome, Rybicki, & Durant, R., 1998). They suggest that risk behavior is clustered among these girls (Jackson, Henderson, Frank & Haw, 2012; Rome, Rybicki, & Durant, R., 1998). The research at hand was undertaken with the assumption that chronic strains imposed by society shape additional life behaviors. The notion of clustered risk behavior reinforces this assumption. For this research, drug use was indicated using a compiled list of questions regarding specific drugs. Girls who said they had recently used any drug were compared against all others.
Drugs inquired about included marijuana, cocaine, heroin, inhalants, and others, including pharmaceutical drugs that were not prescribed to them.

The sections above have discussed each of the predictor variables in the research model. The variables discussed ranged from the presumed chronic strains of minority status and low family income, to the life event pregnancy, and through each of the coping strategies presumed to mediate the relationship between these social stressors and the mental health outcome, depressive symptoms. Literature findings related to each variable was presented, keeping in the context of the research model to every degree possible. The next discussion focuses on the dependent variable in the model, depressive symptoms.

Connecting Depressive Symptoms to Coping Strategies

The social forces that influence mental distress are a source of continual research in the field of sociology. Mirowsky and Ross (2003), Aneshensel and Phelan (1999a), and Horowitz and Scheid (1999) are among those who have published volumes on this topic. Depression, particularly, as a health outcome of the stress process model, was first examined by Pearlin et al. (1981) in the article which coined the term “stress process model” (Pearlin, 1999a). Certainly many others have followed suit (Schwartz, 2002). The analysis of depressive symptoms as an outcome of social stress, therefore, certainly has precedent.

The research for this dissertation was conducted with a particular interest in understanding pregnancy as a contributor to depression, and the forces that might mediate this relationship. Research on the relationship between pregnancy or the
transition to parenthood and mental health is as varied as it is complex (c.f. Conley, Caldwell, Flynn, Dupre, & Rudolph, 2004). Research connecting pregnancy and pregnancy-related experiences to depression was presented in the first chapter and in this chapter in the section on pregnancy. What follows is a discussion of the pregnancy-depression relationship and its connection to coping strategies. There is no study that particularly focuses on all the variables under consideration for this dissertation. However, several studies have touched on the variables in the context of their own study.

Each of the studies presented in this section identified several of the risk factors contained in the research model that guided this dissertation. Some of the literature presented discusses depression before pregnancy and postpartum. This is not without justification. Depression prior to pregnancy has been shown to be a strong risk factor for depression during pregnancy (Lovisi, Lopez, Coutinho, & Patel, 2005). Likewise, the authors followed the women in the months postpartum and reported that depression during pregnancy is a strong predictor of postpartum depression. Others have examined the link between pregnancy and depression, and found that depressive scores in early pregnancy were strongly associated with problems in later pregnancy and postpartum (cf. Skouteris, Wertheim, Railis, Milgrom, and Paxton, 2009). Oppo et al. (2009), for example, found that depressive scale scores taken during the third and eighth month during pregnancy were over 70% accurate in predicting postpartum depression scores. Nevertheless, the discussion focuses on depression during pregnancy whenever possible.
As a first example, using a national data set, Le Strat, Dubertret, and Le Foll (2011) found that ethnicity was related to the likelihood of depression during pregnancy and postpartum. In addition, they found the presence of a significant other, and substance abuse, including smoking tobacco, drug use, and alcohol abuse use were all related to depression during pregnancy and postpartum. While they did not focus on adolescents, the authors note that depressive symptoms were more likely among younger women.

Scafidi and Frank (1997) conducted a study of economically disadvantaged adolescent mothers in order to determine whether drug use influenced likelihood of depression, and investigate the factors that mediate this relationship. They found that drug use was related to increased incidence of depressive symptoms. Further, they found that poorer communication with family was associated with increased risk of depression. Their findings also suggest that poor performance in schools is related to increased incidence of depression among drug users. The authors conclude that the stress of pregnancy during depression in adolescence, a time when stress is already high, particularly among girls who were economically disadvantaged, may have predisposed these youth towards a greater likelihood of drug use.

Singh et al. (2004) found depression during pregnancy to be a factor which both contributed to and resulted from physical health complications. The authors found that depression was associated with tobacco use prior to pregnancy. They also found that race influenced the women’s outcomes. Non-white women with a depression history had more complications during pregnancy than white women with a history of
depression. The authors found depression itself to be associated with serious complications for mother and baby.

Lovisi, Lopez, Coutinho, and Patel (2005) conducted a study among Brazilian women. Their purpose was to determine which social factors place the women at greatest risk for depression during pregnancy. They used scores on the Composite International Diagnostic Interview (CIDI) to diagnose the presence of a major depressive disorder. They found high levels of educational achievement protected the women against depression during pregnancy. Their study confirmed financial hardship, as well as exposure to violence, to be risk factors for depression. They further found that losing connections with significant others before pregnancy was a significant predictor of depression during pregnancy. Though they did not examine pregnant youth, Katz, Conway, Hammen, Brennan, & Najmannm (2011) also found that withdrawal and impaired communications with others predicted depression in young adults.

There were no studies found that investigated the connection between engagement in activities and the pregnancy-depression relationship. However, several have analyzed the link between activities and depressive symptoms. Whether involvement in activities is associated with lower depressive symptoms is an area of debate. For example, Guest and McRee (2009) did not find an association between extracurricular activities and depression among students. However, Guest and McRee did not target pregnant adolescents specifically. In addition, their study did not take gender differences into account. Sabo, Miller, Farrell, Melnick, and Barnes (1999) found differences between boys and girls experiences with extracurricular activities as they relate to sexual attitudes and behavior.
Regarding engagement in activities outside of school, little is known specifically about adolescent ties to non-school related activities in general. However, research suggests civic engagement regarding political participation particularly is related to better mental health among adolescents (cf. Flanagan, & Bundick, M. (2011). Kang and Romo (2011) found that participation in church activities was linked to stronger spirituality. This, in turn, they found to be linked to lower risk of depressive symptoms in girls. Regarding the relative lack of information on this area of social engagement, Williams, Gorman, and Hankerman (2014) note that stigma may dissuade individuals at risk of depressive symptoms from being involved in church activities. Beyond these studies, research of social engagement among other target populations, such as the elderly, suggest it is strongly correlated with depression (cf. Croezen, Haveman-Nies, Alvarado, Veer, & De Groot, 2009). They conclude that engagement in activities decreases risk of depression.

Having discussed each of the variables in the model as they relate to depression, as they appear in each of their unique clusters in the literature, this chapter now turns to a discussion of the gaps in the literature this dissertation fills and the justification for an inclusive model.

Contribution of this Dissertation to the Literature

This study was undertaken to gain a better understanding of pregnancy-related depression in adolescence and the factors which mediate this relationship. The literature cited in this chapter of the dissertation was presented in an attempt explain
how each of the variables under study came to be included in the research model in their respective positions (see Figure 2).

The studies discussed in this chapter offer support for the notion that negative mental health outcomes like depression are heavily intertwined with parenthood and pregnancy. However, when attempting to generalize their results to adolescents, they are constrained by the limitations of their scope and, in some cases, by the lack of contemporary data for their research. The importance of conducting a study with current, national data cannot be understated. Major socio-cultural changes have taken place potentially affecting the perception of pregnancy among adolescents. Social values and role expectations are dynamic over time, and the research on pregnancy-related stress and its resultant mental health consequences spans several decades. This dissertation fills this gap in the literature by investigating the interrelationships identified in the literature, and doing so utilizing national-level data.

Conclusion

Taken as a whole, this review of the literature suggests the need for a model that takes into account social position as an influence on pregnancy among adolescents. Further, the model must take into account the many coping strategies that the literature suggests would mediate the relationship between pregnancy and depressive symptoms. Figure 2 represents the hypothetical chain of relationships that were tested through a process of progressive adjustments. The following chapter discusses each of the hypotheses derived from the literature and depicted in the proposed model.
CHAPTER 4
RESEARCH METHODS

As discussed in the previous chapters, prior research has demonstrated that there are numerous social and psychosocial conditions that influence the risk of depression during pregnancy in adolescence. Chapter 3 explored literature pertaining to the study of pregnancy-related depression in adolescent girls. This chapter first presents an outline of the hypotheses guiding this study, as derived from the literature. The chapter then turns to an examination of the data that was analyzed in the process of investigating the relationships put forth in the hypotheses and depicted visually in Figure 2. Having discussed the NSDUH dataset, the chapter ends with a description of the variables chosen from the dataset for this study.

Progressive Adjustment and the Hypotheses Guiding this Investigation

The hypotheses that guided this research are discussed in this section, beginning with the foundational hypothesis of this work, namely that a relationship between pregnancy and depression exists among adolescents. The discussion of hypotheses then proceeds to a description of each variable in the model, starting at the top of the model and moving downward. The construction of these hypotheses is guided in part by Baron and Kenny (1986), whose work lays the foundation for the methods used to test for mediation in social science research (Pearlin, 1999a, 1999b). In essence, Baron and Kenny note that mediation can be tested through a series of regression runs. Each regression tests an arrow in the hypothetical model, progressively adding variables as the research moves through the hypothetical model.
The work of Mirowsky (1999) and his methods utilizing progressive adjustment in tests for mediation are also heavily relied upon. This discussion turns now to the process of constructing the hypotheses tested in this research. These hypotheses are presented as a concise list in the Appendix at the end of this document.

Mirowsky (1999) suggests that the technique of progressive adjustment “is to social research what dissection is to biological research” (p.106). He notes that progressive adjustment dates back into the earliest days of data analysis. He argues that there are three fundamental tenets that lie at the foundation of all tests for mediation:

- A relationship exists between two variables
- Factors exist which mediate this relationship
- When the influence of mediators is accounted for, the relationship between the two variables is reduced

Mirowsky’s 1999 work is similar to this research, in both his chosen variables and his use of “logistic transformation” (p.106) to test their relationship (Mirowsky, 1999).

With these three basic assumptions in mind, the process of progressive adjustment then begins with the construction of a proposed model. In the case of this research, this model largely follows the structure of the stress process model for mediation presented by Pearlin et al. (1981) and Pearlin (1999a, 1999b). Mirowsky’s (1999) own exploration of the relationship between divorce and depression also influenced the structure of the model utilized for this research, as did the model presented by Lindsay (2004). Figure 1 and Figure 2, as mentioned previously, depict the basic and applied hypothetical models that guide this research.
The hypotheses for this research are derived from the literature on pregnancy among adolescent girls and its association with depression. Based on the review of the literature, the primary foundational hypothesis for this research is:

- **Hypothesis 1**: Pregnancy raises the risk of depressive symptoms.

This hypothesis, separate from the consideration of any other variables, must be demonstrated first to begin to build a case for mediation (Mirowsky, 1999). Without this fundamental relationship, there is nothing to mediate. There is an abundance of research which suggests that pregnancy is related to an increased risk of depression in adolescents, including that presented by Birkeland et al. (2005), Figuieredo, Pacheco, and Costa (2007) and Hoffman (2006). Based on the discussions provided by Pearlin (1999a, 1999b), pregnancy is assumed to be a life event, an isolated occurrence that causes a disruption in the life of the individual. This assumption is not without precedent (cf. Lindsay, 2004).

The next step in progressive adjustment is to account for the forces that influence or predate the relationship between pregnancy and depression (Mirowsky, 1999). Based on the review of the literature, minority status and low family income were determined to influence pregnancy among adolescents. This relationship led to the following hypotheses:

- **Hypothesis 2**: Minority status raises the risk of pregnancy, even when low family income is taken into account.

- **Hypothesis 3**: Low family income raises the risk of pregnancy, even when minority status is taken into account.
Pearlin (1999a, 1999b) conceptualizes these forces as stressors, a source of stress influenced by the individual’s placement in the social system. He refers to minority status and low income as chronic strain, emphasizing that social location has the effect of eroding mental stability over the span of the individual’s lifetime. National data suggests that Hispanics and African Americans have birth rates that far exceed that of whites (Hamilton, Martin, Ventura, 2013). Additionally, the US Centers for Disease Control acknowledges low household income is a predictor of pregnancy (CDC, 2014c).

Next, as per Mirowsky’s discussion, it is necessary to verify that the relationship between pregnancy and depression remains after accounting for the affects of minority status and low family income. This assertion results in the next hypothesis:

- Hypothesis 4: Pregnancy raises the risk of depressive symptoms, even when minority status and low family income are taken into account.

Further, based on Mirowsky’s (1999) assertions, it should be expected that relationship between pregnancy and depression is not greatly affected by the introduction of minority status and income. After adjusting for minority status and income, the elimination or great reduction of a relationship between pregnancy and depression would suggest a spurious relationship between pregnancy and depressive symptoms.

The next step in the adjustment, Mirowsky (1999) states, consists of adding “blocks” (p.111) of mediators to the model. In the case of this research, literature suggests two such blocks: positive coping strategies and negative coping strategies.

Regarding positive coping strategies, several adolescent coping strategies were identified in the literature: communication with parents, engagement in activities, and
success in school. Application of these three positive coping strategies for pregnancy in adolescence results in the following hypotheses, with three parts each. Part [a] of each hypothesis examines the effect of pregnancy of the coping strategy. Part [b] examines the effect of coping strategy on depressive symptoms. Part [c] examines whether the coping strategy serves in a mediating or intervening role for pregnancy. That is, does the coping strategy partially mediate or explain the effect of pregnancy on depression?

- Hypothesis 5: [a] Pregnancy is associated with less positive communication with parents. [b] Positive communication with parents reduces depressive symptoms. [c] When communication with parents is accounted for, the relationship between pregnancy and depressive symptoms is reduced, all other things being equal.

- Hypothesis 6: [a] Pregnancy is associated with less engagement in activities. [b] Engagement in activities reduces depressive symptoms. [c] When engagement in activities is accounted for, the relationship between pregnancy and depressive symptoms is reduced, all other things being equal.

- Hypothesis 7: [a] Pregnancy is associated with less success in school. [b] Success in school reduces depressive symptoms. [c] When success in school is accounted for, the relationship between pregnancy and depressive symptoms is reduced, all other things being equal.

The literature has shown each of these coping strategies to be potential mediators. The next few paragraphs summarize literature findings related to each positive coping strategy.

First, communication with parents has been found be a positive force in preventing pregnancy (Division of Reproductive Health, 2014; Laursen, Coy, & Collins, 1998; Robl, Jewell, and Kanotr, 2012). Research findings also suggest that open communication with parents is associated with fewer depressive symptoms (Scarfidi and Frank, 1997; Le Strat, Dubertret, & Le Foll, 2011; Lovisi, Lopez, Coutinho, & Patel, 2005; Katz, Conway, Hammen, Brennan, & Najmanm; 2011).
Secondly, while research on the role of activities and their relationship to depression is mixed (cf. Guest and McRee, 2009), there is abundant evidence to suggest they play an important role in helping adolescents cope with depression (Flanagan & Bundick, 2011, Kang & Roimo, 2011, Croezen, Haveman-Nies, Alvarado, Veer, & DeGroot, 2009).

Thirdly, success in school has been shown to be related to both pregnancy and depressive symptoms. The CDC (2014c) notes that pregnancy is a significant risk factor for dropping out of school. Several additional sources have shown pregnancy to be related to difficulties in school (Department of Reproductive Health, 2014b; Manlove, 1998; Nash and Dunkle, 1989; Persike and Seiffge-Krenkel, 2012; Henry, 2012). Research suggests that difficulties in school are associated with pregnancy among adolescents (Lovisi, Lopez, Coutinho, and Patel, 2005; Scafidi and Frank, 1997). Taken together, these findings indicate communication with parents, engagement in activities, and success in school should lower the risk of depressive symptoms among pregnant adolescents.

Negative coping strategies have also been suggested by the research. They constitute the next block to be adjusted for in the progressive modeling process. The literature suggested three negative coping strategies: smoking tobacco, heavy alcohol use, and drug abuse. Consideration of these three negative coping strategies for pregnancy in adolescence results in the following set of hypotheses:

- Hypothesis 8: [a] Pregnancy is associated with smoking tobacco. [b] Smoking tobacco increases depressive symptoms. [c] When smoking tobacco is accounted for, the relationship between pregnancy and depressive symptoms is decreased, all other things being equal.
• Hypothesis 9: [a] Pregnancy is associated with heavy alcohol use. [b] Heavy alcohol use increases depressive symptoms. [c] When heavy alcohol use is accounted for, the relationship between pregnancy and depressive symptoms is decreased, all other things being equal.

• Hypothesis 10: [a] Pregnancy is associated with drug abuse. [b] Drug abuse increases depressive symptoms. [c] When drug abuse is accounted for, the relationship between pregnancy and depressive symptoms is decreased, all other things being equal.

Once again, literature has demonstrated that each of these three variables is related to both pregnancy and depression. Findings relative to each are presented in the next few paragraphs.

First, Cornelius, Goldschmidt, DeGenna, & Day, (2007) note that tobacco is used more than any other substance during pregnancy. Kakuszi, Bácskai, Gerevich, and Czobor (2013) found that there was a higher prevalence of smoking among pregnant teens than pregnant adults. Le Strat, Dubertret, and Le Foll (2011) have found smoking to be related to pregnancy-related depression.

Regarding heavy alcohol use and its relationship to pregnancy, findings suggest that pregnancy is related to lower rates of heavy alcohol use among adolescents. Pregnant adolescents have been shown to be less likely than their non-pregnant peers to drink alcohol heavily (Rome, Rybicki, & Durant, 1998). Further, minorities status and low family income, have been found to be associated with lower rates of heavy alcohol use, perhaps due to the cost of alcohol and cost of access to alcohol, such as purchasing false identification (Jean & Ife, 2008; Louie, 2007; Windle, 2003).

While these findings are noteworthy, what remains to be seen is how alcohol use affected the relationship between pregnancy and depressive symptoms. Heavy alcohol use has been shown to be associated with greater likelihood of depressive symptoms. While adolescents who are pregnant may be less likely to drink heavily, those who do
drink heavily should be at increased risk of depressive symptoms. This research has chosen to emphasize the negative in the hypotheses, noting Windle’s (2003) discussion of alcohol being associated with students in at-risk schools, and other literature suggesting pregnancy is part of a cluster of risk behaviors (Jackson, Henderson, Frank & Haw, 2012; Rome, Rybicki, & Durant, R., 1998).

Finally, regarding the relationship between pregnancy and drug abuse, a number of studies have found a relationship between drug use and pregnancy among adolescents (Jackson, Henderson, Frank & Haw, 2012; Mensch and Kandel, 1992; Rome, Rybicki, & Durant, R., 1998). Drug use was found to be predictive of depression in studies conducted by Le Strat, Dubertret, and Le Foll (2011) and Scafidi and Frank (1997). As with heavy alcohol use, there is evidence that drug use is more likely as income goes up (Jean & Ife, 2008; Louie, 2007). Again, though, it was decided, based on arguments for the tendency for risk behaviors to be clustered in this target population (cf. Jackson, Henderson, Frank & Haw, 2012; Rome, Rybicki, & Durant, R., 1998), that drug abuse would remain a negative mediator, even though its impact might be tempered by income.

In sum, in the hopes of making connections and providing an organized approach to the study of depression during pregnancy in adolescents, a series of hypotheses was presented in this section (for a concise list of the hypotheses, see Appendix). The model that visually depicts these hypotheses is found in Figure 2. These hypotheses were intended to demonstrate the process of mediation, as discussed by Baron and Kenny (1986) and Mirowsky (1999) through the use of progressive adjustment. These hypotheses, when taken together, constitute a test of the
associations illustrated in Figure 2 and emulate the process of progressive adjustment for mediators outlined in Mirowsky (1999). If, after accounting for all the effects of the variables together, the relationship between pregnancy and depression is no longer significant, the data is said to support the notion of “perfect” mediation (Baron & Kenny, 1986). Accordingly, if this is the study’s finding, the conclusion must be that the coping strategies that are significantly affected by pregnancy and, in turn, significantly affect depression in the final model mediate the effects of pregnancy on depression. In other words, it is through these coping strategies that pregnancy affects depression.

Data of the Investigation

Data for this research was drawn from the National Survey on Drug Use and Health, or NSDUH. The NSDUH is a national survey, conducted annually by the Substance Abuse and Mental Health Services Administration (SAMHSA) of the US Department of Health and Human Services (USHHS). The agency that conducts the survey is the Research Triangle Institute, or RTI. About 700 RTI field investigators are used to collect the data each year (USHHS, 2006, 2007, 2008).

The NSDUH asks respondents a comprehensive set of questions about their health and lifestyle, with a particular focus on obtaining information about tobacco, heavy alcohol use, and drug use and related experiences (USHHS, 2006, 2007, 2008). In recent years, a substantial number of questions were added to assess the mental health of the population (USHHS, 2006, 2007, 2008). The survey contains a comprehensive set of background questions as well as questions about everyday habits.
and opinions. Data collected over 2006, 2007, and 2008 was combined for examination for this research.

The NSDUH was conducted under the name National Household Survey on Drug Abuse (NHSDA) until 2002, when respondents were offered $30 for participation, significantly improving response rates and the reliability of findings on key questions (USHHS, 2006, 2007, 2008). New sampling procedures were adopted in 2005 in order to make states the first level of stratified sampling. Eight states with larger populations were designed to yield 3600 respondents. The remaining 42 states and District of Columbia were sampled to yield 900 respondents each. States were then divided into Census tracts. Each census tract was expected to yield 100 homes in less populated areas, 150 homes in more densely populated areas. In addition, youths and young adults are oversampled, making approximately equal the number of respondents from each of the following age groups: youths aged 12-17, young adults aged 18-25, and adults 26 to 34 years, 35 to 49 years, and 50 years or older (USHHS, 2006, 2007, 2008).

The NSDUH targets non-institutionalized people living in the US who are twelve years of age or older at the time of the survey. Persons living in group homes, dorms, and civilians on military bases are included (USHHS, 2006, 2007, 2008). The NSDUH utilizes computer-assisted interviewing techniques that include computer-assisted participant and survey administrator interviews, in combination with self-interviewing software in order to provide respondents with privacy on potentially sensitive questions. The adjacent years 2006, 2007, and 2008 were chosen for this study because they utilized identical sampling and data collection methods (USHHS, 2006, 2007, 2008). The data for the three years were pooled because pregnancy is a rare event among
adolescents. Pooling the data for adjacent years with identical sampling and data collection methods was a reasonable strategy to ensure a sufficient number of pregnant girls in the sample to sustain the analysis.

The NSDUH is a cross-sectional survey (USHHS, 2006, 2007, 2008). Its data is made available for public use, enabling research on substance use and its many correlates. Questions measure substance use over the lifetime, in the past twelve months, and in the past thirty days. Detailed questions about overall health and mental health, including diagnosis and access to treatment, are asked, along with a host of other questions. Topical modules are added in certain years as well (USHHS, 2006, 2007, 2008).

The NSDUH also includes a subset of questions aimed directly at youth, asking about experiences with parents, in schools, and an age-specific mental health questions. Some responses, when missing or unknown, are reputed from neighborhood data, such as family income (USHHS, 2006, 2007, 2008). In total, there are over 3000 variables in the NSDUH (USHHS 2006, 2007, 2008).

The NSDUH (2006-2008) focuses on several areas of interest to this study and identified as correlates of adolescent pregnancy and depression in the literature (USHHS, 2006, 2007, 2008). It includes questions dedicated to pregnancy and health care, youth experiences related to activities, school success, and communication with parents, in addition to the myriad of information on substance use and abuse. The NSDUH was chosen as ideal for this study given all these characteristics. Having described the basic characteristics of the dataset and the data collection process, the
discussion in the next section presents particular information related to sample size and response rates for the NSDUH.

NSDUH Sample Size and Weighted Response Rate

Due to the complex sampling methods utilized, the NSDUH is not self-weighted. Researchers must use statistical procedures that take the strata, primary sampling unit (PSU), and sampling weight into account, in order to draw inferences about the population from the sample (USHHS, 2006, 2007, 2008). The NSDUH has a target sample size of 67,500 for each year, given the number of cases chosen per state (USHHS 2006, 2007, 2008). The achieved sample size for the 2006 NSDUH was 67,802 persons. However, the file made available for use contains 55,279 cases to protect against disclosure of identities. The achieved sample was 67,870 in 2007. Again, a portion of the cases were withheld from the public, with 55,435 being the final number of records released for analysis. In 2008, the achieved sample size was 68,736, with 55,739 case files made available for public use.

Due to the strategies implemented for ensuring high participation rates, the 2006 NSDUH resulted in a 90% weighted screening response rate. That same year, the weighted interview response rate was 74% (USHHS, 2006). Subsequent year weighted response rates were nearly identical. For 2007, the weighted screening response weight was 90%, and the weighted interview response rate was 74%. These rates are based on the original sample size prior to subsampling (USHHS, 2007). In 2008, the weighted screening weight was 89% and the weighted response weight was 74% (USHHS, 2008).
The NSDUH has several very noteworthy advantages. It is the only dataset to provide national-level data on drug use for analysis of the population of the United States (USHHS 2006, 2007, 2008). It also provides national-level access to information about individuals who might otherwise not be available to researchers, given the number of individuals in the target population who never receive treatment or otherwise come in contact with agencies that report to national databases (USHHS, 2007, 2008). Further, given the size and scope of the NSDUH and its precise “deeply stratified” (USHHS 2008, p. 8) sampling methods, the precision level of population estimates is high.

The scope of the NSDUH, including its sample size and response rate, makes it a valuable resource for analysis of data related to particular target populations. Having discussed the dataset, the next section presents an examination of the particular variables from the dataset that were considered for this study.

Measures

Ten variables were selected from the NSDUH for use in this study. Detailed justifications for the inclusion for each variable were presented in the previous chapter and are not included here. What is included is a discussion of how each variable was operationalized and measured using variables collected by the NSDUH. A detailed list of the variables and the questions associated with them is presented in Table 1. The discussion proceeds with an examination of each variable.

First, respondents in the NSDUH were asked about their race and their ethnicity. Responses were then combined into a single race/ethnicity measure. For this study,
those categories were collapsed further. Non-Hispanic whites were compared against all others. Minorities were grouped and coded 1. Non-Hispanic whites were coded 0.

Table 1

*Characteristics and Corresponding Measures in the form of Survey Question and Response Categories*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minority Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = Non-Hispanic White</td>
</tr>
<tr>
<td></td>
<td>1 = Minority</td>
</tr>
<tr>
<td>Low Family Income</td>
<td>Total Family Income</td>
</tr>
<tr>
<td></td>
<td>0 = $20,000 or more</td>
</tr>
<tr>
<td></td>
<td>1 = Less than $20,000</td>
</tr>
<tr>
<td>Pregnant</td>
<td>Are you pregnant?</td>
</tr>
<tr>
<td></td>
<td>0 = No</td>
</tr>
<tr>
<td></td>
<td>1 = Yes</td>
</tr>
<tr>
<td>Communication with Parents</td>
<td>During the past 12 months, how many times have you argued or had a fight with at least one of your parents?</td>
</tr>
<tr>
<td></td>
<td>0 = 10 or more times</td>
</tr>
<tr>
<td></td>
<td>1 = 1 to 9 times</td>
</tr>
<tr>
<td>Engagement in Activities</td>
<td>This variable was created by counting the number of positive responses reported over the following 4 youth activity questions: School-based, community-based, church or faith-based, or other activities.</td>
</tr>
<tr>
<td></td>
<td>0 = None or 1 Activity</td>
</tr>
<tr>
<td></td>
<td>1 = 2 or More Activities</td>
</tr>
<tr>
<td>Success in School</td>
<td>What were your grades for the last semester or grading period you completed?</td>
</tr>
<tr>
<td></td>
<td>0 = “C,” “D,” or less than “D” average</td>
</tr>
<tr>
<td></td>
<td>1 = “A,” or “B,”</td>
</tr>
<tr>
<td>Smoking Tobacco</td>
<td>During the past 30 days, that is since [reference date] on how many days did you smoke part or all of a cigarette?</td>
</tr>
<tr>
<td></td>
<td>0 = Never smoked or did not smoke in past 30 days</td>
</tr>
<tr>
<td></td>
<td>1 = Smoked 1 or more days in past 30 days</td>
</tr>
<tr>
<td>Heavy Alcohol Use</td>
<td>Heavy Alcohol Use is defined as drinking five or more drinks on the same occasion on each of 5 or more days in the past 30 days. For this variable, &quot;occasion&quot; means at the same time or within a couple hours of each other.</td>
</tr>
<tr>
<td></td>
<td>0 = Never/No heavy alcohol use</td>
</tr>
<tr>
<td></td>
<td>1 = Heavy alcohol use</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 1 (continued).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Abuse</td>
<td>This variable was created by asking about recent use of hallucinogens, heroin, marijuana, cocaine, inhalants, or any of the following psychotherapeutics: sedatives, tranquilizers, stimulants, or prescription-strength pain relievers not prescribed to the respondent.</td>
</tr>
<tr>
<td></td>
<td>0 = Did not use in past month</td>
</tr>
<tr>
<td></td>
<td>1 = Used in past month</td>
</tr>
<tr>
<td>Depressive Symptoms</td>
<td>Have you ever in your life had a period of time lasting several days or longer when most of the day you felt sad, empty, or depressed?</td>
</tr>
<tr>
<td></td>
<td>0 = No</td>
</tr>
<tr>
<td></td>
<td>1 = Yes</td>
</tr>
</tbody>
</table>

The NSDUH asked respondents to estimate their total family income. Respondents are divided into four categories: “Less than $20000,” “$20000 - $49999,” “50000 - $74999,” or “$75000 or More.” When respondents did not or could not provide their own family income, the information was imputed by the NSDUH from comparable families in their neighborhood. For these reasons, there were no missing data for income, even though the respondents in this study were primarily adolescents below working age. Respondents with family income below $20000 were coded 1. Respondents with higher family income were grouped and coded 0.

Pregnancy was conceptualized as the life event impacting adolescents’ ability to cope. To assess respondents whether respondents were pregnant, respondents were simply asked “Are you pregnant?” “Yes” responses were coded 1. “No” responses were coded 0.

In order to ascertain whether adolescents engaged in positive coping strategies by keeping open lines of communication with their parents, the question “During the past 12 months, how many times have you argued or had a fight with at least one of your parents?” was utilized. Responses range from “0” to “10 or more times.” Fewer
arguments or fights were taken as an indicator of better communication. Therefore, respondents who reported nine or fewer fights were grouped and coded 1. Respondents who reported ten or more fights were grouped and coded 0.

To measure engagement in activities as a positive coping mechanism, respondents were asked about their participation in school-based activities, community-based activities, church or faith-based activities, and other types of activities. Adolescents who indicated they participated in two or more activities were considered to be socially active. They were grouped and coded 1 for this variable. Youths who indicated participation in one or none were considered inactive, and therefore grouped and coded 0.

Adolescent respondents were asked to self report their grades for the past semester or grading period. Youth who were considered to be successful in school were those who indicated they had made A or B grades. Those who reported C, D, or below were coded 0. Adolescents reporting A’s or B’s were considered successful and grouped and coded 1.

Respondents were asked if they had smoked in the past thirty days. An answer of “no” was recorded for those who stated they had smoked no tobacco. All others were coded “yes.” Adolescents who said they had smoked tobacco were coded 1 as an indicator of negative coping. All others were coded 0.

Heavy alcohol use was indicated by asking respondents about the number of times they had drunk five or more drinks on a single occasion in the past thirty days. Those who reported five or more days in which they drank five or more drinks in the past thirty days were labeled heavy alcohol users. They were coded 1. Respondents
were coded 0 if they did not drink or had less than five, five-drink occasions in the past thirty days.

The NSDUH asked about use of marijuana, cocaine, inhalants, prescription drugs, heroin, and a number of other drugs. Respondents who indicated that they had, in the past thirty days, used any type of illicit drugs or prescription drugs not prescribed to them were coded 1 for drug use. All others were coded 0.

For the outcome measure depressive symptoms, respondents were asked whether they had ever had a period of their life which lasted several days or more when they felt sad, empty, or depressed in a series of three separate questions. The DSM-IV (1994) states that extended feelings of sadness, emptiness, and depression are necessary leading indicators or symptoms of a major depressive episode. Respondents who said they had ever felt sad, empty, or depressed were coded 1. All others were coded 0.

The hypothesized relationship among these variables is depicted in Figure 2. This chapter now turns to a discussion of the data analysis procedures that were conducted.

Data Analysis

The data for this study was analyzed using social science data processing software SPSS, the Statistics Package for the Social Sciences, Version 22. Given the complex sample design utilized by the NSDUH, all analyses were conducted using appropriate procedures (i.e., that take into account the strata, PSU, and weight) in SPSS’s complex sample module. The data were compiled by pooling information made
public by the NSDUH for the years 2006, 2007, and 2008. Female participants age 12-17 were selected. Listwise deletion was utilized to ensure that only those respondents who answered all of the questions relevant to this study were included. The final unweighted sample size for the study was 22,854 adolescent girls age 12-17.

The resulting pooled data set was tested for multicollinearity by regressing each of the predictors on the others. Tolerance values ranged from .768 (R²=.232) to .991 (R²=.009), well above the conventionally accepted threshold of .200. This indicated there were no issues associated with multicollinearity.

Means and standard error for each of the variables in the study were calculated and are presented in the next chapter. A series of logistic regressions models was estimated to test the hypotheses, the results of which are also discussed in the following chapter. This series of regressions followed the steps for progressive adjustment outlined in Mirowsky (1999) and Baron and Kenny (1986). The progressive adjustment process tested for mediation. These steps were discussed earlier in this chapter. These steps were undertaken to demonstrate whether coping served as a mediator between pregnancy and depression among adolescent girls when minority status and family income were accounted for. These relationships are depicted in Figure 2 and based on the assertions put forth by Pearlin et al. (1981), Pearlin (1999a, 1999b) and others who proscribe to the notion of the stress process model for mediators (see Figure 1) as way to understand the relationship between larger social forces and individual negative health outcomes.
Conclusion

This research was conducted for the purpose of understanding the impact of pregnancy on depressive symptoms, and the role of coping strategies in mediating that impact. This chapter discussed the ways in which progressive adjustment for mediators was utilized to examine these relationships. The chapter also discussed and presented individual measures for the variables involved. The next chapter entails a discussion of the findings of the study.
CHAPTER 5
FINDINGS

The previous chapters outlined the necessity and purpose of this study, the
variables that pertain to the study, and the methods that best resolve the questions
raised by the hypotheses. The previous chapter presented in detail the research
methods that were undertaken in this study, including justification for these methods as
tests for mediation. A series of hypotheses were presented to test the theoretical model
presented in Figure 2. The Appendix presents a summary list of these hypotheses. In
this chapter, findings related to these hypotheses are discussed. First, however,
Chapter 5 begins with a discussion of the characteristics of the sample chosen for this
study from the NSDUH dataset.

Sample Characteristics

After combining the NSDUH data for 2006, 2007, and 2008 and removing
missing cases, the sample consist of a total of 22,854 adolescent girls in the study.
Among the sample, there were 7,783 participants in 2006, 7,442 in 2007, and 7,629
participants in the year 2008. Regarding the age distribution of participants, twelve,
thirteen, and fourteen year olds numbered 3,213, 3,620, and 3,707, respectively. The
fifteen, sixteen, and seventeen year olds were slightly more in number, with counts of
4,072, 4,189, and 4,053, respectively.

Weighted means and standard errors (adjusted for NSDUH’s complex sampling
design) for each of the variables are presented in Table 2. Discussion focuses on the
pooled data, as characteristics are relatively stable across year.
Table 2

Descriptive Statistics for the Variables in the Analysis by Year and Three Years Combined

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>2006-2008 M (SE)</th>
<th>2006 M (SE)</th>
<th>2007 M (SE)</th>
<th>2008 M (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minority</td>
<td>.384 (.007)</td>
<td>.376 (.010)</td>
<td>.384 (.010)</td>
<td>.392 (.010)</td>
</tr>
<tr>
<td>Low Family Income</td>
<td>.155 (.004)</td>
<td>.162 (.006)</td>
<td>.160 (.006)</td>
<td>.144 (.005)</td>
</tr>
<tr>
<td>Pregnant</td>
<td>.008 (.001)</td>
<td>.008 (.001)</td>
<td>.009 (.002)</td>
<td>.006 (.001)</td>
</tr>
<tr>
<td>Communication with Parents</td>
<td>.714 (.004)</td>
<td>.710 (.007)</td>
<td>.730 (.007)</td>
<td>.702 (.008)</td>
</tr>
<tr>
<td>Engagement in Activities</td>
<td>.889 (.003)</td>
<td>.889 (.004)</td>
<td>.895 (.004)</td>
<td>.884 (.005)</td>
</tr>
<tr>
<td>Success in School</td>
<td>.767 (.004)</td>
<td>.759 (.007)</td>
<td>.775 (.006)</td>
<td>.766 (.003)</td>
</tr>
<tr>
<td>Smoking</td>
<td>.100 (.003)</td>
<td>.112 (.004)</td>
<td>.970 (.004)</td>
<td>.092 (.004)</td>
</tr>
<tr>
<td>Heavy Alcohol Use</td>
<td>.019 (.001)</td>
<td>.022 (.002)</td>
<td>.018 (.002)</td>
<td>.017 (.002)</td>
</tr>
<tr>
<td>Drug Use</td>
<td>.094 (.002)</td>
<td>.099 (.004)</td>
<td>.091 (.005)</td>
<td>.094 (.004)</td>
</tr>
<tr>
<td>Depressive Symptoms</td>
<td>.532 (.005)</td>
<td>.549 (.007)</td>
<td>.520 (.009)</td>
<td>.526 (.007)</td>
</tr>
<tr>
<td>Unweighted Count</td>
<td>22,854</td>
<td>7,783</td>
<td>7,442</td>
<td>7,629</td>
</tr>
</tbody>
</table>

Minority status and low family income each represented chronic strain in the stress process model. The mean for minority was .384 with a standard error of .007. Thus, 38% of respondents were minority, while 62% were non-Hispanic white. Low
family income was not as common as minority status, with about 16% having low income.

Pregnancy represented the life event in the stress process model. Among the adolescents under study, pregnancy was a rare event, with only 187 girls indicating that they were pregnant. They made up less than one percent (0.8%) of the sample.

Regarding the positive coping strategies, communication with parents, engagement in activities, and success in school were each relatively frequent in occurrence. Over seventy percent (71%) reported good communication with parents. Approximately nine out of ten were engaged in more than one activity (89%), while about three-fourths (77%) had A or B grades.

Negative coping strategies were considerably less frequent than positive coping strategies. Exactly 10% stated that they had smoked in the past thirty days, while 90% stated they had never smoked or had not smoked recently. Heavy drinking was considerably less common, with only about two percent (2%) reporting they had five or more heavy drinking episodes in the past thirty days. Surprisingly, reported drug use was considerably more frequent than heavy alcohol use. Drug abuse nearly equaled the levels of smoking in frequency, with 9% stating they had used drugs in the past thirty days.

The mental health outcome measured for the study was depressive symptoms. Feelings of sadness, emptiness, or depression were relatively common. Over one-half (53%) said that they had ever had several days where they felt sad, empty, or depressed. Having discussed the basic descriptive statistics of the adolescents under study, the following section presents findings relative to each of the hypotheses.
Hypotheses

The hypotheses were designed to test whether coping strategies mediate the relationship between pregnancy and depressive in adolescent girls, aged 12-17, accounting for family income and minority status. These hypotheses were presented and discussed in detail in the previous chapter. They are designed to test the proposed model depicted in Figure 2. Tests of the model were based on Mirowsky’s (1999) process of testing for mediation, and influenced by Baron and Kenny’s (1995) discussion of the same. A concise list of the hypotheses is presented in the Appendix. Findings related to each hypothesis are now presented.

Hypothesis 1: Pregnancy and Depression

The first hypothesis stated that pregnancy raises the risk of depressive symptoms. Mirowsky (1999) argues that two variables must be shown to be related before their relationship can be tested for mediation. The results of the logistic regression of depression on pregnancy are presented in Table 3, Model 1 and support the hypothesis. Results indicated that pregnant girls were 75% more likely to have experienced feelings of sadness, emptiness, or depression than their non-pregnant peers, providing support for the hypothesis (odds ratio = 1.748, \( p < .01 \)).

Hypotheses 2 and 3: Minority Status, Low Family Income, and Pregnancy

The second and third hypotheses examined the effects of the chronic strains minority status and low income, respectively, on the life event, pregnancy.
<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy</td>
<td>1.748**</td>
<td>1.693*</td>
<td>1.511</td>
<td>1.410</td>
<td>1.351</td>
</tr>
<tr>
<td>Minority Status</td>
<td>1.002</td>
<td>1.060</td>
<td>1.056</td>
<td>1.102**</td>
<td></td>
</tr>
<tr>
<td>Low Family Income</td>
<td>1.156**</td>
<td>1.137</td>
<td>1.117</td>
<td>1.121</td>
<td></td>
</tr>
<tr>
<td>Communication with Parents</td>
<td></td>
<td>.399***</td>
<td></td>
<td>.423***</td>
<td></td>
</tr>
<tr>
<td>Engagement in Activities</td>
<td></td>
<td>.897</td>
<td></td>
<td>.977</td>
<td></td>
</tr>
<tr>
<td>Success in School</td>
<td></td>
<td>.600***</td>
<td></td>
<td>.653***</td>
<td></td>
</tr>
<tr>
<td>Smoking Tobacco</td>
<td></td>
<td></td>
<td>2.086***</td>
<td>1.787***</td>
<td></td>
</tr>
<tr>
<td>Heavy Alcohol Use</td>
<td></td>
<td></td>
<td>.771</td>
<td>.661**</td>
<td></td>
</tr>
<tr>
<td>Drug Abuse</td>
<td></td>
<td></td>
<td>1.986***</td>
<td>1.700***</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.131</td>
<td>1.105</td>
<td>3.460</td>
<td>.965</td>
<td>2.597</td>
</tr>
<tr>
<td>Model F</td>
<td>7.520**</td>
<td>4.337**</td>
<td>86.388***</td>
<td>38.259***</td>
<td>68.957***</td>
</tr>
<tr>
<td>Model degrees of freedom</td>
<td>1.60</td>
<td>3.58</td>
<td>6.55</td>
<td>6.55</td>
<td>9.52</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01; ***p<.001
First, Hypothesis 2 argued that minority status raises the risk of pregnancy. Results are presented in Table 4. Findings indicated that, separate from any consideration of income, minority girls were about twice as likely as white girls to become pregnant (odds ratio = 2.073; \( p < .0005 \)). Minority status remained significant with the introduction of income into the model. Controlling for income, minority status raised the risk of pregnancy by 62% (odds ratio = 1.619, \( p < .05 \)).

Table 4

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds Ratio for Risk of Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minority Status</td>
<td>2.073***</td>
</tr>
<tr>
<td>Low Family Income</td>
<td>3.346***</td>
</tr>
<tr>
<td></td>
<td>2.881***</td>
</tr>
</tbody>
</table>

*\( p < .05 \); **\( p < .01 \); ***\( p < .001 \)

Hypothesis 3 stated that low family income is associated with an increased risk of pregnancy. The results of logistic regression indicated that an increased risk of pregnancy was associated with low family income, both separate from and inclusive of any consideration of minority status. Ignoring minority status, girls from low income families were nearly 3.5 times as likely as girls from higher income families to become pregnant (odds ratio=3.346, \( p < .001 \)). When minority status was taken into account, the low-income effect was slightly reduced but remained statistically significant (odds ratio = 2.881, \( p < .001 \)).

Findings regarding minority status and low family income and their relationship to pregnancy lend support to Hypothesis 2 and Hypothesis 3. Minority status and low income were shown to be associated with an increased risk of pregnancy, even when controlling for one another.
**Hypothesis 4: Pregnancy, Depression and the Demographic Variables**

The fourth hypothesis stated that the life event pregnancy continued be associated with increased risk of depressive symptoms, even when the impact of the chronic strains minority status and low income were taken into account (see Table 3, Model 2). Findings indicated that pregnancy was indeed associated with an increased risk of depressive symptoms when these two factors were held constant. Specifically, pregnancy was associated with a 69% risk of depression under these conditions (odds ratio = 1.693, \( p < .05 \)).

This model was the first to test the impact of minority status and income on depressive symptoms. Controlling for the other variables, minority status was found not to have a significant direct effect on depression (odds ratio=1.002, \( p = .954 \)). On the other hand, income had the predicted effect: the odds of depressive symptoms were about 16% higher for girls from low-income families compared to girls from families with higher incomes (odds ratio = 1.156, \( p < .01 \)).

**Hypotheses 5, 6, and 7: Positive Coping Strategies**

The next series of hypotheses focused on the positive coping strategies, namely communication with parents, engagement in activities, and success in school. There were three parts to each of the three positive coping strategy hypotheses. First, pregnancy was expected to be associated with less of each positive coping strategy, holding minority status and low family income constant. Second, the positive coping strategies were each expected reduce the risk of depressive symptoms.
Table 5

Odds Ratios for Risk of Each Positive and Negative Coping Strategies Considering the Chronic Strains Minority Status and Low Family Income and the Life Event Pregnancy as Predictors

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model 1 Communication with Parents</th>
<th>Model 2 Engagement in Activities</th>
<th>Model 3 Success in School</th>
<th>Model 4 Smoking Tobacco</th>
<th>Model 5 Heavy Alcohol Use</th>
<th>Model 6 Drug Abuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy</td>
<td>.801</td>
<td>.272***</td>
<td>.490***</td>
<td>3.495***</td>
<td>1.528</td>
<td>2.955***</td>
</tr>
<tr>
<td>Minority Status</td>
<td>1.692***</td>
<td>.782***</td>
<td>.687***</td>
<td>.467***</td>
<td>.385***</td>
<td>.764***</td>
</tr>
<tr>
<td>Low Family Income</td>
<td>1.333***</td>
<td>.569***</td>
<td>.540***</td>
<td>1.422***</td>
<td>1.140</td>
<td>1.355***</td>
</tr>
<tr>
<td>Constant</td>
<td>1.992</td>
<td>10.075</td>
<td>4.323</td>
<td>.133</td>
<td>.025</td>
<td>.108</td>
</tr>
<tr>
<td>Model F</td>
<td>53.586***</td>
<td>65.214***</td>
<td>85.142***</td>
<td>38.660***</td>
<td>6.491***</td>
<td>13.812***</td>
</tr>
<tr>
<td>Model degrees of freedom</td>
<td>3.58</td>
<td>3.58</td>
<td>3.58</td>
<td>3.58</td>
<td>3.58</td>
<td>3.58</td>
</tr>
</tbody>
</table>

*p<.05; **p<.01; ***p<.001
Lastly, the introduction of the positive coping strategies to the model was expected to reduce the relationship between pregnancy and depressive symptoms, all other things being equal. This section now turns to a consideration of each portion of these hypotheses.

To begin with, pregnancy was expected to be associated with a reduced likelihood of each positive coping strategy, taking the effects of minority status and low family income into account. Results are shown in Table 5. While findings indicated that positive communication with parents was 20% less likely among pregnant adolescents, the results were not significant (Odds ratio = .801, \( p = .247 \)). However, pregnancy was found to be a significant predictor of both engagement in activities and success in school (\( p < .0005 \)). Pregnant girls were about 75% less likely to be socially active and approximately 50% to report success in school (Odds ratios = .272 and .490, respectively) than their non-pregnant peers. Hence, while engagement in activities and success in school met the first condition of being a mediator between pregnancy and depression, positive communication with parents did not.

The second part of the hypotheses argued that each positive coping strategy would be associated with a reduced risk of depressive symptoms. As predicted, both communication with parents and success in school had significant, inverse relationships with depressive symptoms. As presented in Table 3, Model 3, those who reported fewer arguments with parents were about 60% less likely to report feelings of sadness (odds ratio = .399, \( p < .001 \)), while success in school was associated with a 40% decreased risk in depressive symptoms (Odds ratio = .600, \( p < .001 \)), all other things being equal. Engagement in activities did not have a significant effect on depression.
Thus, while engagement in activities met the first condition of being a mediator, it did not meet the second condition. The only positive coping strategy to meet both the first and second condition was success in school.

The last portion of hypotheses 5, 6, and 7 stated that the relationship between pregnancy and depressive symptoms would be reduced with the addition of the positive coping strategies. As predicted, the effect of pregnancy on depression was decreased in magnitude and significance with the addition of the positive coping strategies. The unstandardized logistic regression coefficient associated with pregnancy (not shown) was reduced 22% from .53 (LN[1.693] = .53) in Table 3, Model 2 to .41 (LN[1.511] = .41) in Table 3, Model 3. However, pregnant girls were still about 50% more likely to have depressive symptoms, but the effect was only marginally significant (p = .075).

Taken as a whole, results for these hypotheses suggest that the relationship between pregnancy and depressive symptoms is partially mediated by positive coping strategies. Specifically, pregnancy appears to affect depressive symptoms indirectly through its effect on one of the positive coping strategies, namely, success in school. Positive communication with parents and engagement in activities did not meet the conditions for mediation.

Interestingly, the addition of the positive coping strategies to the model also changed the income effect. While girls from families with low incomes were still more likely to have depressive symptoms, like the effect of pregnancy, the effect of low family income effect became much weaker and only marginally significant (odds ratio = 1.137, p = .062) when positive coping strategies were considered. This pattern suggests that
the effect of low family income on depressive symptoms is also partially mediated by success in school.

_Hypotheses 8, 9, and 10: Negative Coping Strategies_

Smoking tobacco, heavy alcohol use, and drug abuse were presumed to be negative coping strategies for this research. Once again, there were parts to each of hypotheses associated with each of the three negative coping strategies. First, it was expected that pregnancy would be associated with an increased likelihood of smoking, heavy alcohol use, and drug abuse, respectively, with minority status and low family income again held constant. Furthermore, these negative coping strategies were each expected to increase depressive symptoms. Thirdly, the inclusion of the negative coping strategies was expected to decrease the relationship between pregnancy and depressive symptoms, all other things being equal. As was the case with the positive coping strategies, results were mixed.

Considering pregnancy as a predictor of smoking, heavy alcohol use, and drug abuse, results were found to be significant for two of these three variables. Results are presented in Table 5, Models 4, 5, and 6. Pregnancy was found to be significantly associated with increased odds of smoking tobacco and drug abuse (p<.0005). Pregnant adolescents were 3.5 times as likely as their non-pregnant peers to smoke tobacco, and 3 times as likely to use drugs. However, results for heavy alcohol use were not significant (p=.432). Thus, smoking tobacco and drug abuse met the first condition of being a mediator, while heavy alcohol use did not.
To address the hypotheses regarding the effects of each of the negative coping strategies on depressive symptoms, two models were estimated. These are presented in Table 3: Models 4 and 5. Model 4 introduced the negative coping strategies as a solitary block, without including the positive strategies. Model 5 took all of the coping strategies, positive and negative, into account.

Beginning with the first negative coping strategy, smoking tobacco was found to be a significant predictor of depressive symptoms. Absent the positive coping strategies (Table 3, Model 4), girls who smoked tobacco were twice as likely as girls who did not to have depressive symptoms (Odds ratio = 2.086, \( p < .001 \)). The smokers’ disadvantage decreased slightly once all of the coping strategies were accounted for but remained significant (odds ratio = 1.787, \( p < .001 \)).

Heavy alcohol use, while it was presumed to be a negative coping strategy, was actually shown to reduce depressive symptoms (Table 3, Model 5). When all of the coping strategies were included in the model, heavy alcohol use was a significant predictor of depressive symptoms, reducing risk of depressive symptoms by 34% (Odds ratio = .661, \( p < .01 \)). However, since heavy alcohol use was not affected by pregnancy, it does not appear to act as a mediator between pregnancy and depression.

Drug abuse had the predicted effect on depression in the target population. As Table 3, Model 4 shows, drug abuse increased the risk of depressive symptoms by 99% when only negative coping strategies were taken into account (odds ratio = 1.986, \( p < .001 \)). When both positive and negative coping strategies were considered (Table 3, Model 5) drug abuse increased the risk of depressive symptoms by 70.0% (odds ratio =
1.700, \( p < .001 \). Thus, in sum, both smoking tobacco and drug abuse met the first two conditions of being a mediator, while heavy alcohol use did not.

To meet the third and final condition, smoking tobacco and drug abuse must reduce the effect of pregnancy on depression when they are included in the model with pregnancy. As hypothesized, the introduction of the negative coping strategies, either alone or in combination with the positive strategies, was associated with a decrease in the effect of pregnancy on depression (Table 3, Models 4 and 5). The unstandardized logistic regression coefficient associated with pregnancy (not shown) was reduced 43% from .53 (LN[1.693] = .53) in Table 3, Model 2 to .30 (LN[1.351] = .30) in Table 3, Model 5. While pregnant girls were 35% more likely to have depressive symptoms than their non-pregnant peers, this difference was only marginally significant (\( p = .095 \)). The pattern of results suggests that smoking tobacco and drug abuse, like success in school, partially mediate the effects of pregnancy on depressive symptoms.

With regards to the effects of the other variables in the model, some are worth nothing. For example, the introduction of the negative coping strategies resulted in no appreciable changes in low income as a predictor of depressive symptoms. Low income continued to remain insignificant in both Models 4 and 5 (\( p = .110 \) and \( p = .104 \), respectively.

Minority status, however, presented an interesting development. In Model 4, without taking the positive coping strategies into account, minority status remained insignificant, with the odds ratio still very close to one (1.056, \( p = .110 \)). Minority status gained significance, however, once all of the coping strategies were taken into consideration. In Model 5, minority status was shown to be associated with a 102%
increase in depressive symptoms ($p<.01$). As more coping strategies were introduced, the odds ratio associated with minority status has increased slightly, finally coming into significance.

Among adolescent girls, the impact of pregnancy on depressive symptoms appears to be explained in large part by pregnancy’s impact on the ability to cope. The findings related to hypotheses 8, 9, and 10, along with findings for hypotheses 5, 6, and 7, suggest that, on balance, the relationship between pregnancy and depressive symptoms is partially mediated by three coping strategies. It was found that success in school was the positive coping strategy acting as a mediator. Smoking tobacco and drug abuse were the negative coping strategies acting as mediators.

**Summary of Findings**

The stress process model is based on the assumption that stressors raise the risk of mediators, which in turn increase the risk of experiencing a negative health outcome (Pearlin, 1999a; Pearlin, 1999b; Pearlin et al., 1981). The tests that have been conducted for this study were intended to determine whether pregnancy, a presumed stressful life event, independently causes an increase in risk of depressive symptoms in adolescent girls, or, alternatively, whether the apparent risk associated with pregnancy is actually the result of the impact pregnancy has on coping strategies. A series of models were estimated through the process of progressive adjustment (Mirowsky, 1999; Baron & Kenny, 1995). This process tested for mediation in the context of the stress process model.
Findings indicate that when pregnancy is considered alone, it is a significant risk factor for depressive symptoms. However, when the effects of coping strategies are taken into account, pregnancy loses significance as a predictor of depressive symptoms. The results suggest that pregnancy primarily affects depression via its impact on the ability to cope. Three of six coping strategies considered were found to be affected: success in school, smoking tobacco, and drug abuse. The implications of these and all the results presented in this chapter are discussed further in Chapter 6.
CHAPTER 6

CONCLUSION

This dissertation began with an introductory discussion of the social problems associated with pregnancy in adolescence. Depression during pregnancy and related correlates were discussed. Definitions germane to this study were presented. The second chapter outlined the basic structure of the stress process model defined by Pearlin et al. (1981) and Pearlin (1999a, 1999b). Chapter 3 of this work presented the literature related to adolescent pregnancy, with a particular focus on outlining each of the variables targeted for inclusion in this research and their connection to the stress process model. Chapter 4 presented the hypotheses that were derived for this research, as well as the methods that were utilized to investigate each hypothesis. The fifth chapter of this work presented findings related to each of those hypotheses.

This concluding chapter of this work discusses interpretations of the findings presented in the previous chapter. Limitations of these findings and suggestions for further study is also presented.

Interpreting Findings in the Context of the Stress Process Model

This study was undertaken to investigate the relationship between pregnancy and depressive symptoms among adolescent girls, and the factors which may mediate that relationship. The stress process model posed by Pearlin et al. (1981) and iterated by so many others (cf. Schwartz, 2002) argues that particularly among individuals who are disadvantaged by their social location, life events like pregnancy contribute to mental health outcomes by stretching the individual’s ability to maintain balance or
stability. In essence, the stress overwhelms their coping mechanisms. It is this cascading process that leads to conditions like depression.

Findings of this study fit with the notion that pregnancy is a part of a larger "stress process" that leads to negative mental health consequences in young girls. Information gathered by the US Department of Health through its National Household Survey on Drug Use and Health was collected and analyzed. Three years of data were combined and analysis was conducted using the progressive adjustment procedures outlined by Mirowsky (1999) and Baron and Kenny (1995). Progressive adjustment, consisting of estimating and interpreting a series of logistic regression models, was used to determine the nature of the relationship between minority status, low family income, pregnancy, and coping strategies as predictors of depressive symptoms.

Findings supported the notion that the stress of pregnancy takes its toll on mental health indirectly through its association with positive and negative coping strategies. The study began with Hypothesis 1, which tested to see that pregnancy increased the risk of depressive symptoms. The data supported the notion that the two variables were related. This fit with the abundance of literature in the prior chapters that suggested pregnancy was linked to depressive symptoms (cf. Bernazzani & Bifulco, 2003; Dietz et al., 2007; Figueiredo, Pacheco, & Costa, 2007; Lovisi, Lopez, Coutinho, & Patel, 2005).

The next series of hypotheses tested for the association between minority status and low family income and pregnancy. This was based on the notion put forth by Pearlin et al (1981) and others that disadvantaged social position raises the risk of negative life events, as suggested by national data from the CDC, for example (Hamilton, Martin, and Ventura, 2013). While low family income was indeed found to be related to
pregnancy, minority status was not in this study. No direct association was found between minority status and depressive symptoms until all the coping variables were taken into account. Even then, the risk associated with minority status was low. However, the odds ratio for low family income decreased with the addition of variables, suggesting that coping also partially mediated the effect of low family income on depression.

The fourth hypothesis argued that the relationship between pregnancy and depressive symptoms would hold, even when minority status and low family income were taken into account. This was to verify that the life event, pregnancy, still had an impact on wellness when social location was taken into consideration, as the literature suggested it would (cf. Hamilton, Martin, and Ventura, 2013). Indeed, this was found to be the case.

Among the six coping strategies considered, three were found to be mediating the relationship between pregnancy and depression. One of the three mediators was a positive coping strategy, success in school. The other two mediators were negative coping strategies, smoking tobacco and drug abuse. These coping strategies reduced the magnitude and significance of the pregnancy effect on depression. This pattern suggested that as a life event, pregnancy may alter the risk of depression only through its relationship with coping strategies. Positive communication with parents, engagement in social activities, and heavy alcohol use did not act as mediators.

The measures of positive communication with parents and engagement in social activities available in the dataset were rather narrow. For example, it is likely that the action of simply engaging in activities is not necessarily helpful to well-being. One must
perhaps establish supportive connections to significant others. While the literature suggested involvement in activities alone might be helpful (cf. Dworkin, Larson, & Hansen, 2003; Smith, 2003), other literature points to the importance of mattering (cf. Cobb, 1976) or attachment (cf. Bowlby, 1969). These constitute social support rather than coping (Pearlin et al., 1981, Pearlin, 1999a, 1999b; Turner and Turner, 1999). It would be therefore helpful for future studies on this topic to take social support into account as a mediator.

Contrary to expectations, heavy alcohol use was found to be associated with an increased risk of depressive symptoms. The literature indicated heavy drinking may be part of a cluster of risk behaviors that come together with pregnancy in adolescence (Jackson, Henderson, Frank & Haw, 2012; Rome, Rybicki, & Durant, R., 1998). When all other factors were taken into account, however, heavy alcohol use was shown to be a protective factor against depressive symptoms. It is possible that alcohol or the social conditions associated with alcohol actually reduced depressive symptoms. Recent WHO research suggests that alcohol in certain amounts may be associated with a reduced prevalence of depression (Bellos et al., 2013). On the other hand, considering the influence of income on pregnancy, this finding lends support to studies which have found heavy drinking to be more prevalent among affluent adolescents (Jean & Ife, 2008; Louie, 2007; Windle, 2003). Those studies argued that adolescents have particular difficulty accessing alcohol due to their age. Affluent adolescents, it was suggested, would have spending money to skirt age-specific legal restrictions by purchasing false identification, for example. Although the study controlled for family income, it did not include a measure of the adolescent’s discretionary income.
Given the finding related to heavy alcohol use, it is interesting that the same finding did not become apparent for drug abuse, which literature has indicated might also be related to affluence. It is possible that social conditions are such for adolescents that drugs are easier to access than alcohol for the non-affluent classes. As mentioned earlier, it is possible that alcohol has the effect of self medicating depressive symptoms while drug use does not. Drug use runs the gambit from inhalants to hallucinogens to illicit prescription drugs. These may not, on balance, have positive biochemical effects.

In this section, the interpretations of findings in the context of the stress process model were discussed. This chapter now turns to a discussion of the limitations of this research. The next section also presents suggestions for research in the future after taking these findings into account.

Limitations of the Study and Suggestions for Future Research

There were several imitations to this research. First, results of this study are generalizable only to adolescent girls. While boys who become fathers may also be adversely affected by the stress of parenthood in adolescence, they are not analyzed in this study. Further, only girls age 12 to 17 were included. The questions in the NSDUH that are asked of youth age 12 to 17 differ in many cases from the questions asked of adults. For this reason, though females aged eighteen or older may be living within the same social conditions as their slightly younger peers, they were not included in this study.

This study is also limited in that it does not capture the experiences of institutionalized persons. Adolescent girls who live in institutions such as prison,
treatment centers, or hospitals are not represented in the study. It is likely that their experiences differ from those of other girls in that they are perhaps more at risk for negative life experiences. Further study that includes or targets institutionalized persons is recommended.

In addition, the NSDUH is cross-sectional. It does not provide a measure of change over time. For this reason, time order of the variables in question in this study must in some cases be assumed. For instance, respondents are not asked how long they have been pregnant. While it is assumed that pregnancy affects the presence of the mediators and depressive symptoms, it is possible in some cases that the mediators and depressive symptoms predate the knowledge or presence of pregnancy. Future research would ideally follow subjects through pregnancy and beyond, asking extensive questions about prior behavior and experiences, in order to get a clearer picture of the relationships between the variables under study.

Also, the data contained in the NSDUH is the result of self-report and is therefore dependent on the respondent's recall and truthfulness. While the NSDUH questionnaires were self administered and assurances were given to respondents about the confidential nature of the process, results may have been affected by the respondents' perceptions of personal embarrassment or the desire to embellish her experiences. Over-reporting or underreporting may have occurred.

There exist as well some potential limitations regarding the health outcome, depressive symptoms, and its measurement. First, this study uses depressive symptoms as an outcome, not full diagnostic-level depression. The DSM-IV (1994) outlines specific symptoms in its definition of a major depressive episode, or MDE. In
order to meet the criteria for a diagnosis of MDE, a patient must report feelings of “depressed mood” or a “loss of interest or pleasure” that last several days. Additionally, individuals experiencing a MDE must generally report three or more of the following symptoms: loss of interest in daily activities, change in appetite or, in children, failure to meet growth expectations, disrupted sleep, psychomotor disturbance, extended fatigue, feelings of worthlessness or guilt, trouble concentrating, and thoughts of death or suicide.

The NSDUH includes a series of nine questions which are designed to measure whether respondents have experienced symptoms which meet the criteria for a MDE. Adolescents are asked a series of “yes-no” questions adapted from National Comorbidity Survey for Adolescents (NCS-A; Harvard School of Medicine, 2005) which ascertain their MDE experiences. While these MDE questions would be ideal for this study, they were coded “missing” or “not applicable” for a large portion of the adolescent sample, and an even larger portion of the target group, pregnant adolescents. Adolescents who answered “no” to any one of three filter questions regarding feelings of sadness, hopelessness, and loss of interest or boredom were not asked the MDE questions. Further, only those who said “yes” to sadness, were asked about hopelessness. Only those who said “yes” to sadness and hopelessness were asked about loss of interest or boredom. Thus, due to sample size considerations, the dissertation used responses to the first filter question about “sadness” as the dependent variable, which captures the necessary conditions or symptoms for a person to meet the criteria for a MDE outlined by the DSM-IV (1995).
Given this limitation, however, as Pearlin (1999a) notes, the purpose of sociological research is not to diagnose and treat individuals. It is to identify the social conditions which might lead to mental health problems. Feeling sad, empty, or depressed is a leading indicator of depression by definition (DSM-IV, 1995). In this sense, the study has done what it set out to do by identifying the social conditions which raise risk for depression.

The outcome variable is constrained in an additional way, however, by its time of reference. Respondents were asked if they have ever experienced feelings of sadness, emptiness, or depression. It is possible that their sadness predated some of the other variables in the model. There exists, furthermore, the possibility that multiple episodes of depression have taken place prior to the time of interview. Unfortunately, this is a limitation of the data that is non-resolvable. It is possible, for instance, that depressive symptoms contribute to the other variables examined, including pregnancy and the mediators, such as smoking, drug use, or poor communication with parents. This was the best variable from the NSDUH available given the sample subset under study. Nonetheless, again turning to Pearlin (1999a), it is often the case that there exists a feedback loop within the stress process model. He refers to this as stress proliferation. The stresses and outcomes of life, he argues, are recursive in nature. They feed on each other. While these reciprocal effects are acknowledged here, they are beyond the scope of this study.

Additionally, ample evidence suggests a strong correlation between depression in childhood, depression immediately prior to pregnancy, depression during pregnancy, depression immediately postpartum, and depression in later life (cf. Eberhard-Gran,
Tambs, Opjordsmoen, Skrondal, and Eskild, 2004; Figueiredo, Pacheco, & Costa, 2007; Lovisi, Lopez, Coutinho, & Patel, 2005; Oppo, 2009; Skouteris, Wertheim, Railis, Milgrom, and Paxton, 2009). One study has demonstrated that among mothers, depression in one stage of life is up to 70% predictive of depression in later life (Oppo et al., 2009). While it is possible that depression predates some of the other variables in the model, there is a significant likelihood that this is not entirely the case.

While there were limitations inherent in this study, there were also a number of noteworthy findings that have implications for future policy. Those implications are put forth for consideration in the next section of this chapter.

Implications

First and foremost, it should be noted that over one-half of the population in this study reported a time in their life when they experienced feelings of sadness, emptiness or depression. Given these are the necessary precursors to a major depressive episode, it is recommended that mental health organizations that assist adolescents through times of crisis are prioritized as public resources that maintain health and well-being among youth.

These findings illuminated the importance of the development of positive coping strategies. As a result, it is suggested that programs that foster positive connections to the learning process be enhanced. Parents and schools play an integral role in shaping the adolescent’s well-being.

The consequences of negative coping strategies are equally brought to light in this study. Smoking and drug use were both found to be indicators of difficulties with
depressive symptoms. Adolescents may be turning to these substances to manage depressive symptoms, or the substances themselves and the situations in which they are used may be contributing to depressive symptoms. In either case, early intervention strategies that effectively prevent the use of these substances, in combination with the increased availability of mental health resources for adolescents, are recommended as components of a comprehensive public health improvement strategy.

Moreover, given the odds ratios suggesting pregnancy has a direct or indirect effect on depressive symptoms, it is proposed that adolescents have access to accurate sex education. Education which includes information on pregnancy and disease prevention and management is advocated. The stress process suggests that stress manifests itself as a health breakdown. This may be associated with physiological health as well as mental health. This research lent support to the notion that stress has the effect of cascading down from social location through a life event and through coping abilities to create a negative health outcome. This suggests that adolescents who are socially disadvantaged are more vulnerable to sexually transmitted disease by nature of their social location.

Funding for effective, comprehensive programs aimed at reducing poverty, in addition, are suggested to complement such programs. Given the risks associated with income, whether directly or indirectly, affordable and accessible sexual and maternal health resources are suggested as well. Adolescents particularly may have problems with transportation to doctors or clinics. In addition, they may not have the availability of a parent or mentor who could offer or guidance through the healthcare process and
information regarding options for healthcare available to them. Public programs to assist adolescents gain information about health and healthcare is recommended.

Conclusion

Link and Phelan (1995), in their article, “Social Conditions as Fundamental Causes of Disease,” very elegantly and famously argue that social location, in and of itself, fundamentally alters the individual’s life chances. Being at a disadvantaged location in society alters a person’s access to resources. However, when society itself is under strain, when pathways are broken for entire segments of the whole, there is no resource the individual has access to that has the potential to equalize their life chances with those in more privileged circumstances.

Link and Phelan’s (1995) work is derived from the same guiding theoretical perspective, stated from the outset of this dissertation, upon which the stress process model is based (Pearlin 1999a, 1999b; Pearlin et al., 1981). At the heart of this research sits the notion that social structure has an independent effect on one’s life (Durkheim, 1951; Merton, 1968). What Pearlin provides is a microscope through which the effects of social position are made clear through the examination of mediators such as positive and negative coping strategies. Progressive adjustment was utilized to examine these mediators. As Mirowsky (1999) states, progressive adjustment “is to social research what dissection is to biological research” (p.106). This process made it possible to understand the ways in which social position may erode health by affecting coping strategies. Results of the study suggest that success in school and the avoidance of negative behaviors, namely smoking and drug use, are predictive of reduced risk of
depressive symptoms. Findings further suggest that minority status, low family income, and pregnancy indirectly affect risk of depressive symptoms through these mediators.

This study lends credence to research on the stress process by suggesting that the consequences of life events such as pregnancy are part of a larger mosaic of circumstance. Here, pregnancy likely affects depressive risk through its relationship to the coping strategies under study. Both pregnancy and coping strategies, however are in part the results of social position. Addressing the consequences of social disadvantage is critical.
APPENDIX

CONCISE LIST OF HYPOTHESES
Hypotheses derived from the literature review and tested for this research:

1. Pregnancy raises the risk of depressive symptoms.

2. Minority status raises the risk of pregnancy, even when low family income is taken into account.

3. Low family income raises the risk of pregnancy, even when minority status is taken into account.

4. Pregnancy raises the risk of depressive symptoms, even when minority status and low family income are taken into account.

5. [a] Pregnancy is associated with less positive communication with parents. [b] Positive communication with parents reduces depressive symptoms. [c] When communication with parents is accounted for, the relationship between pregnancy and depressive symptoms is reduced, all other things being equal.

6. [a] Pregnancy is associated with less engagement in activities. [b] Engagement in activities reduces depressive symptoms. [c] When engagement in activities is accounted for, the relationship between pregnancy and depressive symptoms is reduced, all other things being equal.

7. [a] Pregnancy is associated with less success in school. [b] Success in school reduces depressive symptoms. [c] When success in school is accounted for, the relationship between pregnancy and depressive symptoms is reduced, all other things being equal.

8. [a] Pregnancy is associated with smoking tobacco. [b] Smoking tobacco increases depressive symptoms. [c] When smoking tobacco is accounted for, the relationship between pregnancy and depressive symptoms is decreased, all other things being equal.

9. [a] Pregnancy is associated with heavy alcohol use. [b] Heavy alcohol use increases depressive symptoms. [c] When heavy alcohol use is accounted for, the relationship between pregnancy and depressive symptoms is decreased, all other things being equal.

10. [a] Pregnancy is associated with drug abuse. [b] Drug abuse increases depressive symptoms. [c] When drug abuse is accounted for, the relationship between pregnancy and depressive symptoms is decreased, all other things being equal.
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