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The effect of resource adequacy on depression among adolescent mothers in urban and non-urban environments

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Table of Contents

Introduction

Teen pregnancy continues to be a societal concern in the United States. Overall, between 750,000 and one million teenagers become pregnant every year (Blake & Bentov, 2001; Whitman, Borkowski, Keogh, & Weed, 2001). The stress of pregnancy and parenting may overwhelm a young woman and deplete her resources, leaving little energy for the development of positive role identity, stabilization of self-concept, enhancement of self-esteem, and other adolescent tasks (Erikson, 1963; McCarthy & Hoge, 1982; O'Malley &Bachman, 1983; Smith Battle & Leonard, 1998). It is no surprise that teen mothers are prone to depression; the rates of depression among both mothers and adolescents are high. About 45-60% of adolescent mothers report depressive symptoms (Colletta, 1983; Deal & Holt, 1998; Reis, 1988), compared to 13% in older mothers (O'Hara & Swain, 1996).

There are many factors that may affect a teen mother's likelihood of developing depressive symptoms. It seems likely that various resources are related to depression (Colletta, 1983; Hudson, Elek, & Campbell-Grossman, 2000; Turner, Sorenson, & Turner, 2000). Resources can be either identified objectively, such as income or educational level, or perceived by the individual on a more personal level, such as someone to talk to, time to be with children, and time to stay in shape and looking nice. It seems logical that both categories of resources may impact mental health, with a teen mom's perception of her situation accounting for variance in depression beyond what objective resource measures can predict.

The implications of community and neighborhood conditions on individuals are areas of research that had a recent resurgence of interest (Coulton, Korbin, & Su, 1996). Community factors may also affect depression levels among teen mothers. While research

(e.g., Bennett, Skatrud, Guild, Loda, & Klerman, 1997) has examined adolescent pregnancy and abortion rates in urban and non-urban areas, no studies have explored the impact of a teen mom's area of residence on her level of depression.

Many people have an image of teen pregnancy as primarily an urban rather than a non-urban phenomenon. However, in some regions of the U.S., research has revealed that the proportion of births to teenagers is higher in non-urban than urban areas, particularly among African-American teens (Bennett et al., 1997). Moreover, non-urban areas tend to lack medical services, be plagued with poverty, and be socially isolated despite the picturesque images some may have. These are all risk factors for adolescent pregnancy. A teen who gives birth also may be judged more harshly in a more conservative, homogenous small community rather than a large city, and be less likely to seek psychiatric services when needed. This could have a negative effect on the mental health of an adolescent mother who is already overwhelmed with responsibility and stress. In addition, conditions such as loneliness and social isolation, more common to teen mothers in non-urban environments, are related to depression (Hudson et al., 2000; Kessler, 1997).

Purpose

The purpose of this study is to determine the effect of resource adequacy on depression among adolescent mothers in urban and non-urban settings. Self-perceived resource adequacy includes resources such as time, money, housing, and someone to talk to. This measure of self-perceived resources is based on the mother's perception of her situation, rather than on more concrete objective measures. It should be noted that objective measures of resources, including education level and income, also will be used in the statistical modeling techniques to be utilized in the study. It is predicted that self-perceived resources will account for variance in depression after objective resources are controlled.

No identified research has been conducted investigating differences in urban and non-urban teen mothers after the birth of their infant. It is hypothesized that non-urban teen mothers will have more depressive symptoms than urban teen mothers because they may find services less available and may be reluctant to seek mental health services when needed. In addition, non-urban and urban areas may both be plagued by poverty, but the accompanying social isolation in non-urban areas may contribute to more depressive symptoms among teen mothers. They also may feel that they are more harshly judged, as non-urban communities tend to be more conservative and homogenous than urban communities and more unforgiving of those persons who break social norms.

Adolescent Pregnancy and Motherhood

History

Pregnancy among adolescents is a major health and social problem in our country (Roye & Balk, 1996). It is generally accepted as a key factor in the perceived cycle of intergenerational poverty (Harris, 1997). Despite public perception to the contrary, teenage pregnancy and parenting are far from new phenomena. In the past, pregnancy among adolescents was not strongly noted so long as the pregnancy resulted in matrimony, as it frequently did before the 1960s (Vincent, 1961). After all, close to half of all young woman were married by age 20 during the baby boom era. Four decades ago, pregnant teens who did not marry were often whisked away discreetly and the infant was placed for adoption.

As larger percentages of pregnant adolescents (especially African-American adolescents) chose to remain single when they became pregnant, the issue of teen parenthood became a social concern in the late 1960s and came into crisis status in the mid 1970s (Furstenberg, 1991; Laumann, Gangon, Michael, & Michaels, 1994). In other words, the increasingly weaker link between marriage and childbirth led to awareness of social and economic issues related to teen parenting. Researchers and politicians began to focus on disadvantages of early parenthood (Vinovskis, 2003).

According to Furstenberg (1991), the number of births to teenagers increased by over 50% between 1960 and 1975. This increase was even more pronounced because the overall birthrate dropped by one-third, greatly increasing the percentage of births to teenagers from 2% to 7% of births to women of all ages. It also should be noted that the actual proportion of teenagers within the U.S. population was increasing during this time due to the baby boom. Nevertheless, service providers, hospitals, and schools were forced

to notice the trend (Furstenberg, 1991). In the 1970s and 1980s, scholars began publishing a plethora of journal articles pertaining to adolescent pregnancy and motherhood. Public social concern over teen pregnancy and parenthood increased throughout the 1980s (Harris, 1997).

The United States actually has seen declines in teenage pregnancy and parenthood since the early 1990's. Birth rates are continuing to decrease among all ethnic groups and in all states, although the rate among Hispanic females has declined less than the rate among non-Hispanic black and non-Hispanic white females (Whitman et al., 2001). It has been suggested that 20% of this drop is due to teenagers having less sex, whereas 80% is due to teenagers using contraceptives more effectively (Alan Guttmacher Institute, 1999). Other researchers argue that the decline may be due to a drop in the number of teens having a second birth and a growing economy offering plentiful opportunities to young people (Darroch & Singh, 1999; Gallup-Black & Weitzman, 2004).

Because of the negative consequences associated with teen parenthood, this decrease is considered by most Americans to be promising news. However, teen parenting continues to be an important social and political issue. In fact, President Clinton called teen pregnancies and births where there is no marriage "our most serious social problem" in his 1995 State of the Union Address. In particular, the welfare dependence of teen mothers makes this issue a concern for policymakers and politicians. The interdependence of controversial issues, such as sex education, abortion, and contraceptive access, with adolescent pregnancy also makes this a hot topic in political circles (Mauldon & Luker, 1996). The estimated $20 billion annual cost of subsidizing the care of infants born to teen mothers sparks argument (Hardy, 1988; Johnson, Lay, & Wilbrandt, 1988). Some even feel

that teen mothers are less deserving of public assistance than other persons living in poverty because they have disregarded traditional values of marriage and family (Whitehead, 1993). Other citizens criticize our welfare system for encouraging teen childbearing by offering aid to women who give birth out-of-wedlock.

Prevalence

Overall, between 750,000 and one million teenagers become pregnant every year (Blake & Bentov, 2001; Whitman et al., 2001). While approximately 35% of pregnancies end in abortion and 14% end in miscarriage or stillbirth, over half of these pregnancies end with a live birth (Jaskiewica & McAnarney, 1994; Moore, 1996). About 90% of these teens choose to raise their children rather than place them for adoption (Whitman et al., 2001).

Most of the decline in teen pregnancy has occurred among the oldest adolescents (ages 18-19). This groups accounts for more than 60% of all teen births. Unfortunately, birth statistics among the youngest adolescents (ages 10-14) appear to be remaining steady, although this group is responsible for only 3% of teen births (Elo, King, & Furstenberg, 1999). The youngest group may not account for a large proportion of births, but it can be argued that this group accounts for a large proportion of health and social problems, as well as developmental delays (Elo et al., 1999). Coleman and Dennison (1998) argue that the birth rate among younger teens should be examined more closely than the birth rate among older teens when discussing teen pregnancy, as parenthood is a completely different experience for a 14-year-old than a 19-year-old. A 14-year-old having a child really is a "kid having a kid." A 19-year-old is more likely to be responsible for her own child with less support from parents and other family.

In comparison with other industrialized countries, the United States' teen birthrate greatly exceeds that of other nations. Perhaps this is one reason for continuing societal concern about teen pregnancy despite its decreasing rates. European countries have birth rates that are far lower than that of the U.S., while Japan's rate is less than 10% of the United States' when compared by births per 1,000 females. The rates of Canada and the United Kingdom are about half of the United States' rate (Harris, 1997). The largest differential between the U.S. birthrate and the rates of other countries is between the youngest teenagers (those under 15; Jones, Forrest, & Goldman, 1986).

Ethnic Differences in Teen Pregnancy and Parenthood

Some argue that the high rate of teen pregnancy in our country is due to ethnic diversity. European-American young women do have the lowest rate among U.S. racial groups. However, this rate is still much higher than the rate for similar girls in other nations (Jones et al., 1986). The ethnic heterogeneity of the U.S. is certainly not responsible for its teen birthrate.

The incidence of teenage birth, however, often is linked to race or ethnicity. Among African-Americans, teen births account for a greater percentage of all births than among European-Americans (23% vs. 11%; U.S. Department of Health and Human Services, 1996). Much research has compared teen birthrates of African-American, Hispanic, and European-American young women. While African-Americans have the highest teen birthrates by ethnicity and European-Americans the lowest, Hispanics tend to fall in the middle (Darabi, Dryfoos, & Schwartz, 1986). Births among African-American teens are also less likely to be first births than births among European-American teens (70% vs. 82%;

Maynard, 1996), indicating that African-Americans are likely to have a second or even third birth before the end of their teen years.

It is not surprising that African-Americans are more likely to become teen parents than other ethnic groups, as evidence suggests that African-American young women experience more pressure to engage in sexual intercourse at an early age than other young women (Musick, 1993). Studies (e.g. Bingham, Miller, & Adams, 1990) suggest ethnicity accounts for a significant amount of variance in age at first intercourse, with African-American young women generally having an earlier age at first intercourse. Ethnicity also has a relationship with subsequent sexual activity and contraceptive choices (Gibson & Kempf, 1990; Hogan & Kitawaga, 1985). In addition, ethnicity may play a role in how an adolescent and her family respond to the pregnancy (Darabi, Dryfoos, & Schwartz, 1986; Musick, 1993). African-American and Hispanic adolescents are more strongly pressured to give birth and keep their children after their family discovers their pregnancy. Also, in general, they feel that their teenage motherhood is more accepted than it is for European-American young women. Williams (1991) noted that African-American young women generally are confident in their abilities as mothers and see their early childbearing as acceptable and normal.

Ethnicity is also linked to the social environment in which the young woman experiences her pregnancy and childbirth (Garcia Coll, Hoffman, & Oh, 1987) and the kind of support she has in raising her child (Burton, 1990, Garcia Coll, 1990). Henly (1997) found that African-American teen mothers, when compared to their European-American counterparts, were likely to have less access to informal financial support and more likely to experience financial insecurity. Young European-American women also were much

more likely to be living with their male partner than young African-American women. African-American teen mothers were more likely than European-American teen mothers to live with their families of origin during the pregnancy and childbirth.

Negative Outcomes

Young women who become pregnant as teenagers are at high risk medically, psychologically, socially, and financially. Teen moms and their children are at risk for poor long-term outcomes compared to older mothers (Coley & Chase-Lansdale, 1998; Maynard, 1997). Odds are against adolescent mothers even before their children are born. They may lack access to quality health resources and have higher rates of pregnancy complications, miscarriage, and stillbirths than older pregnant women (Bassuk, Weinreb, Buckner, Brown, Salomon, & Bassuck, 1996; Manlove, Mariner, & Papillo, 2000; Maynard, 1997). Research suggests that when adolescents become aware of their pregnancy they may not obtain health care until months later (Sarri & Phillips, 2004). Johnson and colleagues (1988) determined that half of pregnant teens did not receive any medical care during their first trimester. Whereas 10% received no care during their first and second trimesters, 2.4% received no care during the entire pregnancy. Lack or delay of prenatal care is, not surprisingly, a predictor of difficulties in pregnancy.

Teenage mothers and their children are certainly at higher risk for negative family outcomes than other families (Diehl, 1997; Furstenberg, 1991; Lutenbacher & Hall, 1998; Roye & Balk, 1996). Among these risks are negative interaction with infants (Culp, Appelbaum, Osofsky, & Levy, 1988), negative attitudes about parenthood (Roosa & Vaughan, 1984), and less knowledge about child development (Roosa & Vaughan, 1984). Depression is common among these women, although it is rarely treated (Sarri & Phillips,

2004). Serious sadness, worry, and confusion have been self-reported in over half of pregnant and post-partum urban teenagers (Hardy & Zabin, 1991). Interviews with teen parents indicate that their lives tend to be chaotic and full of crises (Sarri & Phillips, 2004).

There is also a relationship between early childbearing and lower educational attainment. It is not surprising that adolescent women who have children are more likely to drop out of school and earn a lower degree of education (Furstenberg, 1976; Jones, Astone, Keyl, Kim, & Alexander, 1999; Scott-Jones & Turner, 1990). Early childbearing is also an economic issue for young women and their children. Teen mothers have an increased risk of enduring extended poverty (Hoffman & Foster, 1997), and teen mothers earn about half as much money as those women who delay childbearing (Repke, 1990). Approximately 80% of all women under the age of thirty who are welfare recipients had their first child as a teenager (Repke, 1990).

Causation versus Correlation

The role of teen pregnancy as a causal factor in negative outcomes has been questioned in recent years (Hotz, McElroy, & Sanders, 1999). Of course, teen mothers are not randomly selected from the population. Obviously, it should not be assumed that teen pregnancy or parenthood is solely responsible for all of these negative consequences. It could be argued that the same factors that account for early pregnancy also account for other disadvantages, making the relationship between pregnancy and adversity a spurious one. In other words, the significant associations could suggest differences in the types of women who tend to bear children as adolescents. Poverty and socioeconomic class, in particular, could be suggested as a cause for both negative life events and teen childbearing.

Researchers have used sister comparison studies to investigate the population of teen mothers and evaluate teen motherhood as a causal factor. In this method, a young woman who first gave birth at age 19 or younger has been compared to her sister who gave birth at age 20 or older. This is useful because it tries to tease apart the effects of teen parenthood from the effects of poverty and background rather than simply relying on cross-sectional data. Studies have found that adversity is more common among those young women who become pregnant in adolescence (Chilman, 1979; Geronimus & Korenman, 1992; Hoffman, Foster, & Furstenberg, 1993; Stiffman, Powell, Earl, & Robbins, 1990).

For example, Corcoran and Kunz (1997) found that much of the relationship between future poverty and teen pregnancy was due to family characteristics such as family income when using sister data. It should be pointed out that some of the observed variation could not be accounted for by family background. Research by Hoffman and colleagues (1993) indicates that significant effects of teen childbearing on graduation rates, economic well-being, and family size are apparent after controlling for family background by using sisters' data. In general, it is agreed that controlling for family characteristics by using sisters' data does reduce the apparent causal effects of teen parenthood (Corcoran & Kunz, 1997; Geronimus & Korenman, 1992; Hoffman et al., 1993). There is some uncertainty regarding the amount of variance that may be accounted for by the actual pregnancy.

However, East and Jacobson (2000) argue that sibling comparison studies are limited for several reasons. Among these reasons are failure to recognize the effects of a teen's childbearing on her siblings and family, failure to pay attention to birth order and spacing effects, and lack of consideration of family experiences that are not shared. A teen's pregnancy is not an isolated event that only affects the pregnant teen. The pregnancy

has dramatic implications for the entire family, including a sister who delays childbearing. In fact, East (1996) suggests that there is increased conflict between a young woman and her sister(s) as a result of teen pregnancy. For this reason, it is not possible to assume that sister comparison studies are able to tease apart the effects of the pregnancy from family background characteristics. It is also not reasonable to assume that sisters are similar before the pregnancy occurs because often birth order impacts children and adolescents. Families are dynamic systems, and the constant change ensures that these sisters are not born into exactly the same family. It should also be noted that not all family experiences are shared by both sisters—again dispelling the notion that the event of a teen pregnancy changes two individuals that were very much the same.

Another obvious criticism of sister comparison studies is the lack of randomness of a teen pregnancy. As mentioned before, teen pregnancy does not occur randomly. Because certain factors (the most basic and obvious being sexual activity) predispose a young woman to pregnancy, it is unreasonable to assume a level of similarity between sisters before the event of pregnancy occurs. In addition, the effect of sisters' biological similarities has been virtually ignored in this avenue of research. Nevertheless, sisters' data (and sometimes cousin data) continues to be an interesting, if imperfect, avenue for exploration of the drawbacks of teen parenthood among researchers.

Other researchers have attempted to compare pregnant teens who gave birth to pregnant teens who miscarried (Hotz, McElroy, & Sanders, 1999; Hotz, Mullin, & Sanders, 1997). This method also tries to capture the causal relationship between early parenthood and negative outcomes. Teens who miscarried did have improved rates of high school graduation, but the two groups seemed to have similar outcomes overall. Although

innovative, this method could be criticized because miscarriage may not be a random phenomenon, although Hotz and colleagues refer to the work as a "natural experiment." Young woman who miscarry might be more likely to have used drugs or alcohol during pregnancy and had less or inadequate prenatal care. It could also be suggested that young women of lower socioeconomic status are more likely to lose a child to death before term.

Although the correlation versus causation controversy seems like an issue for research methodologists to argue, it has important political and economic implications. Are the implications of adolescent childbearing as serious as the general public perceives? If teen parenthood has few significant negative consequences, perhaps our money and energy would be better spent by simply focusing on poverty (East & Jacobson, 2000).

Interference with Developmental Tasks

Pregnancy is an important time of transition for all women who give birth. Terms such as "metamorphosis" and "transformation" may be used to describe this period. Pregnancy has even been referred to as a time of crisis where a woman must revise herself and assume a new identity. Whereas these changes are meaningful for a pregnant adult woman, these adjustments may be more traumatic for a teenager.

Early childbearing demands the attention of developmentalists. A teenage pregnancy is an overwhelming experience for a young woman who must cope with typical physiological, social, and psychological developmental challenges of adolescences along with parenting issues (Adams & Kocik, 1997; Stevenson, Maton, & Teti, 1999). Early parenthood may interfere with adolescent psychological tasks. The combination of two developmental crises, parenthood and adolescence, may result in a less than positive experience for a young woman who must resolve her own stages of role identity and at the

same time must tend to the needs of a child (Erikson, 1963; Hurlbut, Culp, Jambunathan, & Butler, 1997; Musick, 1993).

The stress of pregnancy and parenting may overwhelm a young woman and deplete her resources, leaving little energy for the development of positive role identity, stabilization of self-concept, enhancement of self-esteem, and other adolescent tasks (Erikson, 1963; McCarthy & Hoge, 1982; O'Malley &Bachman, 1983; Smith Battle & Leonard, 1998). Teen pregnancy can be viewed as an interruption of the typical life sequence, as the sequence of school, job, marriage, and childbearing may be completed out-of-order. Children of teen parents may be at greater risk than other children because their parents are not developmentally able to successfully adapt to the challenges of parenting in the face of other developmental tasks (Brooks-Gunn & Chase-Lansdale, 1995).

Identity formation in adolescence is a key idea in Erik Erikson's theory of personality development. Erikson postulated eight developmental stages (Erikson, 1963). Four of these stages were associated with childhood, one with adolescence, and three with adulthood. Each stage is represented as a crisis in development that must be resolved before a person can pass to the succeeding stage.

The first stage, which is associated with infancy, involves developing a basic trust of the world. The infant must form a trusting relationship with his/her caregiver in order to gain necessary trust of the environment around him or her. The second stage, which is associated with toddlerhood, involves developing a sense of autonomy. The child's energy is channeled toward the development of physical skills that will allow him/her to gain independence. The third stage, associated with the preschool years, involves developing a sense of initiative. The child continues to become more assertive and take on more tasks by

his/herself. The fourth stage, associated with the elementary school years, involves developing a sense of industry by learning new skills (Erikson, 1963).

In adolescence, a person must negotiate identity vs. role confusion. If a person reaches adolescence having had a successful childhood developmentally, he or she may approach adolescence feeling they reside in a secure world with a sense of autonomy, initiative, and industry. Identity formation may be more of a challenge if an adolescent is plagued by mistrust (lack of trust), shame and doubt (lack of autonomy), guilt (lack of initiative), and inferiority (lack of industry). During adolescence, a young person must consciously search for their identity. If the adolescent cannot make decisions about career, sexual orientation, and life in general, role confusion, rather than identity, may be a possibility. Erikson felt that adolescent exploration should result in a sense of individuality, a role in society, and a commitment to values. Any earlier hindrances make it less likely that identity will be realized (Erikson, 1963).

Erikson suggested that three stages were associated with adulthood. The key task of early adulthood is to develop a sense of intimacy through love relationships, whereas the key task of middle adulthood is to develop a sense of generativity by finding a way to satisfy and support the next generation. In late adulthood, Erikson posited that the key task was developing ego integrity while reflecting on and accepting one's life.

According to Erikson's psychosocial stage theory of development, a person must negotiate a stage before continuing on to the next stage (Erikson, 1963; Hurlbut et al., 1997). Erikson believed that the search for identity, and development itself, was a life long process. As adolescents struggle to achieve a positive role identity, an important life change, such as the addition of a child, can have negative effects on the conclusion of this

stage. In addition, parenting teens are quickly thrust into the adult stages, which involve sharing themselves with another while attempting to maintain their own sense of self and caring for future generations (Goldhaber, 2000; Hurlbut et al., 1997). Some teen mothers may excel in the socially accepted adult role, whereas others exhibit significant stress (Larson, 2004).

Erikson felt that resolution of each psychosocial crisis was necessary for full development to occur (Erikson, 1963). Demands of motherhood (typically present in later stages) may leave a young woman unable to explore career choices, educational opportunities, dating, and friendships that are generally present in the teenage years. Perhaps due to the interference of parenthood with typical developmental tasks, early pregnancy and parenthood may result in psychological strain, distress, and depression (Carter, Osofsky, & Hann, 1991; Corcoran, 2001; Wasserman, Brunelli, & Rauh, 1990).

Family Resources

What Are Family Resources?

Family resources are assets that can be used to accomplish family goals. They are necessary means to solving family problems and come in various forms. Resources extend beyond tangible items, such as money, cars, houses, and appliances, to include human potential, environmental qualities, talents, and personal characteristics. Without resources, people and families are unable to reach their goals (Deacon & Firebaugh, 1981; Rice & Tucker, 1986). Resources are also viewed as coping mechanisms. The more valuable resources a family has, the more able they are to deal adequately with stressors. For example, having the resource of cash makes a car malfunction less stressful for a family.

Resources typically include income, socioeconomic status, parent education, and other measures related to finance or financial potential. These types of resources are generally thought to be related to family and child outcomes and are important predictors in social science. Despite this, it has been suggested that resources not be limited to those representing financial areas in family research. Some scholars (e.g., Brody & Flor, 1997; Dunst, 2000; Dunst & Leet, 1987; Fink, 1995; Rhodes, Orme, Cox, & Buehler, 2003; Van Horn, Bellis, & Snyder, 2001) have broadened the concept of family resources by including constructs such as time, social support, and church activity. This viewpoint increases the understanding of family functioning by not focusing solely on economic resources.

According to Rice and Tucker (1986), resources can be classified into one of three categories: economic, human, and environmental. Cash and household items are examples of economic resources. These are resources that are depleted with use. A sense of humor, psychomotor skills, and job potential are examples of human resources. Human resources

must be developed and often fine-tuned, but are not depleted in the same sense as material resources. Access to community facilities and living space are examples of environmental resources (Rice & Tucker, 1986).

It has been suggested that a broader set of resources be included in studies on teen childbearing. Resources for teen mothers should be perceived as more than a checklist of class and income (Henly, 1993). The social context of the adolescent is complex, and resources should be viewed more fully.

Models of Family Stress

Rueben Hill (Hill, 1949), a social scientist for the Army, studied families during and after World War II. He attempted to assess the effect of war casualties on these military families. Although modified more recently, his ABC-X Model of Family Stress is still used in family science as a description of the processes by which families survive stress and crises throughout their life-spans. According to Hill, the interaction effect between (a) stressors, (b) family resources, and (c) perceptions of events as stressors defines a crisis for a family. "X" can be defined as the outcome, or the amount of distress manifested.

Stressors are life events affecting the family that have the potential to change the social system of the family (Hill, 1949; Lavee, McCubbin, & Olson, 1987). It is typical for scholars to classify stressors as normative and non-normative (McCubbin, Joy, Cauble, Comeau, Patterson, & Needle, 1980). Normative life events are expected and associated with role adjustments. These changes occur in most families and include events such as departure for college and transition to parenthood. In general, normative life stressors are considered short-term rather than chronic. Non-normative stressors are unexpected. They include natural disasters, serious illness and death, and loss of a job. Although a pregnancy

is considered a normative life event, a pregnancy for an adolescent is usually perceived as non-normative or "off-time," as women in our culture today generally not expected to become pregnant before finishing high school or marrying (Leadbetter & Way, 2001; Osofsky, Osofsky, & Diamond, 1988). However, it should be pointed out that early childbearing may be normative rather than "off-time" for some young women, especially minority women from an inner-city area (Cohler & Musick, 1996; Leadbetter & Way, 2001).

If stressors can be handled adequately with use of family resources, an event will not be perceived as a crisis. If an event is perceived to be a crisis by a family, individuals within the family become disorganized for a variable length of time. Families with a variety of resources will suffer fewer crises and have shorter periods of disorganization when an event is perceived as a crisis. On the other hand, families with few resources are likely to have more crises with longer periods of disorganization. They are also less likely to return to their former level of functionality after the phase of disorganization.

The McCubbin ABC-X Model (McCubbin & Patterson, 1981) extends Hill's model to address the notion that events do not occur in isolation. This model introduced the term "pile-up," indicating that stressors build upon other stressors and families are seldom dealing with only one stressor. McCubbin and Patterson (1982) describe five types of stressors and strains that contribute to pile-up: a) a stressor event and its hardships; b) normative transitions; c) prior strains; d) the consequences of family efforts to cope; and e) ambiguity. It has been argued that this model more adequately represents chronic stressors and the dynamic, constantly evolving nature of family life. For instance, a teen pregnancy should not be thought of an event that happens in isolation as it occurs in a family situation

already involving other stressors. Teen pregnancy and parenthood are also more accurately represented as on-going, chronic stressors that interact with previous strains within the family and are affected with the attempts of the family to cope with the pregnancy and parenthood.

Research has found support for Hill and McCubbin's models. High stress combined with social isolation (indicative of a lack of family resources) often result in dysfunction for families (Crnic, Greenberg, Robinson, & Ragonzin, 1984; Engeland, Breitenbucher, & Rosenberg, 1980). According to these theories, a positive perception of the situation, as well as intangible and tangible resources, reduces the likelihood that family stressors will manifest as crises.

Family resources have been viewed as a protective factor in families who are adapting to stressors and adjusting to transitions (Ievers, Brown, Lamber, Hsu, & Eckman, 1998; McCubbin & McCubbin, 1987). Resources affect the relationships between family risk factors and outcomes in children (Brody & Flor, 1997, 1998). Resources have also been viewed as a measure of success in evaluating programs and interventions (Foster, 1998; Herman & Marcenko, 1997).

Hill's and McCubbin's models are relevant to this study because self-perceived and objective resources will both be included in analyses. If perceptions of the situation are not an important key to predicting outcomes, self-perceived resources will not be a significant predictor of variance in depression when objective resources are controlled. However, it seems logical that how resources are perceived by a person has an impact on their outcome beyond how those resources can be measured objectively.

Depression

Overview

Depression is chronic and debilitating for many sufferers and has an adverse affect on one's quality of life (Judd, 1997; Papakostas et al., 2004). Known to affect more women than men, depression and depression-related disorders are expected to be the second-leading cause of disability in the world by 2020 (Brown, 2001; Cross-National Collaborative Group, 1992). Whereas all the devastating effects of depression may not be tangible, the monetary effects are tangible. It has been stated that the yearly cost of depression to society in the United States was $44 billion in 1990 (Greenberg, Stiglin, Fineklstein, & Berndt, 1993). Over half of this amount is accounted for by the price of depression in the workplace. Persons with depression have more days lost from work than persons without depression (Johnson, Weissman, & Klerman, 1992). Research by Almond and Healey (2003) suggests that depression is the most prevalent cause of absenteeism in the workplace in Great Britain.

Depression has a negative impact on psychosocial functioning. Women with depression have more difficulty in roles involving marriage, family, and work than non-depressed women (Weissman, Prusoff, & Thompson, 1978). Persons with depression or depression-related disorders also have impaired social functioning in job and leisure settings compared to other persons (De Lisio, Maremanni, Perugi, & Cassano, 1986). In addition, major depression is related to less satisfying social interactions and intimate relationships (Fredman, Weissman, Prusoff, & Bruce, 1988). Research has shown that marriages where one or both partners are depressed can be difficult to endure. It is not

surprising that depressed persons have a lower likelihood of marital stability and tend to be more likely to experience divorce (Kessler, Walters, & Forthofer, 1998).

Research has suggested that the incidence of major depression has increased greatly over the last 30 years among both men and women (Cross-National Collaborative Group, 1992). Of course, the genetic make-ups of humans have not changed substantially in the previous few decades. This indicates that environmental influences are mostly responsible for this increase. Kessler (1997) reviewed previous research and suggested that significant risk factors for depression include social isolation, personality aspects, family history, adversity in childhood, and life stresses.

Life Events as a Cause of Depression

Do life events cause depression? Researchers have debated the role of stressful life events, such a teen pregnancy, in depression (see Kessler, 1997). Depressive episodes often develop after major stressful life events (Paykel, 2001), and stressors are related to greater severity of depressive symptoms in clinical (Mahatme, Dhavale, & Patkar, 1989) and non-clinical (Bebbington, Hurry, & Tennant, 1990) samples. Several studies have provided evidence that 60% to 70% of depressed adults have experienced a severe life stress in the year before onset (Brown & Harris, 1989, 1993; Frank, Anderson, Reynodl, Ritenour, & Kupfer, 1994). The same relationship may be present for younger people who are depressed as well. Cross-sectional studies examining children and adolescents demonstrate a significant association between stressful life events and depression (Garber & Hilsman, 1992; Williamson, Birmaher, Anderson, Al-Shabbout, & Ryan, 1995). Events such as death of a loved one, divorce, and exposure to suicide have been associated with depression in children and adolescents (Brent, Perper, Moritz, & Allman, 1993; Reinherz, Giaconia,

Pakis, Silverman, Frost, & Lefkowitz, 1993; Weller, Weller, Fristad, & Bowes, 1991). Kessler (1997) argues that there is a "dose-response" relationship between stressful events and depression. In other words, severe events share a closer association with depression than less severe events.

Kessler (1997) points out that stressful life events are prevalent in studies examining the association between life events and depression. This is an important point to consider, as only a small portion of those who have experienced major stressful events actually encounter depression. Obviously, stressful life events are only one factor to consider when predicting who will become depressed. However, it should be noted that the majority of depressed people do report events such as these shortly before onset.

Causal relationships are difficult to determine in research in this area. Studies examining the link between stressful life events and depression often do not consider that depression can bias a person's ability to accurately report events (Kessler, 1997). It is possible that depression is causing stressful events that are being reported as precursors to depression. Also, persons who have experienced depression have more stressful events than other persons even when they are not depressed (Kessler & Magee, 1993). For reasons such as these, scholars find it challenging to prove that the association between stressful events and depression is a one-way causal relationship.

Researchers (e.g., Williamson et al., 1995) have also distinguished between "dependent" and "independent" stressful events. A dependent event is defined as an event that could be due to one's own actions, whereas an independent event is an event that is no fault of the subject. For instance, an example of a dependent event would be being fired from a job. An independent event would be losing a job due to budget cuts. When

distinguishing between the two types of events, independent events were significantly associated with depression (Brown & Harris, 1978). This finding means that stressful events that are not the result of one's own action are linked to depression. It could be argued that this is evidence that life events do cause depression, as depression seems likely to cause dependent stressful events but not independent stressful events. However, it should be pointed out that retrospective reports in studies on dependent and independent events may be biased. Being depressed can lead to an increase in a person's reports of past stressful events (Cohen, Towbes, & Flocco, 1988). Depression may also bias a person's report of whether an event was dependent or independent, and it may affect a person's willingness to report certain events.

Rather than focusing on individual stressful events (e.g., widowhood, job loss), recently research has begun to focus on chronic stress (e.g., marital difficulties, work stress). Studies have suggested that chronic stressors are mediators in the relationship between life events and depression (see Kessler, 1997). The effects of life events on depression actually may be accounted for mostly by chronic stress rather than a single, individual event. For example, research by Umberson and colleagues (1992) suggests the death of a spouse affects a person's level of depression primarily through the social isolation that follows the death (a chronic stress).

It has been established that teen motherhood is linked to depression (Field et al., 1988). Does teen motherhood cause depression? Because of the reasons discussed above, it is difficult to say for certain. It should be noted that depression could play a role in a young woman becoming pregnant as well. However, adolescent motherhood presents a chronic,

on-going stress, which may be more responsible for depression than a single event, such as becoming pregnant (Kessler, 1997).

Maternal Depression

According to previous research, depression clearly has an enormous impact on women (see Kessler, 2003). Whereas some argue that the gap is narrowing in recent years (e.g., Weismann et al., 1993), many studies have revealed that depression is about twice as common among women compared to men (see Nolen-Hoeksema, 1987). Sex-role theories emphasize the differences in men's and women's environments and posit that stress associated with traditional female roles is responsible for the gender difference in depression (Mirowsky & Ross, 1989). These scholars claim that women are more depressed than men because women have decreased levels of satisfaction and increased levels of stress compared to their male counterparts. On the other hand, rumination theory suggests that women are more likely than men to allow sadness to grow into major depression because women tend to dwell on problems (Nolen-Hoeksema, 1990). In other words, women have difficulty "letting things go."

Scholars (e.g. Hammen, 2001) have suggested that there should be a great deal of concern particularly about young women regarding depressive symptoms. Often this group develops depressive disorders as they begin marital relationships and childbearing. As young women emerge into late adolescence and early adulthood, their environments may be challenging and stress-inducing. The beginnings of family life are often difficult, even in the best of circumstances.

Depressive symptoms may interfere with the role of mothering by affecting mother-infant interaction (Murray, 1992; Radke-Yarrow, Cummings, Kuczynski, & Chapman,

1985). Most depressed mothers, according to Hammen (2001) attempt to be good mothers but do not function well in this role due to symptoms of depression, such as hopelessness and fatigue. They are simply overtaken by stress, particularly if they have little support from a partner, family, or friends.

Depression and Teen Motherhood

Depression is a major issue for teen mothers, as a large number of adolescent are depressed, and pregnancy excacerbates depression symptoms (Colletta, 1983). About 45-60% report depressive symptoms (Colletta, 1983; Deal & Holt, 1998; Reis, 1988), compared to 13% in older mothers (O'Hara & Swain, 1996). It also may be useful to separate adolescent mothers into categories of older and younger when exploring depressive symptoms. Reis (1988) found that a greater percentage (67%) of younger teen mothers (16 and younger) than older teen mothers (17-19) were depressed. The stress of early parenthood, along with poverty, lack of education, and inadequate social support, may place an adolescent at added risk for depression or other psychological dysfunction.

Postpartum depression tends to occur disproportionately in adolescent mothers when mothers of all ages are random recruited (Field et al., 1988). Adolescent mothers ages 15 to 17 are more than twice as likely to be depressed as mothers ages 25 to 34 (Deal & Holt, 1998). Some researchers (e.g., Kalil & Kunz, 2002) argue that higher levels of depression may be present in teen mothers because most are unmarried and more live in poverty as compared to older mothers. However, research by Holt and Deal (1998) indicates that the difference in depression symptomology remained significant when comparing young African-American mothers (age 15-17) and European-American mothers (ages 18-19) to older mothers after controlling for family income and marital status.

Colletta (1983) found that adolescent mothers who are unmarried, younger, and less educated were more likely than other teen mothers to be depressed. In this sample, socioeconomic status and race were not associated with depression. In general, teenage mothers were more vulnerable to depression when they experienced high levels of stress as a result of relationship problems, family issues, financial hardship, or medical illness. Higher levels of depression were related to lower levels of emotional support and financial assistance. Other research (Promodoris, Abrams, Field, & Scafidi, 1994) has found that depression among teen mothers is negatively linked to family cohesion.

A small pilot study ($N = 21$) conducted by Hudson, Elek, and Campbell-Grossman (2000) suggests there is a negative relationship between social support and depression among teen mothers. In addition, loneliness was positively correlated with depression. Hudson and colleagues posit that lack of social support and loneliness may be common in adolescent mothers as they may have few resources left for other relationships after the demands of motherhood.

However, Wiemann and colleagues (1996) found lower rates of depression and anxiety in pregnant teenagers than did past studies (e.g., Steer, Scholl, & Beck, 1990, 1991). The authors argue that the psychological distress experienced by teen mothers may be declining due to more relaxed societal norms. Young women who feel supported, particularly those who attend a prenatal clinic designed for teen mothers, may not feel stigmatized.

However, this study did suggest that unmarried teens had a higher level of depression than did married teens. In addition, pregnant young women who had a turbulent relationship or no current relationship with the father of their baby were more likely to

exhibit symptoms of psychopathology. Other risk factors included previous history of physical or sexual assault and already having young children.

In another study (Prodromidis, 1994), lack of social skills, poor physical health, lack of supportive relations with family and peers, and low level employment status were associated with depression among teen moms. Other research (Turner, Sorenson, & Turner, 2000) suggests that resources such as mastery and social support may shield young mothers from depression. Adolescent mothers who have higher levels of social and personal resources tend to be less likely to experience depressive symptoms.

Depression is a predictor of negative outcomes in adolescent mothers. In particular, depression is associated with a rapid repeat pregnancy (Gillmore, Lewis, Lohr, Spencer, & White, 1997) and poor academic performance (Dryfoos, 1990). Young mothers who are depressed are also less successful economically (Danzinger et al., 2000).

Although depression among adolescent mothers has been the focus of many studies, some teen mothers have positive views of motherhood, optimistic feelings about their futures, and a belief that their life has been affected by mothering in an overwhelmingly positive way (Arenson, 1994; Smith Battle, 1995; Smith Battle & Leonard, 1998). Some young mothers may make dramatic positive changes in their behaviors and lifestyle with the birth of their child. Research (e.g., Spear, 2001) has suggested that many pregnant teenagers express confidence in their abilities to parent and still achieve educational and occupational goals.

Urban and Non-Urban Environments

Defining Urban and Non-Urban

Defining urban and rural, or non-urban, has been a challenge (Rourke, 1997). It has been argued that no definition of rural and urban is satisfactory for all purposes (Stamm, Metrick, Kenkel, Davenport, Davenport, & Hudnall, 2003), and the only feature all the definitions have in common is that rural areas have lower population densities than do urban areas (Cordes, 1990). Although the 55 million people who live in rural areas represent an increase in number over time, it is a decrease in proportion of the population. In other words, rural areas have grown, but not as quickly as urban areas.

There are two definitions of rural that are commonly used by the federal government: The Office of Management and Budget's (OMB) Metropolitan-Nonmetropolitan classification system and the Bureau of the Census Urban-Rural classification system (Ricketts, Johnson-Webb, & Taylor, 1998). These methods often are used to distinguish rural and urban in order to apply federal policies and compile national statistics.

Definitions of metropolitan areas were first standardized by the Bureau of the Budget, a predecessor of OMB, in 1949. Originally, these areas were called "standard metropolitan statistical areas." In 1990, this term was changed to the current "metropolitan statistical areas." Requirements for classification of metropolitan area were redefined in 1958, 1971, 1975, 1980, 1990, and 1993. The OMB method currently states that each metropolitan area must include one or both of the following: 1) a city with 50,000 or more residents or 2) a Census-defined urbanized area (containing at least 50,000 people) and a total metropolitan population of at least 100,000 residents (75,000 in New England).

Although most changes in designations of metropolitan areas have occurred after decennial censes, updates can take place at any time (Ricketts et al., 1998). The OMB definitions have been used for such purposes as classifying rural and urban hospitals for reimbursement from Medicare.

The term "rural" was first defined by the Bureau of the Census in 1874. At the time, "rural" classification was given to the population that lived outside towns of 8,000 or more. The 8,000 resident limit was lowered to 2,500 in 1910. The Bureau of the Census currently defines urban as all territory, population, and housing in urbanized areas and in places of 2,500 or more people outside urbanized areas. An urbanized area (UA) is a continuously built-up area with a population of more than 50,000 and generally has a population density of at least 1,000 people per square mile. If an area is not classified as urban, it is classified as rural. This means that a rural place is a Census Designated Place or an incorporated place with fewer than 2,500 residents that is not located within a UA. The Census definition of rural and urban are dichotomous—either a place is entirely urban or entirely rural (Ricketts et al., 1998). The exception to this is an extended city. An extended city is defined as an unincorporated area that has large portions of sparse population. For these areas, separate urban and rural counts are provided by the Census.

Ricketts and colleagues (1998) suggest that having two national definitions of rurality can be confusing. The OMB and Census definitions do not overlap completely. The OMB's metropolitan areas contain 14% rural and 86% urban populations, for example, and non-metropolitan areas contain 62% rural and 37% urban populations. The OMB system has been criticized for including significant rural areas in its metropolitan counties,

particularly in the Western United States. On the other hand, the Census definition of urban often includes people living in towns with 10,000 residents or less.

A variant of the federal systems of classification is the Rural-Urban Continuum Code (RUCC) system, sometimes called the Beale codes in recognition of Calvin Beale, who contributed to their creation (Ricketts et al., 1998; see also Butler & Beale, 1993). The RUCCs were developed in 1975 and updated in 1983. They also underwent a less significant revision in 1988. The RUCCs classify all counties into one of nine categories. There are three levels for metropolitan counties, and six levels for non-metropolitan counties. The non-metropolitan counties are categorized by the number of residents living in towns of greater than 2,500 residents and also by proximity to a metropolitan area. An advantage of RUCCs is that they allow areas to be broken down into more distinct categories rather than simply metropolitan and non-metropolitan. A zip code approximation of RUCCs has been developed because the smallest geographic data for many datasets is the zip code. The following are the RUCCs:

METROPOLITAN (N = 1,089)

1 counties in metro areas of 1 million population or more

2 counties in metro areas of 250,000 to 1 million population

3 counties in metro areas of fewer than 250,000 population

NON-METROPOLITAN (N = 2,052)

4 urban population of 20,000 or more, adjacent to a metro area

5 urban population of 20,000 or more, not adjacent to a metro area

6 urban population of 2,500 to 19,999, adjacent to a metro area

7 urban population of 2,500 to 19,000, not adjacent to a metro area

8 completely rural or less than 2,500 urban population, adjacent to a metro area

9 completely rural or less than 2,500 urban population, not adjacent to a metro area

It should be noted that metro areas with one million or more residents were previously divided into central counties (0) and fringe counties (1). In 2000, only 1.6 percent of the residents in large metro areas were living in fringe counties. Recently, this distinction has been dropped, and central counties and fringe counties have been combined and coded 1. Code 1 now represents all counties in metro areas of one million people or more. In addition, the non-metro areas are sometimes classified into "urbanized" (codes 4 and 5), "less urbanized" (codes 6 and 7), and "thinly populated" (codes 8 and 9; Ricketts et al., 1998).

Urban and Non-Urban Differences

In spite of arguments of the exact definition of rural, the term is characterized in the literature by several themes (Bushy, 1994; Human & Wasem, 1991; Stamm et al., 2003; Yawn, Bushy, & Yawn, 1994). Residents of rural areas are general assumed to have lower levels of formal education and higher levels of unemployment. Rural people are perceived to be more conservative, more socially isolated, more racially homogeneous, older, poorer, and less healthy. Crime is perceived as non-existent in rural settings, as residents may not lock their homes and doors. Health care falls short of adequacy, as there is decreased access to medical technology and it is often difficult to obtain treatment for mental disorders and

substance abuse. Young people in rural settings migrate to cities seeking education and work.

On the other hand, urban settings conjure pictures of fast-paced, impersonal interactions. Cities are noisy places where people cannot relax or let down their guard even for a moment. People are wary of crime in large cities and tend to dismiss thoughts that city dwellers value a sense of community. Metropolitan areas also evoke images of poverty-stricken ghettos and "projects" plagued with drugs and drive-by shootings. Within the ghetto, gang members dictate the culture, forcing families to stay inside with bars on their doors.

Despite the picturesque image of rural America that some may have, non-urban families are impacted by stressors that have a large negative impact on adolescent functioning (Kenkel, 1986; Atkins & Krantz, 1993). It has been suggested that this stress, attributed to factors such as loneliness, isolation, economic instability, and barriers to healthcare, has as much impact on non-urban teens as crowding and violence have on urban teens (Elgar, Arlett, & Groves, 2003). Economic problems in the rural Midwest have had a negative impact on the mental health of adolescents (Hoyt, Conger, Gaffney Valde, & Weihs, 1997), and non-urban teens have been shown to have higher levels of loneliness and smaller peer groups than urban teens (O'Grady, 1996; Woodward, 1990; Woodward & Frank, 1988). Perhaps because of the small available pool of peers, non-urban teens are more likely to be stressed by interpersonal conflict than urban teens (Laursen & Collins, 1994). Urban teens may be able to find new peer groups when they have conflicts with friends, whereas non-urban teens are limited in their choice of peers.

It has been suggested that some resources may be sparse in non-urban settings. In general, non-urban persons have fewer job opportunities, lower education levels, and limited public transportation (Arnold, Seekins, & Nelson, 1997). Although a lack of resources increases the need for mental health services, non-urban residents are unlikely to have access to mental health services and unlikely to use these services when available (Bushy & Carty, 1994). Residents claim that these services are not accessed because of large geographic distances, lack of providers, and cost.

Bushy and Carty (1994) also suggest that the attitude of self-reliance in rural areas prohibits many from seeking psychiatric services when needed. Families that live in non-urban settings tend to keep problems within the family to maintain their reputation and avoid embarrassment. Problems such as alcoholism and sexual abuse are seldom brought to the attention of experts. Bushy and Carty (1994) point out that, perhaps because of the attitude of self-reliance, it is usually not a rural priority to seek grants that provide funding for mental health and support services. It seems as if seeking psychiatric services such as counseling is something many rural residents view as shameful. Rural norms suggest that problems should be dealt with by the family with informal support from friends and neighbors.

Results of a study (Elliot & Larson, 2004) conducted with a non-urban sample suggest that non-urban teens forgo healthcare more than urban teens. About 40% had a physical or mental healthcare issue left untreated. Reasons for not seeking healthcare included anxiety, lack of access, self-reliance, and non-supportive parents. More specifically, teens claimed they couldn't afford healthcare or find transportation. Often, they stated that they didn't know where to seek help or were afraid that someone might see

them. Frequently they had a health concern that they didn't want their parents to know about (e.g., contraception, pregnancy, sexually transmitted diseases), and were scared that their parents would find out "through the grapevine" if they went to see a doctor. This need for privacy reflects the developmental task in adolescence of attaining more independence, and a rural setting may not be the optimal place to protect that privacy.

Drug use is a variable often studied in rural and urban settings. Edwards (1994) reported lower rates of most types of drug use in isolated, rural communities compared to more urban areas. Kowalski and Duffield (1990) suggest that many rural communities are homogenous and there are few conflicts of values in these areas. These homogenous attitudes encourage conformity of behavior and create negative attitudes toward what is deemed "deviant." If someone in a rural area breaks a social norm (such as using an illegal drug), often they are punished with a negative label or social ostracizing. People in a large city may either not know about the "deviance" or be more forgiving. It would follow that if someone in a non-urban area would break a social norm by becoming pregnant as a teenager, they may experience more negative feedback than someone in a more urban area.

"Density of acquaintanceship" may also be a factor that distinguishes urban and rural settings (Freudenberg & Jones, 1986). "Density of acquaintanceship" refers to the proportion of face-to-face interactions between individuals within a community. The anonymity of a person is decreased in a small town because "everyone knows everyone." For instance, an adolescent might be unlikely to buy condoms at a local store because she knows the clerk, or the clerk knows her mother. The same may be true for a young woman considering an abortion. If the services are available in her area, she may be worried about others finding out about her situation. Research by Elliot and Larsen (2004) suggests that

teens indicate "density of acquaintance" factors when relating reasons for not seeking healthcare.

Adolescent Pregnancy and Parenthood in Urban and Non-Urban Environments

Many people have an image of teen pregnancy as an urban rather than non-urban phenomena. However, about 25% of all youth live in rural areas. Rural areas tend to lack medical services, be plagued with poverty, and be socially isolated. All of these risk factors are key in early childbearing. In fact, rural youth are more likely than urban youth to be living in poverty, although urban youth are more likely receive public assistance.

Researchers (Bennett et al., 1997) have compared rural teenagers and urban teenagers in Southeastern states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee) using 1990 census data. This study used the rural-urban continuum code developed by Butler and Beale (1993). According to this definition, about 13% of residents in this region live in rural settings, and the rural areas have a higher proportion of teenagers than the urban settings.

According to Bennett and colleagues, 7% of births in this Southeastern region were to 15- to 17-year-olds. In rural areas, 9% of all births were to young women age 15 to 17, whereas the rate was 6% in urban areas. Birthrates were also higher among rural 18- to 19-year-olds than their urban counterparts. Pregnancy rates among African-American 15- to 17-year-olds were higher in urban settings (106 per 1,000) than rural settings (87 per 1,000). However, the pregnancy rate of European-American women aged 15-17 was similar across rural and urban areas (about 46 per 1,000). The likelihood that a young woman has had a prior pregnancy is greater in urban than rural settings.

Results using birthrates and pregnancy rates should be distinguished, as there is evidence to suggest that urban and rural adolescents may differ in their likelihood of obtaining an abortion. When controlling for age and race, abortion rates were much higher for urban teenagers (20 per 1,000 women) when compared to rural teenagers (9 per 1,000). However, this part of the study did not include data from Florida, Kentucky, or Alabama. It is also suggested that states who did report abortions did not do so consistently. Authors suggest that the major difference between rural and urban areas is the likelihood of obtaining an abortion rather than the likelihood of conceiving, as access to health services may be more limited in rural areas.

Justification for Hierarchical Linear Modeling

Many issues in social science concern the relationship between individuals and society. People interact with their surroundings; they are influenced by groups with which they are involved, and in turn they impact those groups. Individuals and social groups make up a natural hierarchy of many levels. In research, it is important to recognize that human beings do not exist in isolation; they are in constant interaction with their environments.

Individual factors are important in determining the outcomes of teen mothers. However, studies have failed to explore the impact of "higher-level" variables in teen pregnancy outcomes. "Higher-level" variables may include peer groups, communities, neighborhoods, and schools in which participants are nested. It is reasonable to question the experiences of two parenting adolescents in two different communities. While they may have much in common, their experiences may be dissimilar because of their environment. The same may be true for two parenting adolescents who attend different schools, even if they are located in the same community. It cannot be denied that part of the variance in the outcome of teen mothers is due to the structures in which the mothers are nested, such as schools and communities. However, because of limits in previous studies, the amount of variance accounted for by these "higher-level" variables is debatable.

Many studies in social science have failed to acknowledge the hierarchies or clusters that exist within data. Individuals may be grouped into categories (such as highly selective colleges) based on their existing individual differences. Other groupings may be present for more random reasons. However, once these individuals are grouped, they become more similar to other members of their group and more distinct from members of other groups because they share similar environments and experiences. It seems logical to expect higher

average correlations on outcome variables among members of the same group rather than members of different groups.

Because most analytic techniques state independence of observations as a primary assumption, nested or hierarchical data create a problem. Individuals belonging to a certain group, whether it be a classroom, school, community, or even nation, are likely to be less heterogeneous than individuals sampled from a broader population. This homogeneity violates the assumption of independence, as ordinary least squares regression will create standard errors that are too small. This will result in a higher probability of rejecting the null hypothesis than if more appropriate statistical methods were used or the data included individuals that were completely independent of each other (Osborne, 2000).

A common solution to hierarchical data issues involves moving variables to a different level by aggregation or disaggregation. Aggregation involves moving variables from a lower level to a higher level. An example of aggregation would be computing a school mean for intelligence scores from individual intelligence scores of students. In this example, a large proportion of the variation is discarded before the analysis is even begun, as within-group variance is not recognized. Disaggregation involves moving variables from a higher level to a lower level. An example would be assigning all students at a certain school a variable reflecting their school's socioeconomic status and completing analyses at the individual level. This is a problem because the socioeconomic status variable would not accurately represent the student's socioeconomic status in all cases, and of course the assumption of independence is violated (Bryk & Raudenbush, 1992).

For these reasons, hierarchical linear modeling (HLM) will be used for analysis in this study. HLM allows researchers to account for variance at individual and community

levels without violating the assumptions of regression. The idea behind HLM is that each individual is nested within a group, and groups may have unique slopes and intercepts from other groups. HLM produces correct p values at all levels and makes it possible to simultaneous model data from different levels.

Previous research has suggested that HLM is a valuable tool for determining the effects of communities on individuals, as individuals develop within a set of nested social contexts (Bronfenbrenner, 1986). The implications of community and neighborhood conditions are areas of research that had a recent resurgence of interest (Coulton et al., 1996), and yet the ecological perspective is not new in child development theory and research (Belsky, 1980; Bronfenbrenner, 1986; Bronfenbrenner, Moen, & Garbarino, 1984; Garbarino, 1997). Theorists have suggested contextual effects for general development and development of psychopathological symptoms (Bronfenbrenner, 1986; Jessor, 1992, 1993). Jessor (1992, 1993) posits that several contexts are important to adolescent development, including neighborhood, school, peer group, and family. These contexts have both risk and protective factors within them.

Studies have demonstrated that community conditions are a predictor of outcomes in adolescents. For example, community level effects have been found for cognitive problems (Brooks-Gunn, Duncan, Klebanov, & Sealana, 1993), behavioral problems (Hoffman, 2000), anxiety (Aneshensel & Sucoff, 1996), and depressive symptoms (Aneshensel & Sucoff, 1996; Wickrama & Bryant, 2003) in adolescent samples. Teenage sexual activity has been associated with neighborhood poverty and the accompanying social isolation (Brooks-Gunn et al., 1993).

Hypotheses and Research Questions

This study will address several hypotheses:

1. Objective measures of resources will predict depression when controlling for self-perceived resources. Teen mothers with fewer objective resources will have more symptoms of depression than teen mothers with more objective resources.
2. Self-perceived resources will predict depression when controlling for objective measures of resources. Teen mothers with fewer self-perceived resources will have more symptoms depression than teen mothers with more self-perceived resources.
3. Setting will predict depression among teen mothers. Non-urban teens will have more depressive symptoms than urban teens.
4. Age will be related to depression among teen mothers after controlling for resources and environment, with younger teens exhibiting more depressive symptoms than older teens.
5. Ethnicity will be related to depression among teen mothers. While controlling environment (urban vs. non-urban), African-American teen mothers will be less depressed than European-American teen mothers.

In addition, cross-level interactions will be investigated using a multilevel modeling method. These cross-level interactions will include urban/non-urban*self-perceived resources, urban/non-urban*education, urban/non-urban*income, and urban/non-urban*age. The addition of these moderators will determine if the relationships between the predictor and outcome variables differ in urban and non-urban settings. Perhaps, for instance, education is associated with decreased depression for teen mothers in urban, but not non-urban, environments. The effect of age may also be moderated by urban/non-urban

environment. Younger teen mothers in non-urban settings may be more depressed than older teen mothers in non-urban settings, whereas the same relationship may not be present for urban teen mothers.

Method

National Early Head Start Research and Evaluation Project

This study uses data collected as part of the National Early Head Start Research and Evaluation Project. It is a cross-site national study, with a main objective to investigate and assess the impacts of Early Head Start (EHS) on family and child outcomes. The study was conducted by Mathematica Policy Research, Inc. and Columbia University's Center for Children and Families and Teachers College, in collaboration with the Early Head Start Research Consortium. Funding came from the Administration on Children, Youth, and Families (ACYF). The research goals of the overall study were to "(1) understand the extent to which the Early Head Start intervention can be effective for infants and toddlers and their low-income families, and (2) understand what kinds of programs and services can be effective for children and families with different characteristics living in varying circumstances and served by varying approaches" (Administration on Children, Youth, and Families, 2002, pp. 16-17).

The data come from 17 sites around the country where Early Head Start programs started in 1995. Applicants for the Early Head Start Research and Evaluation Project, recruited between July 1996 and September 1998, were families who applied for Early Head Start services and then were screened to decide if they qualified for the program. Each site was allowed to determine its own criteria with income (using the federal poverty guidelines) as one factor in determining eligibility. A family's unique needs were also taken into account, as Head Start guidelines allow children who do not meet low-income criteria to participate if they may be benefited by the program. Some sites used a weighting or point

system to determine eligibility. A total of 3,001 families were originally selected for the study (Administration on Children, Youth, and Families, 2002).

Research sites were required to recruit twice as many families as would be included in the program. It should be noted that some sites placed an emphasis on recruiting certain groups, such as teenage mothers. Once families were selected as eligible for EHS, they were randomly assigned to either the program or control group. Control group families could not receive Early Head Start services until their child was three years of age, when the child would be old enough for a Head Start program. There were 1,513 families assigned to the program group and 1,488 to the control group. Basic characteristics of the two groups, such as income, age and education of the mother, and ethnicity, did not differ (Administration on Children, Youth, and Families, 2002).

The national evaluation was designed to examine outcome variables of the Early Head Start program. The three outcome variables were service use; child development and parenting; and family development. Parents and children were assessed at enrollment in the study, and again at 6, 15, and 26 months after enrollment. Birthday-related assessments were conducted at 14, 24, and 36 months after birth. Response rates overall were similar between the program and control group. These rates ranged from 72.2% to 81.6% for the assessments from which this data came. The primary reasons for non-response were inability to locate the families and refusals to participate. Families received a small stipend for their participation in each part of the study, such as a $10-$20 gift certificate to a local store (Administration on Children, Youth, and Families, 2002).

Participants

Only teen mothers from the original EHS dataset were included in this study. Initially, 633 teenage mothers were enrolled in the study. Those participants who had complete (75% or more) data on both the family resource and depression measures (n = 523; 83%) did not differ statistically in age, ethnicity, income, education, and receipt of public housing, WIC, AFDC, and food stamps from those did not have complete data. Zip codes were available for all participants and all zip codes were identified on the RUCC scale from one to nine. Therefore, all of the participants contributed to the group mean of their site. The maximum number of participants per site was 88, whereas the minimum was 9. The numbers of participants at other sites were 14, 17, 18, 19, 25, 27, 27, 27, 29, 31, 33, 37, 38, 39, and 45.

The mean age of these teen mothers at enrollment was 17.3 years (*mode = 17; min* = 13; SD = 1.64). Age of the father was available for 183 of the cases. In these cases, the mean age of the father was 20.43 (*mode = 20; min* = 14; *max* = 41; SD = 3.41). Nearly half (47.7%) of participants classified themselves as African-American, whereas 27.5% identified themselves as European-American and 14.7% identified themselves as Mexican/Chicano. Other ethnicities represented included Puerto Rican (n = 11), Central American (n = 5), and other Hispanic (n = 5). The categories of Samoan, American Indian, Asian Indian, and Filipino contained less than four participants each. Almost 90% indicated that English was their primary language. Over 75% of the teen mothers were single at the time of enrollment, whereas 9.5% were married and 11.5% were cohabitating. The remainder were divorced or separated. These data were not available for 1.6% of the sample. Out of the 633 teen mothers, 320 reported they were attending high school at the

beginning of the study, whereas 25 were in middle school. It can be assumed that the remainder had graduated or dropped out. About 1/3 (n = 206) were enrolled in a teen parent program, and 42 had been pregnant in the past.

Measures

Demographics. At the start of the study, demographic data were collected for each family. These data included age of mother and father (when available), education of mother, health status of mother and child, income, ethnicity, proficiency of the English language, and living situation.

Environment. The Rural-Urban Continuum Code (Ricketts et al., 1998; see also Butler & Beale, 1993) was used to classify each teen mother's home address at the start of the study. The RUCCs classify all counties into one of nine categories. After classifying each teen mother's home address, each site was assigned a RUCC by averaging all of the RUCCs of the teen mothers served by the site. This was done to avoid categorizing a site based on its location rather than the population it serves. The RUCCs were used as a continuous (from 1 to 9) rather than dichotomous variable for HLM analysis.

Resources.

Self-Perceived Resources. The Family Resource Scale (FRS; Dunst & Leet, 1987) was used as an assessment of the teen mother's perception of available resources across a range of areas approximately six months after initial assessment. The measure consists of 30 items and uses a 5-point Likert-type response format. Responses range from *not at all adequate* to *almost always adequate.* A response of *does not apply* is also permissible. Cronbach's alpha in the present study for the FRS was .82.

Objective Resources. At the time the FRS measured self-perceived resources, objective resources were measured by gross family income and education level of the mother. Each teen mother was asked her gross family income. Participants were able to define their own family based on the following working definition: "A family is composed of: 1) a pregnant woman or 2) 2 or more people who a) reside together in the same household; and b) are related either by blood, marriage, adoption, or commitment. A child's biological or adoptive parent or other focal adult who resides outside of the household may also be included." Because the teen mother may have defined her family differently than it was defined by the site for eligibility purposes, the income specified here may have not been the same income that qualified the family for Early Head Start.

Options for education level included no school completed, less than 4th grade, 5th through 8th grade, 9th grade, 10th grade, 11th grade, 12th grade (no diploma), graduated high school, some college, associate degree, bachelor's degree, master's degree, and doctorate degree. In this sample, the highest level of education obtained by a participant was "some college."

Depression. The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), a self-report measure designed for the general population, was used to assess depressive symptoms in mothers approximately 14 and 36 months after the birth of their child. The 20-item long-form used at 14 months. Depression at 36 months was assessed using a short-form of 12 items. Respondents indicate how many times per week they experienced each item, using a scale ranging from *rare or none of the time* to *most or all of the time.* The internal consistency for the 20-item measure has been shown to be .85 for the general population (Radloff, 1977). Because the CES-D is a state rather than trait

measure, test-retest reliabilities are moderate, ranging from .32 to .54 across a range of 3 to 12 months for the 20 item measure (Radloff, 1977). The possible range on the long-form is 0 to 60, while the possible range on the short-form is 0 to 36. Higher scores indicate more depressive symptomology. For the long form, a score of 16 or greater indicates that a person is possibly depressed, and a score of 23 or greater indicates that a person is probably depressed. No empirical standards have been established for the 12-item short-form. In this study, Cronbach's alpha for the long form was .85, while Cronbach's alpha was .80 for the short form.

Plan of Analysis

Time lapse between measures. Because the FRS was completed six months after initial assessment and the CES-D was conducted approximately 14 months after birth, it was necessary to determine the length of time between the completion of the two measures for each family. It should also be noted that enrollment in the study and the initial assessment could have been before or after the birth of the child. Because most of the initial assessments were conducted after the birth of the child, it was expected that the two assessment points would be closer together than eight months. The mean lapse in time between the FRS and CES-D was 6.03 months ($SD = 4.45$). Out of the 633 families, 44 actually completed the FRS after completing the 14-month CES-D. There were no significant differences between the group that completed the FRS first and the group that completed the CES-D first in the areas of gross family income, age, education, depression at 14-months, and depression at 36-months. Because of the large range of time lapses, time lapse between the FRS and the CES-D at 14 months was used as a covariate in the study. It may be the case that resources are a better predictor for depression when the time lapse is

shorter. For analyses involving the CES-D at 36 months, the time lapse between the FRS and 36 month assessment of depression was used as a covariate. This time lapse from ranged from 20.43 months to 41.60 months (*mean* = 31.10; *SD* = 4.23).

Results

Descriptive Statistics/Preliminary Analysis

Descriptive statistics for income, self-perceived resources, 14-month depression, and 36-month depression are displayed in Table 1. Frequencies were run for both depression variables. Possible scores for depression at 14 months ranged from 0 to 60. For this sample, the minimum was 0, and the maximum was 56. Approximately 18% of participants scored at 23 or over, indicating probable depression, whereas 27% of participants scored at 16 or over, indicating possible depression. Skewness (1.05) and kurtosis (1.11) were both less than 2. For depression at 36 months, possible scores were 0 to 36, and actual scores ranged from 0 to 32. No standards for depression have been established for this measure. Skewness was 1.11 and kurtosis was 1.40.

Frequencies were also run for education level. Sixty-two participants indicated that their highest level of education completed was 5^{th}-8^{th} grade. One-hundred-eight indicated that they had completed 9^{th} grade, and 108 also indicated that they had completed 10^{th} grade. Eleventh grade was the highest level of education for 117 teen mothers. One-hundred-eight had been through 12^{th} grade, although not all of these reported that they had received a high school diploma. Twenty participants had some schooling beyond high school.

It also should be noted that the EHS program and comparison groups were compared on key variables in this study. Program and comparison groups did not show significant differences on depression at 14 months [F (1, 521) = .09, p = .76], depression at 36 months [F (1, 521) = .26, p = .61], self-perceived resources [F (1, 521) = 1.30, p = .25], education [F (1, 521), = .14, p = .71], or income [F (1, 521) = .04, p = .84].

Zero-Order Correlations

Zero-order correlations for education, income, age, self-perceived resources, 14-month depression, 36-month depression, and family RUCC are displayed in Table 2. Depression at 14 and depression at 36 months were positively related. Both depression measures were also negatively related to self-perceived resources, indicating that teen mothers who felt their resources were more adequate were less depressed at 14 and 36 months than teen mothers who felt their resources were less adequate.

Depression at 14 months, but not at 36 months, was related to education, with less-educated teen mothers being more depressed than more-educated teen mothers. Obviously, education level was positively related to age for teen mothers. Older teen mothers were likely to have completed more of their education than younger teen mothers. As indicated by a positive correlation for self-perceived resources and education, teen moms who had completed more education were likely to indicate that their resources were more adequate than teen moms who had completed less of their education.

The RUCC (family, not site) showed a significant positive relationship with age of the teen mother. Teens who were younger at the time they become mothers were more likely from urban settings than rural settings. The RUCC was also related to self-perceived resources. Teen moms from more non-urban settings were more likely than teens from more urban settings to perceive their resources as adequate than teens from more urban settings.

ANOVAs

First, it should be noted that the sample of urban teen mothers (n = 246) consisted of 32 European-American, 126 African-American, 48 Mexican/Chicano, and 40 "other." The sample of non-urban teen mothers (n = 277) consisted of 116 European-American, 114 African-American, 37 Mexican/Chicano, and 10 "other." A chi-square test determined that ethnicity and environment (urban vs. non-urban) were related, X^2 (3 df) = 26.72, $p < .01$. In other words, the frequency of ethnicities varies significantly by environment. European-American teen mothers were more likely to reside in non-urban than urban settings.

A univariate analysis of variance was performed with urban/non-urban, marital status (single, married, cohabitation, widowed/separated/divorced), and ethnicity (European-American, African-American, Mexican/Chicano, other) as predictor variables and depression at 14 months as the outcome variable. This model predicted 5.8% of the variance in 14 month depression. The interaction for urban/non-urban, marital status, and ethnicity was not significant, F (6, 486) = .99, p = .43. The interactions for marital status and ethnicity [F (7, 486) = 1.43, p = .19], marital status and urban/non-urban [F (2, 486) = .64, p = .53], and urban/non-urban and ethnicity [F (3, 486) = .99, p = .43] also were not significant. Ethnicity was not a significant predictor of depression, F (3, 486) = .42, p = .74. The urban/non-urban variable was also not significant, F (1, 486) = .87, p = .35. In addition, marital status was not significant, F (3, 486) = 1.12, p = .34.

This analysis was repeated with depression at 36 months as the predictor variable. Again, 5.8% of the variance in depression was explained. The interaction for urban/non-urban, marital status, and ethnicity was not significant, F (6, 486) = 1.10, p = .36. The interactions for marital status and ethnicity [F (7, 486) = .62, p = .74], marital status and

urban/non-urban [F (2, 486) = .67, p = .51], and urban/non-urban and ethnicity [F (3, 486) = 1.43, p = .23] were not significant. Again, ethnicity [F (3, 486) = .65, p = .59], marital status [F (3, 486) = .75, p = .52], and the urban/non-urban variable [F (1, 515) = .86, p = .35] were not significant predictors of depression.

Similar analyses were conducted to compare the means of self-perceived resources among levels of ethnicity, marital status, and urban/non-urban. This model accounted for 9.8% of the variance in self-perceived resources. The interaction for the three variables was not significant, F (6, 486) = .88, p = .51. The interactions for marital status and ethnicity [F (7, 486) = 1.96, p = .06], marital status and urban/non-urban [F (2, 486) = 2.49, p = .08], and urban/non-urban and ethnicity [F (3, 486) = 1.70, p = .17] were not significant. Ethnicity [F (3, 486) = 1.28, p = .28], marital status [F (3, 486) = 1.04, p = .37], and the urban/non-urban variable [F (1, 515) = .03, p = .87] did not have significant main effects on self-perceived resources.

Regression analyses

Regression 1 (14-month depression; Table 3). Depression at 14 months was regressed on education, income, and age. This model explained only 1.4% of the variance in depression, F (3, 519) = 2.45, $p < .07$. Among these three predictor variables, the only significant predictor was education. While controlling for age and income, teen mothers who had higher levels of education had lower levels of depression than teen mothers who had lower levels of education. This finding should be interpreted with caution because, as stated above, the whole model did not account for significant variance.

The model was then estimated again with self-perceived resources added as a predictor variable, F (4, 518) = 15.20, $p < .01$. This regression accounted for 10.5% of the

variance in depression at 14 months. In this model, the only significant predictor was self-perceived resources. When education, income, and age were controlled, self-perceived resources were negatively related to depression at 14 months. Teen mothers with a higher level of self-perceived resources were less depressed than were other teen mothers. Possible interactions (self-perceived resources*education, self-perceived resources*income, education*income) were then added to the model. None of these interactions were significant predictors of depression at 14 months.

Regression 2 (36-month depression; Table 4). A regression model was estimted with depression at 36 months as an outcome variable and education, income, age, and depression at 14 months as predictors. Depression at 14 months was added to the model to determine if the other predictor variables explained any variance beyond that explained by 14-month depression. Twenty-five percent of the variance in depression was predicted by this regression, $F(4, 518) = 42.61, p < .01$. Depression at 14 months significantly predicted depression at 36 months. However, no other predictors were significant. When self-perceived resources were added to the model, the regression predicted 25% of variance in depression, $F(5, 517) = 34.24, p < .01$ (Table 3). Again, depression at 14 months was the only significant predictor of depression at 36 months.

Interactions (self-perceived resources*education, self-perceived resources*income, education*income) were added to the regression. Depression at 14 months remained significant. Education had a significant negative relationship with depression in this model, and self-perceived resources was also significant in the predicted direction. However, the interaction of self-perceived resources and education was significant. In order to reduce problems with multicollinearity, this model was estimated again after deleting interaction

terms that were not significant (self-perceived resources*education, education*income). Depression at 14 months, education, self-perceived resources, and the interaction term of self-perceived resources and education remained significant.

Further investigation revealed that the interaction for self-perceived resources and education was disordinal, indicating the main effects for self-perceived resources and education were qualified by the interaction. In other words, the main effects, although statistically significant, should be interpreted carefully. For those teen mothers with lower levels of self-perceived resources, those with more education were more depressed at 36 months. For those teen mothers with higher levels of self-perceived resources, the relationship between education and depression was as predicted, as those with more education were less depressed.

Regression 3. Depression at 14 months was regressed on education, income, self-perceived resources, urban/non-urban, and ethnicity. Ethnicity was dummy-coded with African-American as the reference group, as it contained the most observations in the sample. Next, interaction terms (urban/non-urban*education, urban/non-urban*income, urban/non-urban*self-perceived resources, and urban/non-urban*ethnicity) were added. The model was estimated again for depression at 36 months.

*14 months (*Table 5). About 11% of the variance in teen mothers' depression at 14 months was accounted for by this model, $F(6, 516) = 10.82, p < .001$. The only statistically significant predictor was self-perceived resources, as teen mothers who perceived themselves as having more resources were less depressed than other teen mothers. Ethnicity was not a significant predictor among all teen mothers at 14 months. The addition of the

interaction terms did not predict additional variance, and none of the interaction terms were significant.

36 months (Table 6). Only 5% of variance in depression at 36 months was accounted for by the predictor variables in the model, F (6, 516) = 4.36, $p < .001$. Self-perceived resources was negatively related to depression. No other variables were statistically significant. The interaction terms did not predict additional variance in depression at 36 months.

Hierarchical Linear Models: 14 month depression as outcome.

In all HLM equations, level 1 (individual level) variables were group-centered. This indicates that the original predictors are centered around their corresponding site means. Level 2 (site level) variables have been grand-centered.

The terms "random" and "fixed" are used frequently in hierarchical linear modeling and warrant discussion. Individual and site level predictors are assumed to be fixed, meaning they must be non-varying and take on only certain values. However, individual level intercepts and slopes are generally assumed to vary randomly across groups (or in this case, sites). Their variances are called "random coefficients." In HLM, variances for the intercepts and slopes are estimated by default when a model is first constructed. A researcher has the choice of "fixing the intercepts" or "fixing the slopes." This means that it is assumed that the variance is assumed to be zero, so they are constant across groups. For instance, if a fixed intercept would indicate that it is assumed that the group mean is equal across groups for that analysis.

"Explained variance" is an important key to interpreting results in multiple regression. It determines the amount of variability in the dependent variable that is

accounted for by the independent variables. It is not possible to obtain a true R-squared value in multilevel modeling and this has proved to be problematic to researchers (Snijders & Bosker, 1999). However, there are statistics that provide a value of the variance that is explained by the model. HLM statistical computer programs do not report these numbers in their output. A statistician can obtain these values by comparing the error variance terms in an unrestricted or empty model (HLM 1 below) and a restricted or fitted model (HLMs 2-6). Proportional reductions in estimated variance can be computed analogously to multiple regression models by examining the proportions by which the variance components at each level (σ^2 at the individual level and τ^2_0 at the group level) are reduced when adding predictor variables (Snidjers & Bosker, 1999). However, this method sometimes reveals that adding predictors decreases rather than increases the amount of variance accounted for, which leads to an illogical interpretation as additional predictors cannot decrease the amount of variance accounted for in multiple depression. In addition, negative values of R-squared can be computed, which is also not possible in multiple regression. Because one cannot explain a negative amount of variance, this is not desirable (Snijders & Bosker, 1999).

Snijders and Bosker (1999) suggest a formula for determining total variance explained: 1 – ((level 1 restricted error variance + level 2 restricted error variance) / (level 1 unrestricted error variance + level 2 unrestricted error variance)). In this method, the empty model (with no predictors) is compared to the fitted model. This is the proportional reduction of level one error variance (σ^2) and level two error variance (τ_{00}^2) due to the predictor variables included.

Snijders and Bosker (1999) suggest using a formula for between-group variance explained that takes into account how many participants are at each site: ((level 1 restricted error variance/n) + level 2 restricted error variance) / ((level 1 unrestricted error variance/n) + level 2 unrestricted error). In this study, the group mean used was 31. Level two explained proportion of variance can be defined as the proportion of reduction in the mean squared prediction error for the group (in this case, site) mean of the outcome variable.

In addition, variance explained at level one can be computed by subtracting individual-level error variance in a fitted model from individual-level error variance in an empty model (with no predictor variables). This is then divided by the individual-level error variance in the empty model to determine the proportion of variance between-individuals that is explained by the model. This can also be thought of as 1-(σ^2 for the empty model / σ^2 for the fitted model).

Hierarchical linear model 1. A simple intercept (fully unconditional) model was run without using individual-level predictors or site-level predictors. This is also known as an ANOVA model.

Level 1:

$$Dep(14) = Bo + R$$

Level 2:

$$Bo = Goo + uo$$

Analysis revealed that there was significant variance in depression at 14 months by site, F (16, 506) = 2.27, $p < .01$. This preliminary model is helpful as it serves to partition the total variance in depression at 14 months into variance between and within sites. An intraclass correlation, sometimes called a cluster effect, is a coefficient that measures the

proportion of variance that is between groups or level 2 units (Raudenbush & Bryk, 2002). The intraclass correlation was .04, indicating the proportion of variance between sites. Therefore, 96% of variance was at the individual level.

Hierarchical linear model 2. A random intercept model was run with RUCC added as a site level predictor. This is also considered a means as outcomes model. The level 1 model remains unchanged, as no individual level predictors were contained in the equation. In this model, the effectiveness of RUCC in predicting the differences between sites is examined.

Level 1:

$$Dep(14) = Bo + R$$

Level 2:

$$Bo = Goo + Go_1(RUCC) + uo$$

Snijders and Bosker (1999) suggest using a formula for between-group variance explained that takes into account how many participants are at each site: ((level 1 restricted error/n) + level 2 restricted error) / ((level 1 unrestricted error/n) + level 2 unrestricted error). A potential problem with this method is that there is the possibility that the variance may be larger in the restricted model than the unrestricted model, and therefore, R-squared will be negative. This is unusual, and did occur in this study. Using Snijders and Bosker formula (1999) for computing the between-group variance explained, it was determined that virtually 0% of the variance at level 2 was explained by how rural or urban the site was.

Snijders and Bosker (1999) suggest a formula for determining total variance explained: 1 – ((level 1 restricted error variance + level 2 restricted error variance) / (level 1

unrestricted error variance + level 2 unrestricted error variance)). In this case, the total variance explained was 1 - ((102.04) / (101.58)) = -.0045, or virtually 0.

Hierarchical linear model 3. Next, a random intercept and fixed slope model was run with individual level predictors (ANCOVA model). Individual level predictors included lapse, self-perceived resources, education, age, and income. RUCC was not included in this model.

Level 1:

$$Dep(14) = B_o + B_1(lapse) + B_2(self\text{-}perceived\ resources) + B_3\ (education) + B_4(age) + B_5(income) + R$$

Level 2:

$$B_o = G_{oo} + u_o$$

$$B_1 = G_{10}$$

$$B_2 = G_{20}$$

$$B_3 = G_{30}$$

$$B_4 = G_{40}$$

$$B_5 = G_{50}$$

Self-perceived resources was a significant predictor of depression at 14 months in the hypothesized direction. However, none of the other level 1 predictors were significant. Using Snijders and Bosker's (1999) formula for determining total variance explained, it was determined that 9.1% of the variance in depression at 14 months was explained by model 3. In addition, using only σ^2, it was found that 9.71% of level one variance was explained by the predictors.

Hierarchical linear model 4. A contextual or compositional model was run. Individual-level predictors were included. The intercept was fixed, but the slope was random. RUCC was included as predictor of intercept.

Level 1:

$$Dep(14) = B_o + B_1(lapse) + B_2(self\text{-}perceived\ resources) + B_3\ (education) + B_4(age) + B_5(income) + R$$

Level 2:

$$B_o = G_{oo} + G_{01}(RUCC) + u_o$$

$$B_1 = G_{10}$$

$$B_2 = G_{20}$$

$$B_3 = G_{30}$$

$$B_4 = G_{40}$$

$$B_5 = G_{50}$$

Again, self-perceived resources was a significant predictor of level 1 variance. Teen mothers with more self-perceived resources were likely to be less depressed than teen mother with less self-perceived resources. Because model 2 strongly suggested that RUCC was not a good predictor of variance at level 2, it seems obvious that model 4 would not fit the data better than model 3. In fact, the Snijder and Bosker (1999) formula suggested that only 8.5% of variance was explained by model 4. Using only individual-level error variance, it was determined that 9.7% of between-participants variance was explained.

Hierarchical linear model 5. A random intercept and fixed slope model with both individual and site level predictors was estimated. A general use of multilevel or hierarchical linear modeling is to investigate how variables at one level of the model may

affect relationships occurring at another level of the model (Raudenbush & Bryk, 2002). In this model, interactions between level 1 and level 2 variables can be explored. In this case, the cross-level interactions added to the model were RUCC*lapse, RUCC*self-perceived resources, RUCC*education, RUCC*age, and RUCC*income.

Level 1:

$$Dep(14) = B_o + B_1(lapse) + B_2(self\text{-}perceived\ resources) + B_3\ (education) + B_4(age) + B_5(income) + R$$

Level 2:

$$B_o = G_{oo} + G_{01}(RUCC) + u_o$$

$$B_1 = G_{10} + G_{11}(RUCC)$$

$$B_2 = G_{20} + G_{21}(RUCC)$$

$$B_3 = G_{30} + G_{31}(RUCC)$$

$$B_4 = G_{40} + G_{41}(RUCC)$$

$$B_5 = G_{50} + G_{51}(RUCC)$$

Model 5 showed two significant predictors at the individual level. Again, self-perceived resources was significant in the predicted direction. Age was also a significant predictor in this model, with older teens more depressed than younger teens when the other variables were controlled. Model 5 did not account for additional variance when compared to the previous models. In fact, Snijders and Boskers formula for variance accounted for suggest that only 8.3% of variation in depression was explained. Using only individual level error variance (σ^2), it was determined that 9.34% of between-participants variance was explained.

Hierarchical linear model 6. It was intended to estimate a random intercept and slope model with both individual and site level predictors. However, because every individual level predictor matrix was nearly singular and the model would not run, income was deleted from the model. (A singular matrix is one in which one or more of the rows or columns can be calculated as a combination of other rows and column.) Income was selected for deletion because it made no contribution to predicting variance in the previously run models. The beta value for income in models 3-5 was .00, with a standard deviation of 0.

Level 1:

$$Dep(14) = B_o + B_1(lapse) + B_2(\text{self-perceived resources}) + B_3(education) + B_4(age) + R$$

Level 2:

$$B_o = G_{oo} + G_{01}(RUCC) + u_o$$

$$B_1 = G_{1o} + G_{11}(RUCC) + u_1$$

$$B_2 = G_{oo} + G_{21}(RUCC) + u_2$$

$$B_3 = G_{oo} + G_{31}(RUCC) + u_3$$

$$B_4 = G_{oo} + G_{41}(RUCC) + u_4$$

While controlling for other variables, model 6 indicated that self-perceived resources and age were significant predictors of depression at level 1. Teen mothers with more self-perceived resources were less likely than other teen mothers to be depressed. Older teen mothers were also more depressed than younger teen mothers. In model 6, 16.1% of total variance was explained. Using only individual-level error variance (σ^2), it was determined that 17.45% of between-participants variance was explained. Results

suggested that the residual variance of the slope for self-perceived resources varied significantly at level 2. This indicates that the error terms of all the site-level equations except for that of self-perceived resources actually could be deleted from the model and these equations could be treated as fixed.

Hierarchical linear modeling: 36-month depression as outcome (Table 8).

Hierarchical linear model 1. A simple intercept (fully unconditional) model was estimated without using individual-level predictors or site-level predictors. This is also known as an ANOVA model.

Level 1:

$$Dep(36) = Bo + R$$

Level 2:

$$Bo = Goo + uo$$

The analysis revealed that there was significant variance in depression at 36 months by site, $F(16, 506) = 1.77, p = .03$. The intraclass correlation was .03, indicating the proportion of variance between sites. Therefore, 97% of variance is at the individual level.

Hierarchical linear model 2. A random intercept model was run with RUCC added as a level 2 predictor. This is also considered a means as outcomes model. The level 1 model is the same.

Level 1:

$$Dep(36) = Bo + R$$

Level 2:

$$Bo = Goo + Go_1(RUCC) + uo$$

Using Snijders and Bosker (1999) formula for computing the between-group variance explained, it was determined that virtually 0% of the variance at level 2 was explained by how rural or urban the site was. This is similar to the depression at 14 month model. The Snijders and Bosker (1999) total variance explained formula revealed that virtually 0% of the total variance was explained by this model. (The actual value was less than 0 (-.108)).

Hierarchical linear model 3. Next, a random intercept and fixed slope model was run with individual level predictors (ANCOVA model). Individual level predictors included lapse, self-perceived resources, education, age, and income. RUCC was not included in this model.

Level 1:

$$Dep(36) = B_o + B_1(lapse) + B_2(self\text{-}perceived\ resources) + B_3\ (education) + B_4(age) + B_5(income) + B_6(dep14) + R$$

Level 2:

$$B_o = G_{oo} + u_o$$

$$B_1 = G_{10}$$

$$B_2 = G_{20}$$

$$B_3 = G_{30}$$

$$B_4 = G_{40}$$

$$B_5 = G_{50}$$

$$B_6 = G_{60}$$

Not surprisingly, depression at 14 months significantly predicted depression at 36 months. However, none of the other individual-level predictors were significant. Using the

explained total variance formula (Snijder & Bosker, 1999), it was determined that approximately 22% of the total variance in depression at 36 months was explained by model 3. With the formula using only individual-level error variance (σ^2), it was determined that 23.42% of individual-leve variance was explained.

Hierarchical linear model 4. A contextual or compositional model was estimated. Individual-level predictors were included. The intercept was fixed, but the slope was random. RUCC was included as a predictor of the intercept.

Level 1:

$$Dep(36) = B_o + B_1(lapse) + B_2(self\text{-}perceived\ resources) + B_3\ (education) + B_4(age) + B_5(income) + B_6(dep14) + R$$

Level 2:

$$B_o = G_{oo} + G_{01}(RUCC) + u_o$$

$$B_1 = G_{10}$$

$$B_2 = G_{20}$$

$$B_3 = G_{30}$$

$$B_4 = G_{40}$$

$$B_5 = G_{50}$$

Again, depression at 14 months was a significant predictor of level 1 variance in depression at 36 months. Model 2 indicated that RUCC was not a good predictor of variance at level 2. Therefore, it is not surprising that this model is not a better than model 3. In fact, the Snijder and Bosker (1999) formula suggested that 22% of total variance was explained by model 4, which is equal to the proportion of variance explained by model 3.

Using only individual-level error variance (σ^2), it was determined that 23.42% of level one was explained.

Hierarchical linear model 5. A random intercept and fixed slope model with both individual- and site-level predictors was estimated.

Level 1:

$$Dep(36) = B_o + B_1(lapse) + B_2(self\text{-}perceived\ resources) + B_3\ (education) + B_4(age) + B_5(income) + B_6(dep14) + R$$

Level 2:

$$B_o = G_{oo} + G_{01}(RUCC) + u_o$$

$$B_1 = G_{10} + G_{11}(RUCC)$$

$$B_2 = G_{20} + G_{21}(RUCC)$$

$$B_3 = G_{30} + G_{31}(RUCC)$$

$$B_4 = G_{40} + G_{41}(RUCC)$$

$$B_5 = G_{50} + G_{51}(RUCC)$$

$$B_6 = G_{60} + G_{61}(RUCC)$$

In model 5, depression at 14 months was the only significant predictor of variance in depression at 36 months. Model 5 did not account for additional variance when compared to the previous models. In fact, the Snijders and Boskers formula suggests that only about 21% of total variation in depression was explained. Using only individual-level error variance (σ^2), it was determined that 22.64% of individual level variance was explained.

Hierarchical linear model 6. It was intended to run a random intercept and slope model with both individual and site level predictors. As in HLMs predicted depression at 14

months, because every individual level predictor matrix was nearly singular and the model would not run, income was deleted from the model again.

Level 1:

$$Dep(14) = B_o + B_1(lapse) + B_2(self\text{-}perceived\ resources) + B_3\ (education) + B_4(age) + R$$

Level 2:

$$B_o = G_{oo} + G_{01}(RUCC) + u_o$$

$$B_1 = G_{1o} + G_{11}(RUCC) + u_1$$

$$B_2 = G_{oo} + G_{21}(RUCC) + u_2$$

$$B_3 = G_{oo} + G_{31}(RUCC) + u_3$$

$$B_4 = G_{oo} + G_{41}(RUCC) + u_4$$

Model 6 indicated that 26% of the total variance in depression at 36 months was accounted for by the predictor variables. Again, depression at 14 months was the only significant predictor of depression at 36 months. The formula using only individual-level error variance was used to determine that 27.90% of individual-level variance was explained. The variance for the slope for depression at 14 months significantly varied significantly at level 2. However, because all of the other level 2 equations did not have significant ($p < .05$) variance, they could actually be deleted from the model and treated as fixed.

Discussion

This study addressed several hypotheses:

1. *Objective measures of resources will predict depression when controlling for self-perceived resources. Teen mothers with fewer objective resources will have more symptoms of depression than teen mothers with more objective resources.*

Objective resources were defined as gross family income and education at time of enrollment in the study. Income served as a poor predictor of depression at 14 and 36 months. This may be due, in part, to the dynamic nature of income among adolescent mothers. An adolescent mother's income at enrollment in the study could be very different from their income 14 or 36 months later. This instability could account for the relative ineffectiveness of income in the regression models. Also, teens were allowed to define their own family and had latitude in including the income of various people, such as boyfriends and parents. In addition, this was a sample of low-income teen mothers. For the most part, there was little variability in income, with 80% reporting less than $12,000 a year. There is a chance that a different sample could yield significant results for income. However, it should be noted that teen mothers are likely to be low-income, so a more representative sample may not differ from this sample in income substantially.

Education was also used as a predictor of depression at 14 and 36 months. In zero-order correlations, education was negatively correlated with 14 month depression, indicating that teen mothers with less education were more depressed than other teen mothers. Education was also linked to self-perceived resources. Teen mothers with more education indicated that they felt their resources were more

adequate than other teen mothers. Education was a significant predictor of depression at 14 months (but not 36 months) while controlling for age and income in a regression equation (see regression model 1). (Note that the main effect for education at 36 months was qualified by the interaction for education and self-perceived resources (see regression model 2).) However, when self-perceived resources were added to the model, self-perceived resources were a significant predictor of depression at 14 months, whereas education was not. It was predicted that objective resources such as education would explain unique variance in depression, and this was not the case. Therefore, this hypothesis was not supported.

2. *Self-perceived resources will predict depression when controlling for objective measures of resources. Teen mothers with fewer self-perceived resources will have more symptoms of depression than teen mothers with more self-perceived resources.*

The results supported this hypothesis in part. Self-perceived resources predicted depression at 14 when education and income were controlled (see regression model 1). (At 36 months, the main effect for self-perceived resources was qualified by the interaction for self-perceived resources and education (see regression model 2)). From this data, it is impossible to apply causal implications. Teen mothers who have more positive perceptions of their situations may be less likely to be depressed, but depression may also cause a teen mother to view her situation as more hopeless. It is probably most realistic to assume a reciprocal relationship between perceptions and depression. This finding supports the ideas suggested by Hill (1949) and many others since. An individual or family's perception is an important variable to measure and understand, as only devoting

research attention to objective variables, such as income and education, neglects information that is integral in investigations of people and families in stress and crisis.

3. *Setting will predict depression among teen mothers. Non-urban teens will have more depressive symptoms than urban teens.*

This hypothesis was not confirmed. As evidenced in the hierarchical linear models, rural/urban setting was a poor predictor of depression at the site level. Models using RUCC as a predictor variable at the site-level were not better than models without a site-level predictor. Depression at both 14 and 36 months did vary significantly by Early Head Start site ($p < .05$). However, virtually none of this variance could be accounted for by the mean RUCC of the site. It should also be noted that RUCC was run as a dichotomous (urban vs. non-urban), rather than continuous (1 through 9) variable, at the site level. This dichotomous variable did not explain the level 2 variation in depression at 14 or 36 months either. Apparently other factors are responsible for the significant differences between sites.

4. *Age will be related to depression among teen mothers after controlling for resources and environment, with younger teens exhibiting more depressive symptoms than older teens.*

This hypothesis was not supported. In general, age was not related to depression among teen mothers. In HLMs 5 and 6 (36 months), depression actually was positively linked to age, with older teen mothers more depressed than younger teen mothers (see Table 8). A possible explanation for this relationship is that perhaps older teens are able to view their situation more realistically and understand

the obstacles they will encounter better than younger teens. Teen mothers are at high risk psychologically, socially, and financially. Perhaps older teens are more aware of this, and therefore more depressed.

5. *Ethnicity will be related to depression among teen mothers. While controlling for environment (urban vs. non-urban), African-American teen mothers will be less depressed than European-American teen mothers.*

This hypothesis was not supported by the results. ANOVAs including urban/non-urban status as a covariate did not indicate a significant relationship between ethnicity and depression at 14 or 36 months among all teen mothers. In regression analysis, ethnicity was dummy-coded (with African-American as the reference group) and included in the model (see regression models 3 and 4). When controlling for education, income, and self-perceived resources, teen mothers who indicated their ethnicity as European-American, Hispanic, or "other" did not differ significant on 14- and 36- month depression from teen mothers who indicated their ethnicity as African-American. The urban/non-urban variable was added as a moderator for education, income, self-perceived resources, and ethnicity. This revealed no statistically significant interactions. According to these results, ethnicity is not a significant predictor of depression among teen mothers.

Conclusions

Results from the EHS study were in partial support of the stated hypotheses. Ethnic and environment hypotheses were not supported. Little variance in depression scores was accounted for by ethnicity of the mother and by the mother's affiliation with an urban or non-urban Early Head Start site. The hypothesis regarding RUCCs was based on notions that rural areas are plagued by poverty, social isolation, and lack of resources. This was a study of low-income adolescent mothers. In this sample, participants in both urban and non-urban settings were struggling financially. In effect, it could be stated the entire sample was plagued by poverty. With poverty comes a lack of resources. Although non-urban teenage mothers are often physically further away from needed mental and physical health resources, urban teenage mothers may not view these resources as accessible because of their situation, despite being physically closer to them. To summarize, many of the same conditions that make non-urban adolescent teen mothers susceptible to depression may also make urban adolescent teen mothers susceptible to depression.

Non-urban teens have been shown to have higher levels of loneliness and fewer friends than urban teens (O'Grady, 1996; Woodward, 1990; Woodward & Frank, 1988). Part of this loneliness may be due to the limited circle of peers encountered by non-urban adolescents. Urban teens can often find new friends when they choose to "break up" with peers, but non-urban teens may be more limited. However, this could also mean that friends of pregnant non-urban teenagers are supportive, as they cannot find new friends to replace a friend who is pregnant. Small towns and rural areas also have a reputation for informal social networks that may substitute for the more organized resources or programs found in

other areas. This may mean that pregnant and parenting teenagers in non-urban areas are not necessarily feeling more isolated than pregnant and parenting teenagers in urban areas.

Despite the lack of significance of the urban/non-urban variable, the use of hierarchical linear modeling was still advantageous because it determined the proportion of variance in depression that was at the site level and the proportion of variance in depression that was at the individual level. The multilevel models were able to measure the effects of the individual-level factors while controlling for the effect of the site. In the future, perhaps other variables could be explored that may account for more site level variance. In addition, it should be noted that the lack of significance may be due in part to decreased power from small group sizes.

It was hypothesized that African-American teen mothers would be less depressed than European-American teen mothers because the African-American culture in general is more accepting of early births. However, increased acceptance among the families of young African-American women is certainly not the same as approval (Luker, 1996). Many mothers of African-American teens became pregnant as adolescents themselves and are greatly disappointed when their daughters bear children early. Young women in the African-American community who seem likely to excel are often warned that to have a baby too soon would mean they were "throwing their life away" (Moore, Simms, & Betsey, 1986; p. 72). Because African-Americans have the highest teen birthrates by ethnicity (Darabi, Dryfoos, & Schwartz, 1986), a teen birth in the African-American community is not a rare occurrence. However, the parents of a young African-American woman who bears a child are usually well-aware of the ramifications of an adolescent pregnancy, perhaps because they have experienced them first-hand (Luker, 1996).

Previous research has suggested that ethnicity may play a role in how an adolescent's family responds to the pregnancy, with African-American teens feeling pressured to give birth and keep their infants (Darabi, Dryfoos, & Schwartz, 1986; Musick, 1993). They also, in general, feel that their teenage motherhood is more accepted than the teenage motherhood of young European-American women. However, contradictory research suggests that other factors must be more predictive of family reactions. Hardy and Zabin (1991) found the mother of the pregnant teen may show a wide variety of reactions to news of the pregnancy. Mothers of pregnant adolescents have been reported to be angry, upset, disappointed, ambivalent, displeased, supportive, and happy. Interestingly, the proportions of mothers showing each of these reactions was not related to ethnicity.

Although some argue that young African-American mothers tend to be less depressed than their European-American counterparts because a teen pregnancy is more normative for them, African-American adolescent mothers may experience depression for different reasons. They are more likely than European-American mothers to depend on welfare and government aid in the first 15 to 18 months of their child's life, with over 90% of adolescent African-American mothers receiving assistance in this timeframe (Hardy & Zabin, 1991). In addition, Hardy and Zabin (1991) report that most teen mothers want to work, but finding an adequate job is more common among European-American than African-American teen mothers. Research shows African-American teen mothers are also less likely to be in a stable relationship when their children are young than European-American teen mothers (Hardy & Zabin, 1991). Whereas there are some arguable reasons than African-American teens would be less depressed than European-American teens (e.g., more cultural acceptance, social support), it should also be noted that there has been much

recent research on the prevalence of adverse mental health outcomes in the African-American culture, particularly among adolescents (Garrison, Jackson, Marsteller, McKeown, & Addy, 1990; Goodman, 1999; Hammack, 2003; Hammack, Robinson, Crawford, & Li, 2004; Taylor, 1996). Some studies (e.g., Garrison et al., 1990) have suggested that African-American adolescents report higher levels of depressed mood when compared to other ethnic groups. This may be partially due to the racial discrimination experienced by African-American teens (Hammock, 2003).

Since the 1950s, studies have reported that African-Americans have higher psychological distress than European-Americans in the U. S. (Kessler & Neighbors, 1986). Some (e.g., Neff, 1984; Vernon & Roberts, 1982) have controlled for socioeconomic status and found that this difference disappears. Other research (Eaton & Kessler, 1981) has even suggested that an interaction between race and socioeconomic status exists, with the differences in stress and depression being most prominent among people with lower socioeconomic status, as low-income African-Americans are substantially more depressed than low-income European-Americans. It seems plausible that any positive effects of acceptance for African-American teen mothers may be offset by the main effect of race on depression and psychological distress among persons with low socioeconomic status.

The overall decrease in teen births in the U.S. in recent years has been well-documented. Unfortunately, birth statistics among the youngest adolescents (ages 10-14) have not decreased. This group is responsible for a small but steady percentage (about 3%) of teen births (Elo, King, & Furstenberg, 1999). Coleman and Dennison (1998) argue that the birth rate among younger teens should be examined more closely than the birth rate among older teens when measuring progress in preventing teen pregnancy, as parenthood is

a completely different experience for a younger teen than an older teen. A 14-year-old having a child really is a "kid having a kid." A 19-year-old is more likely to be responsible for her own child with less support from parents and other family.

It was predicted that age would be negatively related to depression for teen mothers when controlling for environment and resources. Younger teen mothers were not more depressed than older teen mothers. In fact, two hierarchical linear models suggested that age is positively related to depression at 14 months, as older teen mothers were more depressed than younger teen mothers when controlling for income, resources, and environment. In some ways, having a child as a younger teenager may be less taxing than having a child as an older teenager. Older teens may be more responsible for their infants and children than younger teens, as younger teens often remain at home with their parents after giving birth, while older teens often move out and establish their own home. Research has suggested that 16- to 19-year-old teenage mothers are likely to indicate an understanding of the sacrifices parenting requires, whereas 13- to 14-year-old teenage mothers were less understanding of the parts of adolescent they may have to forfeit (Spear, 2001). Luker (1999) suggests that younger teens are actually more likely to remain in school and graduate than older teens when the child is born. This can only be accomplished with the large amount of support generally received from the parents of a younger teen mother.

It was predicted that objective resources and self-perceived resources would account for unique variance in depression among teen mothers. While income did not predict variance in depression, zero-order correlations revealed that self-perceived resources (at 14 and 36 months) and education (at 14 months only) did account for significant portions of

variance. However, when controlling for self-perceived resources, education did not predict unique variance at 14 or 36 months. Self-perceived resources predicted unique variance in depression at 14 months.

In general, hypotheses concerning objective resources, such as income and education, were not supported. At 36 months, there was a significant interaction for self-perceived resources and education. For those teen mothers who perceived their resources more positively, education was negatively related to depression. Surprisingly, for those teen mothers who perceived their resources more negatively, education was positively related to depression. Perhaps young women who see their situation in a more positive light may be likely to view their education as an asset. These teen mothers may be able to see their education as a resource which will serve to enhance their life and the life of their child. In addition, they perceive themselves as having more resources, which may help them use their education.

However, adolescent mothers with a high level of education and a low level of self-perceived resources showed more depressive symptoms than adolescent mothers with adolescent mothers with a low level of education and a low level of self-perceived resources. It may be the case that these young mothers, who do not perceive their situation positively, are depressed because they see their education as a waste. They may not feel they have the resources to use their education in a positive way. Perhaps the higher level of education of these adolescents makes them feel as though they were really going places—until they became pregnant. They may have had higher hopes for their future than other young women, and therefore, became more depressed as teen mothers.

At 14 months, adolescent mothers who viewed their resources as more adequate were likely to be less depressed than adolescent mothers who viewed their resources as less adequate. This was true when controlling for more objective resources, such as income and education. Henly (1993) suggested that resources for teen mothers should be perceived as more than a simple checklist of class and income. This idea is certainly supported by these findings. There is no doubt that the addition of self-perceived resources in studies on families and individuals under stress enriches research.

It should be noted that the McCubbin ABC-X Model (McCubbin & Patterson, 1981) certainly is a more realistic representation than Rueben Hill's (1949) original model when studying teen motherhood. McCubbin and Patterson focused on the notion that events do not occur in isolation and introduced the term "pile-up." The interaction effect of stressors, resources, and perceptions define a crisis for a family. According to McCubbin and Patterson (1982), there are five types of stressors and strains that contribute to pile-up: a) stressor event and hardships, b) normative transitions, c) prior strains, d) consequences of efforts to cope, and e) ambiguity. For a teen mother, "pile-up" seems an adequate term to describe life in the first 36 months after a child's birth and the length of time data was collected for this study. Teen pregnancy is not an event that occurs and causes stress for a specified and definable period of time. It is not difficult to see how pile-up would accumulate for an adolescent mother during the early years of her child's life, and some research (Umberson et al., 1992) suggests that it is "pile-up" rather than an actual event that links stressful events to depression.

This research focuses on the resources and perceptions that define stress and crisis. Resources can be more objective, such as income and education, or subjective, from the

viewpoint of someone in the situation. Among the teen mothers in this study, perceptions of resource adequacy are important predictors of depression. If a teen mother sees her situation more positively, she is likely to be less depressed. This is a key finding, as those professionals working with adolescent teenagers who are pregnant or parenting should be focused not only on the objective resources that they perceive but the more subjective resources as perceived by the young woman. According to this research, asking questions such as "Do you feel you have enough money for savings?" and "Do you feel you have childcare that meets your needs?" may be at least as important, if not more important, than using a standard checklist to define the resources of teen mothers.

This finding may hold true for social workers and psychologists working with other populations, such as the elderly or disabled. The importance of learning the person's perceptions of their situation should not be underestimated. A key predictor of possible depression for at-risk persons may not be a professional opinion of their situation, but their own opinion of their situation. While the amount and nature of resources someone actually has is important, their perception of the resources they have provides valuable added information. If we are to provide resources or access to resources for individuals and families, we must learn in which areas they feel their resources are weak.

Professionals should be aware that income is not always the best way of measuring resources of teen mothers. Income was not related to depression. This may be due to the dynamic, unstable nature of a variable such as income for an adolescent mother. Income may be variable from month to month or even week to week due to changing job situations and also changing (and often tumultuous) relationships with family and partners. It may also be indicative that a teen's family income may not represent all the monetary resources

she has available. Perhaps there are other people in her life (e.g. boyfriend's family, grandparents) who are willing to provide financial support to help her and her child(ren) meet their needs. This factor would most likely not be represented in an income variable, but would be reflected in a measure of self-perceived resource adequacy.

Although the discussed models of family stress and crisis indicate that perceptions are contributors to the level of stress endured, the link between perceptions of resources and depression is likely bi-directional. A positive outlook could ward off future depressive symptoms, but it seems obvious that someone who is more depressed is likely to perceive her situation more negatively. Nevertheless, it may be useful to think of a teen mother's perceptions of her resources in terms of coping.

For parenting teenagers, tremendous challenges result from the on-going stressors of adolescent development and parenting roles (Barnet et al, 1996). Coping has been defined as the "cognitive and behavioral efforts made to master, tolerate, or reduce external and internal demands and conflicts among them" (Folkman & Lazarus, 1980). Research on coping has sought to reveal the most effective and appropriate methods of coping to deal with stress and ward off depression (Wegmann, 1988). Among young women, studies on coping have suggested that non-depressed participants have higher levels of optimism than depressed participants (Folkman, Lazarus, Pimley, & Novacek, 1987). Although the participants in the current study may differ from other young women in that they have experienced a transition to motherhood, this finding still holds.

A study by Myors, Johnson, and Langdon (2001) focuses on the coping methods of pregnant (not parenting) adolescents. Optimistic coping styles, when compared to other coping styles such as self-reliant, supportant, fatalistic, and evasive, were the most

frequently used and most effective. Pregnant adolescents who used coping methods such as "thinking about the good things in life," "trying to think positively," and "trying to see the good side of the situation" felt these methods were useful for handling the stressors and crises of their pregnancy. However, the authors point out that optimism and excessive positivism shown during pregnancy may be indicative that a teen does not have a realistic understanding of their situation and upcoming challenges. They suggest that perhaps this style of coping is better suited toward pregnancy than parenthood as it may not be sustainable during high levels of stress involved with being a mother. According to Myors and colleagues (2001), young women during their pregnancies may have unrealistic fantasies of motherhood, but these views likely disappear with the birth of the child, if not before.

A "Pollyanna" is someone who is foolishly or blindly optimistic. It is reasonable to assume that a teenager with a young child would quickly lose her "Pollyanna-like" attitude as they have an increasing number of sleepless nights, a lack of time with friends, and decreasing amount of money to spend on themselves. However, the current study posits that a realistic, yet optimistic, view of one's situation may be beneficial to an adolescent mother's mental health.

On the other hand, there is evidence that being depressed can lead to bias in reporting past stressful events (Cohen, Towbes, & Flocco, 1988). It follows that answers to questions regarding the adequacy of one's resources may not always be accurate, as depressed persons may be more likely to recall times and events when their resources were not adequate, whereas non-depressed persons may be more likely to recall times and events

when their resources were adequate. Responses to items regarding resources may be more of a symptom rather than a precursor to depression.

The high rates of depression among adolescent mothers 14 months after the birth of their child warrants discussion. In this sample, 16% of teen mothers were probably depressed, and 24% of teen mothers were possibly depressed. Because no other identified studies have used the 20-item CES-D measure to explore depression among adolescent mothers, it is difficult to compare these rates. Other research has suggested that 45-60% of adolescent mothers report depressive symptoms (Colletta, 1983; Deal & Holt, 1998; Reis, 1988). Wiemann and colleagues (1996) found lower rates of depression and anxiety than some older studies (e.g., Steer, School, & Beck, 1990; 1991), leading the authors to suggest that relaxing social norms were responsible for less psychological distress. However, the results of this research indicate that depression among adolescent mothers is still a significant problem that greatly deserves more attention and research. The ramifications of depression among this population are numerous. For instance, depression among adolescent mothers is related to rapid repeat pregnancy (Gilmore, Lewis, Lohr, Spencer, & White, 1997), less economic success (Danzinger et al., 2000), and poor physical health (Prodromidis, 1994).

Although it is reasonable to assume that teen pregnancy and parenthood are stress-provoking, the actual pregnancy and parenthood may not be the initial causes of depression. Obviously, if teen pregnancy were a random event, we could say that the high rate of depression among these young women is due to pregnancy and childbearing. However, this is not the case, as a selection bias is present. Adolescents who become pregnant differ from other teens in many ways, and they may be more prone to depression beforehand. In fact,

research (Kosunen, Kaltiala-Heino, Rimpela, & Laippala, 2003) has suggested that adolescents who are depressed have an increased number of sexual partners and may be less likely to use contraception. If it is true that depressed teens have more partners and are less likely to use contraception, this would provide evidence that depressed adolescents are more likely to become pregnant than non-depressed adolescents. Perhaps depression predisposes teenagers to becoming parents, or at least to conceiving a child.

It has been well-documented that young women who live in poverty are more likely to become pregnant and give birth than other young women (Chilman, 1989). There is also strong evidence of a relationship between economic strain and depression among women (Brown, Brody, & Stoneman, 2000; Brody, Stoneman, & Flor, 1995; McLoyd, Jayaratne, Ceballo & Borquez, 1994). Is the rate of depression in this sample high because these young women are parenting or because these young women are poor? According to Luker (1996), poverty is the key issue. For the most part, adolescent mothers were born into families of low socioeconomic status and grew up in poverty in disadvantaged neighborhoods. Many had early years that were plagued by violence and abuse. These are factors that predispose young women to depression before a pregnancy even occurs. If we are to follow this logic, these mothers may have been depressed even if they had waited to have children.

Although rates of teen parenthood have declined in recent years in the U.S. (Alan Guttmacher Institute, 1999), the high depression rates among low-income teen mothers in this sample suggests that adolescent childbearing is certainly not a social issue that has been "solved." Even if there are fewer teen mothers, their likelihood of depression among young women who become parents begs for attention, as maternal depression is not an issue only

affecting a mother. Children of depressed mothers are likely to experience many negative consequences, such as attention-deficit disorder, conduct disorder, academic difficulties, social problems, and attachment disorders (Beardslee, Bemporad, Keller, & Klerman, 1983; Dumas, 1986; Friedlander, Weiss, & Traylor, 1986; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; NICHD, 1999; Webster-Stratton & Hammond, 1988). Research has shown that mother-infant interactions are negatively affected by maternal depression (Murray, 1992; Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985).

An obvious, but not so simple, way to reduce depression among teen mothers is to reduce teen motherhood. This has been the direction of programs since 1980s, and these programs have been somewhat effective. Of course, depression and teen pregnancy could be thought of as two consequences of poverty (Luker, 1996). In this case, the most logical solution would be focus energy and effort on programs to help low-income children and families.

Researchers in the area of adolescent pregnancy and parenthood, based on the results of this study and the suggestions of other authors (e.g., Schinke, 1998) may be wise to conduct studies that investigate the actual thoughts and feelings of young women who experience motherhood. Gaining insight on these issues could include asking questions such as "What is it like to be pregnant from the perspective of a teenager?" to guide research (Spear, 2004). Some scholars (e.g., Spear, 2001; 2004) have criticized the plethora of research on teen pregnancy and parenthood that focuses solely on incidence and prevalence rates, socioeconomic status, and family structure, without giving attention to the experiences and perspectives of adolescent mothers after their birth. As Lesser, Anderson, and Koniak-Griffin (1998) have stated, "While there is a growing body of research in the

areas of adolescent parenting and parenthood, less is known about the personal experiences of these teens" (p. 8).

Professionals who work with pregnant and parenting young women may be more interested in what this research means in terms of counseling and providing programs for this population. A key finding regards the importance of a young mother's perceptions of her resources. Her own perceptions far exceed her income and education in predicting depression. In screening adolescent mothers who may be at risk for depression, it would be wise for professionals to ask questions about a young woman's views of her situation. For example, a teen mother may have a job that is seen by the counselor and the public as low-level and menial. However, whether the teen mother herself feels that the job is adequate may be more important than other's views in predicting her mental health. Intake checklists at at-risk pregnancy clinics may quickly assess a mother-to-be or new mother's situation using a broad series of questions. Depth, as well as breadth, may be a key to determining how a young woman is handling the situation in terms of coping and mental health. Taking time and listening to her responses, rather than hastily rating objective resources, may be a valuable tool for professionals who work with pregnant and parenting teens.

Another important lesson from this study involves the negative relationship between depression and self-perceived resources. Teen mothers who are less depressed are those teen mothers who see their situation in more of a positive light. The findings of this study suggest that their objective resources, such as income and education, are not strongly related to their perceptions of their resources, so it is not the case that their situations are simply much better than other teen mothers. While this is most likely a bidirectional relationship, it may be useful for professionals working with this population to be aware of

the link between depression and perception. Focusing on the strengths of teen mothers and their families may help to ward of depression.

Studies have examined the effects of optimism on mental health (Scheier & Carver, 1992). Research by Carver and Gaines (1987) has examined the impact of optimism on depression among a group of women having their first child. The women completed an optimism measure and a depression measure in their final trimester of pregnancy. Three weeks after the birth, they completed the same measures. Optimism at time 1 was negatively associated with depression at time 2, even when the initial depression measure was controlled. Among new mothers, optimism predicted changes in depression across time. Those women who were more optimistic were less likely to become depressed. Similar results have been found with other populations (e.g., Aspinwall & Taylor, 1992). Although no causal relationships can be implied by the present study, there is a chance that adolescent mothers with more positive perceptions of their situations were less depressed, at least in part, due to those positive perceptions.

How might optimism or positive thinking help someone be less depressed and more psychologically healthy? Optimists may have more adaptive coping skills than pessimists (Scheier & Carver, 1992). They are more likely to have a focused plan to deal with a problem, and more intent on growing personally out of adversity. Optimists are also likely to accept the reality of their stressful situation. Whereas optimists have coping strategies defined as positive, pessimists cope negatively by denying problems exist. Pessimists may quit when difficulties arise. Research (Aspinwall & Taylor, 1992) on adjustment in college students has suggested that optimists adjust better psychologically to new situations than pessimists at partly because the optimists have better coping techniques.

Although hypotheses regarding age, ethnicity, and urban/non-urban environments were not supported, this research provides valuable information and future direction for those in the area of teen pregnancy. First and foremost, the link between self-perceived resources and depression should not be ignored. Future researchers would be wise to focus on a young woman's view of her situation. It would be useful to tease apart the causal relationship between self-perceived resources and depression by assessing both among teen mothers at several points in time. If a young women's perceptions of her strengths impacts her level of depression at a later point, social workers and nurses would be helping to prevent depression by guiding clients to emphasize the positive aspects of their motherhood.

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Appendices

Table 1. Descriptive statistics.

	Mean	*SD*	*Min*	*Max*
Family income per year	7,720.00	10,824.00	0	53,000.00
14-month depression	14.94	10.60	0	56
36-month depression	7.94	6.30	0	32
Self-perceived resources	3.70	.59	1.20	5

Table 2. Zero-Order Correlations.

	Education	*Income*	*Age*	*Self-perceived resources*	*14 mo. Dep.*	*36 mo. Dep.*
Education						
Income	.02					
Age	.44**	-.01				
Self-perceived resources	.12**	.02	.00			
14 mo. Dep.	-.09*	-.02	.02	-.32**		
36 mo. Dep.	.03	-.04	-.01	-.19**	.50**	
Family RUCC	.07	-.04	.12**	.17**	.00	.04

*$p < .05$
**$p < .01$

Table 3. Regression model 1 (depression at 14 months).

	Std. Beta	t	Std. Beta	t
Age	.08	.12	.05	1.17
Income	-.02	-.45	-.02	-.37
Education	-.13	-2.62**	-.08	-1.75
Self-perceived resources			-.31	-7.26**

*$p < .05$
**$p < .01$

Table 4. Regression model 2 (depression at 36 months).

	Std. Beta	t	Std. Beta	t	Std. Beta	t	Std. Beta	t
Age	-.03	-.67	-.03	.48	-.03	-.69	-.03	-.76
Income	-.02	-.63	-.02	-.62	-.01	-.02	.02	-.62
Education	.03	.68	.03	.77	.58	2.42*	.58	2.49*
Self-perceived resources			-.04	-.92	.38	2.20*	.34	2.09*
14 month dep	.50	13.00**	.49	12.01**	.49	12.10**	.49	12.19**
Self-perceived resources*education					-.74	-2.45*	-.71	-2.83*
Self-perceived resources*income					-.16	-.73		
Education*income					.14	.78		

*$p < .05$
**$p < .01$

Table 5. Regression model 3 (depression at 14 months).

	Std. Beta	t	Std. Beta	t
Education	-.07	-1.67	-.08	-1.52
Income	-.02	-.42	-.08	-1.42
Self-perceived resources	-.32	-7.60**	-.30	-5.88**
European-American	.08	1.71	.08	1.45
Hispanic	-.03	.72	-.01	-.09
Other	.05	1.09	.13	1.44
Education*urban/non-urban			.09	.52
Income*urban/non-urban			.12	1.82
Self-perceived resources*urban/non-urban			-.11	-.65
European-American*urban/non-urban			-.02	-.28
Hispanic*urban/non-urban			-.05	-.66
Other*urban/non-urban			-.11	-1.19

*$p < .05$
**$p < .01$

Table 6. Regression model 3 (depression at 36 months).

	Std. Beta	t	Std. Beta	t
Education	-.03	-.62	-.10	-.17
Income	-.03	-.62	-.04	-.67
Self-perceived resources	-.20	-4.57**	-.21	-3.98**
European-American	.07	1.40	.07	1.16
Hispanic	-.06	-1.37	.01	.15
Other	-.05	-1.00	.11	1.16
Education*urban/non-urban			-.07	-.40
Income*urban/non-urban			.04	.57
Self-perceived resources*urban/non-urban			.09	.52
European-American*urban/non-urban			.02	.33
Hispanic*urban/non-urban			-.11	-1.47
Other*urban/non-urban			-.19	-1.90

*$p < .05$
**$p < .01$

Table 7. HLM models (depression at 14 months).

	Model 1 (fully conditional)	*Model 2 (means as outcomes)*	*Model 3 (ANCOVA)*	*Model 4 (Contextual)*	*Model 5 (Random int; fixed slope)*	*Model 6 (Random int. & slope)*
FIXED EFFECTS						
Individual level						
Lapse 14			.06 (.10)	.06 (.08)	.07 (.08)	.11 (.10)
Self-perceived resources			-5.36** (1.32)	-5.36 ** (1.31)	-5.28** (1.16)	-4.62** (.86)
Education			-.36 (.29)	-.36 (.28)	-.36 (.30)	-.53 (.30)
Income			.00 (.00)	.00 (.00)	.00 (.00)	
Age			.46 (.28)	.46 (.24)	.48* (.22)	.66* (.27)
Site level						
RUCC		.01 (.27)		.01 (.27)	.01 (.27)	.00 (.25)
Cross-level interactions						
RUCC*lapse 14					.06 (.07)	-.01 (.10)
RUCC*self-perceived resources					-.04 (.68)	-.36 (.48)
RUCC*education					.05 (.15)	.00 (.15)
RUCC*income					.00 (.00)	
RUCC*age					-.10 (.25)	.00 (.28)
RANDOM EFFECTS						
Individual-level variance, σ^2	97.30	97.34	87.85	87.88	88.22	80.33
Site-level variance, t_{00}^2	4.28	4.70	4.55	4.96	4.95	5.19
Lapse slope						.12
Self-perceived resources slope						8.79**
Education slope						.88
Age slope						.68
CONSTANT	15.04 (.68)	15.04 (.65)	15.04 (.68)	15.04 (.65)	15.04 (.65)	15.06 (.63)

*$p < .05$

**$p < .01$

Note: Numbers in parentheses are standard errors.

Table 8. HLM models (depression at 36 months)

	Model 1 (fully conditional)	*Model 2 (means as outcomes)*	*Model 3 (ANCOVA)*	*Model 4 (Contextual)*	*Model 5 (Random int; fixed slope)*	*Model 6 (Random int. & slope)*
FIXED EFFECTS						
Individual level						
Lapse 36			.04 (.04)	.04 (.04)	.04 (.04)	.06 (.04)
Self-perceived resources			-.82 (.50)	-.82 (.50)	-.85 (.50)	-1.02 (.49)
Education			-.04 (.17)	-.04 (.17)	-.02 (.18)	.08 (.16)
Income			.00 (.00)	.00 (.00)	.00 (.00)	
Age			-.11 (.10)	-.11 (.10)	-.13 (.10)	-.23 (.13)
Depression at 14 months			.29** (.03)	.29** (.03)	.29** (.03)	.29** (.03)
Site level						
RUCC		.18 (.18)		.18 (.18)	.18 (.18)	.18 (.18)
Cross-level interactions						
RUCC*lapse 36					.02 (.02)	.03 (.02)
RUCC*self-perceived resources					.05 (.38)	.05 (.36)
RUCC*education					-.07 (.11)	-.05 (10)
RUCC*income					.00 (.00)	
RUCC*age					.08 (.14)	.02 (.13)
RANDOM EFFECTS						
Individual-level variance, σ^2	38.74	38.74	29.67	29.67	29.97	27.93
Site level variance, t_{00}^2	1.02	1.08	1.28	1.34	1.33	1.40
Lapse slope						.00
Self-perceived resources slope						1.95**
Education slope						.18
Age slope						.10
Depression 14 slope						.01
CONSTANT	8.06 (.38)	8.08 (.36)	8.08 (.36)	8.09 (.35)	8.09 (.35)	8.09 (.35)

*$p < .05$
**$p < .01$

Note: Numbers in parentheses are standard errors.