Adult Depression and Chronic Conditions:

Chains of Risk Exposure from Childhood and Adulthood Outcomes

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Abstract

In this study, I examine the extent to which childhood family conditions increase the odds of reporting depression and/or chronic conditions in adulthood using data from the National Comorbidity Study-Replication (NCS-R). Although there is a growing body of sociological literature addressing the implications of mental health on physical health, more research is needed to identify particular profiles of risk for depression and physical health. Exposure to stressful life conditions in childhood can lead to the 'embodiment' of context, resulting in increased likelihood of adulthood health conditions and additional adulthood risk factors. The results illustrate that adults with depressed mothers had increased odds for major depression with and without chronic health conditions. In addition to childhood conditions, welfare receipt, marital status, and employment in adulthood are also associated with mental and physical health. These findings dramatically illustrate the far reaching influence of childhood family context on adult health and life chances.

Adult Depression and Chronic Pain: Examining the Relationship between Childhood Family Context and Health in Adulthood

Although research in the biomedical tradition has demonstrated important linkages between mental and physical health (e.g., Kiecolt-Glaser and Glaser 2002; Hertzman 1999), social scientists have been slow to recognize and incorporate these dimensions of health into conceptual and quantitative models. Studies that incorporate both mental and physical health demonstrate complex relationships between social context, mental health, physical health, and health behavior (Foster et al. 2008; Gorman and Read 2006; Herd et al. 2007; Lorenz et al. 2006). Earlier in life, exposure to parental psychological distress can leave individuals susceptible to later mental health problems, suggesting an intergenerational transmission of disparate life chances through health in adulthood. Furthermore, mental and physical illnesses in families do not occur in isolation, with individuals in lower socioeconomic strata being more susceptible to health problems over the life course (Link and Phelan 1995; Mirowsky and Ross 2003). Because the risk of morbidity and mortality dramatically increases for those who are depressed (Carney et al. 2002; Brown 1990), the cost of personally experiencing depression, or growing up in a family with a depressed parent, is a serious public health concern as approximately 16% of the general population has experienced major depressive disorder in their lifetime (Kessler et al. 2003).

While there is a substantial body of social science literature examining the contextual predictors of depression as an outcome and its' association with health-risk behaviors, coping strategies, and coping resources (i.e. forms of social support; McLeod and Fettes 2007; Thoits 1995), there are fewer studies exploring the associations between the presence of mental *and* physical health problems in adulthood and their association with childhood family context. In addition, less is known about *how* constellations of risk factors may change based on the

combinations of health conditions examined. In this study, I integrate a life course epidemiologic perspective and the family stress model into an analysis utilizing data from the National Comorbidity Study-Replication, to 1) assess whether chronic health conditions and major depression are significantly related outcomes; 2) examine the extent to which maternal depression and parenting behaviors mediate the relationship between childhood family poverty and lifetime major depression and chronic health conditions in adulthood; 3) assess which potential adulthood risk factors are associated major depression and chronic health conditions; 4) how risk factors may vary based on the presence of depression versus chronic conditions. Thus, the central goal of this study is to identify social characteristics that are linked to mental *and* physical health problems in adulthood.

The case of depression and chronic conditions

While there is a debate about the causal relationship between depression and physical health conditions, there is a sizeable medical literature demonstrating the link between depression and physical health conditions, especially cardiovascular disease (Carney et al. 2002). Clinical research, however, also indicates that pain is 'inextricably linked to depression [sic]' and can increase the severity of chronic disease and risk of morbidity (Kiecolt-Glaser et al. 2002; Fifield et al. 1998). While the biological mechanisms linking the conditions are not completely clear, we know that psychosocial well-being is associated with human immune function through the body's physiological response to social stressors (Fremont and Bird 2000). Specifically, individuals who report experiencing depression are also more likely to suffer from immune dysregulation or suppression (See Fremont and Bird 2000 for review).

Epidemiology and medical sociology research consistently demonstrates that individuals of lower social status are more susceptible to chronic health conditions and psychological

disorders (Robert and House 2000). In their discussion of the links between differential social status and health outcomes, Mirowsky and colleagues suggest that sociologists must consider examining mental and physical health conditions simultaneously as 1) conditions promoting physical well-being also promote psychological well-being (i.e. education level); 2) some physiological and mental health conditions are associated with one another; 3) symptoms such as fatigue and chronic pain can be results of both physical disease or emotional strain; and 4) the body's endocrine and nervous systems are linked to both mental and physical health (Mirowsky et al. 2000). Studying the potential co-occurrence of physical and mental health conditions in order to ascertain the contextual pathways through which these outcomes either do, or do not, co-occur will paint a richer picture of how health manifests over the life course and how family contextual factors social contribute to them.

Intergenerational Transmission of Health

There has been a shift in perspective in studying the etiology of adult illness from focusing primarily on adulthood behavioral and health characteristics to identifying and examining accumulated risks over the life course beginning from childhood (Kuh and Ben-Shlomo 1997). Kuh and Ben-Shlomo provide an overview of the life course epidemiologic approach to chronic disease. One conceptual approach they suggest is the 'chains of risk model,' which posits that individuals' exposure to environmental or behavioral insults may cluster together in 'socially patterned' ways, having long-term health consequences (see also Link and Phelan 1995). For example, children living in families of low socioeconomic status are at increased risk for having parent with elevated levels of distress or even psychological disorders (i.e. depression) due to chronic stress associated with economic hardship. These conditions may culminate in parenting behaviors that are harsh and inconsistent, thus potentially influencing their children's own

biological and emotional processing responses to stress in the home culminating in developmental challenges such as externalizing and internalizing behaviors through childhood and adolescence (Repetti et al. 2002). These developmental processes are associated with adulthood life chances including lower high school completion and increased likelihood of adulthood mental and physical health problems. As illustrated, this is a cluster of risk factors are related to one another and contributing to subsequent life chances. Moreover, as contextual stressors that are experienced in particular life stages, these conditions may imprint biological and emotional effects on the body - in other words, the 'emodiment' of adverse social conditions (Ben-Shlomo et al. 2003).

Health and Stressful Childhood Family Context

The consequences of low socioeconomic status for families include increases in the likelihood parents experience mental health problems such as depression, which increasing the risk of harsh and inconsistent punishment of their children and emotional withdrawal according to the family stress model (Elder and Shanahan 2007; McLoyd 1998). These parenting behaviors are associated with declines in children's mental and physical well-being and have lasting consequences through adulthood. Specifically, children who experience stressful family contexts with harsh and inconsistent parenting are more likely to have higher levels of externalizing and internalizing behavior problems through adolescence (Goosby 2007; McLoyd 1998), engage in more risky behaviors through adulthood (e.g. early sexual behavior and delinquency; Costello et al. 1999), report lower subjective health ratings (Wickrama et al. 1997) and have lower educational attainment (McLeod and Kaiser 2004). Moreover, there is evidence that children also influence their parent suggesting that family interactions can potentially lead to continuous cycle of risk for particular health risks (Hawkins et al. 2007). These outcomes are

part of complex, dynamic processes in which participants are embedded in the each other's life course state.

Poverty is a specific stressor addressed by the family stress model, which is related to long term health consequences and socioeconomic status in adulthood. Adults who experience poverty in childhood are more likely to experience ill health in adulthood, live in poverty, and to receive welfare (Nielsen et al. 2004). Moreover, among the poor, those who receive government assistance in the form of Temporary Assistance to Need Families (or AFDC before 1996), food stamps, or the special supplemental feeding program for Women, Infants, and Children (WIC) are more likely to suffer from chronic health problems and disability (Danzinger et al. 2002). In addition, both physical and mental health are related to labor force participation where individuals experiencing ill health in both childhood and adulthood are less likely to participate in the labor force.

Chains of Risk into Adulthood

Within the life course chronic disease epidemiologic model, exposure to harmful or stressful life events can increase the risk on additional stressors over the life course. Figure 1 illustrates the conceptual relationship linking poverty in childhood and adolescence to the subsequent impact on family health, environment, and adulthood health status. As illustrated by the family stress model, disadvantage in childhood and adolescence can leads to long-term consequences in adulthood through parents mental health and stressful family context. Indeed, the reproduction of socioeconomic status, health, and family outcomes are shaped by childhood and adolescent family context due to constraints and opportunities available based on family SES (Walsemann et al. 2009). Moreover, in adulthood, vulnerability to health problems are linked both with early biography and adulthood processes. For example, individuals who grow up in economically

disadvantaged circumstances are more likely to have earlier onset of psychological problems (Gilman et al. 2003). Furthermore, suffering from psychological disorders in adulthood is associated with being both economically disadvantaged (Robert and House 2000) and at increased risk of marital disruption (Kessler et al 1998).

There are, however, distinctions in the characteristics of individuals who are vulnerable to experiencing depression and chronic conditions. Women, for example, are more likely to suffer from elevated levels of depression and to report more functional impairment relative to men (Gorman and Read 2006; Reiker and Bird 2000). Marital status is also associated with mental and physical well-being, with women who experience divorce reporting higher levels of distress and physical illness relative to married women (Lorenz et al. 2006). Educational attainment, an indicator of socioeconomic status, and highly correlated with income, is also associated with lower levels of depression and better physical health relative to those with less education and income (Mirowsky and Ross 2003). There is evidence, however, that health selection (individuals in ill health are less likely to successfully achieve higher status attainment), and social causes (individuals are exposed to stressful life events that contribute to worse health) play a role in health and economic attainment (Goosby and Cheadle 2009; Miech 1999; Kessler et al. 1995). In addition, race and ethnic difference in physical health demonstrate that African Americans are more likely to suffer from certain physical illnesses including hypertension, diabetes, and particular types of cancer (Dressler et al. 2005), however, the evidence around race/ethnic differences in mental health are mixed. African Americans are less likely to report elevated levels of depressive symptomatology, but are more likely to have more debilitating levels of depression when present (Williams et al. 2007).

Building on prior research examining the intergenerational transmission of health and studies including more inclusive indicators of health, this study examines whether certain risky family characteristics in childhood are associated with lifetime diagnosis of major depression and chronic health conditions. In addition, I examine the extent to which these family characteristics associated with different constellations of etiology. Guided by a life course epidemiologic perspective and the family stress model I use data from the National Comorbidity Study Replication (NCS-R), I address the following questions: 1) Are major depression and chronic pain endogenous outcomes in the family stress process? 2) Moreover, does having a mother who experiences prolonged episodes of depression and particular parenting behaviors mediate the relationship between childhood poverty and the likelihood of experiencing depressive symptomatology and/or chronic pain in adulthood? 3) Which adulthood characteristics contribute to risk of reporting major depression and chronic health conditions, and 4) Do profiles of risk vary by combination of health conditions?

Data and Methods

Data

The U.S. National Comorbidity Survey Replication (NCS-R) is a nationally representative survey of adults ages 18 and older. Face-to-face household surveys were given to 9,282 English-speaking adults between 2001 and 2003 in the coterminous United States based on a multi-stage clustered area probability sample design (Kessler et al. 2004). The response rate for the full sample was 70.9%. The survey consisted of two parts. Part I of the survey was administered to all respondents in the study with data collected on demographic characteristics and diagnostics assessments. Part II of the survey was administered to a subsample of 5692 respondents, a portion of whom met criteria for at least one mental disorder in the Part I screening. The Part II

portion of the survey included additional questions about psychological disorders and their correlates.   Analyses here were performed on the Part II portion of the sample which was weighted to adjust for differential probabilities of selection. Approximately 996 missing cases were dropped in the multinomial logit analysis due to listwise missing on the covariates, however, sample weights applied adjust for non-response in the sample.   There was little difference in weighted proportions of characteristics for the analytic sample used in the regression analysis relative to the full sample (see Table 1).

As noted previously, the data was obtained using a multistage probability sample in order to adjust for multiple levels of nesting within standard metropolitan statistical areas (SMSA) and primary sampling units (PSUs). To account for the non-independence of observations due to clustering, all analyses are conducted in Stata 10 using the built-in survey procedures which adjust for the complex survey design (StataCorp 2007).

Measures

Dependent Variables

Lifetime major depression is a dichotomous variable assessed using the Diagnostic and Statistical Manual of Mental Disorder version 4 (DSM-4). *Chronic Pain* was a dichotomous measure created from a battery of questions in the NCS-R about physical health problems, which ask the following questions: Have you ever had 1) arthritis/rheumatism, 2) chronic neck or back problems, 3) frequent or severe headaches, and   4) any other chronic pain? The individual items (alpha=.49) were condensed into a dichotomous measure where 0=having no chronic pain and 1=answering 'yes' to one or more chronic conditions.

Childhood Family Characteristics

The primary measure of the respondents' mothers' depression was measured using an item for *maternal depression.* This was a dichotomous variable asking, "During the years you were growing up, did your mother or the woman who raised you ever have periods lasting 2 weeks or more where she was sad or depressed most of the time?" (0=no; 1=yes).

Because maternal affect, closeness, and parenting behavior are associated independently with children's mental health (Repettie et al. 2002) the following measures were included: *Maternal/guardian closeness,* measured by asking 1) "How emotionally close were you with her while you were growing up - very close, somewhat, not very, or not at all?" and *Maternal love,* measured by asking 2) "How much love and affection did she give you? -- a lot, some, a little, or not at all?" The final of maternal parenting behavior was measured using *Frequency of physical punishment.* The item was measured with following question, "How often parent/guardian push, grab, shove, throw something, slap, or hit you?" Responses were coded 1=never; 2=rarely; 3=sometimes; 4=often.

Government assistance in childhood is associated with lower levels of educational attainment (Ku and Plotnick 2003) as well as higher rates of depression and physical illness (Danzinger et al. 2002). Here it is used here as a proxy, albeit imperfect, for poverty in childhood. Government assistance receipt was measured using a dichotomous measure asking if the family received government assistance for six months or more during childhood or adolescence (0=no; 1=yes).

Adulthood characteristics

A variable for *government assistance in adulthood* was asked as follows, "Have you ever received public assistance or welfare since turning age 18 - such as Aid to Families with Dependent Children, General Assistance, or Temporary Assistance for Needy Families?" (0=no;

1=yes). Additional adulthood characteristics included *employment status*, measured using a set of three dichotomous variables: (1) employed (the reference category) (2) unemployed (seeking work), and (3) not in the labor force. Respondents' *Race and ethnicity* was measured with 'white' as the reference category and dummy variables for black, Hispanic, and other. Given the small number in the Asian and 'other' category, the two categories were combined to maintain appropriate statistical power for the analyses. *Sex* was measured where male=0 and female=1. *Marital status* was categorized as two dummy variables for never married and divorced or separated, with married as the reference category. Respondents' highest level of *education* was measured using a continuous measure in years of education (range: 4 years to 17+ years). The *log of income* was measure respondents' current household income. Respondents' *age* was measured using the continuous measure in years of age and age^2.

Analytic Design

In order to examine depressive symptomatology, chronic pain, or both, the two dichotomous measures for depressive symptoms and chronic pain were combined into a four-category nominal scale and modeled and analyzed using the multinomial logit model (Long 1997). The four categories were (1) no depression or chronic pain (reference) (2) depression only, (3) chronic pain only, and (4) depression and chronic pain. This approach has an advantage in that there is no need to make directional assumptions about the relationship between depression and chronic pain which are likely to be endogenous. The results for the multinomial models are reported in Tables 2-4 by each outcome category. The second set of multinomial logistic analyses in Table 5 identify how childhood and adulthood risk factors may contribute to the risk of experiencing depression and chronic conditions relative to experience either condition alone. These results come from the same regression equations but are discussed separately to keep the discussion

organized. In the Table 5-M1, depression only is the reference category and is compared to the risk of experiencing either chronic conditions only and both. In Table 5- M2, chronic pain is the reference category and is compared to the risk of experiencing both depression and chronic health conditions.

Results

Descriptive Results

Table 1 provides the weighted descriptive statistics for both the full sample and the analytic sample. Because the characteristics look similar for both samples, the results focus only on the analytic sample. Looking at the Table 1 sample characteristics, it appears that major depression and chronic pain are potentially comorbid outcomes, as 13% of adults reported experiencing both chronic pain and depressive symptoms. Approximately a 41% of the sample reported no experience with major depression or chronic pain and approximately 6% of the sample reported having had major depression in their lifetime and 40% reported having only chronic pain. The Pearson's χ^2 test results confirm that major depression and chronic pain are significantly associated outcomes (χ^2=137.67; df=42; p=.000)[i].

Among childhood familial characteristics that put children at risk for health and mental health problems in adulthood, approximately 20% of the sample reported having a mother who had bouts of depression lasting two or more weeks. Approximately 9% of the sample reported receiving government assistance for 6 or more months during childhood or adolescence. Closeness to mother and how much respondent felt loved by their mother had similar distributions with the majority of the sample reporting that they were very close to their mothers and felt loved by their mothers (.68 and .76 respectively). Finally, 61% said their parents never physically punished them, 19% reported rarely receiving physical punishment, and the remainder reporting punishment sometimes (15%) and often (6%).

[Table 1 about here]

Multivariate Models: Depression and Chronic Pain

Table 2 addresses whether maternal depression and particular parenting behaviors increase the likelihood of experiencing depressive symptoms, chronic pain or both in adulthood. Using multinomial logistic models, I examine which family characteristics increase the odds of experiencing being in depression, chronic pain, or both relative to having no symptoms. For clarity, models for each of the three outcomes are reported in three separate tables (Tables 2-4), with 'no symptoms' being the reference category in each of the tables. Table 2 includes model results for reporting depression only, while Table 3 reports results for chronic pain only. Table 4 reports results for chronic pain and depression. For Tables 2-4, the first three models include childhood family characteristics along with respondents' individual characteristics (race, gender, and age). The final Model (M4) is the full model including the entire variable list, including adulthood characteristics including welfare receipt, family structure, marital status, and employment status. In Table 5, the multinomial logit models report full multivariate models, where depression and chronic health conditions are the reference categories and compares the risk of experiencing one illness relative to having both conditions.

Depression Only

The results for Table 2 indicate that poverty in childhood measured by AFDC receipt for 6 or more months, is not associated with the odds of being diagnosed with lifetime major depression relative to no symptoms in M1. In model 2, however, maternal depression significantly increases the odds of major depression. Adults who report their mothers experiencing two or more weeks of depression have an increased risk of reporting depression relative to no symptoms at all (odds=2.269). The significant relationship between maternal depression and adulthood

depression persists across models. In addition, among the parenting behavior and affection variables included in M3, are not significantly associated with the odds of lifetime major depression. Conversely, increased physical punishment in childhood increase the odds of reporting depression in adulthood (odds=1.23). Upon including adulthood characteristics in M4, maternal love and closeness are rendered non-significant, while parental physical punishment remains significant. Among the adulthood characteristics, those who are divorced are at a notable risk for reporting depression relative to those who are married (odds=2.15). In addition, other notable characteristics in the model include race, where African Americans have a lower risk of reporting depression, a result that persists across all four models. In addition, females are consistently at increased risk for reporting depression.

[Table 2 about here]

Chronic Pain

In Table 3, the results demonstrate the maternal depression mediates the relationship between childhood family AFDC receipt and the odds of reporting health problems in adulthood. In M1, family AFDC receipt in childhood increases the odds of reporting chronic pain (odds=1.32). However, in M2, adults who report having a mother who experiencing depression increased the likelihood of reporting adulthood chronic pain by 66% while welfare receipt in childhood was no longer significant. Additionally, in M3, increased frequency of physical punishment increased the odds of reporting chronic pain in adulthood by 23%. Diverging from Table 2 results, with the introduction of adulthood characteristics in M4, adulthood welfare receipt increases the odds of reporting chronic pain only, while higher levels of education slightly reduce the risk of reporting chronic pain (odds=1.65 and .94 respectively). Finally, among individual characteristics, a similar pattern emerges among African Americans, who have a reduced

likelihood of reporting chronic pain relative to reporting no conditions, while women are at increased risk of reporting chronic pain.

[Table 3 about here]

Chronic Pain and Depression

In Table 4, which reports the model results for the odds of reporting depression and chronic pain relative to reporting no symptoms, poverty in childhood has a markedly higher magnitude of risk for comorbidly experiencing depressive symptoms and chronic pain relative to the risk for each outcome individually. Childhood welfare receipt in M1 doubles the odds of reporting chronic pain *and* depression relative to no symptoms (odds=2.02). Additionally, maternal depression in M2, which mediates the effect of childhood family AFDC receipt, increases the odds of reporting chronic pain and depression in adulthood by a factor of 3.6 for each standard deviation increase. As in Tables 2 and 3, maternal depression remains a strong predictor of health outcomes in adulthood. In M3, where parenting behaviors and affection are included, parental love and affection do not significantly contribute to the risk of reporting chronic pain and depression while physical punishment increases the odds of reporting chronic pain and depression (odds=1.58). In the full model (M4), along with maternal depression (odds= 2.98) and physical punishment (odds=1.49), adults who report receiving government assistance are at increased odds of reporting chronic pain and major depression (odds=1.96). Those who are not in the labor force or divorced are also at markedly higher risk of reporting chronic pain and depression (odds=1.54 and 1.98 respectively). As in previous models, African Americans are at a reduced risk of reporting chronic pain and depression and women are consistently at a substantially higher risk of reporting chronic pain and depression.

[Table 4 about here]

In sum, across models, the results indicate that while family poverty is associated increased of mental and physical health problems, the relationship is mediated by maternal depression.   Along with maternal depression, parenting behavior in the form of physical punishment consistently play a role in adult reports of depression and chronic pain. Among adulthood characteristics, adults who reported receiving government assistance increased the risk of reporting chronic pain and/or depression, while those who are divorced are at a higher risk of reporting depressive symptoms and/or chronic pain, while not being in the labor force predicts reporting depression and chronic pain.   Among the individual characteristics, being female increases the odds of reporting both depressive symptoms and/or chronic pain. Finally, African Americans have a lower risk of reporting both chronic pain and/or depressive symptoms in all model results.

Etiology of Risk

Table 5, reports estimated models where the reference categories are major depression in Model 1, chronic pain in Model 2, and both depression and chronic pain in Model 3 in order to examine potential differences in risk profiles. In other words, do risk factors in childhood and adulthood predict the likelihood of experiencing both depression and chronic health conditions relative to experiencing only major depression or chronic pain? In M1, where major depression only is the reference category, childhood adversity does not appear to be associated with the risk of reporting chronic conditions versus depression, although being divorced (odds=.495) or never married (odds=.652) along with higher educational attainment (odds=.92) reduce the odds of reporting chronic conditions relative to depression. Conversely, maternal depression and frequency of physical punishment in children both increase the risk of reporting depression and chronic conditions relative to only reporting depression. Adulthood welfare receipt (odds=1.56)

and not participating in the labor force (odds=1.89) also increase the risk of experiencing both conditions. Finally, females are at higher risk for reporting both as opposed to depression only (odds=1.86).

In Model 2 the results comparing characteristics associated with increased risk of both chronic conditions and major depression relative to only chronic pain are reported. Again, maternal depression (odds=1.94) and physical punishment (odds=1.26) increase the risk of reporting both conditions relative to only chronic pain. Among adulthood characteristics, not participating in the labor force increases the risk of reporting both chronic conditions and depression. Marital status is also a risk factor with being divorced or never married increasing the odds of reporting both conditions (odds=1.86 and 1.75 respectively). Among individual characteristics, being black or Hispanic reduces the risk of reporting both conditions while being female again increases the odds of reporting both conditions as opposed to chronic conditions only.

In sum, among those experiencing health conditions, reduced risk of experiencing chronic health conditions relative to depression appears to only be associated with adulthood marital status and level of education. The increased risk of experiencing both conditions relative to depression only, were related to both childhood characteristics (maternal depression and physical punishment) and adulthood socioeconomic factors. Finally, the risk profile for experiencing both conditions relative to reporting chronic pain only indicated that childhood family factors, labor force participation, and marital status all increased the risk of having major depression and chronic health conditions.

[Table 5 about here]

Discussion

The primary goal of this study was to explore how risky family contexts in childhood contribute to adult mental *and* physical health outcomes by examining the following questions: 1) Are major depression and chronic pain related to one another and? 2) Does having a mother who experiences prolonged episodes of depression and particular parenting behaviors help explain the relationship between childhood poverty and the increased likelihood of experiencing depression or chronic pain, or both in adulthood? 3) Which adult characteristics are risk factors for experiencing major depression or chronic pain? Finally, 4) do the etiological profiles of health conditions vary by presence of depression, chronic health conditions or both?

The findings of this study, within the chains of risk perspective and applying the family stress model, support the results of previous studies that report childhood context is markedly important in predicting adulthood life chances. One of the most compelling findings in this study was the consistent contribution maternal depression to adult mental and physical health. The intergenerational transfer of disadvantage is supported in the developmental and sociological literature noting that children who come from families where the mother experiences elevated levels of distress are at increased risk for deleterious life chances including increased risk of early onset of major depressive disorder and elevated risk of major depression in adulthood (Jaffe et al. 2002). Moreover, this study contributes to the literature in that maternal depression during childhood is not only associated with depression in adulthood, it is also associated with the likelihood of experiencing depression *and* chronic pain .

Parenting behaviors and emotional support are seen as two key mechanisms through which parents' distress is manifested. These factors, in turn, are associated with the life chance trajectories of their children (McLoyd 1998). In this study, there was no support for emotional support as a protective factor, although reporting higher frequencies of physical punishment

significantly increased the likelihood of reporting experiencing depression chronic pain. Emotional support, in this case measured by adult perceptions of emotional closeness to their parent and how much their parent loved them as a child, was not supported as an important protective mechanism offsetting stressful life events that exacerbate deleterious mental and physical health outcomes over the life course (Taylor and Seeman 1999). Evidence from previous research suggests that when less parental support is perceived by youth during adolescence, they are more likely to report an increase of physical ailments (Wickrama et al. 1997). In addition, exposure to stressful life events, such as child abuse, can lead to 'weathering' or physiological wear and tear, increasing susceptibility to physical illness and emotional distress in adulthood (Foster et al. 2008; Geronimus 1992).

Adulthood characteristics associated with mental and physical health were independently associated with adulthood health and did not mediate the maternal depression effect. Specifically, increased duration of welfare receipt increased the odds of having chronic health conditions only or both depression and chronic health conditions, while divorced respondents were more likely experience major depression or both conditions. Each of these findings support previous research that individuals who are in poverty are more likely to suffer from psychological disorders (Luo and Waite 2005) and health conditions and that individuals with psychological disorders are more likely to experience marital instability (Kessler et al. 1998).

In this study, African Americans had markedly lower odds of reporting depression and chronic pain in adulthood, while females had increased odds for reporting either chronic pain, depressive symptoms, or both. In addition, divorce increased the risk for chronic pain and depression. With a growing literature on health disparities by gender, socioeconomic status, and race/ethnicity, it is important to understand how these areas intersect in explaining differences in

health outcomes. The race differences in depression are generally the same or lower in prevalence than that of whites, although African Americans are more susceptible to a higher prevalence physical ailments (i.e.-hypertension, cancer, diabetes), earlier mortality, and report lower levels of general global health relative to whites (LaVeist 2005). This study indicates, however, that while African Americans are more vulnerable to particular illness, they are potentially buffered from other types of illness, in this case chronic pain and depressive symptoms. This study somewhat supports previous research suggesting that African Americans report similar or lower measures of depressive symptoms relative to whites (Williams et al. 2007). More research is needed to better understand *why* African Americans are less vulnerable or are less likely to report experiencing depression and chronic pain. The literature on gender disparities in mental health consistently indicate that women have higher rates of depression than men (Kessler 2006), which this study replicates. In addition, in this study, women are more likely to report chronic pain and functional impairment. Moreover, supporting previous findings, those who are divorced are also more vulnerable to physical illness and mental distress.

In examining potential etiologic differences in risk among those with depression and/or chronic conditions, there was clear evidence of variations in risk factors. Adulthood characteristics including marital status and education are related to the odds of chronic health conditions relative to major depression suggesting that the mechanism through which health is influenced by childhood factors may not include maternal depression. However, maternal depression and parenting behavior were related to reporting both chronic health conditions and depression as opposed to just one condition. The same was true participation in the labor force and marital status. These findings suggest that research is required examining the potential

social *and* biological mechanisms through which social factors influence various combinations of health outcomes.

Biological processes tie depression to rates of morbidity/mortality due to contributions to immune dysregulation, or physiological responses of the immune system. The reactivity of the immune system, in turn, leads to an increased susceptibility to physical illness (Kiecolt-Glaser and Glaser 2002). The biological reactivity of stressful life conditions is also associated with genetic predispositions. Specifically, individuals with parents who suffer from depression or other health conditions are potentially *more* vulnerable to negative reactivity in risky family environments (Taylor, Repetti, and Seeman 1997). Heritability of major depression is part of a complex interaction between genes and environment (Sullivan 2000). This study does not have the means to test physiologic response to stressful life conditions, or to measure the extent to which genes contribute to the propensity for experiencing major lifetime depression. However, in this study 7% of adults diagnosed with major depression and 13% of people with chronic conditions reported having a depressed mother and while the rates were low, they were significantly associated.

This study illustrates the potential cycle through which disadvantage, both socioeconomic and health related, can be transferred across generations. There is a marked correlation between mother's physical and mental health during her childhood and her children's subsequent mental and physical health (DeGenna et al. 2007), an outcome exacerbated by lower socioeconomic status. Extending this cycle, for parents who may experience health problems and stressors in their own childhood, there is an increased likelihood that they themselves will be susceptible not only to physiological and mental health problems, but that their children will be as well. Specifically, experiencing these stressors as parents may in turn lead to deleterious stress

response reactivity from their own children along with a likelihood of their children having decreased life chances. This argument is not meant to be deterministic, only to illustrate the increased risks present in the context of stressful experiences over the life course. There are, however, some limitations to the assumptions that can be made by this study.

Because this study relied on cross sectional data and retrospective reports of childhood experiences, I am unable to address potential endogeneity in family processes during childhood. Specifically, stressful context in the family may be bidirectional. In other words, mothers experiencing psychological distress, which can be manifested through their behavior toward their children may, in turn, lead to reactions from children in the form of emotional and/or behavioral problems or vice versa (Vandewater and Landsford 2005). The occurrence of these problems, in turn, might lead to increased distress among parents and a continuation of the cycle. In addition, as the reports in this study come from the perspective of the adults retrospectively, I am unable to decipher reporter bias regarding this study. There are, however, studies that suggest in the absence of prospective longitudinal data, retrospective data is a reliable method to obtain health histories in childhood (Molla and Lubitz 2008; Haas 2007). While these findings warrant caution, the reports given by the respondents do demonstrate that even as a *perception* of their childhood, there is a strong association between the context they report and their own psychological and physical well-being.

This study supports the findings in the biomedical literature that depression and physical health are very likely to co-occur, although I cannot specifically determine the extent to which major depression is truly comorbid with chronic pain in this sample. The two outcomes, however, are associated with approximately 13 % of the sample reporting both chronic pain and depression. Moreover, depression and depressive symptoms are cyclical, with individuals who

experience elevated levels of distress being more likely to report them again (Pearlin and Schooler 1978) and chronic conditions by definition are recurring. It may be very likely that these two conditions occur simultaneously.

Despite these limitations, this study contributes to the literature by demonstrating the importance of measuring multiple indicators of mental and physical health. Herd and colleagues (2007) posed a strong argument for the importance of social scientist including multiple indicators of health when studying the SES/health relationship. This study illustrated the importance of this process as the results of this study indicate that childhood family characteristics may differentially predict subsequent outcomes in adulthood. In this case, maternal depression and parenting behavior were associated with reporting both adult depression and depression and chronic pain, but not chronic pain only, once other adulthood and background characteristics were taken into account. However, people who report depressive symptoms are more likely to have a depressed parent *and* more likely to report chronic pain along with depression relative to those with chronic pain only.

Conclusion

The outcomes of these analyses point to the following key findings; 1) maternal depression and parenting behaviors are important for adult mental *and* physical health and 2) the risk of experiencing chronic pain and depressive symptoms together are increased by maternal depression in childhood and adolescence. This study provides further evidence that risky context in childhood is associated with subsequent health and well-being in adulthood. Moreover, this study contributes to the literature by showing that maternal mental health remains a strongly associated with adults well-being long after childhood. Further research using longitudinal data is needed to disaggregate family processes in developmental trajectories of health, mental health,

and reactivity to stress in adults who grow up in families where elevate parental distress is present. In addition, further exploration is needed on both the relationship between mental and physical health and their simultaneous contribution to risk of morbidity and mortality. By targeting outcomes of parents and youth early on, there is hope of alleviating the disparate health outcomes present in the U.S.

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Figure 1.
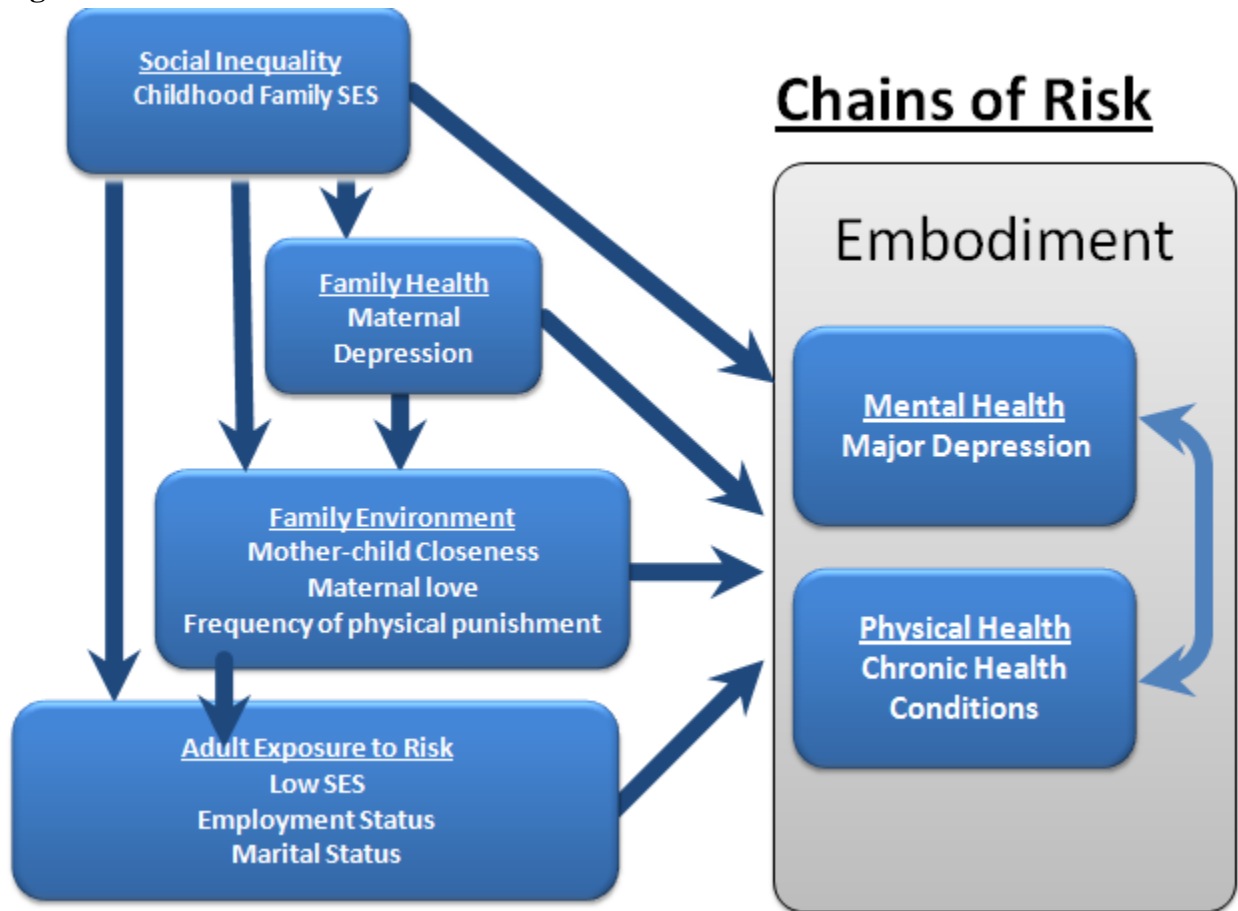
Table 1. Weighted proportions of variables for full sample (N=5692)

	Full Sample	*Analysis Sample*		*Full Sample*	*Analysis Sample*
Variable	Proportion	Proportion	Variable	Proportion	Proportion
Adulthood Depression and Chronic Conditions			*Adult respondent characteristics*		
			Welfare		
No depression/no pain	0.41		receipt since 18	0.15	0.15
Depression only	0.06		unemployed*	0.05	0.05
Chronic Pain Only	0.40		not in labor force	0.30	0.29
Depression and Chronic Pain	0.13		Black**	0.12	0.12
Risky Childhood Family Context (full sample)			Latino	0.11	0.11
Maternal Depression	0.20	0.20	Other	0.04	0.04
Closeness to mother			Female	0.47	0.54
very	0.67	0.68	divorced/separated***	0.21	0.20
somewhat	0.24	0.23	never married	0.23	0.22
not very	0.07	0.07	highest education^		
not at all	0.02	0.02	<= 12	0.49	0.47
How much did mother love you			13-15	0.28	0.28
a lot	0.75	0.76	16+	0.23	0.24
some	0.17	0.16			
a little	0.07	0.06			
not at all	0.02	0.02			
Frequency of physical punishment					
Never	0.61	0.61			
Rarely	0.18	0.19			
Sometimes	0.15	0.15			
Often	0.06	0.06			
Family Public Assistance (6+ mo	0.10	0.09			

*employed is reference category

**note-in full sample approximately 20% of the population has major lifetime depressive disorder

Table 2. Multinomial Logistic Regression Model Results for Depression only (N=4697)

Variables	no symptoms M1		(ref) M2		M3		M4	
	rrr	(se)	rrr	(se)	rrr	(se)	rrr	(se)
Childhood Family Characteristics								
family afdc receipt	0.999	(0.042)	0.816	(0.159)	0.746	(0.149)	0.671	(0.155)
maternal depression			2.269 ***	(0.299)	1.997 ***	(0.272)	1.961 ***	(0.299)
closeness to mother					0.917	(0.109)	0.861	(0.105)
maternal love					0.938	(0.119)	0.981	(0.143)
punishment					1.235 **	(0.077)	1.225 **	(0.084)
Adulthood Characteristics								
adulthood afdc receipt							1.258	(0.253)
unemployed							0.810	(0.202)
not in labor force							0.811	(0.192)
divorced/seperated							2.148 ***	(0.353)
never married							1.168	(0.259)
log income							1.057	(0.077)
highest education							1.021	(0.033)
black	0.571 **	(0.109)	0.611 **	(0.120)	0.626 *	(0.126)	0.588 *	(0.123)
hispanic	0.695 *	(0.123)	0.689 *	(0.133)	0.702	(0.137)	0.793	(0.167)
other	0.830	(0.315)	0.821	(0.305)	0.805	(0.307)	0.824	(0.306)
female	1.384 **	(0.162)	1.350 **	(0.158)	1.355 *	(0.155)	1.340 *	(0.175)
age	1.115 ***	(0.026)	1.116 ***	(0.028)	1.111 ***	(0.028)	1.078 *	(0.038)
age2	0.999 ***	(0.000)	0.999 ***	(0.000)	0.999 ***	(0.000)	0.999 **	(0.000)

*p<.05 **p<.01 ***p<.001

Note: Relative risk ratio (rrr) based on multinomial logit models are reported

Table 3. Multinomial Logistic Regression Model Results for Chronic Pain only (N=4697)

Variables	no symptoms M1	(ref)	M2		M3		M4	
	rrr	(se)	rrr	(se)	rrr	(se)	rrr	(se)
Childhood Family Characteristics								
family afdc receipt	1.323 *	(0.159)	1.169	(0.142)	1.073	(0.030)	0.931	(0.116)
maternal depression			1.663 ***	(0.225)	1.499 **	(0.204)	1.529 **	(0.236)
closeness to mother					0.967	(0.108)	0.905	(0.106)
maternal love					0.933	(0.109)	0.959	(0.112)
punishment					1.230 ***	(0.053)	1.181 ***	(0.053)
Adulthood Characteristics								
adulthood afdc receipt							1.649 **	(0.265)
unemployed							1.011	(0.144)
not in labor force							1.064	(0.180)
divorced/seperated							1.033	(0.138)
never married							0.761	(0.117)
log income							0.961	(0.027)
highest education							0.939 *	(0.030)
black	0.743 **	(0.103)	0.798	(0.108)	0.823	(0.112)	0.693 **	(0.086)
hispanic	0.850	(0.159)	0.856	(0.198)	0.875	(0.168)	0.751	(0.153)
other	0.795	(0.178)	0.775	(0.179)	0.766	(0.181)	0.861	(0.204)
female	1.463 ***	(0.131)	1.456 ***	(0.133)	1.453 ***	(0.131)	1.390 **	(0.160)
age	1.058 ***	(0.014)	1.054 ***	(0.015)	1.050 ***	(0.015)	1.043 *	(0.020)
age2	1.000 *	(0.000)	1.000	(0.000)	1.000	(0.000)	1.000	(0.000)

*p<.05 **p<.01 ***p<.001

Note: Relative risk ratio (rrr) based on multinomial logit models are reported

Table 4. Multinomial Logistic Regression Model Results for Depression and Chronic Pain (N=4697)

Variables	no symptoms M1 rrr	(se)	(ref) M2 rrr	(se)	M3 rrr	(se)	M4 rrr	(se)
Childhood Family Characteristics								
family afdc receipt	2.024 ***	(0.296)	1.460 *	(0.253)	1.190	(0.218)	1.000	(0.195)
maternal depression			3.589 ***	(0.484)	2.802 ***	(0.400)	2.973 ***	(0.457)
closeness to mother					0.892	(0.092)	0.854	(0.089)
maternal love					0.946	(0.104)	0.977	(0.114)
punishment					1.584 ***	(0.092)	1.491 ***	(0.097)
Adulthood Characteristics								
adulthood afdc receipt							1.965 ***	(0.330)
unemployed							0.882	(0.218)
not in labor force							1.536 ***	(0.225)
divorced/seperated							1.980 ***	(0.238)
never married							1.333	(0.231)
log income							0.957	(0.029)
highest education							1.042	(0.057)
black	0.402 ***	(0.070)	0.479 ***	(0.084)	0.508 ***	(0.089)	0.348 ***	(0.064)
hispanic	0.541 **	(0.101)	0.602 *	(0.132)	0.597	(0.124)	0.522 *	(0.114)
other	1.006	(0.234)	1.023	(0.237)	0.950	(0.214)	0.885	(0.191)
female	2.638 ***	(0.228)	2.563 ***	(0.236)	2.668 ***	(0.241)	2.495 ***	(0.279)
age	1.129 ***	(0.018)	1.128 ***	(0.018)	1.121 ***	(0.020)	1.136 ***	(0.023)
age2	0.999 ***	(0.000)	0.999 ***	(0.000)	0.999 ***	(0.000)	0.999 ***	(0.000)

*p<.05 **p<.01 ***p<.001

Note: Relative risk ratio (rrr) based on multinomial logit models are reported

Table 5. Multinomial Logistic Regression Model Results for Depression only (N=4697)

Variables	M1 Depression (ref)		M2 Chronic Pain (ref)
	Chronic Pain	Both	Both
	rrr	rrr	rrr
Childhood Family Characteristics			
family afdc receipt	1.389	1.492	1.075
maternal depression	0.780	1.516 **	1.944 ***
closeness to mother	1.051	0.993	0.944
maternal love	0.978	0.996	1.018
punishment	0.964	1.217 *	1.262 ****
Adulthood Characteristics			
adulthood afdc receipt	1.311	1.561 *	1.191
unemployed	1.331	1.089	0.818
not in labor force	1.246	1.892 ***	1.519 ***
divorced/seperated	0.495 ***	0.922	1.860 ***
never married	0.652 *	1.141	1.752 ***
log income	0.909	0.986	1.085
highest education	0.920 **	0.938	1.019
black	1.178	0.591 *	0.501 ***
hispanic	0.946	0.658	0.696 *
other	1.045	1.075	1.028
female	1.037	1.862 ***	1.795 ***
age	0.968 *	1.054	1.089 ***
age2	1.001	1.000	0.999 ***

*p<.05 **p<.01 ***p<.001

Note: Relative risk ratio (rrr) based on multinomial logit models are reported

i The Pearson Chi-square is adjusted for complex survey design, thus the degrees of freedom are based on the 42 strata in the survey design sample.