Childhood Household Conditions Effect on Adulthood Depression in the United States

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Abstract

Previous studies have shown that parental death and childhood abuse have been linked to the development of depression later on in life. However, these two risk factors are only two events in an individual's childhood. In order to fully understand how childhood household conditions can lead to increased risk for adulthood depression later on in life, many more aspects of an individual's childhood need to be accounted for and treated as a possible contributor to depression and anxiety later in life. In this study, two additional categories of childhood risk factors, economic hardship and social relations, are investigated as predictors of future adulthood depression. The analysis is performed with the National Longitudinal Study of Youth 1979 dataset, using specifically the initial interview round and the 1992 survey round containing the CES-D administration. Of the economic hardship risk factors, being in poverty resulted in an increase in depression score, while having a father at work lacked results. As the number of siblings in family increased, the level of depression did as well. Both the family dissension and broken home risk factors showed an increase in depression score as social health decreased. Economic hardship and social relations during childhood both seem to be valid predictors of adulthood depression later in life, although not as strong as childhood abuse. Level of depression

in early adulthood was not able to produce any significant predictive relationship with marital status, number of kids, income, or general health much later in life.

Introduction

Transitioning from adolescence into adulthood is a major developmental milestone in life. It is a time of increased independence, self-discovery, and social and mental maturation. The weight of increased responsibilities and awareness of the real world causes this time to unfortunately also serve as a window of opportunity for development of mental and anxiety disorders. Depression disorders and anxiety disorders are commonly linked together; over half of depression diagnoses are accompanied by an anxiety disorder diagnosis (ADAA 2018). Depression and anxiety disorders affect over 40 million adults in the United States, which is 18.1% of the population every year (ADAA 2018). Symptoms can include poor mood, intense feelings of sadness, anxiety, or exhaustion, and delusions of guilt or illness. Symptoms can become so severe that they affect how a person feels, thinks, and handles daily activities. People with depression or anxiety disorders are three to five times more likely to visit specialty doctors and six times more likely to be hospitalized than a healthy individual (ADAA 2018). Depression and anxiety can be attributed to a set of risk factors, which include genetics, brain chemistry, individual personality, as well as life events (ADAA 2018).

Depression and anxiety as a disease has been focused on by researchers due to its prevalence in the population. However, these analyses usually increase our understanding of the mechanisms of depression on the brain biologically and how potential drug treatments can improve depressive symptoms. Little research has been conducted on the causes and risk factors of depression, especially from a social standpoint.

Health inequalities in general have been shown to stem from over 10 different social factors, including socioeconomic status, stress, unemployment, and substance abuse and addiction. People who are raised in working class homes have a much lower chance of survival at great ages and are more susceptible to illness risks throughout their lives (Lundberg 1997). This trend is pervasive in both prosperous and third world countries. Taking into account the diversity of social risk factors and the complexity of depression as a disorder, parental death and childhood abuse cannot be the only two childhood predictors of adulthood depression. Despite the knowledge on known childhood risk factors currently playing a large role in the development of adulthood depression, a more thorough and complete explanation is required to understand depression development and attempts to better improve treatment options.

Theory and Literature Review

The connection between past life events and adult depression has been well documented. Brown (1961) reported that out of 216 depressed adult patients, 41% of them had lost a parent to death before the age of 15. Parental death is so traumatic that it produces both short term grief, but also a long-lasting predisposition to react with depression when faced with loss or rejection in adult life (Crook and Eliot 1980). Brown et al. (1999) show that adults that reported being abused or neglected in the home as a young child are at increased risk for anxiety and depression disorders. Cheasty et al. (1998) was able to find that adults who were sexually abused as children also were at a much higher risk for depression. An association between the severity of abuse and the risk of adulthood depression was found, but the positive results were only confined to those who had experienced more severe abuse as children (Cheasty et al. 1998). Loss of a parent and childhood abuse are all part of the complex childhood family circumstances, which are very complex and contain a range of other possible risk factors. Parental presence, parental alcohol

and substance abuse, family social economic status, and childhood health are all risk factors part of the household and community ecosystems.

In Lundberg, a conceptual model is proposed that connects the studied predictors, social class, economic hardship, and social relations, with two intermediate stages, adult social class and sense of coherence. *See Figure 1.*
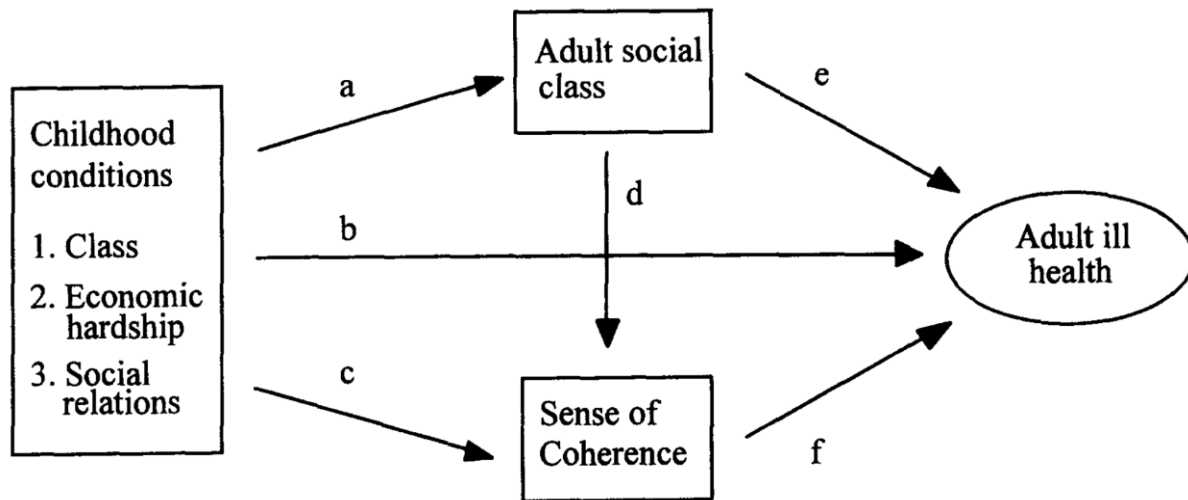

Fig. 1. Conceptual model.

As early as infancy and childhood, human beings try to achieve stability and predictability in life in pursuit of motivation to perform more actions. This sense of manageability and coherence is strongly influenced by not only childhood actions, but also parental response to childhood actions (Antonovsky 1993). Antonovsky then proposed his sense of coherence theory, which outlines the concept that life is complex in the extreme, so every human being is confronted with a flood of ambiguous, confusing, and contradictory stimuli in his or her everyday life, which invokes tensions between self, other people, and social structures. In his later work however, Antonovsky produced inconsistent results regarding the application of his theory, leading to questions regarding the strength of the sense of coherence subject in general. Lundberg's analysis showed little to no relationship between childhood conditions and

sense of coherence (Lundberg 1997). Due to this lack of evidence and high number of confounding variables connected to sense of coherence, the causal pathway c and f is unfeasible to be investigated in this study. Specifically, analysis of adult social class and sense of coherence as intermediate factors will be omitted, and the b causal pathway will be investigated. Adult social class analysis is omitted because this study will focus on childhood conditions and their effect on adult ill health, and adult social class has already been shown to have significant effects on adulthood depression. An appropriate causal model for this study is shown below. *See Figure 2.*

Figure 2: Conceptual Causal Diagram

A case for this model and pathway was found by Forsdahl; he found that poor living conditions economically and socially during early years of development increased the vulnerability to known risk factors for heart disease (1912). The link between causal mechanisms and adult health can be biological or based on experience. Adverse childhood conditions can affect the human body over time in a way that increases vulnerability to disease and other mental health conditions (Lundberg 1997). They can also affect educational chances, job opportunities, and life chances in general, leading to unhealthy life careers; this link cannot be studies using traditional lab science (Lundberg 1997).

In Lundberg, social class was measured by the occupation of the father figure in the family (Lundberg 1997). However, the occupation to social class conversion is not available in

this study due to the nature of the dataset (explained later). The starting point of the conceptual model for this study instead begins with social factors and the combination of social class and economic hardship, as they are usually closely related.

Duncan et al. were able to show that economic deprivation and periods of family poverty during childhood affected the IQ score of the child later on in life. Children born into working class families that were constantly struggling to live were negatively affected and tested with a lower IQ than their more affluent counterparts (1994). Could these economic and social class risk factors during childhood also translate to a health disparity, specifically with the onset of adulthood depression? This study will attempt to demonstrate that abuse and death are not the only predictors of adult depression, but that childhood economic and social risk factors are also significant predictors of adulthood depression.

Hypotheses

This study will introduce two new categories of depression risk factors: economic risk factors (specifically economic hardship) and social risk factors (as described in Lundberg 1997). Both of these categories include potential risk factors that are a part of childhood family circumstances. The hypotheses of this study are shown below.

1. Both the economic hardship risk factors and the childhood social health predictors will mimic the overall trend of correlation between other childhood health factors and depression. For example, respondents worse off economically as a child will on average have less severe depression score than the more affluent respondents.

2. In terms of parent loss, respondents who have had both parents pass away will have a higher CES-D score than both respondents with only one parent and respondents with both parents.

Methods and Data

All of the data used in the study will be taken from the National Longitudinal Survey of Youth 1979 dataset. This dataset is chosen because it follows the American youth from childhood all the way to adulthood, which contains the time points of interest for this study. Americans born between 1962 and 1966 were interviewed for the first time in 1979, when they were between the ages of 12 and 17. Then, they were interviewed biennially until the most recent completed round, which finished in 2016 (NLSY 1979). Therefore, childhood conditions from the initial interview can be measured along with depression severity as that same respondent is an adult. However, the most important characteristic of the NLSY 1979 is that it contains two years of the CES-D survey results, which stands for the Center for Epidemiologic Studies Depression Scale and was developed by the National Institute of Mental Health. The survey itself is a twenty-item survey that measures the prevalence of depression symptoms based on the answers to the questions (NLSY 1979). This special section was only administered in 1992 and 1994 years, where the respondents be between 30 and 34 years old. In the National Longitudinal Studies of Youth, the answers to the CES-D survey questions are fed into an algorithm that computes a single number descriptor of the results between 0 and 60. A greater number indicates an increasing prevalence of depression-related symptoms. In this study, this number will be referred to as the depression score. The 1992 CES-D survey was the traditional twenty item survey, while the 1994 CES-D score was a result of a seven-item questionnaire. Therefore, the 1992 CES-D score is used to calculate the adult depression of each respondent.

The method of data collection for the independent and control variables will be using responses to the interview and surveys conducted at the first round of surveying (between ages of 12 and 17) and responses in the 1992 (ages 30 and 34) round of interviewing. The original first

round of surveying is used because it contains the full interview, as it is the initial one. It contains the normal respondent questions and responses, but also a parent questionnaire, which also contains valuable information on household condition. None of the other rounds administered the parent questionnaire (NSLY 1997).

Similar to Lundberg 1997, economic hardship factors will be represented by the income of the family during the respondent's childhood, specifically through the father figure's occupation. In Lundberg's study, respondent's childhood social class was measured through the occupation of the father figure in the household. The occupation was coded into seven different social job categories such as upper non-manual, farmer, skilled workers, and unskilled workers (Lundberg 1997). Not only was this sorting of occupations into social classes fairly subjective, but the social class hierarchy of these categories is not very defined. For example, is being a farmer a higher social class than being an unskilled worker? This distinction was not explained in Lundberg. Also, Lundberg's study was conducted in Sweden in 1991. Sweden's 1991 economy and social class hierarchy is very different from the 1979 United States'. Also, the NLSY 1979 data was also only able to provide the labor division of the occupation, such as manufacturing or health services (NLSY 1979). There exists a question that asks for the annual income of the family, but it was only asked to a specific sample and had a much smaller response rate than the other questions in the survey (NLSY 1979). Therefore, two dichotomous independent variables that could represent childhood economic hardship risk factors were chosen: if the father figure in the family was generating income at age 14 and if the family was in poverty at the time of survey. The third economic factor, presence of a large family, was measured by a continuous variable asking for the respondent's number of siblings.

Lundberg breaks down the broad category of social relation factors into two different types: broken home owing to death of parent, or dissension in the childhood family (1997). This study has a variable to measure each of those categories: separated parents at the age of 14 for dissension in the family and living father or mother for broken home. Each variable is a dichotomous variable and was chosen for each category because it best represented the circumstance of that category.

The analyses are performed with multiple linear regressions, with economic factors and social factors combined into a single unifying model. All dichotomous variables were coded into a one if the response given was "yes", and a zero if the response given was a "no". All observations that had missing responses for any of the values were removed from the analysis. The multiple regression model is shown below.

CES-D Score $(Y_i) = \beta_0 + \beta_1 * num\_siblings(X_1) + \beta_2 * fam\_in\_poverty(X_2) + \beta_3 * father\_worked(X_3) + \beta_4 * parent\_alive (X_4) + \beta_5 * live\_w\_both\_parents(X_5) + \beta_6 * race (X_6) + \beta_7 * sex(X_7) + \varepsilon_i$

B_i is the association between the risk factor and future adulthood depression score, with β_0 being the intercept. ε_i is the error term associated with every prediction. The model aims to minimize the error term as much as possible.

Along with the main analysis, some respondents' characteristics were taken from the 2016 interview rounds, in which the respondents were between the age 49 and 54. Specifically, the respondent's marital status, number of kids, income in the past year, and a general health assessment. The purpose of these variables was to investigate whether the level of depression measured in 1992 was correlated with any outcomes much later in life. This secondary analysis is not included in any of the models for the primary analysis.

Independent Variables:

Family poverty status (fam_in_poverty) is a dichotomous variable measured from the response to the survey question "Was your family in poverty in 1979?" (NLSY 1979). This question was asked to respondents in the first initial interview, either in the year 1979 or 1980. "Yes" responses were coded as a 1, and "No" responses were coded as a 0. As explained above, this variable serves as part of the substitute to measure childhood social class and economic hardship of the respondent.

Employment of father figure (father_worked) is a dichotomous variable measured from the response to the survey question "Was your father (biological or adoptive) working at age 14?" (NLSY 1979). This question was asked to respondents in the first initial interview, either in the year 1979 or 1980. "Yes" responses were coded as a 1, and "No" responses were coded as a 0. This variable is the other part of measuring childhood social class and the economic hardship of the respondent.

Parent living status (parent_alive) is a discrete variable constructed from two dichotomous variables. The survey questions asked were "Is your father alive?" and "Is your mother alive?" (NLSY 1979). If both of the respondent's parents were dead (responded "No" to both questions), the response was coded as a 0. Only father alive was coded as a 1, only mother alive was coded as a 2, and both parents alive was coded as a 3. The two variables for living status of each parent were combined in order to obtain more clear and explanatory results depending based on each stage of parent loss.

Lived with both parents (liv_w_both_parents) is a dichotomous variable constructed from the response to the survey question "Did you live with both your biological mother and biological father from the time you were born until your 18th birthday?" (NLSY 1979). This question was asked in the 1988 survey round, which is not the initial interview. However, this

question asks about childhood information, so the year of administration is not significant. Year 1988 was the first year that every respondent in the study was guaranteed to be at least of age 18, hence the wording of the question (NLSY 1979).

Number of siblings (num_siblings) is the only continuous independent variable used in the study. It is measured from the survey question "How many siblings do you have?" and was asked in the 1979 and 1980 initial interviews (NLSY 1979). The minimum number of siblings observed was 0, while the maximum was 29. The mean number of siblings was 3.854. Discrete variables race and sex were also included in the model as control variables. Race was measured with three responses, "White", "Black", or "Other". Sex only had two choices, "Male" or "Female".

Results

The first point to note is the percentage of the respondents that had childhood conditions that were hypothesized for more at risk for adulthood depression. Percentages that stood out included that almost one-fifth of respondents grew up in poverty and two fifths of respondents did not live together with both parents. *See Table 1.*

Table 1: Percentage reporting problems in childhood

Variable	(%)	Valid Observations	Data collected in year
No living parents	9.2	4,789	1979
> 8 siblings	6.2	12,668	1979
Father was not working at age 14	8.2	10,256	1979
Family in Poverty	19.4	9,891	1979
Did not live with both parents	40.2	10,465	1988
Non-white	29.9	11,969	1979
Male	50.4	12,686	1979

The next issue to address relates to how each of the individual discrete independent variables affects the mean CES-D score. Each of the discrete variables showed an increase in

CES-D score as the adverse childhood condition worsened. *See Table 2*. Respondents who lost

both of their parents had a mean score of 11.33 whereas respondents who had not lost either of

their parents had a mean score of 8.93. Similarly, if the respondent's family is in poverty, then

the mean CES-D score was 12.17, whereas respondents above the poverty line averaged a 8.86

score. Respondents who did not live with both parents in the same household averaged a score of

10.42 compared to 8.97 for respondents who lived together. The smallest difference in means

was from the employment status of the father figure at the respondent's age 14. Lack of a

working father figure gave a mean of 9.97, but the presence of one only gave a mean score of

9.29. *See Table 2*.

Mean CES-D Score by Parent Living Status

	Mean.CESD.Score
Neither Parent Alive	11.33
Only Father Alive	9.301
Only Mother Alive	9.509
Both Parents Alive	8.934

Mean CES-D Score by Family Poverty Status

	Mean.CESD.Score
No	8.862
Yes	12.17

Mean CES-D Score if Father was Working at Age 14

	Mean.CESD.Score
No	9.974
Yes	9.292

Mean CES-D Score by if Lived Together with Both Parents

	Mean.CESD.Score
No	10.42
Yes	8.971

Table 2: Mean CES-D Score each discrete economic and social variable

Finally, turning to the main aim of the study, the main conceptual pathway will be

analyzed. All the economic and social factors during childhood were combined into a descriptive

model predicting adult CES-D depression score. *See Table 3*.

Table 3: Multiple Linear Regression of Economic and Social Childhood Risk Factors on Adulthood Depression Symptom Prevalence

	Dependent variable:
	CES-D Depression Score
Only Father Alive	−1.554***
	(0.600)
Only Mother Alive	−1.442***
	(0.496)
Both Parents Alive	−1.461***
	(0.474)
Father Employed	0.684
	(0.516)
Family in Poverty	2.294***
	(0.391)
Lived with both parents	−0.991***
	(0.301)
Number of Siblings	0.198***
	(0.053)
Race: Black	1.445***
	(0.323)
Race: Other	0.300
	(0.603)
Sex: Female	1.598***
	(0.258)
Constant	8.533***
	(0.699)
Observations	4,789
R^2	0.039
Adjusted R^2	0.037
Residual Std. Error	8.908 (df = 4778)
F Statistic	19.148*** (df = 10; 4778)
Note:	*p<0.1; **p<0.05; ***p<0.01

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From the model including the control variables, clear relationships between adulthood

depression and childhood economic and social risk factors can be observed. Accounting for other

variables, growing up in poverty influenced development of adulthood depression the most, with the CES-D score rising by 2.294 points. Similarly, having both parents alive or having at least one parent alive lowered CES-D score by more than a point. Interestingly, for every sibling the respondent has, the depression score increases by 0.198 points. Growing up with 7 other siblings would have similar impact to losing a parent in terms of development of adult depression.

The results of the secondary analysis regarding marital status, number of kids, income, and general health assessment showed that depression score in 1992 did have some predictive ability on these characteristics, but the results lacked both statistical and applicative significance.

Discussion

The evidence presented in the results supports the notion that negative or adverse childhood conditions or experiences can lead to development of adulthood depression later on in life. Each of the social and economic factors, except for father employment, was able to show a significant difference in mean depression levels as well as a negative change as childhood conditions worsened in the regression model.

The first hypothesis of the study was supported. The trend observed between adulthood depression and parent loss in childhood showed that children who have had one or more parents pass away resulted in an increased development of adulthood depression later in life. This relationship was also the case for each of the other variables investigated. As childhood conditions worsened economically or socially, then the corresponding level of depression also increased. In terms of economic adversity and hardship, growing up in a family in poverty showed the most substantial impact on depression later on out of all the other relationships investigated. Increased family size also had a significant positive effect on depression later on. As a family grows in size, resources must be divided more thinly among the children, especially

economic resources. Large families will have significantly more economic strain than a smaller family with the same overall income. In terms of growing up in a broken home or with family dissension, both parental death and living separately from parents showed a negative correlation with CES-D score. Each of the economic and social risk factors showed the same trend of effect on depression as parental death.

The second hypothesis of the study was only partly supported. Based on the difference in means of depression level between respondents who had lost both parents versus those who had only lost one parent, the hypothesis is supported. The mean CES-D score of respondents who had lost both parents is indeed the highest among any of the four categories (one parent lost or no parents lost). However, when incorporating the other variables into the regression analysis, death of both parents does not show the most significant and strong negative relationship with depression level. In fact, losing one parent and losing both parents are around equal in terms of predicting depression level in adulthood. This could indicate that just losing one parent gives the child enough grief/pain to pass the threshold for increased risk of developing depression.

Economic risk factors can contribute to the development of depression in adulthood through a variety of both biological and social means. Children growing up in poverty or being strained income-wise have reduced access to better education, job opportunities, and life career development in general. In the United States, better healthcare costs more money to acquire. Seeing specialty doctors and having regular checkups and dental cleanings is a luxury that not all Americans can afford. Biologically, these economically hindered children are less likely to have access to proper healthcare. This lifestyle in general can have implications on brain chemistry and personality, both of which contribute to depression and anxiety disorders in later life (ADAA 2018).

As for social risk factors, there are a few theories regarding the translation of trauma and distress of a broken home or family dissension into the development of adulthood depression. Crook and Eliot hypothesized that living in a broken home as a young child produces short-term grief for the child, but this predisposes him or her to react with depression when experiencing other adversity in life (1980). After losing one parent or both parents, the grief is enough to trigger this effect, leading to increased risk for developing adulthood depression. Experiencing constant family dissension invokes a plethora of unhealthy tensions between the child and persons and the environment (Antonovsky 1993). Over time, these tensions build up and affect health negatively leading to increased risk of depression and mental health detriment. Living away from both parents usually is accompanied by arguments, family issues, drugs or alcohol, or parental marriage issues. None of these situations culture a healthy environment, and eventually take their toll on brain chemistry or personality, therefore leading to depression.

Concerns and Limitations

Although the National Longitudinal Survey of Youth 1979 is not a dataset specifically designed to measure mental health and early childhood conditions of individuals, it contains a wide enough range of measured information to make accurate inferences about each of the risk factors of this study. It also contains an official, widely accepted measurement of depression in the CES-D score, which was widely taken in the 1992 survey round (NLSY 1979). This study attempts to measure the viability of economic and social relation risk factors in childhood as depression risk factors, so a wide variety of questions about the household must be asked, exactly where the NLSY1997 excels.

Many of the survey questions used to create independent variables in the study specified "biological" parents or "father figure" in the wording of the question. Although the chance of

bias is very small, there could have been a few respondents with the perfect family circumstances to answer in a way that biases the measurements. For example, an adopted respondent with both an adopted mother and father figure could have responded "No" to the biological parent living status questions on the survey. Although they did not respond untruthfully, this respondent did indeed grow up with both parents, but would be counted as parent-less in the regression analysis.

Another common problem observed with all surveys involving health is reporting bias observed due to spurious answers. Due to the tendency for medical conditions to be reported in negative terms, respondents are not always motivated to answer truthfully, especially when marking more accurate answers makes him or her feel worse about himself. This effect, called negative affectivity, can introduce bias into the sample, which usually causes the relationships observed to look weaker than in actuality.

Intellectual Merit and Broader Impact

Studies have already shown that certain childhood risk factors, such as loss of a parent, childhood neglect, and poverty, are associated with higher risk of developing depression in adulthood (Crook and Eliot, 1980). However, childhood household conditions involve so much more than just parents and income. The home is a dynamic environment with many constantly moving parts. Circumstances change every year. The economy will rise and fall, home values will change, or the child may have to drop out of school to work in order to help support the family. The family could move to a new home, which completely changes the environment once again. The purpose of this study was to attempt to measure these economic factors as well as social relation factors to see if these were also valid predictors of the onset of adulthood depression in the future.

This study shows that adulthood depression risk factors from childhood conditions embody more than just death of parent, abuse, or poverty. Depression or the risk of development is predicted by an aggregate of more childhood factors, including economic and social factors, some of which play a larger role than others in contributing to changes in mindset and eventually risk of depression. The analyses presented support the broader theories, such as the life career hypothesis, which states that continuous disadvantages, specifically economic hardship, living in a broken home, and family dissension, are more likely to continuously produce illness (Lundberg 1997).

As for the debate regarding the link between childhood conditions and adulthood depression, no conclusive results can be drawn other than that both are valid possible contributors. Adverse childhood conditions can definitely affect biological programming of the brain and personality for the worse. On the other hand, economic hardship and poor social health conditions can reduce the education and career opportunities for a child, which bleeds into reduced access to healthcare resources. Biological programming and social health are both most likely strong contributors to the childhood condition/adult ill health link, but the results from this study cannot draw conclusive evidence on each mechanism's prevalence.

Expanding the knowledge pool on depression and anxiety risk factors is just one step in improving depression treatment in children, adolescents, and adults. Better overall understanding of risk factors can improve depression intervention techniques and can expand to better intervention for depression and anxiety related issues like suicide or panic attacks. On a broader scale, this study also offers a small step towards eliminating health inequalities that stem from economic inequalities in general, which is the overarching goal of social medicine study.

Appendix

Table 1: Mean CES-D Score; characteristics in 2016 survey

	Dependent variable:
	Mean CES-D Depression Score
Married	8.890
Unmarried	8.932
0-3 Kids	8.142
3-6 Kids	8.648
6+ Kids	8.730
Family In Poverty	11.740
Family Not In Poverty	8.796
General Health Poor	9.876
General Health Fair	9.001
General Health Good	8.783
General Health Great	8.729
General Health Excellent	8.410

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