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# The Relationship between Mother's Working and Children's Mental Health : A Descriptive Study*

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## Abstract

**Purpose:** It is of great significance to look at the relationship between the mother's working condition and the child's health status because the mother's influence on their child is very significant. In this context, this research explores the relationship between a mother's working conditions and their children's mental health. **Research design, data and methodology:** This research uses the National Longitudinal Survey of Youth 79 (NLSY79) and the National Longitudinal Survey of Youth Children and Young Adults 79 (NLSY-CH79) data. It uses data linking mothers' NLSY79 data with children's NLSY-CH79 data. This research first performs the OLS regression on the CES-D mean to examine how the mother's income and working time affect their children's mental health. In addition, this research uses the ordered logistic regression for each CES-D item to check the robustness. **Results:** This research indicates that increased children's stress has a very strong association with decreased mother's number of working weeks. **Conclusions:** The results imply that the decrease in working weeks of mothers can be connected with the increase in their children's stress due to the mother's intervention. This research also shows that the children's stress increases as the mother's income increases, although it decreases as total net family income increases.

**Keywords:** CES-D items, Children's stress, Mother's working time, Mother's wage and salary

**JEL Classification Code**: E44, F31, F37, G15

## 1. Introduction

The relationship between parental socioeconomic status and children's health has been one of the popular research topics for a very long time. In particular, research on the effects of parental socioeconomic status, including family income, parental health, and parental education level, on children's health has been actively conducted. Case et al. (2002) demonstrated that children's health had a positive relationship with household income. Currie (2009) also showed strong evidence of the link between parental socioeconomic status and child health, which suggested that health could play a role in the intergenerational transmission of economic status. Some other previous research, including Nicholson et al. (2012) and Wimer and Wolf (2020), also suggest that working parents can positively impact children's well-being by improving their environment and financial stability.

In terms of children's mental health, children of working mothers may also experience less stress because they receive relatively less intervention from their mothers. For example, if adolescent children can avoid their working mother's excessive intervention for private education, it may improve their well-being. As Heinrich (2014) argues, on the contrary, the mother's work may not necessarily benefit children. Mother's work can interfere with developing the bond or intimacy between mothers and their young children. The stress that mothers bring home from work can diminish their parenting skills, disrupt the family atmosphere, and thus lead to stress in their children. If working mother's stress affects their children, it may negatively affect their children's well-being.

The impact of working mothers on their children's mental health is an empirical question. Furthermore, considering that women's labor participation is increasing increasingly nowadays, it is of great significance to look at the relationship between the mother's working conditions and the children's mental health because the mother's influence on their children is very significant. However, there is little research on the relationship between mother's working conditions and their children's mental health. This is my research motivation.

This research aimed to examine the relationship between mothers' working conditions, such as income or working time, and their children's mental health, especially considering that the relationship between mother and child can significantly impact the child's mental health during the child's growth. The discussion of how a mother's income affects the child's health status can be broadly approached in two ways regarding household income. First, the increase in the mother's income can positively affect their children's mental health if the mother's income has the same effect on their children's health as the household income, similar to Case's research. In this case, the mother's income can just be considered part of the household income. However, if the mother's income is recognized as an additional income for the household, the increase in the mother's income can negatively affect their children's mental health because it can lead to an increase in the children's extracurricular activities, such as private tutoring. In South Korea, children's increased academic stress due to excessive private education is already recognized as one of the major social problems. Oh et al. (2020) stated that private tutoring increases students' academic stress.

In addition to the mother's income, the mother's working times can also affect their children's health status. In particular, the mother's working time is particularly relevant to their children's mental health because it can affect the bond or the intimacy between the mother and the child or the extent of the mother's intervention in their children. If the reduction in the mothers' working times has a positive effect on their children's mental health, this can be primarily explained by strengthening the bond or the intimacy between the mother and child. On the contrary, if a mother's reduced working times negatively affect her child's mental health, it can be mainly explained by increased stress in the children due to the mother's intervention.

The results show that increased children's stress is very strongly associated with decreased mothers' number of working weeks. This result suggests that a decrease in the mother's working weeks can be connected with an increase in their children's stress due to the mother's intervention. Also, increases in total net family income positively affect children's mental health, but increases in the mother's total income by wage & salary have negative effects on children's mental health. These results support the fact that the mother's working conditions significantly affect their children's mental health status.

The remainder of this paper is organized in the following fashion. The next section describes the data and the research methodology, including the descriptive analysis of the data. In Section 3, this research presents the empirical results.

Finally, Section 4 summarizes the main results and discusses the limitations of this research.

## 2. Data and Methodology

The data source for this research is the National Longitudinal Survey of Youth 79 (NLSY79) and the National Longitudinal Survey of Youth Children and Young Adults 79 (NLSY-CH79) data. The NLSY79 cohort is a longitudinal project that follows the lives of a sample of American youth born between 1957 and 1964. The cohort originally included 12,686 respondents ages between 14 and 22 when first interviewed in 1979. After two subsamples were dropped, 9,964 respondents remained in the eligible samples. This research uses data from Round 1 (Survey Year 1979) to Round 27 (Survey Year 2016). The NLSY-CH79 cohort is a longitudinal project that follows the biological children of the women in the NLSY79. As of 2016, over 10,000 children were interviewed in more than one survey round. To date, a total of 11,530 children have been confirmed to be born to NLSY79 mothers interviewed. This research uses data from 1986 to 2016, representing 16 survey rounds for the child sample and 12 survey rounds for young adults.

This research uses data linking mothers' data of NLSY79 and children's data of NLSY-CH79. For estimation purposes, ten-year data sets from 1996 to 2016, except for 2008, which has no children's wage & salary information, are pooled, and year dummies are included to control year-specific macroeconomic effects. After linking and pooling the data, the mothers' antenatal data are excluded for their children. For example, NLSY79 data for mothers before 2000 are deleted for a child born in 2000. This research also excludes the data with missing values in one or more of the 7 Center for Epidemiological Studies-Depression (CES-D) items for children because it is impossible to calculate the mean and the standard deviation for the 7 CES-D items.[2] In addition, the range of children's ages is limited to between 15 and 30 years old, considering the age at which the CES-D items can be self-evaluated.[3] Finally, the data with missing values in the independent variables and the control variables in this research are also excluded. Table 1 represents summary statistics for the variables related to the children's information, the mother's information, and the family background.

**Table 1:** Summary Statistics for the Variables related to the Children's Information, the Mother's Information, and the Family Background

| | Obs. | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| **<Children's Information>** | | | | | |
| Mean of CES-D[1)] | 18,783 | 0.6224 | 0.5350 | 0 | 3 |
| Gender | 18,783 | 1.4953 | 0.5000 | 1 | 2 |
| Age | 18,783 | 21.1921 | 4.5813 | 15 | 30 |
| Birth Order | 18,783 | 1.8671 | 1.0439 | 1 | 10 |
| Years of Schooling | 18,783 | 11.2907 | 2.6764 | 0 | 20 |
| Allergy | 18,783 | 0.0050 | 0.0706 | 0 | 1 |
| Total Income by Wage & Salary | 18,783 | 10706.5 | 17599.0 | 0 | 250,000 |
| **<Mother's Information>** | | | | | |
| Age | 18,783 | 45.4250 | 5.9133 | 29 | 59 |
| Years of Schooling | 18,783 | 13.0458 | 2.4601 | 0 | 20 |
| Government Officer | 18,783 | 0.0815 | 0.2736 | 0 | 1 |
| Total Income by Wage & Salary | 18,783 | 24818.8 | 29707.3 | 0 | 370,314 |
| Number of Working Weeks | 18,783 | 37.2402 | 21.7002 | 0 | 52 |
| **<Family Background>** | | | | | |
| Urban | 18,783 | 0.7437 | 0.4366 | 0 | 1 |
| Health Plan | 18,783 | 0.8262 | 0.3789 | 0 | 1 |
| Family Size | 18,783 | 3.4947 | 1.6428 | 1 | 16 |
| Total Net Family Income | 18,783 | 63942.8 | 79192.7 | 0 | 974,100 |

Note:
1) The mean of CES-D is calculated using the 7 individual CES-D items in the NLSY-CH79 data.
The mean of CES-D represents the degree of overall depression symptoms for children.

Table 1 indicates that the children's gender ratio is very evenly divided and that the proportion of people living in cities is about three-quarters. The children's average age is

[2] The CES-D, originally published by Radloff in 1977, is a 20-item measure that asks caregivers to rate how often over the past week they experienced symptoms associated with depression, such as restless sleep, poor appetite, and feeling lonely (*American Psychological Association*, 2011). In NLSY79-CH, each CES-D item is a self-report scale that measures the current prevalence of depression symptoms. Survey respondents rate a series of statements regarding how they felt during the week prior to the interview. Response options range from 0 to 3 for each item (0 = Rarely or none of the time (< 1 day), 1 = Some or little of the time (1-2 days), 2 = Occasionally or a moderate amount of the time (3-4 days), 3 = Most or all of the time (5-7 days)). While the full 20-item battery was included in the 1992 (round 14) survey, a collapsed 7-item battery was administered to respondents in the 1994 (round 16) survey (*National Longitudinal Surveys*, n.d.).

[3] According to the NLSY-CH questionnaire, CES-D related questions have been surveyed for young adults between 14 and 24. However, the age to be analyzed in this research was limited to between 15 and 30 years old, considering both the survey age and data availability and data frequency.

21 years old, and the mother's average age is 45 years old. In addition, the average mother's total income by wage & salary is about $25,000, and the average total net family income is approximately $64,000.

The CES-D mean is analyzed through OLS regression. Additionally, in terms of robustness verification, this research performs an ordered logistic regression using each CES-D item variable divided into four categories in the NLSY-CH79 data as a dependent variable to check whether each CES-D item is the same results for the mean of 7 CES-D items. Table 2 represents the summary statistics for seven individual CES-D items in the NLSY-CH79 data.

**Table 2:** Summary Statistics for Children's (Young Adults') CES-D Scores

| | Obs. | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| Mean of CES-D | 18,783 | 0.6224 | 0.5350 | 0 | 3 |
| Poor Appetite | 18,783 | 0.3948 | 0.7619 | 0 | 3 |
| Trouble Keeping Mind | 18,783 | 0.6547 | 0.8897 | 0 | 3 |
| Depressed | 18,783 | 0.3727 | 0.7505 | 0 | 3 |
| Everything Took Extra Effort | 18,783 | 1.2359 | 1.2060 | 0 | 3 |
| Restless Sleep | 18,783 | 0.7640 | 1.0045 | 0 | 3 |
| Sad | 18,783 | 0.4498 | 0.7674 | 0 | 3 |
| Could Not Get Going | 18,783 | 0.4852 | 0.7946 | 0 | 3 |

Note:
1) The mean of CES-D is calculated using the 7 individual CES-D items in the NLSY-CH79 data.
The mean of CES-D represents the degree of overall depression symptoms for children.
2) 0 = 'Rarely or none of the time (< 1 day)'
1 = 'Some or a little of the time (1-2 days)'
2 = 'Occasionally or a moderate amount of the time (3-4 days)'
3 = 'Most or all of the time (5-7 days)'

This research first performs the OLS regression on the CES-D mean to examine how the mother's income and working time affect their children's mental health. This research considers the total net family income, the mother's total income by wage & salary, and the mother's number of working weeks as the independent variables. In detail, this research considers two cases regarding the mother's total income by wage & salary. The first case is that the mother's total income by wage & salary is directly used as one independent variable. Another case is that the proportion of the mother's total income by wage & salary among total net family income is used as an independent variable. This research also considers the linear and quadratic relationships for the mother's number of working weeks. Regarding control variables, the children's factor, mother's factor, and family background are considered, and each factor roughly contains variables for age, gender, rate, and education level, as presented in Table 1.

In addition, this research uses the ordered logistic regression for each CES-D item to check the robustness. The independent variables for the ordered logistic regression are the same as in the previous OLS regression. It only considers the quadratic relationship for the mother's number of working weeks. The control variables in the ordered logistic regression are also the same as in the previous OLS regression.

## 3. Empirical Results

### 3.1. OLS Estimate Results for Overall Depression Symptom

This section explores how children's overall depression symptom is affected by the mother's working conditions, such as the mother's income and the mother's working time. Table 3 presents the OLS regression results for the mean of 7 CES-D items for children. The dependent variables are the mean of 7 CES-D items for children, which is calculated under the assumption that all 7 CES-D items have an equally weighted effect on each child's depression. The independent variables include total net family income, the mother's total income by wage & salary or the proportion of the mother's total income by wage & salary among total net family income, the mother's number of working weeks, and its squared term. This model also contains several control variables, such as the mother's occupation [4], variables for children's characteristics (age, birth order, years of schooling, total income by wage & salary), dummies for children's demographic characteristics (race, gender, allergy), variables for mother's characteristics (age, years of schooling), dummies for mother's characteristics (health plan, government officer, and married), family size, regional dummy variables (urban, North East, North Central, South, West, and SMSA dummies), and year-dummies.

[4] For reference, occupations are classified according to 1970 census industry and occupation codes for NLSY data until 2000, and they are classified according to 2000/2002 census occupation& industry codes for NLSY data from 2002 onwards. In detail, this research classifies the occupations as follows: (1) professional, technical, and kindred workers (2) managers and administrators, except farm (3) sales workers, (4) clerical and unskilled workers, (5) craftsmen and kindred workers, operatives (including transport equipment operative), and laborers, except farm, (6) farmers, farm manager, farm laborers and farm foremen, (7) service workers (including private household workers), (8) others, and none

**Table 3:** OLS Regression Results for Children's CESD Mean

| Model | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Total Net Family Income (/Mil.)[4] | -0.081 (0.076) | -0.082 (0.076) | -0.036 (0.068) | -0.039 (0.068) |
| Total Income by Wage & Salary (/Mil.)[5] | 0.240 (0.183) | 0.224 (0.183) | | |
| (TIWS) / (TNFI)[6] | | | 0.043** (0.020) | 0.046** (0.020) |
| Number of Working Weeks | -0.001*** (0.000) | -0.005*** (0.002) | -0.001*** (0.000) | -0.005*** (0.002) |
| Number of Working Weeks Squared (/Thou.)[7] | | 0.064** (0.028) | | 0.070** (0.028) |
| Mother's Occupation (Base: None / Others) | | | | |
| Professional | -0.035 (0.021) | -0.019 (0.022) | -0.037* (0.021) | -0.021 (0.022) |
| Managers | -0.013 (0.023) | 0.001 (0.024) | -0.015 (0.023) | 0.000 (0.024) |
| Sales | -0.015 (0.025) | 0.001 (0.026) | -0.017 (0.025) | 0.001 (0.026) |
| Clerical | -0.001 (0.021) | 0.014 (0.022) | -0.004 (0.021) | 0.012 (0.022) |
| Craft / Operator / Labor | -0.003 (0.024) | 0.013 (0.025) | -0.007 (0.024) | 0.010 (0.025) |
| Farmers / Farm Manager | -0.161*** (0.061) | -0.142** (0.061) | -0.162*** (0.061) | -0.141** (0.062) |
| Service | 0.012 (0.021) | 0.028 (0.022) | 0.010 (0.021) | 0.027 (0.022) |
| Child Race (Base: Hispanic) | | | | |
| Black | 0.057*** (0.014) | 0.057*** (0.014) | 0.057*** (0.014) | 0.057*** (0.014) |
| Non-Hispanic & Non-Black | 0.042*** (0.013) | 0.043*** (0.013) | 0.042*** (0.013) | 0.043*** (0.013) |
| Child Gender: Female | 0.097*** (0.009) | 0.097*** (0.009) | 0.097*** (0.009) | 0.097*** (0.009) |
| Birth Order | 0.016*** (0.005) | 0.016*** (0.005) | 0.016*** (0.005) | 0.016*** (0.005) |
| Child Age | 0.019*** (0.002) | 0.019*** (0.002) | 0.019*** (0.002) | 0.019*** (0.002) |
| Child Years of Schooling | -0.024*** (0.002) | -0.024*** (0.002) | -0.024*** (0.002) | -0.024*** (0.002) |
| Child Total Income by Wage & Salary (/Mil.)[8] | -2.333*** (0.315) | -2.339*** (0.315) | -2.326*** (0.313) | -2.334*** (0.313) |
| Child Allergy | 0.152** (0.073) | 0.153** (0.073) | 0.154** (0.073) | 0.155** (0.073) |
| Mother's Age | -0.002 (0.002) | -0.002 (0.002) | -0.002 (0.002) | -0.002 (0.002) |
| Mother's Years of Schooling | 0.001 (0.002) | 0.001 (0.002) | 0.001 (0.002) | 0.002 (0.002) |
| Urban | 0.018 (0.012) | 0.019 (0.012) | 0.018 (0.012) | 0.019 (0.012) |
| SMSA (Base: Not in SMSA) | | | | |
| SMSA, Not Central City | 0.025* (0.015) | 0.026* (0.015) | 0.026* (0.015) | 0.026* (0.015) |
| SMSA, In Central City | 0.013 (0.017) | 0.013 (0.017) | 0.012 (0.017) | 0.012 (0.017) |
| SMSA, Central City Not Known | 0.065* (0.038) | 0.065* (0.038) | 0.065* (0.038) | 0.064* (0.038) |
| Region (Base: Northeast) | | | | |
| North Central | -0.003 (0.014) | -0.003 (0.014) | -0.003 (0.014) | -0.004 (0.014) |
| South | 0.042*** (0.015) | 0.042*** (0.015) | 0.041*** (0.015) | 0.041*** (0.015) |
| West | 0.030* (0.017) | 0.030* (0.017) | 0.030* (0.017) | 0.030* (0.017) |
| Health Plan | -0.031** (0.014) | -0.033** (0.014) | -0.029** (0.014) | -0.031** (0.014) |
| Government Officer | -0.011 (0.017) | -0.009 (0.017) | -0.012 (0.017) | -0.009 (0.017) |
| Family Size | -0.009** (0.004) | -0.009** (0.004) | -0.008** (0.004) | -0.008** (0.004) |
| Marital Status (Base: Never Married) | | | | |
| Married, Spouse Present | -0.013 (0.019) | -0.012 (0.019) | -0.003 (0.020) | -0.001 (0.020) |
| Other | 0.046** (0.018) | 0.046** (0.018) | 0.043** (0.018) | 0.043** (0.018) |
| Number of Observation | 18,783 | 18,783 | 18,783 | 18,783 |
| F-value | 19.88 | 19.54 | 20.11 | 19.79 |
| Prob > F | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| R-square | 0.0583 | 0.0587 | 0.0585 | 0.0589 |

Note:
1) These estimates include year dummies and a constant term.
2) ***, **, * denote 1%, 5%, 10% significance level, respectively.
3) (Robust) Standard errors in parenthesis.
4) Considering the scale adjustment, (Total Net Family Income (/Mil.)) is calculated by (Total Net Family Income)*(1/1000000).
5) Considering the scale adjustment, (Total Income by Wage & Salary (/Mil.)) is calculated by ((Mother's) Total Income by Wage & Salary)*(1/1000000).
6) (TIWS) / (TNFI) is calculated by ((Mother's) Total Income by Wage & Salary) / (Total Net Family Income).
7) Considering the scale adjustment, (Number of Working Weeks Squared (/Thou.)) is calculated by ((Mother's) Number of Working Weeks)*((Mother's) Number of Working Weeks)*(1/1000).
8) Considering the scale adjustment, (Child Total Income by Wage & Salary (/Mil.)) is calculated by (Child Total Income by Wage & Salary)*(1/1000000).

Table 3 indicates that the children's stress reduction due to an increase in the number of working weeks of the mother showed very strong significance. However, this research also shows that too many mother's numbers of working weeks increase their children's stress. In addition, this research indicates that the children's stress increases as the mother's household income share increases. Although not statistically significant, children's stress increases as the mother's income level increases and as total net family income decreases. Results related to the relationship between family income and children's health are consistent with previous research.

Table 3 additionally shows that the mother's occupations have no significant effect on children's depression. It is further confirmed that children's factors significantly influence their CES-D items rather than their mother's factors. Although much previous research, such as Desai and Alva (1998) and Sonego et al. (2013), has examined the impact of parental education levels on children's health, such as Desai and Alva (1998) and Sonego et al. (2013), this relationship was not confirmed in this research.

### 3.2. Ordered Logistic Regression Results for Individual Depression Symptoms

This section investigates how children's 7 individual depression symptoms are affected by the mother's working conditions, respectively. Unlike the OLS estimates for the mean of 7 CES-D items in the previous section, this section investigates the impact of the mother's working condition on the children's specific depression symptoms through the ordered logistic regressions for each CES-D item. Table 4 represents the ordered logistic regression results for each CES-D item variable. Panel A includes total net family income, the mother's total income by wage & salary, the mother's number of working weeks, and its squared term as independent variables; on the other hand, Panel B includes total net family income, the proportion of the mother's total income by wage & salary among total net family income, the mother's number of working weeks, and its squared term. The control variables are the same as the OLS regression in the previous section for both Panel A and B.

**Table 4:** Ordered Logistic Regression Results for Children's (Young Adults') Individual CESD Scores

| Dependent Variable | Mean (OLS) | Poor Appetite | Trouble Keeping Mind | Depressed | Everything Took Extra Effort | Restless Sleep | Sad | Could Not Get Going |
|---|---|---|---|---|---|---|---|---|
| <Panel A> Ordered Logistic Regression using Wage & Salary | | | | | | | | |
| Total Net Family Income (/Mil.)[5] | -0.082 (0.076) | -0.118 (0.392) | 0.222 (0.252) | -0.373 (0.404) | -0.483* (0.268) | -0.221 (0.270) | 0.034 (0.317) | -0.084 (0.336) |
| Total Income by W&S (/Mil.)[6] | 0.224 (0.183) | 0.483 (0.989) | -0.334 (0.678) | 0.912 (0.990) | 0.859 (0.714) | 0.566 (0.677) | 0.019 (0.853) | 0.624 (0.814) |
| Number of Weeks[8] | -0.005*** (0.002) | -0.018*** (0.007) | -0.011* (0.006) | -0.012* (0.007) | -0.007 (0.006) | -0.011* (0.006) | -0.009 (0.007) | -0.011* (0.006) |
| Number of Weeks Squared (/Thou.)[9] | 0.064** (0.028) | 0.271** (0.120) | 0.147 (0.104) | 0.149 (0.125) | 0.102 (0.097) | 0.132 (0.103) | 0.134 (0.116) | 0.194* (0.112) |
| Wald Chi-square | | 526.40 | 261.14 | 574.90 | 1042.01 | 437.39 | 413.51 | 342.57 |
| Pseudo R-square | | 0.0251 | 0.0089 | 0.0299 | 0.0264 | 0.0149 | 0.0194 | 0.0136 |
| <Panel B> Ordered Logistic Regression using (TIWS) / (TNFI)[7] | | | | | | | | |
| Total Net Family Income (/Mil.)[5] | -0.039 (0.068) | -0.037 (0.355) | 0.158 (0.236) | -0.225 (0.355) | -0.290 (0.242) | -0.101 (0.242) | 0.032 (0.294) | 0.051 (0.297) |
| (TIWS) / (TNFI) [7] | 0.046** (0.020) | 0.050 (0.090) | -0.076 (0.073) | 0.069 (0.089) | 0.259*** (0.071) | 0.156** (0.072) | -0.020 (0.081) | 0.160** (0.081) |
| Number of Weeks[8] | -0.005*** (0.002) | -0.019*** (0.007) | -0.010 (0.006) | -0.013* (0.007) | -0.010* (0.006) | -0.013** (0.006) | -0.009 (0.007) | -0.014** (0.007) |
| Number of Weeks Squared (/Thou.)[9] | 0.070** (0.028) | 0.279** (0.121) | 0.137 (0.104) | 0.161 (0.125) | 0.132 (0.097) | 0.151 (0.104) | 0.132 (0.116) | 0.214* (0.113) |
| Wald Chi-square | | 526.12 | 262.74 | 574.25 | 1061.00 | 439.14 | 414.10 | 344.87 |
| Pseudo R-square | | 0.0251 | 0.0090 | 0.0299 | 0.0268 | 0.0151 | 0.0194 | 0.0137 |

Note:
1) The number of observations is 18,783.
2) These estimates include the same variables in Table 3, including year dummies and a constant term.
3) ***, **, * denote 1%, 5%, 10% significance level, respectively.
4) (Robust) Standard errors in parenthesis.
5) Considering the scale adjustment, (Total Net Family Income (/Mil.)) is calculated by (Total Net Family Income)*(1/1000000).
6) Considering the scale adjustment, (Total Income by W&S (/Mil.)) is calculated by ((Mother's) Total Income by Wage & Salary)*(1/1000000).
7) (TIWS) / (TNFI) is calculated by ((Mother's) Total Income by Wage & Salary) / (Total Net Family Income).
8) (Number of Weeks) means the (Mother's) Number of Working Weeks.
9) Considering the scale adjustment, (Number of Weeks Squared (/Thou.)) is calculated by ((Mother's) Number of Working Weeks) *((Mother's) Number of Working Weeks)*(1/1000).

From Table 4, this research identifies similar overall results to the OLS regression results in the previous section. However, although not statistically significant, this research identifies that the opposite sign for income variables appears in some results related to the Trouble Keeping Mind and Sad CES-D items. It is expected that this difference can come from the characteristics of a specific CES-D item, which depends on whether the specific CES-D item is heavily influenced by external factors or controlled by the child's internal characteristics.

### 3.3. The Impact of Control Variables on Children's Mental Health

This section briefly looked at the impact of control variables, which contain children's factors, mother's factors, and family background, on children's depression. Table 5 represents the signs of control variables to the OLS estimates and ordered logistic regression results for children's 7 individual CES-D items.

**Table 5:** OLS and Ordered Logistic Regression Results for Children's 7 Individual CES-D Items: Control Variables

| | Mean (OLS) | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|---|
| Child Race (Base: Hispanic) | | | | | | | | |
| Black | (+) | (+) | (-) | (+) | (+) | (+) | (+) | (+) |
| Non-Hispanic, Non-Black | (+) | (+) | (+) | (+) | (-) | (+) | (+) | (+) |
| Child Gender : Female | (+) | (+) | (+) | (+) | (-) | (+) | (+) | (+) |
| Birth Order | (+) | (+) | (+) | (-) | (+) | (+) | (-) | (+) |
| Child Age | (+) | (+) | (-) | (+) | (+) | (+) | (+) | (+) |
| Child Years of Schooling | (-) | (-) | (-) | (-) | (-) | (-) | (-) | (-) |
| Child TIWS[2)] | (-) | (-) | (-) | (-) | (-) | (-) | (-) | (-) |
| Child Allergy | (+) | (+) | (+) | (+) | (+) | (+) | (+) | (+) |
| Urban | (+) | (+) | (+) | (+) | (+) | (+) | (+) | (-) |
| Region (Base: Northeast) | | | | | | | | |
| North Central | (-) | (-) | (-) | (-) | (+) | (+) | (-) | (+) |
| South | (+) | (+) | (+) | (-) | (+) | (+) | (-) | (+) |
| West | (+) | (+) | (+) | (-) | (+) | (+) | (-) | (+) |
| Health Plan | (-) | (-) | (+) | (-) | (-) | (-) | (-) | (-) |
| Family Size | (-) | (-) | (-) | (-) | (-) | (-) | (-) | (-) |
| Marital Status (Base: Never Married) | | | | | | | | |
| Married, Spouse Present | (-) | (-) | (+) | (-) | (+) | (-) | (-) | (+) |
| Other | (+) | (-) | (+) | (+) | (+) | (+) | (+) | (+) |

Note:
Dependent Variables
(1) Individual CESD: Poor Appetite
(2) Individual CESD: Trouble Keeping Mind
(3) Individual CESD: Depressed
(4) Individual CESD: Everything Took Extra Effort
(5) Individual CESD: Restless Sleep
(6) Individual CESD: Sad
(7) Individual CESD: Could Not Get Going
1) (+) means there is a positive relationship between the dependent variable and the control variable.
(-) means there is a negative relationship between the dependent variable and the control variable.
2) (Child TIWS) means the child's (Total Income by Wage & Salary).

From Table 5, this research identifies that children's mental health improved as their education level or income level increased in all cases, regardless of the characteristics of each CES-D item. This research also finds that an increase in family size positively affects children's mental health. On the other hand, the mental health of children with allergies is not good in general. Although a few exceptions were depending on CES-D items, this research also found that girls and the youngest are more likely to have symptoms of depression. In addition, this research expects that parent's divorce or separation can result in poor mental health for their children.

## 4. Conclusion and Discussion

### 4.1. Summary and Conclusion

This research demonstrates that the mother's working times are a critical factor affecting their children's mental health. This research finds that the children's stress decreases as the mothers' working weeks increase, although too many mothers' working weeks increase their children's stress. In addition, this research also identifies that children's stress decreases as the household income increases; on the other hand, it increases as the mother's income level increases, although it is not statistically significant.

These results clearly show that the mother's working condition significantly affects their children's mental health as the child grows. In particular, the results on the mother's working time imply that the effect of the decrease in the mother's working time on their children's mental health mainly appears as a negative effect from the mother's intervention rather than a positive impact by strengthening the bond or the intimacy between the mother and their children. These results can be connected with the fact that this research is conducted on adolescents aged 15 to 30 years, not on very young children. For very young children, the impact of the mother's working times on the mental health status of the children can be different.

In addition, the results show that the children's stress increases as the mother's income increases, although it decreases as the total net family income increases. These results imply that the mother's income is recognized as an additional income rather than a part of the household income. Additionally, these results can be connected with the fact that the increase in mother's income can negatively affect their children's mental health because it can increase the children's extracurricular activities, such as private tutoring.

### 4.2. Future Research (Limitations)

The results of this research should be interpreted with caution. This research may have an endogenous problem between the mother's working and their children's health status. This research investigates how a mother's working conditions affect their children's mental health status. Conversely, the children's health may affect their mother's working status. As for the interactive relationship between

the mother's work and their children's health status, it is debatable which factors have a relatively more substantial influence on their relationship. In this research, this endogeneity issue is not fully considered. This endogenous problem remains the topic of future research.

Also, the results of this research have been interpreted under the premise that children's depression is closely related to their stress. It can be expected that children's stress certainly has an impact on their depression symptoms. However, it is necessary to clarify the relationship between children's depression and their stress in order for the interpretation of the research findings to have a more robust basis. The discussion of this part is also left as a topic for future research.

Finally, more reviews are needed for several variables through future research. This research was conducted with a primary focus on the total net family income, the mother's total income by wage & salary, and the mother's number of working weeks, considering the data availability. However, much more robust results can be obtained by considering some other variables, such as a mother's hourly wage or a mother's number of working times. The review of this part is also reserved for future research.

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