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Depressive Symptoms in Adolescence as a Predictor of Young Adult Employment Quality: Findings from the National Longitudinal Study of Adolescent to Adult Health

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Depression in adolescence is increasingly common and has been associated with an increased risk of dropping out of secondary school[1–5] and a lower likelihood of pursuing post-secondary schooling or training.[1–2, 6–7] Depression and depressive symptoms in adolescence is also associated with a lower likelihood of being employed in young adulthood[8] and longer durations of unemployment in young adulthood.[9]

Increasingly, economists, policymakers, and academic researchers acknowledge that *job quality* is important to consider as it relates to an individual's overall well-being. *Job quality* often includes objective and subjective indicators that consider both extrinsic (or external) and intrinsic (or internal) qualities.[10–13] Intrinsic and extrinsic aspects of job quality have been associated with overall physical and mental health, job satisfaction, and subjective well-being[10, 15–18] and some have been found to influence occupational attainment in young adulthood.[19]

> *Extrinsic* aspects of job quality include benefits and wages. *Intrinsic* aspects of job quality include the extent to which the job is comprised of diverse and/or complex tasks and the level of autonomy one has on the job (i.e., how much an employee can work independently, take initiative, and exercise discretion).[12, 14–16]

This study uses longitudinal data from a nationally representative sample of adolescents, The National Longitudinal Study of Adolescent to Adult Health, to investigate the association between depressive symptomatology in adolescence and indicators of employment quality in young adulthood. A better understanding of the long-term impacts of adolescent depressive symptoms on employment quality during young adulthood would inform our understanding of how economic and mental health trajectories of individuals with a history of depression unfold.

> **Hypothesis:** Depressed adolescents will be more likely to participate in low quality jobs during young adulthood, specifically jobs that are less complex in nature (i.e., feature more repetitive tasks) and jobs with lower levels of autonomy (i.e., freedom to make important decisions).

Methods

The National Longitudinal Study of Adolescent to Adult Health (*AddHealth*) is a school-based study of adolescent health-related behaviors based on data from adolescents, their families, and schools. Methods are thoroughly reported elsewhere.[20] Data were collected 1994–1995, 1996, 2001–2002, and 2008. Our analysis was limited to individuals who completed interviews at both Wave I and Wave IV (n=15,467) in order to predict outcomes in young adulthood (ages 24–32). A restricted use data contract was obtained, and de-identified data analysis was exempt from IRB oversight.

Prior research with this dataset already illustrated the longitudinal impact of adolescent depressive symptoms on whether or not one is working in young adulthood.[8] Thus, the current study did not examine this association. Rather this study was designed to examine the quality of employment, and only those with employment in Wave IV were included in the sample. Employment was defined as working 10 hours or more per week for pay, reducing the sample by n=2,901. Among those excluded were those who were full-time students and not working, unemployed or temporarily not working, maintaining the home or raising children, disabled individuals, active-duty military personnel, and prisoners.

Measures*

Depressive symptoms at Wave I (ages 12–19) are measured using a modified 19-item version of the Center for Epidemiological Studies—Depression (CES-D) measure[21] which is a well-established and widely used measure of depressive symptoms in epidemiological research. Adapted for the 19-item scale and based on previous analyses using these data, the cutoff scores used in this analysis for "high" depressive symptom levels were 21 for boys and 23 for girls.[22–23] The subjects below the high cutoff score were then divided into two equal-sized (weighted) groups according to sex which corresponded with "moderate" and "low" depressive symptoms. For boys, the moderate score category ranged from ≥9 to <21 and for girls it ranged from ≥10 to <23. The categorical coding of the measure was used to mimic the diagnostic criteria of the DSM-V as much as possible.

Outcome Variables

Individuals were asked two questions about **job quality at Wave IV** (ages 24–32): 1) "Overall, how often do you have the freedom to make important decisions about what you do at work and how you do it?" and 2) "How much of the time do you do the same things repeatedly, that is over and over?" Answer choices were none or almost none of the time, some of the time, most of the time, or all/almost all of the time. Given the resulting distribution of these items, responses to each question were collapsed into three categories for analysis: none or some of the time (1), most of the time (2), or all/almost all of the time (3).

Control variables

Individual controls at Wave I were used including *sex* (male = reference category) and *race/ethnicity* (dummy variables for white non-Hispanic, black non-Hispanic, Hispanic, and other race/ethnicity). Individual intellectual ability was also controlled for using the Add Health Picture Vocabulary Test (AHPVT) which is a measure of *verbal intellect* based on the Peabody Picture Vocabulary Score.[24] Additionally, several family background variables from Wave I parent interviews were used as controls including *family structure* (living with two biological parents, two parents – one non biological, single parent, or other family structure), *maternal*

education (less than high school, high school graduate, some post baccalaureate training or education, bachelor's degree or higher, and missing), and *poverty level* (living over 400%, between 300–400%, between 200–300%, 100–200%, or less than 100% of the 1994 federal poverty level or missing).[25–26] Missing categories were used to retain as large of a sample size as possible. When Wave I and Wave IV control variables had less than 1 percent missing data, individuals with missing data were excluded from this analysis.

Controls at Wave IV were added including *education* (less than high school, high school graduate, some post-high school training or education, bachelor's degree, and some post-baccalaureate training or education). The *number of hours an individual worked* in their primary job at Wave IV was included as a continuous variable. *Wave IV depression* was measured with an adapted 10-item version of the CES-D score. Previous research validating appropriate cut-off scores of the CES-D to represent clinical depression have largely been with older adult populations[27–28] thus the original scoring of this continuous variable was kept intact for analysis (higher scores indicating higher depressive symptoms).

Analysis plan

Bivariate relationships between the primary independent variable (Wave I depression) and the two employment outcomes at Wave IV were explored using Pearson Chi-square.

In Model 1, Ordinal logistic regressions were then used to investigate the impact of Wave I depressive symptoms on Wave IV task repetitiveness and freedom to make important decisions controlling for other Wave I variables.

In Model 2, Wave IV control variables were added. All analyses were run using STATA v. 13[29] and appropriate sampling weights to account for the complex sampling design.[30] All variables were checked for multicollinearity before inclusion in the multivariate models.

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* Information on how missing data were handled can be furnished upon request to the author at Kathryn.Sabella@umassmed.edu

Results

The sample is evenly distributed among boys and girls, and the rate of severe depression was approximately 7% and 10% among boys and girls, respectively. The average age at Wave I was 16 and the average age at Wave IV was 29 (Table 1, Appendix).

Before controlling for other factors, more severe depressive symptoms are significantly associated with higher likelihood of doing tasks repeatedly most of the time (x^2=149.52, p<.001) and lower likelihood of having the freedom to make important decisions most of the time (x^2=72.28, p<.001) (Figure 1).

Figure 1: Employment quality indicators at Wave IV by Wave I Depressive Symptoms
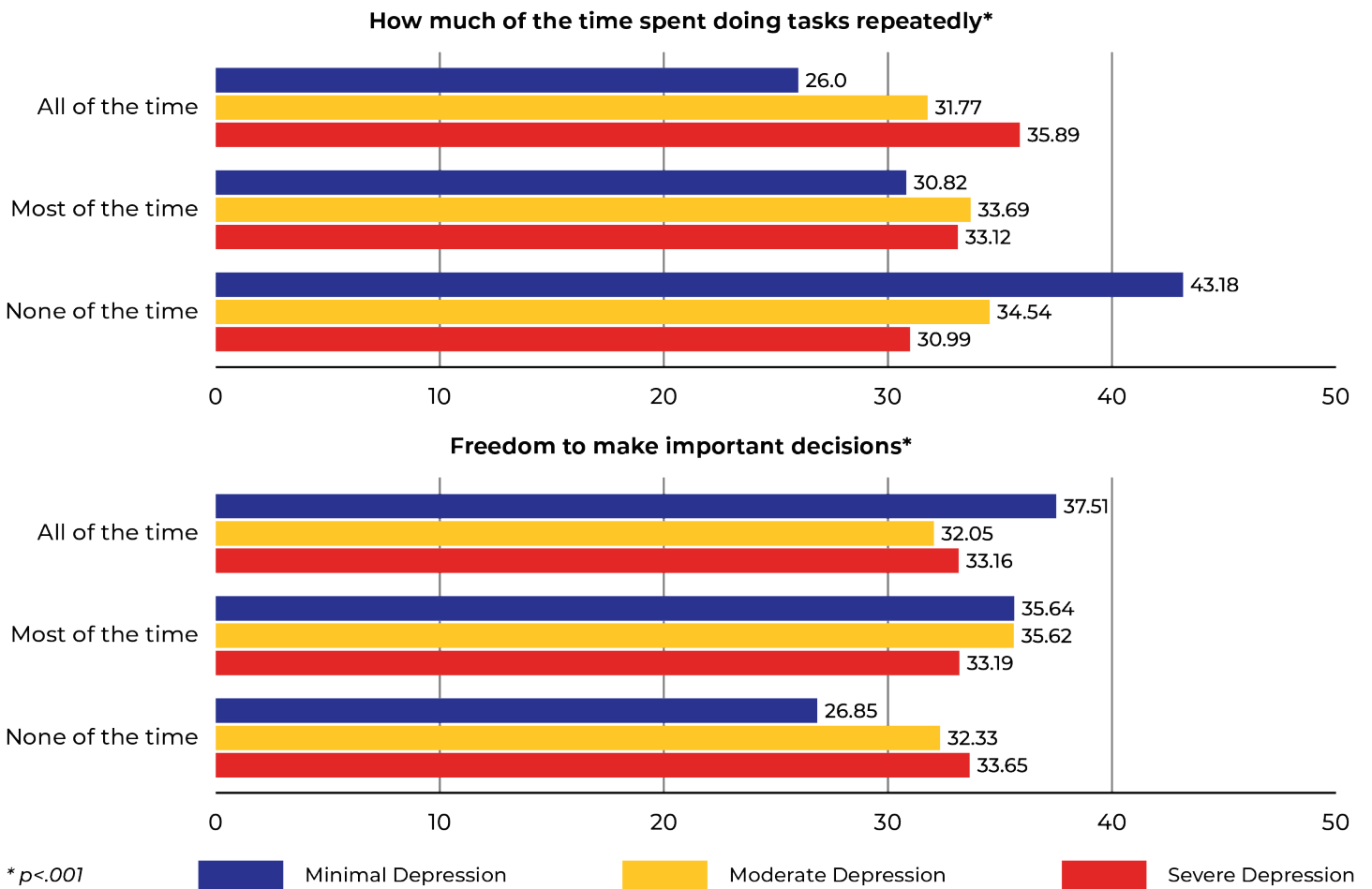

Table 2 (Appendix) shows results of the multivariate models including Wave I control variables and then adding Wave IV control variables.

Task repetitiveness

As shown in model 1 of Table 2, on average and controlling for other factors, young adults who experienced moderate or severe depression in adolescence are about 20% more likely to be in jobs with more repetitive tasks than young adults that experienced minimal depression in adolescence. Model 2 in Table 2 shows that when Wave IV variables are added to the model, the effect of adolescent depressive symptoms is no longer significant. It appears that those with higher depressive symptoms in Wave IV are more susceptible to doing jobs with repetitive tasks while education attainment in Wave IV has a protective effect.

Job autonomy

As seen in model 3 of Table 2, on average and controlling for other factors in the model, individuals with moderate depression were on average about 20% less likely to report being in a job where they have freedom to make important decisions more frequently than those with minimal depression, though the likelihood in those with severe depression was not significant. After adding Wave IV variables to the model (model 4 in Table 2), these trends largely remained intact. Most notably, individuals with moderate depression in Wave I were about 18% less likely to be able to make important decisions more frequently than those with minimal depression controlling for Wave I and Wave IV covariates.

Discussion

This is the first study to look at the longitudinal relationship between depression in adolescence and employment quality indicators in young adulthood. **The presence of depressive symptoms in adolescence appears to be a risk factor for working in jobs in young adulthood that are less complex and that have limited autonomy.** Controlling for other important adolescent and family characteristics, higher levels of depression in adolescence significantly contribute to increased likelihood of being in a job that is less complex (i.e., feature more repetitive tasks). Moderate, but not severe depression, in adolescence contributes to an increased likelihood of being in jobs with lower levels of autonomy (i.e., freedom to make important decisions). Low educational attainment in young adulthood and depression in young adulthood were also associated with the likelihood of someone being in a less complex job in young adulthood.

Limitations

The AddHealth study only screened for depressive symptoms and not symptoms of other common mental health disorders such as anxiety. Thus, co-occurrence with, or the impact of, other mental health conditions could not be controlled for. Further, the CES-D has been widely used as a screening tool for depression in community research, but it is not an indicator of major depressive disorder. Given that mental illnesses are the leading cause of disability in adolescents,[31] future longitudinal studies of adolescents would benefit from assessing mental health more comprehensively and the relationship between a wider range or severity of mental illnesses and employment quality. Finally, these data are representative of the economy at the outset of the Great Recession and are more than 15 years old. Analyses should be replicated with more recent data.

Implications

Parents of adolescents, service workers, and other professionals who work with adolescents need to be particularly aware of these findings. Low quality jobs in young adulthood with few extrinsic and intrinsic rewards are difficult to move beyond,[32] will likely be associated with poor health, mental health and subjective well-being over time[10, 15–18] and potentially have damaging effects on long-term occupational attainment.[19] In developing a treatment plan for adolescents experiencing depressive symptoms, parents and professionals alike need to be aware of the impact of depressive symptoms in adolescence not only on long-term health, mental health, education, and employment, but also the quality of their future employment. Even though data are old, findings suggest that better supporting their educational attainment might moderate the impact of moderate to severe adolescent depression on young adult employment outcomes. While clinical treatment of depressive symptoms is important, education and employment supports may be equally important to improving long term outcomes and restricting a pattern of social drift.

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Appendix: Tables 1 and 2

Table 1: Description of sample (unweighted % or mean(sd)) (n=15,647)

Gender	
Girls	50.99%
Boys	49.01%
Age Wave I (Mean (SD))	**16.13 (1.70)**
Depression Wave I (19 item CES-D)	
Minimal	45.70%
Moderate	45.81%
Severe	8.49%
Race/Ethnicity	
White, non-Hispanic	53.14%
Black, non-Hispanic	21.35%
Hispanic	16.58%
Other Race/Ethnicity	8.93%
Highest Level of Maternal Education	
Limited high school	15.53%
High school graduate	33.25%
Some post-secondary education	19.32%
Bachelor's degree or higher	27.49%
Missing maternal education	4.41%
Family Structure	
Two Biological parents	53.49%
Two parents (only one is biological)	17.84%
Single parent	23.01%
Other family structure	5.66%
AH-PVT percentile score	
0–25th% PVT percent	25.23%
26–50th% PVT percent	23.09%
51–75th% PVT percent	24.77%
76–100th% PVT percent	22.16%
Missing PVT	4.77%
Poverty Level based on family income, household size, and 1994 census poverty levels	
<100% Poverty level	13.08%
100–200% Poverty level	17.69%
200–300% Poverty level	16.73%
300–400% Poverty level	10.28%
>400% Poverty level	18.25%
Missing poverty level	23.97%
Age Wave IV Mean (SD)	**29.00 (1.74)**
Highest level of education Wave IV	
Less than high school	6.27%
High school graduate	15.31%
Some training after high school	44.00%
Bachelors	21.43%
Some post baccalaureate professional education	12.98%
Depression Wave IV (10 item CES-D) Mean (SD)	**8.19 (2.66)**
Wave IV # Hours Mean (SD)	**41.59 (10.65)**

Table 2: Multiple Regression Models

	Repetitive Tasks Most of Time		Can Make Decisions Most of Time	
	Model 1	Model 2	Model 3	Model 4
Model 1: WAVE I Variables				
Depression (minimal = ref)				
Moderate depression	1.19 (1.07–1.33)*	1.08 (0.96–1.21)	0.80 (0.73–0.89)*	0.82 (0.74–0.91)*
Severe Depression	1.21 (1.04–1.40)*	0.99 (0.83–1.17)	0.84 (0.69–1.02)	0.86 (0.71–1.04)
Female	1.24 (1.12–1.37)*	1.33 (1.19–1.48)*	0.83 (0.75–0.93)*	0.83 (0.75–0.93)*
Race (white = ref)				
Black	1.61 (1.34–1.92)*	1.68 (1.40–2.02)*	.83 (0.73–0.95)*	0.83 (0.73–0.95)*
Hispanic	0.91 (0.77–1.06)	0.94 (0.78–1.10)	.80 (0.67–0.96)*	0.80 (0.66–0.96)*
Other race	1.14 (0.93–1.41)	1.21 (0.98–1.50)	1.05 (0.88–1.24)	1.01 (0.85–1.20)
Maternal Education (<high school = ref)				
High School Grad	0.88 (0.75–1.04)	0.95 (0.81–1.13)	1.03 (0.88–1.12)	1.01 (0.87–1.18)
Some post HS	0.73 (0.62–0.87)*	0.86 (0.72–1.03)	1.14 (0.95–1.37)	1.10 (0.91–1.33)
Bachelors or Higher	0.59 (0.50–0.71)*	0.81 (0.68–0.96)*	1.18 (1.01–1.38)*	1.13 (0.96–1.32)
Missing	1.17 (0.89–1.54)	1.16 (0.88–1.51)	1.00 (0.75–1.34)	1.00 (0.76–1.32)
Family Structure (2 bio parents = ref)				
Two parents (1 not biological)	1.21 (1.06–1.37)*	1.04 (0.91–1.19)	1.01 (0.88–1.16)	1.05 (0.91–1.20)
Single Parent	1.34 (1.18–1.52)*	1.19 (1.04–1.36)*	1.04 (0.93–1.17)	1.08 (0.96–1.21)
Other	1.16 (0.93–1.47)	0.98 (0.78–1.23)	1.26 (1.01–1.57)*	1.29 (1.02–1.62)*
PVT score (0–25th percentile = ref)				
26–50th percentile	0.96 (0.84–1.10)	1.03 (0.89–1.20)	1.20 (1.05–1.36)*	1.18 (1.05–1.34)*
51–75th percentile	0.64 (0.55–0.74)*	0.75 (0.65–0.86)*	1.10 (0.95–1.27)	1.05 (0.91–1.22)
75–100th percentile	0.48 (0.41–0.56)*	0.62 (0.54–0.71)*	1.01 (0.86–1.18)	0.96 (0.82–1.13)
PVT missing	0.69 (0.54–0.88)*	0.77 (0.60–0.97)*	0.90 (0.72–1.12)	0.87 (0.71–1.08)
Poverty level (<100% poverty = ref)				
100–200% poverty level	0.88 (0.72–1.07)	0.86 (0.70–1.05)	1.26 (1.03–1.54)*	1.24 (1.02–1.51)*
200–300% poverty level	0.79 (0.66–0.94)*	0.82 (0.68–0.98)*	1.16 (0.92–1.42)	1.14 (0.93–1.39)
300–400% poverty level	0.64 (0.51–0.79)*	0.73 (0.58–0.91)*	1.15 (0.91–1.45)	1.11 (0.87–1.40)
>400% poverty level	0.63 (0.51–0.77)*	0.76 (0.62–0.92)*	1.29 (1.04–1.59)*	1.20 (0.98–1.48)
Poverty level missing	0.77 (0.65–0.91)*	0.85 (0.72–0.96)*	1.17 (0.97–1.43)	1.14 (0.94–1.39)
Model 2: WAVE IV Variables				
Depression		1.08 (1.05-1.10)*		1.01 (0.99-1.03)
Education (< high school = ref)				
High School Grad		0.74 (0.57-0.96)*		0.94 (0.74-1.19)
Some post HS		0.62 (0.49-0.78)*		1.08 (0.88-1.33)
Bachelor's Degree		0.32 (0.25-0.42)*		1.16 (0.94-1.44)
> Bachelor's Degree		0.20 (0.15-0.27)*		1.13 (0.90-1.41)
# of hours worked		0.99 (0.99-1.00)*		1.03 (1.02-1.03)*

*= statistically significant at p<.05 level