Adverse Mental Health and Adolescents' Adult Educational Attainment:
Sibling Comparisons from Norway

Background

The prevalence and importance of adolescents' mental health problems have been increasingly recognized in recent years. International estimates show that up to 20% of adolescents exhibit signs or symptoms of mental or behavioral disorders (Patel et al. 2007; Currie 2009). Adolescents mental health problems, while important in their own right, also often lead directly to adult mental health problems, which are a major cause of lost work time and health care costs (Moussavi et al. 2007; Currie 2009). However, mental health problems may also reduce adult earnings and employment indirectly by inhibiting the child's accumulation of human capital and formal educational qualifications (e.g. Currie 2009; Fletcher 2008).

In this paper, we investigate the link between mental health problems during adolescence on later educational attainment. There is a growing multidisciplinary literature in sociology, economics, and psychology investigating the social effects of childhood and adolescent mental health problems on human capital accumulation and subsequent socioeconomic attainments in adulthood (e.g., Caspi et al. 1998; Currie and Stabile 2006; Chen and Kaplan 2003; Fergusson, Boden and Horwood 2007; Fletcher 2008; Currie et al. 2010; McLeod, Uemura and Rohrman 2012). We aim to contribute to this literature by providing new evidence from the Norwegian setting, with high-quality data and state-of-the-art methods.

We pose several research questions: (1) Are adolescent mental health problems associated with lower educational attainment in early adulthood; (2) Is the association between mental health problems with educational attainment attributable to observable family socioeconomic conditions; (3) To what extent are the effects of adolescent mental health problems on educational attainment attributable to stable family characteristics that are shared by siblings?

Data and Methods

In this study, we use data from a large population-based health survey, the Young Nord-Trøndelag Health Survey 1995-1997 (http://www.ntnu.edu/hunt), matched with longitudinal follow-up data from Norwegian administrative registries. During class hours, a comprehensive questionnaire was completed by about 9,000 adolescent students in all lower secondary schools in one county in Norway. Students were asked a wide range of questions related to health-behavior and well-being, including internalizing problems and externalizing behavior.

Norwegian population registries include information on all resident and alive individuals in any given year. A system of personal ID numbers identifies each individual, and enables linkage of information from different administrative registries. The system also facilitates proper identification of siblings and their parents in the population registry. Furthermore, data from administrative registries enables us to follow the individuals who participated in the survey without attrition problems.

Internalizing problems and externalizing behavior. Internalizing problems were measured of symptoms of anxiety and depression, based on the SCL-5 score. This is a five item scale originally based on the Hopkins Symptoms Checklist-25 (SCL-25). The five item scale has shown to be a reliable measure and correlates highly with the SCL-25 (Tambs and Moum 1993). Externalizing behavior problems were constructed based on 14 statements about school adjustment. Based on explorative factor analysis two factors were extracted to measure attention problems and conduct behavior.

Educational outcomes. Our dependent variable is years of completed schooling at age 27 (the oldest age for the youngest respondents available).

Sociodemographic controls. Information on the birth cohort, sex, whether the child was the first born of his or her mother, family structure, and parental education when the adolescent were children.

Empirical approach. We begin by estimating linear probability models from OLS regressions of the relationship between mental health problems in adolescence and educational attainment, controlling for a wide range of other potentially confounding variables, including parents' education, child year of birth (dummies), whether the child is first born, and sex. These models have the following form:

$$Y_i = \alpha + \beta Mental_i + \lambda X_i + \varepsilon_i \tag{1}$$

Where *Y* is our measure of educational attainment, *Mental* is the adolescents score on internalizing problems and externalizing behavior and *X* is the vector of covariates described above. If high SCL-5 scores are positively correlated with other factors that have a negative effect on child outcomes, then these estimates will overstate the true effect of mental health problems. Thus, we next attempt to control for unobserved heterogeneity by estimating family fixed effects models, which can formally expressed as:

$$Y_{if} = \alpha + \beta Mental_{if} + \lambda Z_{if} + \mu_f + \varepsilon_{if} \tag{2}$$

In these models, the *Z* vector is similar to *X* but omits factors common to both siblings, and the *f* subscript indexes families. A comparison of (1) and (2) will indicate whether OLS estimates are driven by omitted variables at the family level. Evidently, there may also be individual-level factors that are important and which will not be captured by family fixed effects.

Preliminary Results

In Table 1, we began by estimating years of schooling from the indicators of specific mental health problems with control for cohort and age (Models 1-3). All models are estimated for the full sample (Panel A) and for a subsample of siblings in families where at least two siblings were observed (Panel B). For each outcome, we estimated models that included each mental health problem alone, followed by models that included the entire problems together (Model 4). In Model 5, we added controls for extensive social background measures and in Model 6 we also included school fixed effects.

The results from Table 1 indicate that attention problems and conduct behavior were both associated with less schooling whether considered alone or simultaneously, and also after including extensive control variables, while internalizing problems does not seem to have an effect or is in fact positively related to educational attainment when controls are included.

For example, looking at the effects for externalizing behavior the results suggest that a standard deviation increase in the externalizing behavior index is associated with a reduction in years of schooling of nearly 0.32 years for attention problems and 0.21 years for conduct behavior after conditioning on several social background controls and school fixed effects. The results from the full sample closely parallel those for the sibling sample.

Table 2 examines the effects of internalizing problems and externalizing behavior using family fixed effects for the sibling sample. In these models we have eliminated constant family

influences on education and mental health problems that are shared by siblings. The results are rather similar to those found in the Table 1. Internalizing problems still increase years of schooling, while attention problems and conduct behavior reduces years of schooling. A standard deviation increase in the externalizing behavior index is associated with a reduction in years of schooling of nearly 0.18 years for attention problems and 0.23 years for conduct behavior. The results for externalizing behavior still reach high statistical significance. These are rather strong effects compared to results from previous research on this issue.

Discussion

Our preliminary results show that externalizing problems, such as attention problems and conduct behavior, decreases human capital accumulation substantially. However, for internalizing problems the results are reversed, and there is a positive relationship between internalizing problems increase years of schooling after controls. Rich controls for both observed time-varying and observed and unobserved family background variables reduces the links between externalizing problems and educational attainment somewhat, but effects remain. These results indicate that the association between adolescents externalizing problems and educational attainment is not explained by stable family background characteristics. The estimates are unbiased from confounding variables shared by siblings such as some shared genetic endowments, family resources, and stable contexts during childhood, e.g. schools and neighborhood factors. However, factors not shared by siblings are still a source of concern.

References

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Table 1: The effect of internalizing problems and externalizing behaviour on years of education (age 27)

Panel A: full sample (N= ~8400)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SCL5	-0.002			0.160***	0.039	0.057†
	(0.032)			(0.034)	(0.033)	(0.032)
Attentionproblems		-0.397***		-0.301***	-0.268***	-0.321***
		(0.031)		(0.038)	(0.035)	(0.035)
Conduct problems			-0.449***	-0.341***	-0.224***	-0.206***
			(0.029)	(0.034)	(0.032)	(0.032)
Family SES					Yes	Yes
School Fixed effects						Yes
R2	0.007	0.026	0.033	0.041	0.214	0.248
Panel B: sibling sample (N=~3000)						
SCL5	0.030			0.169**	0.078	0.079
	(0.055)			(0.060)	(0.055)	(0.054)
Attentionproblems		-0.316***		-0.237***	-0.200***	-0.247***
		(0.052)		(0.065)	(0.060)	(0.060)
Conduct problems			-0.384***	-0.304***	-0.236***	-0.190***
			(0.050)	(0.058)	(0.055)	(0.056)
Family SES					yes	yes
School fixed effects						yes
R2	0.009	0.020	0.026	0.032	0.225	0.269

Note: linear probability coefficients (standarized) from OLS regression. Robust standard errors in parenthesis, clustered at the family level. Family SES includes firstborn, number of siblings, sex and parental education. All models controls for birthyear and age surveyed.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 2: The effect of internalizing problems and externalizing problems on years of education (age 27), family fixed effects

SCL5	0.049			0.145*
	(0.063)			(0.068)
Attentionproblems		-0.236***		-0.184*
		(0.060)		(0.074)
Conduct problems			-0.276***	-0.226***
			(0.060)	(0.068)
Family SES				Yes
Number of groups				1570
R2	0.092	0.106	0.110	0.111

Note: linear probability coefficients (standarized) from OLS regression. Robust standard errors in parenthesis, clustered at the family level. Family SES includes birthyear, age surveyed, firstborn, and female.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001