Mental Health in Childhood and Human Capital

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Motivation:

- U.S Surgeon General's report on Mental Health:
  - 20% of children in the U.S. suffer some impairment from a mental health disorder
  - 11% have significant functional impairments
  - 5% extreme functional impairment
- Little known about the longer term consequences.
- Our work examines the relationship between several common mental health conditions and future outcomes using large samples of children from the U.S. and Canada.

Our contributions:

1. Use “screener” questions asked of all children instead of requiring diagnosis. Allows us to capture a broader set of children.
2. Use sibling comparisons to try and control for omitted family factors correlated with mental health conditions and poor outcomes.
3. Explore whether specific mental health conditions differ by family SES (income and education).
4. Look at the suitability of an aggregate behavior problems index as measure of child mental health.
5. Use recent longitudinal samples from both U.S. and Canada -- contrast results across health care systems.

Findings in Brief:

- Behavior problems have a large negative effect on educational outcomes.
- Most consistent effects for the two countries are for ADHD.
- Some effects of anxiety/depression on grade repetition and for conduct disorders on staying in school.
- Find no evidence that these effects are modified by family income or maternal education.

Background Literature

- At least 3 relevant literatures:

1. Studies that examine long-term consequences of behavior problems in large samples (c.f. Kessler et al (1995), Gregg and Machin (1998), (Caspi et al, 1998), McLeod and Kaiser (2004), Duncan et al (2006))
2. Studies that examine longer term effects of specific mental heath problems. (c.f. Currie and Stabile (2006), Nagin and Tremblay (1999), Campbell et al 2006))
3. Examining returns to "non-cognitive skills." (c.f. Blanden, Gregg, MacMillan (2006), Heckman et al (2006))

3. Data

1. The Canadian National Longitudinal Survey of Children and Youth (NLSCY)

- a national longitudinal data set which surveyed children ages 0-11 and their families beginning in 1994.
- Follow up surveys were conducted 1996,98, 00, 02.
- The initial sample consisted of approximately 22,800 children in 1994.
- Only children 4-11 in 1994 complete the mental health screeners, ~ 5,000 children, 2300 for math test.
- In the NLSCY, we look at the effect of mental health scores in 1994 on outcomes in 2002.

2. The National Longitudinal Survey of Youth

- Began in 1979 with a survey of approximately 6000 young men and 6000 young women between the ages of 14 and 21.
- Followed every year up to the present.
- In 1986, assessment of children of the female NLSY respondents began at two year intervals.
- Restrict to ages 4-11 in 1994 to be similar to NLSCY
- In the NLSY, we look at how the average mental health score measured over the 1990 to 1994 period affects the average outcomes of children in the 1998 and 2004 waves. This procedure yields a maximum sample of 3758 children.

The measurement of mental health

- Measures are taken from questions asked to parents about symptoms.
- Questions are similar to those that would be asked as a first step in a diagnosis of a mental health condition.

NLSCY:

- Questions can be used to create hyperactivity score (8 questions), and emotional score (8 questions), and an aggressive behavior score (6 questions).
- Use these questions plus others to create a Behavioral Problems Index (BPI)

NLSY:

- Questions can be used to create a hyperactivity subscale (5 questions), a conduct disorder subscale (6 questions), and an anxiety/depression subscale (5 questions) as well as an overall behavior problems index.
- Scores standardized by the child's age. Convert this standardized score to one that has the same range as the scores in the Canadian data.

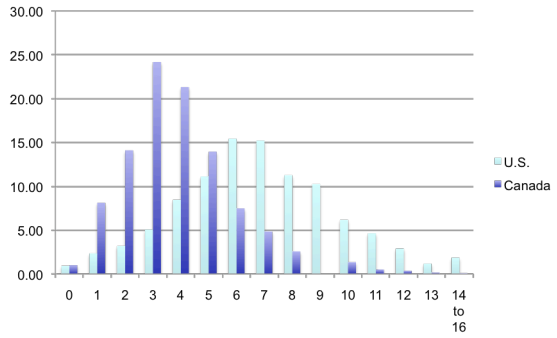
Mental Health Var E.g.

- Hyperactivity score:
  - HOW OFTEN WOULD YOU SAY THAT "name":
    - Can't sit still, is restless or hyperactive?
    - Is distractible, has trouble sticking to any activity?
    - Fidgets?
    - Can't concentrate, can't pay attention for long?
    - Is impulsive, acts without thinking?
    - Has difficulty awaiting turn in games or groups?
    - Cannot settle to anything for more than a few moments?
    - Is inattentive?

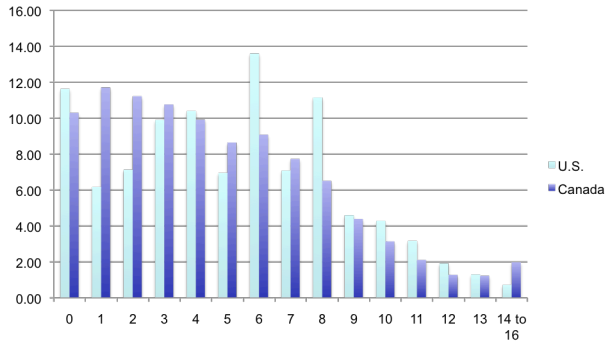
Outcome Measures

- Grade repetition
  - has the child has ever repeated between 1994 (when mental health is measured) and 2004?
- Math and Reading
  - NLSY administers Peabody Individual Achievement Tests (PIATs) for mathematics and reading recognition. NLSCY mathematics tests were administered to children in grades two through ten and are based on the Canadian Achievement Tests. We convert all of the test scores to Z scores.
- Special education
  - only in the NLSY.
- Delinquency
  - NLSY includes illegal drug use or sales, destroyed property, theft, assault, arrested. NLSCY also includes questioning by police,or run away from home. Questions are answered by the child in both surveys.
- Still in school.

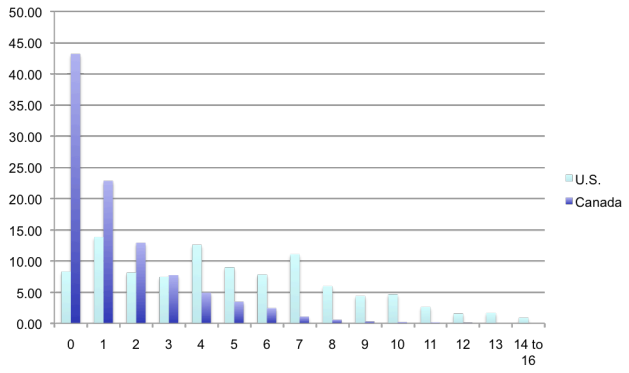
Distribution of Total Behavioral Scores



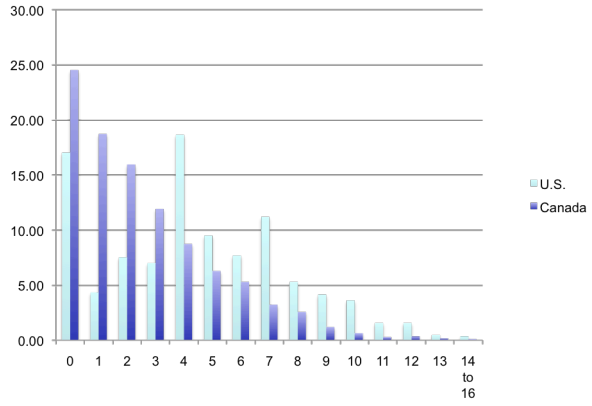
Distribution of Hyperactivity Scores

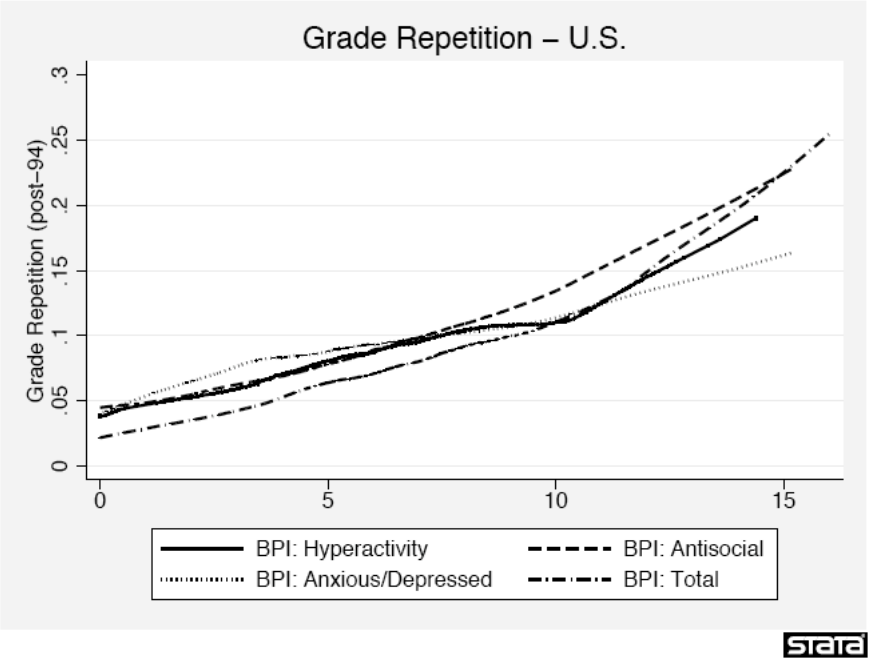


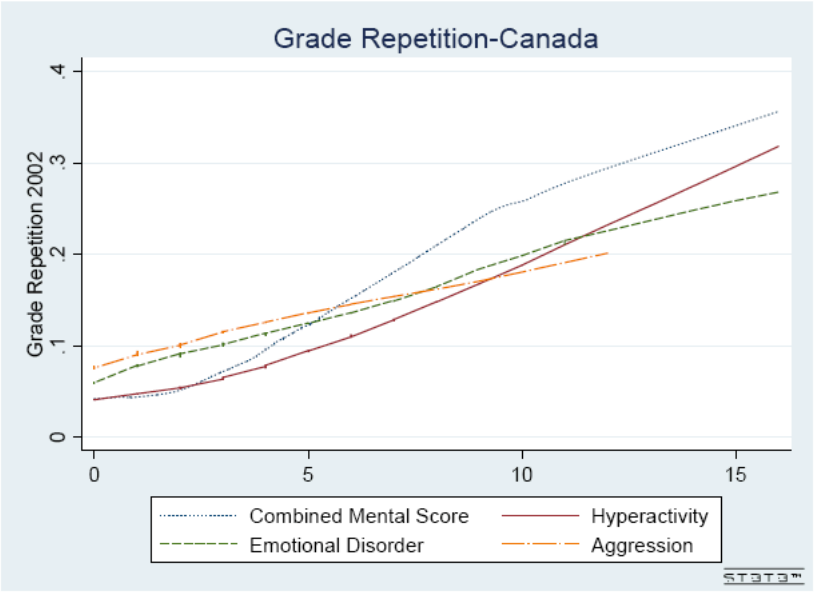
Distribution of Antisocial/Aggression Scores

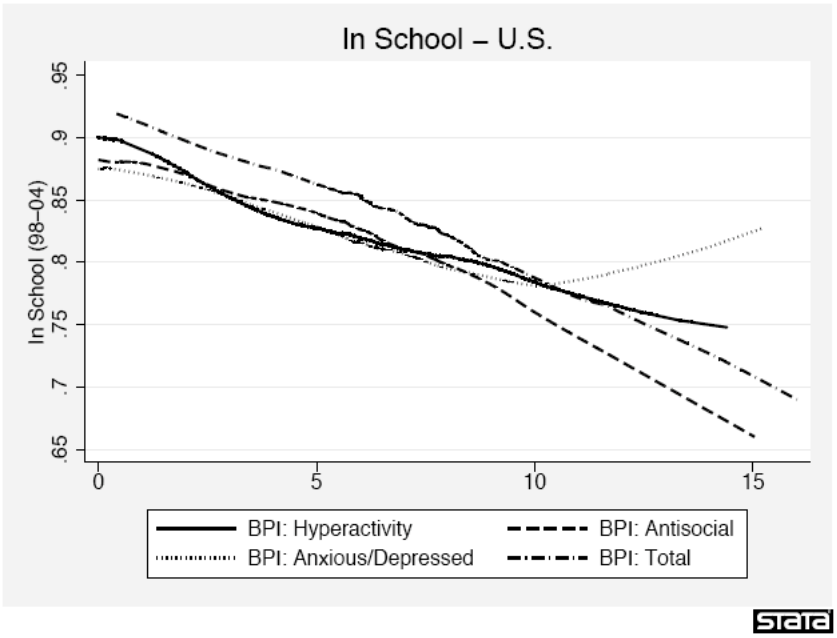


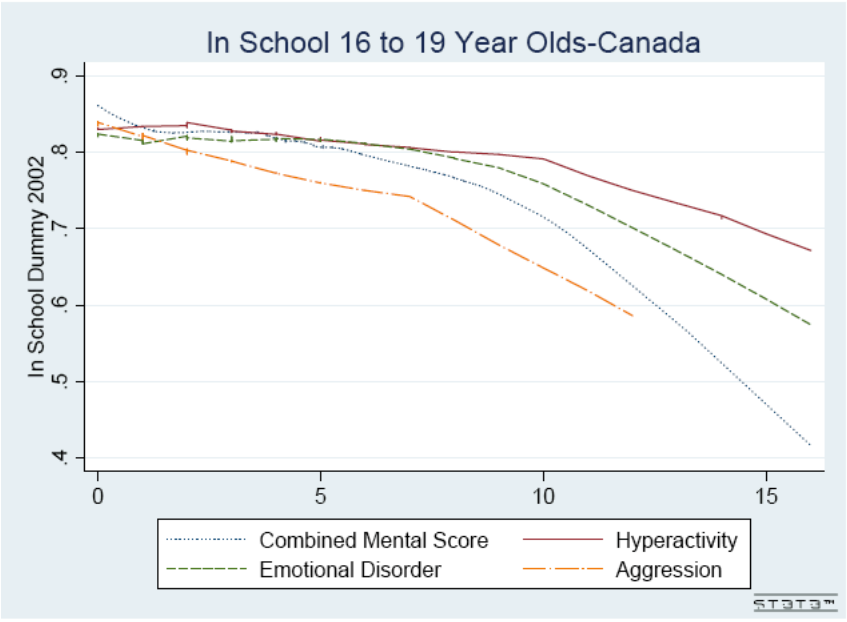
Distribution of Depression Score

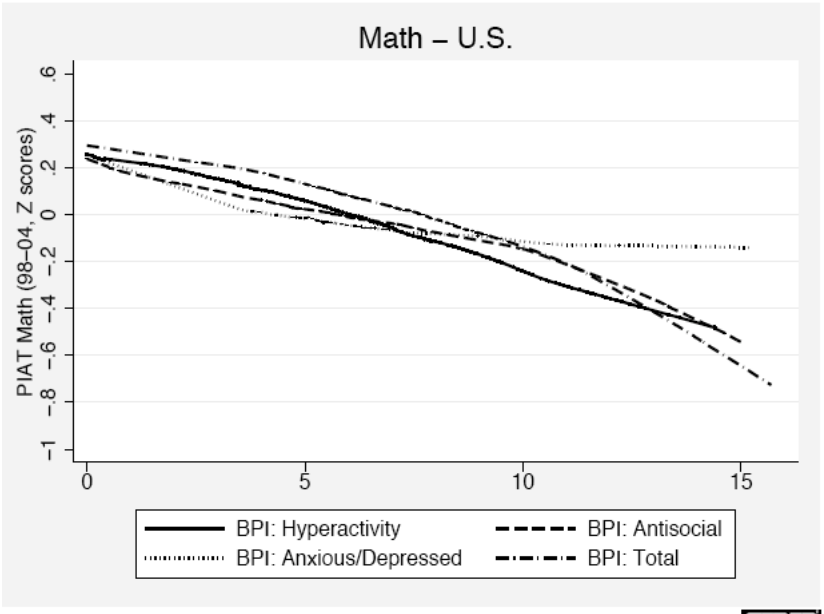


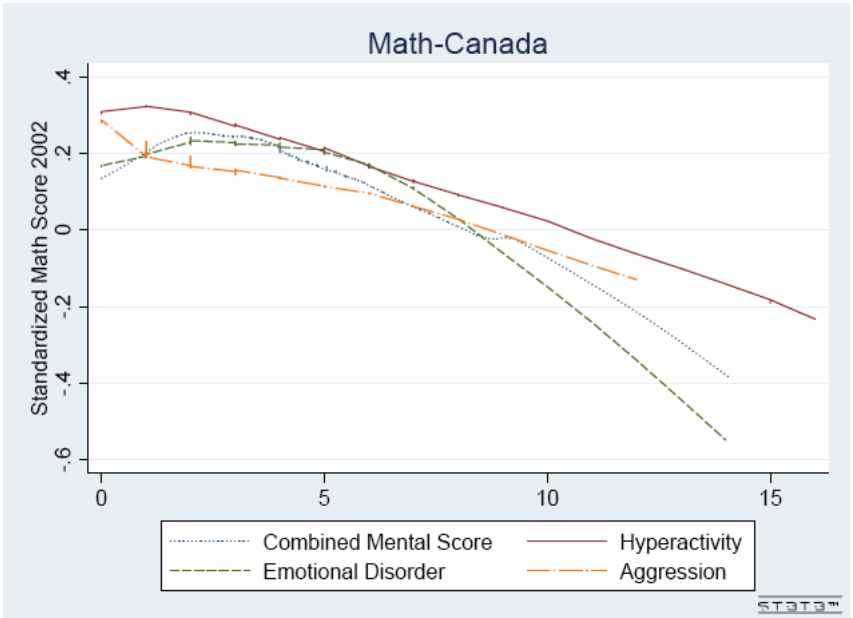

Grade Repetition – U.S.
Grade Repetition (post–94)
0
.05
.1
.15
.2
.25
.3
0
5
10
15
BPI: Hyperactivity
BPI: Antisocial
BPI: Anxious/Depressed
BPI: Total

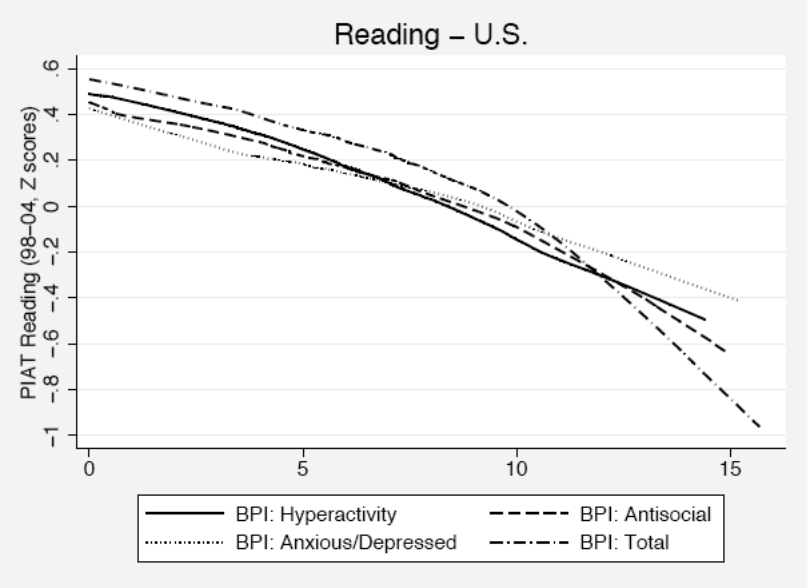

Grade Repetition-Canada
Grade Repetition 2002
0
.1
.2
.3
.4
0
5
10
15
Combined Mental Score
Hyperactivity
Emotional Disorder
Aggression

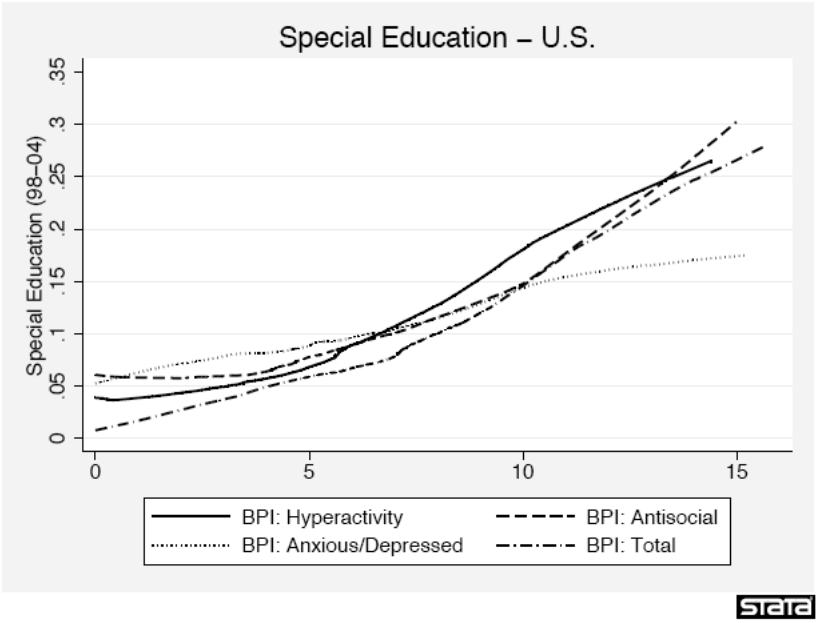

In School – U.S.
In School (98–04)
.65
.7
.75
.8
.85
.9
.95
0
5
10
15
BPI: Hyperactivity
BPI: Antisocial
BPI: Anxious/Depressed
BPI: Total

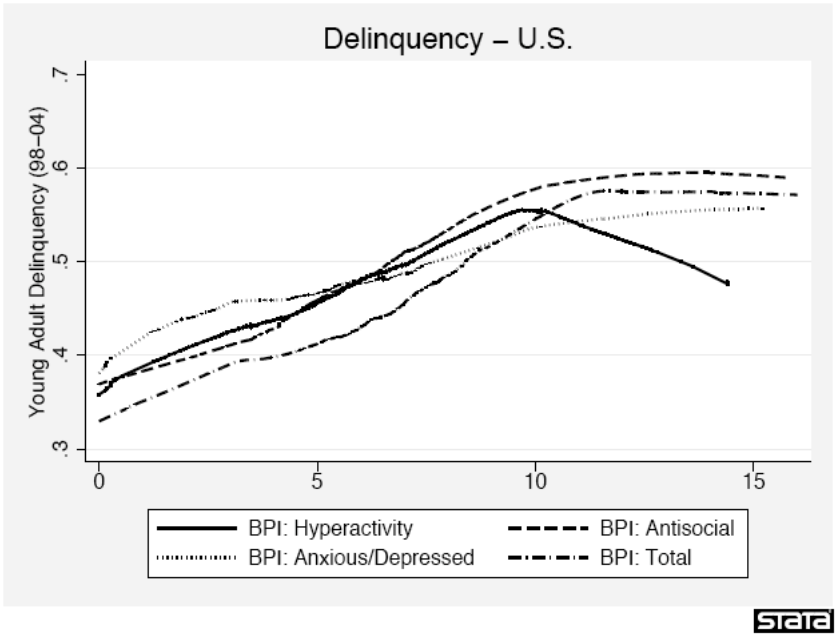

In School 16 to 19 Year Olds-Canada
In School Dummy 2002
.4
.5
.6
.7
.8
.9
0
5
10
15
Combined Mental Score
Hyperactivity
Emotional Disorder
Aggression

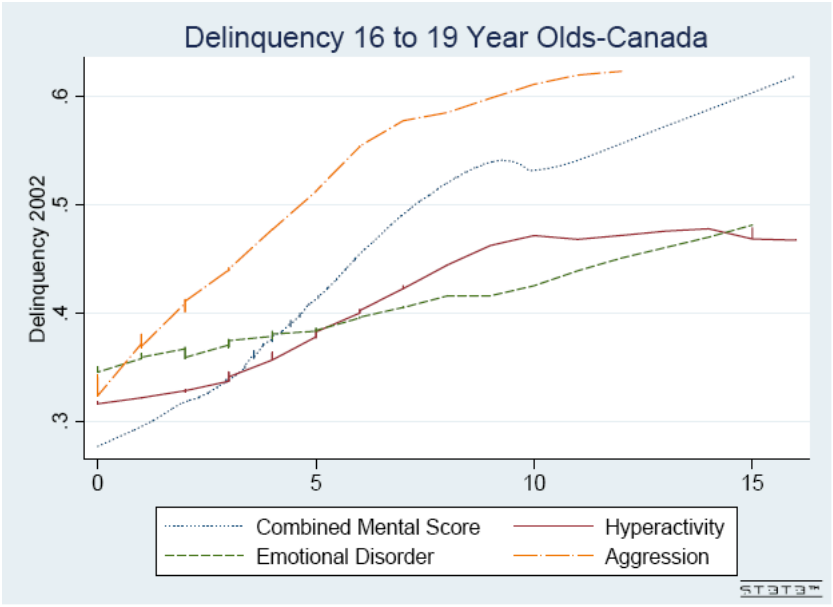

Math – U.S.
PIAT Math (98–04, Z scores)
-1
-.8
-.6
-.4
-.2
0
.2
.4
.6
0
5
10
15
BPI: Hyperactivity
BPI: Antisocial
BPI: Anxious/Depressed
BPI: Total


Math-Canada
Standardized Math Score 2002
-.6
-.4
-.2
0
.2
.4
0
5
10
15
Combined Mental Score
Hyperactivity
Emotional Disorder
Aggression


Reading – U.S.
PIAT Reading (98–04, Z scores)
−1
−.8
−.6
−.4
−.2
0
.2
.4
.6
0
5
10
15
BPI: Hyperactivity
BPI: Antisocial
BPI: Anxious/Depressed
BPI: Total


Special Education – U.S.
Special Education (98–04)
0
.05
.1
.15
.2
.25
.3
.35
0
5
10
15
BPI: Hyperactivity
BPI: Antisocial
BPI: Anxious/Depressed
BPI: Total


Delinquency – U.S.
Young Adult Delinquency (98–04)
.3
.4
.5
.6
.7
0
5
10
15
BPI: Hyperactivity
BPI: Antisocial
BPI: Anxious/Depressed
BPI: Total


Delinquency 16 to 19 Year Olds-Canada
Delinquency 2002
.3
.4
.5
.6
0
5
10
15
Combined Mental Score
Hyperactivity
Emotional Disorder
Aggression

4. Methods

We 1st estimate models that examine the effect of the child's mental health in 1994 on outcomes of interest (listed earlier) several years later.

We also control for permanent income; maternal health status, education and family structure (in 1994); child age (single year of age dummies), whether the child is first born, and sex.

We then estimate models that compare children to their siblings. All fixed differences **between** households are removed.

Finally we examine whether **within** household differences differ by socio-economic status.

Some Estimation Issues:

(1) Treat symptoms linearly, or only examine symptoms above some cutoff level? (we do both).

(2) How to treat children who are treated? If treatment is successful, then their scores will be lower than they otherwise would have been?

We adopt 2 approaches:

- exclude treated children
- assign the 90th percentile of the Mental Health distribution to the treated children as an approximation of their "true" underlying score.

(3) Could Mental Health measures be picking up other learning disabilities?

- Data include questions on other learning disabilities which we can use to distinguish these from our mental health scores.

OLS Regression Results

- BPI (total score) has:
  - Positive effect on delinquency in both Canada and the US
  - Positive effect on grade repetition in both Canada and the US
  - A negative effect on being in school in both Canada and the US
  - A negative effect on math and reading scores in both Canada and the US
  - A positive effect on the probability of being in special education

OLS Hyperactivity Results

- Hyperactivity Score has:
  - Positive effect on delinquency in both Canada and the US
  - Positive effect on grade repetition in both Canada and the US
  - A negative effect on being in school in both Canada and the US
  - A negative effect on math and reading scores in both Canada and the US
  - A positive effect on the probability of being in special education

OLS Results for Depression and Antisocial Behavior

- The same.
- Exception: Depression has no effect on staying in school.

- Perhaps these are not surprising given that disadvantaged children suffer from multiple problems which are highly correlated.

Fixed Effects Results:

- Delinquency:
  - No longer find a relationship between mental health and young adult delinquency.
- Grade Repetition:
  - BPI, Hyperactivity still strongly related to grade repetition in both Canada and the US
  - Antisocial and Depression scores strongly related in the US only.

Fixed Effects Cont.

- Test Scores:
  - BPI, Hyperactivity still have strong negative effect on test scores in both countries.
  - Antisocial Behavior has a negative effect in the US only.
- Special Education:
  - BPI and hyperactivity remain a strong predictor of being in special education.

How Large are these Effects?

In the U.S. each $100,000 increase in permanent income would decrease the probability of grade repetition by 1.9 percentage points, which is only slightly larger than the effect of reducing the hyperactivity or BPI score by one point out of 16!

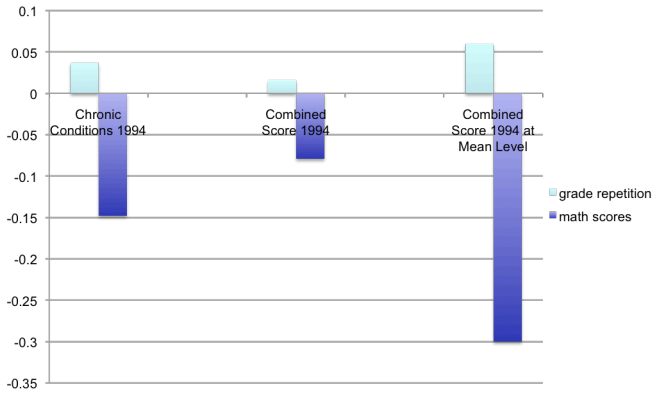
In Canada, each $100,000 worth of permanent income is associated with a 7 percentage point decrease in the probability that a child repeats a grade. A score of 4 out of 16 on the BPI index increase the probability of grade repetition by 8 percentage points.

Seem large.

Mental Health vs. Learning Disabilities

- Concern that measures of mental health may be picking up other problems.
- Include a question on learning disabilities along with the mental health questions.
- Effects of the BPI persist with the inclusion of learning disabilities.
- Learning disabilities correlated with lower test scores and high probability of special education.

Mental Versus Physical Health - Canada



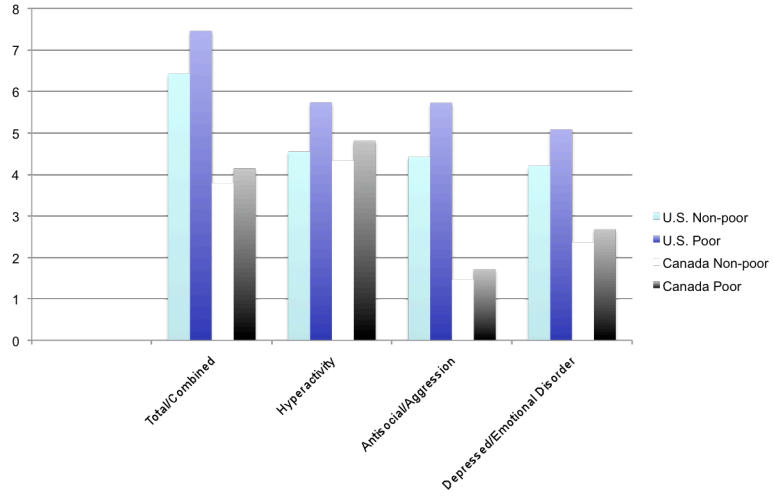
Sex Differences

- For ADHD examine differences by sex of child.
- Effects are stronger at the high end of the ADHD scores distribution for test scores and special education.

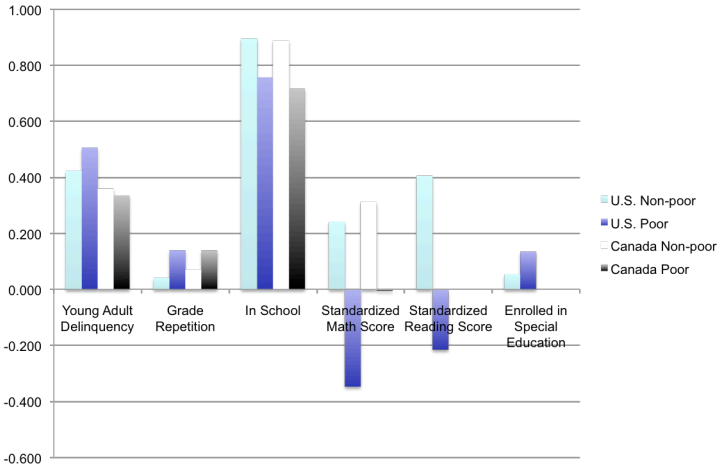
Persistence of Effects

- Can look at both past and current mental health scores to check whether past scores are simply proxies for current mental health scores.
- Find that both current and past scores remain strong and significant for test score results.

Differences by SES – Mental Health



Differences by SES – Outcomes



Summary of SES-Interaction Models:

- OLS:
  - Interactions between BPI and SES (Income, Mother's education, poverty line) show that higher SES mitigates the effects of mental health problems for grade repetition, test scores and special education.
- Fixed effects models:
  - SES has no mitigating effect!

SES-Interactions Cont.

- When we use poverty instead of Income or Education:
  - Positive interaction for test scores in the US only.
  - Possible that this reflects the fact that these children already have the lowest test scores and mental health doesn't cause them to fall any further(a test "floor" effect).
- Overall: little evidence that high SES helps. SHARP contrast to physical health and SES!

Discussion and Conclusions

•Children with mental health problems suffer large negative consequences in terms of their achievement test scores and schooling attainment.

• Hyperactivity has the broadest, and most consistently negative effects, followed by aggression/conduct disorders (externalizing versus internalizing).

•Anxiety/depression increases the probability of grade repetition, though does not affect test scores.

•The BPI is as good as any of the subscales as an indicator of whether a child is at risk of poor outcomes.

• Income does little to protect children from the effect of high mental health disorder scores.

•Our results are robust to excluding children with other diagnosed learning disabilities, and to different ways of handling treated children.

Thank you.