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EDITORIAL

A Solid Knowledge Base on the Seriousness of Childhood-Onset Mental Disorders to Advance Research Into Causal Mechanisms

Catharina A. Hartman, PhD

The Danish nationwide study by Dalsgaard and colleagues¹ in this issue of *JAMA Psychiatry* confirms previous studies of smaller scope: mental disorders with an onset during childhood are associated with substantial underachievement in school. The Danish study stands out for its simultaneous evaluation of 29 mental

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disorders in 629 622 youths. It shows that adolescents with a prior mental disorder have a 40% reduced participation rate in a final examination of compulsory schooling, while those who did take the examinations had lower grades. In other words, at age 16 years, they already have a disadvantage for life. This is not an isolated problem: childhood-onset mental disorders are common. A previous nationwide study by this research group,² also recently published in *JAMA Psychiatry*, showed that 15% of children were diagnosed with a mental disorder before the age of 18 years.

Based on the national registers, which include the children who have been diagnosed (which implies they have been referred and are more severely affected), the Danish study only shows the highest tip of the iceberg. Children who have been referred to mental health services likely underachieve more strongly than children with mental health problems who have not been referred. On the other hand, many children with psychiatric problems do not find their way to mental health services. It is therefore unlikely that the findings of the study overestimate the extent of the problem. Moreover, the peak incidences during emerging adulthood of multiple anxiety disorders and depression are still to come. Reduced educational attainment associated with mental health problems that peak after compulsory schooling is not included in the estimates in this study.¹

What is more, school performance happens to be registered nationwide, but it is only 1 relevant aspect in the lives of adolescents with a mental disorder. We have no equivalent nationwide data to compare all childhood disorders on equally important, soft aspects, such as social skills, friendships, social participation, or overall life satisfaction, because these are not registered. But such psychosocial outcomes are bound to be similarly affected.

On top of this, it is important to realize that the study is a snapshot of individuals' lives at age 16 years. What will happen next? Childhood-onset mental disorders tend to be chronic. Moreover, there is increasing recognition that childhood-onset psychiatric disorders are the very beginning of life trajectories of additional comorbid psychiatric and somatic conditions and reduced job participation and performance. During adulthood, the situation will often not improve.

Can we assume that the mental health problems caused subsequent reduced school performance in the study by Dalsgaard and colleagues?¹ Although causality is certainly plausible (for example, through interference with learning and by missed days at school, as pointed out by the authors), interpreting the association as causal is premature. There are many ambiguities in observational data that cloud our insight into causal factors, and these need to be addressed. I will highlight 3.

First, academic underachievement may enhance mental health problems, rather than the other way around (ie, reverse causation). We do not know from the current study if educational achievement was already reduced before the onset of childhood mental disorders. Insight as to whether reverse causation explains the observed association may come from simultaneous analyses of school performance and mental health over time. As with the longitudinal patterns of onset and course of the childhood-onset psychiatric disorders reported by this group,² similar longitudinal patterns of school functioning can be studied to determine if mental problems lead to reduced learning at school and/or vice versa. In this context, it is important to mention recent advances in statistical modeling. In particular, random-intercept cross-lagged panel modeling lends itself very well to multivariate derivation of potentially causal within-person changes.³

Second, causality cannot be assumed, since both mental health problems and reduced educational achievement are strongly associated with environmental risk conditions. In particular, aspects of the home environment, such as low socioeconomic status (SES) and poor parenting, may induce an association between childhood mental health problems and reduced achievement at school. The findings in the study by Dalsgaard et al¹ were adjusted for SES but not for parenting quality, since this is not part of nationwide registers for obvious reasons. After SES, poor parenting is an important and potentially causal and modifiable risk factor, given consistent evidence for its association with both psychopathology and educational attainment. This indicates that in the example on modeling potential reciprocal effects between poor mental health and school performance, the influences of important confounders, such as different aspects of parenting quality need to be comodeled to determine environmentally steered outcomes.

Third, the association between mental health problems and educational attainment may not only be driven by shared environmental circumstances but also shared genetic influences.⁴ Moreover, exposures through low SES or poor parenting that confound the association between mental health and educa-

tional performance are also partly genetically driven. While a complex, tangled knot, genetic knowledge on complex psychiatric and psychosocial variables is currently strongly progressing,⁵ and with this, enhanced insight into modifiable and unmodifiable causes is likely to increase. Even for highly heritable childhood-onset and adolescent-onset disorders, such as attention-deficit/hyperactivity disorder, autism, and schizophrenia, environmental conditions can have a strong influence. It is often ignored that, in estimates of heritability, potentially present gene-environment interplay is hidden, as illustrated by similarly highly heritable phenotypes that are nonetheless under strong environmental influence, such as intelligence⁶ and height.⁷ Of note in this context is recent progress in the identification of so-called genetic nurture effects; polygenic risk scores of parental genetic variants that are not transmitted to offspring, as derived from genome-wide association studies on educational attainment, were shown to affect educational attainment in offspring. Because only the parents, not the offspring, carry the nontransmitted alleles, this influence must be attributable to the environment created by the parents. This recent work teases apart genetically driven

and true environmental outcomes and needs extension to other variables, including psychopathology.

Psychiatry needs more solid facts in association with the childhood-onset disorders, such as those provided by this Danish group,^{1,2} in particular in longitudinal follow-up studies beyond adolescence into later parts of the life span. Such studies are very rare. It was not long ago that research on child psychiatric disorders ended at the age of 18 years, as if these disorders would suddenly remit while common adult disorders, such as depression and substance use disorders, would suddenly arise independently of the childhood mental health problems.

The knowledge base built up by large and comprehensive studies such as those from Dalsgaard and colleagues^{1,2} not only creates awareness of the magnitude and severity of the situation but also forms the basis for research into the causal processes involved in onset and course. This will appropriately target prevention and intervention strategies, which are otherwise likely to fail. Ultimately, this will improve the often difficult life trajectories of individuals with mental health problems in childhood.

ARTICLE INFORMATION

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