Journal of Adolescent Health ■■ (2017) ■■–■■

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Original article

Revisiting the Link Between Depression Symptoms and High School Dropout: Timing of Exposure Matters

Véronique Dupéré, Ph.D. [a,*], Eric Dion, Ph.D. [b], Frédéric Nault-Brière, Ph.D. [a], Isabelle Archambault, Ph.D. [a], Tama Leventhal, Ph.D. [c], and Alain Lesage, MD [d]

[a] *School of Educational Psychology (École de psychoéducation), Université de Montréal, Montreal, Quebec, Canada*
[b] *Department of Special Education, Université du Québec à Montréal, Montréal, Quebec, Canada*
[c] *Eliot-Pearson Department of Child Study and Human Development, Tufts University, Medford, Massachusetts*
[d] *Department of Psychiatry, Université de Montréal, Montréal, Quebec, Canada*

Article history: Received June 15, 2017; Accepted September 15, 2017
Keywords: Depression symptoms; High school dropout; Late adolescence

A B S T R A C T

Purpose: Recent reviews concluded that past depression symptoms are not independently associated with high school dropout, a conclusion that could induce schools with high dropout rates and limited resources to consider depression screening, prevention, and treatment as low-priority. Even if *past* symptoms are not associated with dropout, however, it is possible that *recent* symptoms are. The goal of this study was to examine this hypothesis.
Methods: In 12 disadvantaged high schools in Montreal (Canada), all students at least 14 years of age were first screened between 2012 and 2015 ($N_{screened} = 6{,}773$). Students who dropped out of school afterward (according to school records) were then invited for interviews about their mental health in the past year. Also interviewed were matched controls with similar risk profiles but who remained in school, along with average not at-risk schoolmates ($N_{interviewed} = 545$). Interviews were conducted by trained graduate students.
Results: Almost one dropout out of four had clinically significant depressive symptoms in the 3 months before leaving school. Adolescents with recent symptoms had an odd of dropping out more than twice as high as their peers without such symptoms (adjusted odds ratio = 2.17; 95% confidence interval = 1.14–4.12). In line with previous findings, adolescents who had recovered from earlier symptoms were not particularly at risk.
Conclusions: These findings suggest that to improve disadvantaged youths' educational outcomes, investments in comprehensive mental health services are needed in schools struggling with high dropout rates, the very places where adolescents with unmet mental health needs tend to concentrate.

IMPLICATIONS AND CONTRIBUTIONS

Recent reviews concluded that *past* symptoms of depression are not independently associated with high school dropout. Results of the present study find that *recent* symptoms are, thus underscoring the potential of school-based mental health programs to hit two targets with one shot, by improving adolescent mental health and educational/vocational outcomes.

Adolescents should be a priority target for screening, prevention, and treatment of mental health problems [1,2]. First, adolescence is a critical developmental period during which many common mental health problems emerge [3]. For instance, among 15–16 years old, about one out of six adolescents experience major depression [4]. Second, untreated mental health problems during

Conflicts of Interest: The authors have no conflicts of interest to disclose.

* Address correspondence to: Véronique Dupéré, Ph.D., School of Educational Psychology (École de psychoéducation), Université de Montréal, C.P. 6128, succ. Centre-ville, Montreal, QC, H3C 3J7, Canada.
E-mail address: veronique.dupere@umontreal.ca (V. Dupéré).

1054-139X/
https://doi.org/10.1016/j.jadohealth.2017.09.024

adolescence can lead to poor health and social outcomes throughout adulthood [5]. Third, compulsory schooling ends after high school; thus adolescence represent a final opportunity to reach, via school-based programs, virtually every individual in a given cohort [2].

In practice, however, implementing mental-health programs in high schools is a challenge, especially in disadvantaged contexts where these programs are most needed [5–7]. A main barrier is the fact that "achieving health outcomes is not the core business of schools" [6]. Rather, high schools' first mandate is to bring as many students as possible to graduation. If mental health programs do not clearly contribute to this primary goal, school personnel under pressure to improve substandard graduation rates may hesitate to channel scarce resources toward such programs [2,8]. As such, health workers need to reconcile their priorities with those of educational workers and decision makers to achieve better collaboration and, ultimately, better outcomes [9].

A key way to promote such collaboration is to demonstrate that mental health problems are strongly associated with high school dropout, and that mental health prevention programs have the potential to improve graduation rates [2]. Such strong associations exist for one class of mental health problems, externalizing behaviors, most notably attention-deficit/hyperactivity disorders (ADHD) and conduct disorders (CD) [10,11]. Evaluation studies show that school-based programs reducing these problems also prevent dropout [10]. From school personnel's viewpoint, these programs hit two high-value targets with one shot: they reduce troublesome behaviors that are very disruptive for classroom functioning and improve graduation rates.

In contrast, the link between high school dropout and internalizing problems, first and foremost depression, is much less clear. Logically, depressed adolescents should be at risk of abandoning school, as a core symptom of depression is of a lack of energy and interest to carry out daily activities like attending school. This potential risk, however, is often overlooked because depression symptoms are not overtly visible and often go unnoticed by teachers [12]. Even when manifest, they are often seen as less urgent because unlike externalizing behaviors, they typically do not interfere with classroom activities [13]. Such perceptions are reinforced by recent reviews concluding that depressive symptoms are not linked with dropout once accounting for externalizing problems [11,14,15].

Rather, this null finding may reflect suboptimal timing of depression assessments in existing studies. Depression tends to be episodic: Most adolescents who experience an episode of depression at some point recover within a few months, and subsequently remain free of clinically significant symptoms for extended periods [16–18]. Such episodic mental health problems are more subject to underreporting than stable problems like ADHD or CD, especially when measured retrospectively years after the fact [19]. Underreporting could have influenced the results of studies linking depression and dropout, as most are retrospective and based on information obtained years or even decades after participants were out of high school [11].

Another timing problem shared by all existing studies, including the few prospective ones, is their focus on depressive symptoms present during childhood or early- to mid-adolescence, that is, many years before dropout becomes legally possible (i.e., at age 16 or 17 in most jurisdictions). With this time frame, it is not surprising that depression symptoms were only weakly associated with dropout, if at all. Theoretically, it is clear why a 17-year-old struggling with depression may be at risk of acting on his or her legal prerogative to drop out, but it is unclear why a classmate who had a bout with depression some years before and is fully recovered (with no relapse) should be particularly at risk.

Empirically, some studies not explicitly addressing the link between depression and dropout still provide suggestive evidence that timing matters and that late adolescence is a key period. Among adolescents, the prevalence of depression peaks around 17 years old [20]. Moreover, it is around that age that adolescents are most likely to engage, when under pressure, in risk behaviors like dropping out that confer short-term relief at the potential cost of lasting negative consequences [21]. In addition, a recent meta-analysis of studies examining the link between depression and academic grades, an outcome related to dropout, found effect sizes that were almost three times larger when depression symptoms were measured in late rather than early adolescence [22]. Finally, exposure to severely stressful (and depressogenic) life events in late adolescence is associated with a three-fold increase in the risk of dropping out shortly following exposure [23].

The goal of this study was to examine whether the presence of clinically significant depression symptoms during late adolescence would be associated with high school dropout, after accounting for externalizing ADHD and CD symptoms, as well as for other important family and school-related background characteristics.

Methods

Sample

The project was approved by appropriate Institutional Review Boards at the University and School Board levels. The recruitment procedure is described in detail elsewhere [23]. Broadly, 12 francophone public high schools with high dropout rates ($M = 36\%$, a rate more than twice the provincial average) in and around the city of Montreal, Canada, participated between 2012 and 2015. In each school, students were administered, early in the school year, a short screening questionnaire that measured their initial risk for dropout, as well as basic sociodemographics (see Measures). All students at least 14 years of age were invited to participate, and the vast majority (97%) provided written consent and participated ($N_{screened} = 6{,}773$).

In a second phase, a selected subset of students was invited to participate in face-to-face interviews during which they were asked about their experiences in the last 12-month period, notably in terms of mental health ($N_{interviewed} = 545$). For the interviews, a participation rate of 70% was obtained, a comparatively high rate, given the overrepresentation of socioeconomically disadvantaged, academically vulnerable adolescents [24]. The interviews were conducted by trained graduate students in clinical/educational psychology and related disciplines.

The interviewed participants fell into three categories. First, all students who dropped out of school in the year following the initial screening were invited. School staff informed the research team as soon as a student dropped out, and meetings were quickly arranged for those who consented to be interviewed. Second, following a matched case-control logic, after each completed interview with a recent dropout, a second interview was conducted with a persevering student from the same school, the same program, the same sex, and with a similar individual risk for dropout according to a risk index administered during the