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Early emotional and behavioral difficulties and adult educational attainment:  
an 18-year follow-up of the TEMPO study.

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## ABSTRACT

Children who experience behavioral difficulties often have short and long-term school problems. However the relationship between emotional difficulties and later academic achievement has not been thoroughly examined. Using data from the French TEMPO study (n=666, follow-up 1991, 1999, 2009, mean age=10.5, sd=4.9 at baseline), we studied associations between internalizing and externalizing symptoms in a) childhood and b) adolescence and educational attainment by young adulthood (< vs. >= high school degree), accounting for participants' age, sex, juvenile academic difficulties, and family income. High levels of childhood (but not adolescent) internalizing and externalizing symptoms were associated with low educational attainment; however in multivariate models only the association with childhood internalizing symptoms remained statistically significant (OR= 1.75, 95% CI 1.00-3.02). Supporting children with internalizing problems early on could help improve their long-term educational attainment.

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## INTRODUCTION

Children with externalizing problems (e.g. ADHD, conduct disorder) often have cognitive difficulties (ex. attention, memory) from preschool onwards. This can contribute to their poor academic achievement (3;5;9) and jeopardize later chances of stable employment, thereby fueling a vicious circle of lifelong poor mental health and socioeconomic frailty (4). One of the pathways through which externalizing problems influence later educational attainment is therefore the experience of school difficulties early on. However, the long-term consequences of other types of childhood psychological difficulties – and particularly internalizing problems including anxiety or psychosomatic symptoms - have not been thoroughly examined in longitudinal studies (7). We tested relationships between children’s externalizing and internalizing problems and later educational attainment in a longitudinal community sample, controlling for baseline characteristics of children and their families.

## METHODS

### Cohort

TEMPO (Trajectoires Épidémiologiques en Population) is an ongoing prospective cohort of French youths (8). The original cohort included 2,582 youths aged 4-16 years in 1991 (average age 10 years), who each had a parent participating in the longitudinal GAZEL cohort study of employees of the French national electrical and gas company. One child was selected from each family and the sample was balanced in terms of family size and socioeconomic background according to French census data. Children were re-assessed in 1999 (n=1148, average age 18 years, 44.5% response rate) and in 2009 (n=1103, average age 29 years, 42.7% response rate). Non-participants disproportionately came from families with low socioeconomic background and were male, but did not vary from participants with regard to parental or own psychological difficulties. After excluding participants with missing responses in 1999 or 2009 (n=474), our study sample comprised 666 individuals.

The TEMPO study received ethical approval from the Comité Consultatif sur le Traitement de l’Information en Matière de Recherche dans le domaine de la Santé (CCTIRS) and the French National Committee for Data Protection (Commission Nationale Informatique et Liberté, CNIL).

### Variables

Educational attainment was ascertained in self-reported questionnaires in 2009 (<= vs. > high school degree). Juvenile psychological difficulties were assessed by parent (1991) and youth (1999) reports on the Child Behavioral Checklist (CBCL), a validated tool that identifies internalizing and externalizing problems (1). A score above the 85<sup>th</sup> percentile is considered indicative of clinically significant symptoms.

Covariates included a) demographic characteristics (age, sex); b) academic difficulties in 1991 (yes vs. no) defined as: (1) repeating at least two school grades, (2) learning difficulties, or (3) poor results in reading, history/geography, maths or science; and c) family income dichotomized at the median net household income in France (< or >=1982€ per month)(6).

### Statistical analysis

The association between childhood internalizing and externalizing symptoms and adult educational attainment was tested in a logistic regression framework. Factors associated with educational attainment in crude analyses ( $p < 0.20$ ) were included in the multivariate analysis.

Statistical analyses were performed using SAS V9.3.

## RESULTS

Results are summarized in Table 1. In bivariate analyses, the likelihood of low educational attainment was elevated among participants with childhood externalizing (OR=1.75, 95%CI 1.01-3.01) and internalizing problems (OR=1.85, 95%CI 1.15-3.06). In multivariate analyses, only childhood internalizing problems remained significantly associated with low educational attainment (OR=1.75, 95%CI 1.00-3.02). Additionally, participants' low educational attainment was significantly associated with 1991 academic difficulties and low family income. In secondary analyses, participants who had both internalizing and externalizing problems in 1991 appeared especially likely to have low educational attainment (OR=2.79, 95% CI 1.07-7.28, as compared with OR=1.68, 95% CI 1.06-2.65 among participants with either internalizing or externalizing problems).

## **DISCUSSION**

In a study of community based youths, children with internalizing symptoms were nearly two times more likely to experience academic failure by young adulthood than those who did not have such difficulties. Children with externalizing problems also appeared at risk of poor educational achievement, but this association was statistically explained by early academic difficulties (3;5). While early academic difficulties appear to mediate the relationship between disruptive behaviors and later educational outcomes, the mechanisms linking anxiety, depression and psychosomatic symptoms with academic achievement may be different (ex. school-specific anxiety, lack of concentration, poor memory) and deserve to be studied in detail.

Our findings also highlight the role of family socioeconomic circumstances with regard to youths' educational attainment, which is explained neither by the presence of emotional or behavioral difficulties nor by early academic difficulties. The mechanisms underlying these socioeconomic disparities may involve material, cultural as well as school factors, such as the cost of schooling, the value attributed to school performance, as well as the ways in which schools encourage (or not) students who experience difficulties. To the extent that educational attainment is related to later work and family outcomes, improving school achievement could help decrease social inequalities in mental health across the lifecourse.

Study limitations include: 1) due to attrition, underrepresentation of families with low socioeconomic position, whose children have high levels of behavioral problems or low academic achievement; 2) parent ascertainment of children's early difficulties, although reassuringly parental reports are valid even when parents have mental health difficulties (10). Key strengths of our study include the longitudinal assessment of youths' difficulties and outcomes in a community setting.

## **CONCLUSION**

Childhood emotional problems are associated with adult educational attainment above and beyond the contribution of sex, family socioeconomic position and childhood academic difficulties. Additional research is needed to understand the underlying mechanisms and identify optimal ways of supporting children with internalizing problems to help improve their long-term educational attainment.

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**CONFLICT OF INTEREST**

On behalf of all authors, the corresponding author states that there is no conflict of interest.

**Table 1: Socio-demographic and youth internalizing and externalizing symptoms in relation to low educational attainment in early adulthood: TEMPO study, 1991-2009 (bivariate and multivariate logistic regression models, OR, 95% CI).**

	Low Educational Attainment N, %		Odds ratio	
			Crude (95% CI)	Adjusted (95% CI)
	No N=130	Yes N=536		
Age >30yrs in 2009	77 (20.1)	55 (18.8)	0.92 (0.62-1.36) p=0.67	-
Male	66 (15.5)	64 (24.0)	<b>1.59</b> <b>(1.08-2.34)</b> p=0.02	1.30 (0.86-1.98) p=0.21
Childhood academic difficulties	71 (14.7)	59 (32.1)	<b>2.73</b> <b>(1.83-4.07)</b> p<0.0001	<b>2.40</b> <b>(1.57-3.66)</b> p<0.0001
Family income <1982€ per month	100 (17.4)	30 (32.3)	<b>2.24</b> <b>(1.38-3.64)</b> p=0.001	<b>2.15</b> <b>(1.29-3.58)</b> p=0.003
Externalizing symptoms (1991)	107 (18.2)	21 (28.0)	<b>1.75</b> <b>(1.01-3.01)</b> p=0.05	1.34 (0.74-2.39) p=0.33
Internalizing symptoms (1991)	104 (18.1)	26 (28.9)	<b>1.85</b> <b>(1.15-3.06)</b> p=0.002	<b>1.75</b> <b>(1.00-3.02)</b> p=0.05
Externalizing symptoms (1999)	112 (18.9)	17 (23.9)	1.35 (0.76-2.42) p=0.31	-
Internalizing symptoms (1999)	115 (20.5)	15 (14.6)	0.66 (0.37-1.19) p=0.17	0.54 (0.29-1.02) p=0.06

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