Attention Problems in Childhood and Adult Substance Use

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Objective To assess the link between childhood attention problems (AP) and substance use 18 years later.

Study design This cohort study was conducted in a community sample of 1103 French youths followed from 1991 to 2009. Exposures and covariates were childhood behavioral problems (based on parental report at baseline), early substance use, school difficulties, and family adversity. Outcome measures were regular tobacco smoking, alcohol problems, problematic cannabis use, and lifetime cocaine use (based on youth reports at follow-up).

Results Individuals with high levels of childhood AP had higher rates of substance use (regular tobacco smoking, alcohol problems, problematic cannabis use, and lifetime cocaine use). However, when taking into account other childhood behavioral problems, early substance use, school difficulties, and family adversity, childhood AP were related only to regular tobacco smoking and lifetime cocaine use. Early cannabis exposure was the strongest risk factor for all substance use problems.

Conclusion This longitudinal community-based study shows that, except for tobacco and cocaine, the association between childhood AP and substance use is confounded by a range of early risk factors. Early cannabis exposure plays a central role in later substance use. *(J Pediatr 2013;163:1677-83).*

A considerable body of research has focused on the link between childhood attention deficit/hyperactivity disorder (ADHD) and later substance use disorders (SUDs).[1,2] Studies based on clinic-referred samples have emphasized this deleterious association. Adolescent and adult patients with ADHD have shown increased rates of tobacco, alcohol, cannabis, and other drug use disorders in both cross-sectional and longitudinal settings.[3-5] Conversely, patients treated for SUDs display an overrepresentation (more than 25% of patients with an SUD) of both concurrent and retrospective ADHD[6,7]; however, because clinical samples tend to select the most severely affected individuals, these patients are not representative of the entire ADHD population. In addition, there are at least 2 problems with using the available clinical data. First, behavioral comorbidities (ie, externalizing and internalizing problems) often have been insufficiently controlled for, and when considered, they frequently acted as confounders or moderators of the association between ADHD and SUD.[8] Second, males have been investigated more often than females, precluding any inference of the findings in both sexes.

Longitudinal population-based studies are needed in this area. These studies can yield different results than clinical studies and can improve the generalizability of findings and possible inferences on causality. Early prospective studies found discrepant results. Some did not find any contribution of ADHD to later substance use, abuse, and dependence after controlling for conduct problems and confounders,[9,10] whereas others noted significant independent links only between tobacco smoking and ADHD and/or its specific dimensions (ie, inattention or hyperactivity-impulsivity).[11,12] Finally, some prospective community studies have reported a link between ADHD and/or its specific dimensions and the use of substances other than tobacco.[13,14]

Beyond the methodological variations in the way in which ADHD and substance use were measured, there have been some common limitations with this type of research. First, substance use outcomes were generally assessed when participants were age <18 years (ie, before they entered young adulthood, when dependence emerges), except for 2 studies that extended to 21 years[12] and 25 years.[10] Second, early first tobacco and cannabis use, which are considered to serve as gateway substance toward heavier forms of consumption, were most often not taken into account. Third, ADHD was often considered as a category rather than a dimensional measure,[9,11,14] even though growing evidence suggests

ADHD	Attention deficit/hyperactivity disorder
AP	Attention problems
CBCL	Child Behavior Checklist
DSM	*Diagnostic and Statistical Manual of Mental Disorders*
GAZEL	Electricity of France -Gas of France
SUD	Substance use disorder
TEMPO	Trajectoires épidémiologiques en population (epidemiological population trajectories)

Table I. Characteristics of the TEMPO sample

Characteristic	Value
Sex, % (n/N)	
Male	41.2 (454/1103)
Female	58.8 (649/1103)
Age at baseline, y, mean (SD)	11.0 (3.7)
Age at follow-up, y, mean (SD)	28.9 (3.7)
Parental divorce, % (n/N)	14.8 (154/1043)
Parental depression, % (n/N)	29.5 (324/1098)
Parental alcohol problems, % (n/N)	23.0 (253/1099)
Parental tobacco use, % (n/N)	22.1 (244/1103)
Low family income at baseline, % (n/N)	34.8 (373/1071)
Participant position at follow-up, % (n/N)	
Student	9.3 (102/1097)
Worker	82.0 (900/1097)
Job-seeker	7.4 (81/1097)
Inactive	1.3 (14/1097)
Substance use at follow-up, % (n/N)	
Regular tobacco smoking	35.8 (385/1075)
Alcohol problems	14.3 (155/1086)
Problematic cannabis use	6.3 (68/1078)
Lifetime cocaine use	7.8 (83/1069)
Early first tobacco smoking	20.6 (227/1103)
Early first cannabis smoking	21.1 (233/1103)

that ADHD symptoms are continuously distributed in the population.[15] Thus, the dimensional approach is necessary to limit possible underestimation of the associations between ADHD symptoms and SUD.[2,15]

Overall, research examining the connection between ADHD and SUD remains controversial with respect to the independence of childhood ADHD in predicting adult SUD. In this study, we tested the hypothesis that attention problems (AP) in childhood and adolescence (age 4-16 years) are associated with substance use (tobacco, cannabis, alcohol, cocaine) in adulthood (age 22-35 years) independent of other factors (ie, childhood conduct problems and anxiety-depression, school difficulties, early tobacco/cannabis smoking, and family risk characteristics) in a community sample followed for up to 18 years.

Methods

Data for this study came from 2 French sources, young adults participating in the Trajectoires épidémiologiques en population (epidemiological population trajectories) (TEMPO) study (http://www.tempo.inserm.fr/) and their parents who are part of the Electricity of France–Gas of France (GAZEL) cohort study (http://www.gazel.inserm.fr/). The latter was set up in 1989 and included 20 624 men and women aged 35-50 years, employed in a variety of occupations ranging

from manual worker to manager and living in France. Since study inception, participants have been followed yearly via self-report questionnaires. The TEMPO study was initiated in 2009 among young adults (age 22-35 years) who had previously taken part in a study of children's psychological problems and access to mental health care in 1991. The original sample in 1991 was selected among 4- to 16-year-olds whose parents were participants in the GAZEL study. The original sample (n = 2582) was selected to match the socioeconomic and family characteristics of French families in the 1991 census.[16,17]

In 2009, we asked parents of youths who had taken part in the 1991 survey to forward the TEMPO study questionnaire to their sons and daughters. Of the 2498 youths whose parents were alive and could be contacted, 16 had died since 1991 and 4 were too ill or disabled to respond. The overall response rate to the 2009 TEMPO questionnaire was 44.5% (n = 1103), which is comparable to response rates reported in other mental health surveys in France. Leading reasons for nonparticipation were nontransmission of the questionnaire by the parent (34.8%) and the youth's lack of interest (28.5%). Regarding baseline features, compared with participants, nonparticipants were more likely to be male (59.8% vs 41.2%), to come from a nonintact family (8.5% vs 5.5%), to come from a lower socioeconomic background (42.3% vs 34.8%), and to have parents who smoked tobacco (21.9 vs 18.7%) and abstained from alcohol (3.5% vs 1.5%). Participants and nonparticipants did not vary in terms of Child Behavior Checklist (CBCL) total score or parental depression. The TEMPO study was approved by the Commission Nationale Informatique et Liberté, the French national committee for data protection.

Youths' Mental Health at Baseline

Youths' psychopathology was assessed in 1991 when parents completed the CBCL.[18,19] The French version of the CBCL has been validated in previous clinical and epidemiologic studies.[20] This widely used tool includes 118 items on youths' behavioral problems in the preceding 6 months. The CBCL makes it possible to construct empirically based scales (based on factor analyses that identify syndromes of co-occurring problem items) and *Diagnostic and Statistical Manual of Mental Disorders* (DSM)-oriented scales (constructed from problem items that resemble DSM criteria for categorical diagnosis). DSM-oriented scales were proposed by Achenbach et al[19] as proxies for DSM diagnostic categories. They are built with items that do not include all DSM criteria, but nonetheless are considered satisfactorily consistent with

Table II. Substance use problems at follow-up by levels of AP

	Regular tobacco smoking	Alcohol problems	Problematic cannabis use	Lifetime cocaine use
AP ≥90th percentile, % (n/N)	52.8 (56/106)	16.7 (18/108)	9.4 (10/106)	14.4 (15/104)
AP 50th-90th percentile, % (n/N)	41.2 (169/410)	16.5 (68/413)	7.3 (30/411)	9.8 (40/407)
AP ≤50th percentile, % (n/N)	28.5 (156/548)	12.1 (67/554)	4.9 (27/550)	4.6 (25/547)
P value	<.0001	.0579	.0389	.0002

Mantel-Haenszel χ^2 test of linearity.