ORIGINAL ARTICLE

Prior Juvenile Diagnoses in Adults With Mental Disorder

Developmental Follow-Back of a Prospective-Longitudinal Cohort

Julia Kim-Cohen, PhD; Avshalom Caspi, PhD; Terrie E. Moffitt, PhD; HonaLee Harrington, BS; Barry J. Milne, MSc; Richie Poulton, PhD

Background: If most adults with mental disorders are found to have a juvenile psychiatric history, this would shift etiologic research and prevention policy to focus more on childhood mental disorders.

Method: Our prospective longitudinal study followed up a representative birth cohort (N=1037). We made psychiatric diagnoses according to *DSM* criteria at 11, 13, 15, 18, 21, and 26 years of age. Adult disorders were defined in the following 3 ways: (1) cases diagnosed using a standardized diagnostic interview, (2) the subset using treatment, and (3) the subset receiving intensive mental health services. Follow-back analyses ascertained the proportion of adult cases who had juvenile diagnoses and the types of juvenile diagnoses they had.

Results: Among adult cases defined via the Diagnostic Interview Schedule, 73.9% had received a diagnosis before 18 years of age and 50.0% before 15 years of age. Among treatment-using cases, 76.5% received a diagnosis before 18 years of age and 57.5% before 15 years of age. Among cases receiving intensive mental health services, 77.9% received a diagnosis before 18 years of age and 60.3% before 15 years of age. Adult disorders were generally preceded by their juvenile counterparts (eg, adult anxiety was preceded by juvenile anxiety), but also by different disorders. Specifically, adult anxiety and schizophreniform disorders were preceded by a broad array of juvenile disorders. For all adult disorders, 25% to 60% of cases had a history of conduct and/or oppositional defiant disorder.

Conclusions: Most adult disorders should be reframed as extensions of juvenile disorders. In particular, juvenile conduct disorder is a priority prevention target for reducing psychiatric disorder in the adult population.

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From the Institute of Psychiatry, King's College, London, England (Drs Kim-Cohen, Caspi, and Moffitt); the Department of Psychology, University of Wisconsin, Madison (Drs Kim-Cohen, Caspi, and Moffitt and Ms Harrington); and the Dunedin Multidisciplinary Health and Development Research Unit, University of Otago School of Medicine, Dunedin, New Zealand (Mr Milne and Dr Poulton).

DEVELOPMENTAL information about psychiatric disorders can improve treatment and prevention.[1] Clinicians ask how long ago a mental disorder first developed to inform an individual's treatment plan. Preventionists ask when in the life course mental disorders first develop in the population to direct primary prevention programs toward the right age groups. More developmental information is needed, and yet, "it is apparent that the amount of life-span information that is incorporated into the *DSM-IV* is only the tip of the iceberg of what should in fact be known. A means of characterizing a developmental history of patients' symptomatology should be developed for *DSM-V*."[2(p955)] We addressed this empirically by asking how many adults with psychiatric disorder can be expected to have a juvenile history of mental disorder.

Recent interest in a life-course developmental approach to psychopathology[1,3] has been generated by 2 main findings. First, several longitudinal-epidemiological studies have pointed to prediction of adult psychiatric problems from childhood,[4-6] whether of the same (ie, homotypic continuity) or a different type (ie, sequential comorbidity). Several pairs of disorders are thought to emerge in sequence, eg, childhood attention-deficit/hyperactivity disorder (ADHD) to adult antisocial personality disorder,[7-10] childhood conduct disorder to adult substance dependence,[11,12] and childhood anxiety to adult depression.[13] However, studies have tended to examine only 2 disorders at a time; we know of no study that has systematically compared the relative strength of possible sequential combinations across disorders.

Second, researchers have become increasingly aware that identifying different developmental trajectories of the same putative disorder can yield insights relevant to the etiology, course, and prognosis, and thus prevention plan-

ning.[2,12,14,15] Juvenile-onset forms of disorders are known to be associated with more severe childhood risks[16-18] and worse prognosis in adulthood.[15,19-21] If reliable life-course sequences of disorders are identified, further research could test the shared vulnerability hypothesis,[2] which argues that sequentially co-occurring disorders share a common diathesis[22] of genetic or environmental origin. In addition, mapping the developmental history and sequential comorbidity of adult psychiatric disorders can provide valuable information for designing prevention strategies. For example, if there is a reliable sequence from childhood disorder A to adult disorder B, then successfully treating A may prevent B.

However, none of the findings to date establish the extent to which adult psychiatric disorders are extensions of juvenile disorders. Although follow-forward longitudinal studies are valuable in predicting the risk for future morbidity associated with early-onset psychiatric problems, follow-back studies are needed to determine the proportion of adults with a childhood history.[23,24] In the present study, we use a follow-back longitudinal strategy to examine the mental health histories of adults who met diagnostic criteria at 26 years of age for a wide range of psychiatric disorders.

Ascertaining the childhood psychiatric history of adults with mental disorders may be accomplished by using prospective or retrospective longitudinal data. With few exceptions, most follow-back studies have used samples defined as adults and have relied on retrospective reports to examine developmental history associated with particular disorders. In contrast, the present study of mental health histories had the benefit of prospective data collected as part of an ongoing longitudinal study. The accuracy of retrospective reports is often suspect,[25] especially with regard to the timing of the age of onset.[26,27] Although improvements in questionnaire design can minimize retrospective errors and biases, prospective longitudinal data are preferred for dating and charting developmental histories.[28,29] In the present study, we report findings from a large birth cohort whose mental health has been repeatedly assessed with a diagnostic psychiatric interview on 6 occasions from 11 to 26 years of age.

The proportion of adults who have a juvenile mental health history could depend on how psychiatric disorders are assessed. Some have argued that using structured diagnostic interviews in epidemiological surveys may generate findings of questionable value to clinicians.[30-34] Critics of structured psychiatric interviews note that they may overdiagnose cases, often by including milder forms of disorders that are unlikely to be seen in a clinician's office.[35,36] To address this concern, we report the mental health histories of cohort members who as adults received treatment for a psychiatric problem and of a smaller subset of cases who received more intensive mental health treatment. Nonetheless, determining histories of disorders in the general population, regardless of treatment status, is important for guiding mental health policy.[2,24,37,38] As such, we also report on the juvenile diagnostic histories of all cohort members who received a diagnosis via a standardized research assessment protocol.

METHODS

PARTICIPANTS

Participants are members of the Dunedin Multidisciplinary Health and Development Study, a longitudinal investigation of the health and behavior of a complete birth cohort.[39] The cohort of 1037 children (52% male) was constituted at 3 years of age when the investigators enrolled 91% of consecutive births from April 1, 1972, through March 31, 1973, in Dunedin, New Zealand. Cohort families are primarily white (91%) and represent the full range of socioeconomic status in the general population of New Zealand's South Island. At each assessment age, participants (including emigrants living overseas) are brought back to the research unit within 60 days of their birthday for a full day of individual data collection. The study protocol was approved by the institutional review boards of the participating universities. Study members gave informed consent before participating. Follow-ups have been performed at 5, 7, 9, 11, 13, 15, 18, 21, and most recently 26 years of age (n=980; 96% of the living cohort members). In this article, we report all available diagnostic data gathered at all ages from 11 to 26 years for the 976 individuals who received a psychiatric interview at 26 years of age.

PSYCHIATRIC DIAGNOSES

Mental health was assessed in private standardized interviews, using the Diagnostic Interview Schedule for Children[40] at the younger ages (11-15 years) and the Diagnostic Interview Schedule[41,42] at the older ages (18-26 years), with a reporting period of 12 months at each age. At each assessment, interviewers were always masked to the cohort members' previous data, including mental health status. Modifications, procedures, reliability, validity, prevalence, and evidence of impairment have been described in detail at 11,[43] 13,[44] 15,[45] 18,[46] and 21 years of age.[47] At 26 years of age, diagnoses were made following the *DSM-IV*[48] criteria (algorithms are available from the authors). At 21 and 18 years of age, disorders were diagnosed according to the then-current *DSM-III-R* criteria,[49] and at 15, 13, and 11 years of age, *DSM-III* criteria.[50] Dunedin cohort prevalence rates in young adulthood match closely those from the US National Comorbidity Survey.[32,47]

The 17 disorders diagnosed at 26 years of age were grouped into 7 diagnostic families that combine diagnoses along the chapter groupings found in the *DSM-IV*. These included (1) 7 anxiety disorders (ie, generalized anxiety disorder, obsessive-compulsive disorder, posttraumatic stress disorder, panic disorder, agoraphobia, simple phobia, and social phobia); (2) 2 depressive disorders (major depressive episode and dysthymia); (3) manic episode; (4) 2 eating disorders (anorexia nervosa and bulimia nervosa); (5) 3 substance use disorders (alcohol dependence, marijuana dependence, and other drug dependence); (6) schizophreniform disorder (schizophrenia [1% of the cohort] and schizophreniform disorder)[51]; and (7) antisocial personality disorder. Included in diagnostic groups were individuals who did not meet full symptom criteria but were currently taking psychotropic medication for a diagnosed psychiatric problem (anxiety disorders [n=18], depressive disorders [n=11], manic episode [n=3], schizophreniform disorder [n=1], and eating disorders [n=1]). Including or excluding these additional cases did not change the results of our analyses.

Psychiatric diagnoses from assessments before 26 years of age are presented in the following 5 disorder categories: anxiety disorders, depressive disorders, substance use disorder (at 18 years of age), conduct disorder (including oppositional defiant disorder at 11 and 13 years of age), and ADHD. Diagnoses of manic episode and schizophrenia were not obtained at juvenile ages, and there were too few cases of juvenile eating disorder to provide adequate power to test group differences.

IDENTIFICATION OF CASES RECEIVING TREATMENT AT 26 YEARS OF AGE

Treatment experience at 26 years of age was assessed during the mental health interview by questions taken from the modified Health Services Utilization questionnaire.[46] Cases were considered to be treatment using if they said they received treatment for a specific psychiatric problem or from at least 1 specific type of treatment provider for a psychiatric problem (n=227). Using a reporting period of the past 12 months, participants were asked about treatment experience as part of the interview modules for each disorder and at the end of the mental health interview. For the first report, participants were asked whether they had seen a physician or other professional treatment provider for problems related to that diagnosis; for the second, whether they had received treatment for any mental health problems from a list of service providers, including a physician/general practitioner (71%), a psychiatrist (13%), a therapist (26%), emergency services (13%), social welfare (8%), courts or police (9%), an educational guidance counselor (1%), a telephone help line (4%), a minister or priest (3%), a self-help group (8%), a marriage counselor (3%), a women's shelter (2%), alternative therapies (16%), or a drug rehabilitation clinic (6%). Of the treatment-using cases, 44% reported having received mental health treatment from more than 1 type of service provider in the past 12 months.

IDENTIFICATION OF CASES RECEIVING INTENSIVE MENTAL HEALTH SERVICES AT 26 YEARS OF AGE

Of particular interest to mental health professionals is the subset of individuals who received intensive mental health services at 26 years of age. The intensive mental health services category (n=132) consisted of treatment users who reported having received treatment from a psychiatrist (22%), a therapist (46%), emergency services (22%), or a drug rehabilitation clinic (11%), taking psychotropic medication for a diagnosed mental disorder (61%), or having been hospitalized for a psychiatric problem (7%), all within the past 12 months.

STATISTICAL ANALYSIS

We herein report prevalence rates for psychiatric disorders and their developmental diagnostic histories. To examine sex differences in morbidity, we calculated sex ratios for each psychiatric disorder (set against 1 for female respondents). We conducted follow-back longitudinal analyses to determine what percentage of cases aged 26 years with a psychiatric disorder had a developmental history characterized by a similar disorder (ie, homotypic continuity) or by different types of disorders (ie, sequential comorbidity). We estimated adjusted odds ratios (AORs) and 95% confidence intervals (CIs) to show associations between disorders at 26 years of age and juvenile disorders, controlling for sex. We tested whether sex moderated the association between adult disorders and a history of juvenile disorders using moderated logistic regression analyses, but we found no significant interactions at $P \leq .05$. To examine the public health impact of childhood disorders on adult disorders, we estimated the population attributable fraction (AFP) while adjusting for sex differences in prevalence rates.[52,53]

RESULTS

ADULT PSYCHIATRIC DISORDERS AND THEIR DEVELOPMENTAL HISTORY

Table 1 presents the 1-year prevalence rates of the 17 psychiatric disorders at 26 years of age. As expected, women were significantly more likely than men to meet diagnostic criteria for anxiety disorders, depressive disorders, and eating disorders. In contrast, men were significantly more likely than women to meet diagnostic criteria for substance use disorders and antisocial personality disorder. Virtually all persons (82%-100%) who met diagnostic criteria for a *DSM-IV* psychiatric disorder in the past 12 months at 26 years of age had met diagnostic criteria at an earlier age (Table 1).

Comparing all cases with a diagnosis at 26 years of age (**Figure 1**A) with treatment-using cases (Figure 1B) and cases receiving intensive mental health services (Figure 1C) revealed 2 findings. First, among cases diagnosed by means of an interview, approximately one half were treatment users and approximately one quarter received intensive mental health services. Second, despite these differences in prevalence, developmental histories were remarkably similar. Of the general population cases at 26 years of age, 73.9% had already met diagnostic criteria for a psychiatric diagnosis before 18 years of age (vs 76.5% of the treatment users and 77.9% of those receiving intensive mental health services). Of the general population cases at 26 years of age, 50.0% had met diagnostic criteria for a psychiatric diagnosis before 15 years of age (vs 57.5% of the treatment users and 60.3% of those receiving intensive mental health services). Given these similarities in developmental histories—coupled with power considerations—follow-back analyses are presented for the general population cases in Table 1; developmental histories of treatment users are provided in **Table 2**.

FOLLOW-BACK ANALYSES

Follow-back analyses focused on prior diagnoses when participants were aged 11 to 15 years because this period clearly reflects a juvenile as opposed to an adult phase in development. The prevalence of childhood disorders in the overall sample at 11 to 15 years of age is presented in **Figure 2**A. Approximately 52% to 55% of adult anxiety, depression, and substance use disorder cases met diagnostic criteria for a psychiatric disorder before 15 years of age (Table 1). Anxiety cases at 26 years of age (Figure 2B) were especially likely to have had anxiety before 15 years of age (AOR for sex, 2.9; 95% CI, 2.1-4.1; AFP, 18%), but also from depression (AOR, 3.3; 95% CI, 2.0-5.5; AFP, 7%), ADHD (AOR, 2.2; 95% CI, 1.2-3.9; AFP, 4%), and conduct and/or oppositional defiant disorder (AOR, 2.2; 95% CI, 1.5-3.1; AFP, 12%). Individuals with adult depression (Figure 2C) were more likely than those without depression to have a history of juvenile anxiety (AOR, 1.9; 95% CI, 1.3-2.8; AFP, 12%), depression (AOR, 2.5; 95% CI, 1.4-4.3; AFP, 6%), and conduct and/or oppositional defiant disorder (AOR, 1.5; 95% CI, 1.0-2.2; AFP, 6%), but not ADHD (AOR, 1.0; 95% CI, 0.5-2.1). Adults with a substance use disorder (Figure 2D) were significantly more likely than those without to have had conduct and/or oppositional defiant disorder (AOR, 3.5; 95% CI, 2.5-5.0; AFP, 22%) before 15 years of age, but not anxiety (AOR, 1.2; 95% CI, 0.8-1.8), depression (AOR, 1.0; 95% CI, 0.6-1.9), or ADHD (AOR, 1.3; 95% CI, 0.7-2.3).

Although group sizes were small and statistical power was modest, we also report juvenile diagnostic histories

Table 1. Prevalence and Developmental History of Psychiatric Disorders Diagnosed via Structured Interview at 26 Years of Age

Disorder at 26 Years of Age (No. Undergoing Assessment)	Prevalence at 26 Years of Age*			Mental Health History, No. (%) at First Diagnosis†		
	No. (%) of Total Cohort at 26 Years of Age	M/F Ratio	No. (%) With Prior Diagnosis	21 (Years of Age)	18 (Years of Age)	11-15 (Years of Age)
Any disorder (976)	470 (48.2)	1.0	386 (82.4)	40 (8.5)	112 (23.9)	234 (50.0)
Anxiety disorders (976)	255 (26.1)	0.7‡	215 (84.9)	21 (8.3)	56 (22.1)	138 (54.5)
General anxiety disorder (974)	54 (5.5)	0.8	47 (88.6)	4 (7.5)	8 (15.1)	35 (66.0)
Obsessive-compulsive disorder (974)	23 (2.4)	0.8	20 (90.9)	0	5 (22.7)	15 (68.2)
Posttraumatic stress disorder (970)	40 (4.1)	0.7	40 (100.0)	6 (15.0)	9 (22.5)	25 (62.5)
Panic disorder (974)	38 (3.9)	0.7	34 (89.4)	4 (10.5)	10 (26.3)	20 (52.6)
Agoraphobia (974)	34 (3.5)	0.5	31 (93.9)	1 (3.0)	9 (27.3)	21 (63.6)
Simple phobia (974)	69 (7.1)	0.3‡	60 (87.0)	2 (2.9)	18 (26.1)	40 (58.0)
Social phobia (976)	104 (10.7)	0.9	85 (82.5)	10 (9.7)	24 (23.3)	51 (49.5)
Depressive disorders (976)	175 (17.9)	0.7§	147 (84.5)	16 (9.2)	40 (23.0)	91 (52.3)
Major depressive episode (976)	161 (16.5)	0.7§	134 (83.9)	14 (8.8)	38 (23.8)	82 (51.3)
Dysthymia (973)	8 (0.8)	1.7	7 (87.5)	0	3 (37.5)	4 (50.0)
Manic episode (973)	29 (3.0)	1.4	27 (93.1)	4 (13.8)	6 (20.7)	17 (58.6)
Eating disorders (971)	26 (2.7)	0.4‖	23 (92.0)	2 (8.0)	5 (20.0)	16 (64.0)
Anorexia nervosa (971)	14 (1.4)	0.4	13 (92.8)	1 (7.1)	2 (14.3)	10 (71.4)
Bulimia nervosa (971)	15 (1.5)	0.4	13 (92.9)	2 (14.3)	2 (14.3)	9 (64.3)
Substance use disorders (976)	228 (23.4)	2.2‡	191 (83.7)	18 (7.9)	53 (23.2)	120 (52.6)
Alcohol dependence (976)¶	168 (17.2)	2.4‡	142 (84.5)	13 (7.7)	43 (25.6)	86 (51.2)
Marijuana dependence (976)	92 (9.4)	2.7‡	80 (87.0)	6 (6.5)	18 (19.6)	56 (60.9)
Drug dependence (976)	36 (3.7)	3.0§	34 (94.4)	3 (8.3)	6 (16.7)	25 (69.4)
Schizophreniform disorder (976)	37 (3.8)	1.3	34 (94.5)	2 (5.6)	13 (36.1)	19 (52.8)
Antisocial personality disorder (973)	40 (4.1)	39.0‡	37 (92.5)	3 (7.5)	9 (22.5)	25 (62.5)

Abbreviation: M/F, male-female.
*Sample size fluctuates across diagnoses from 970 to 976 because of missing data at 26 years of age.
†Of the 976 cases undergoing assessment at 26 years of age, 951 underwent assessment at 21 years of age, 917 at 18 years of age, and 954 at 11-15 years of age.
‡$P \leq .001$.
§$P \leq .01$.
‖$P \leq .05$.
¶Includes physiological and nonphysiological alcohol dependence.

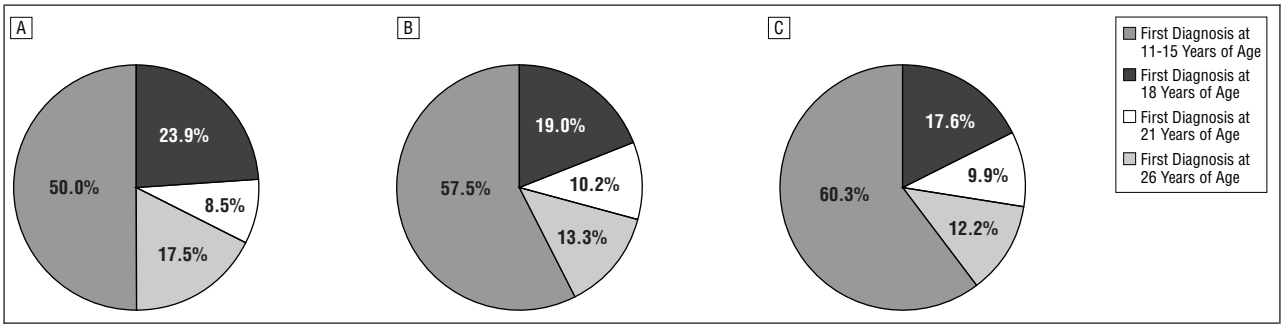

Figure 1. Age at first diagnosis of any disorder among persons meeting criteria for 17 *DSM-IV* mental disorders at 26 years of age. Because of missing data from prior assessments, results are presented in A for 468 of 470 cases with a diagnosis, in B for 226 of 227 treatment-using cases, and in C for 131 of 132 cases who received intensive mental health services.

for adult antisocial personality disorder, manic episode, schizophreniform disorder, and eating disorders (Figure 2E-H). For these 4 disorder categories, the proportion of adult cases who had a juvenile psychiatric disorder ranged from 53% to 64% (Table 1). Adult antisocial personality disorder was significantly associated with childhood conduct and/or oppositional defiant disorder (AOR, 5.8; 95% CI, 2.9-11.4; AFP, 49%), but the association with childhood ADHD (AOR, 2.1; 95% CI, 0.8-5.3) and depression (AOR, 2.6; 95% CI, 0.9-7.1) did not reach statistical significance. (Conduct disorder symptoms before 15 years of age were required for the diagnosis of antisocial personality disorder at 26 years of age, but the full diagnosis of conduct disorder was not required.) Adult mania was likely to have been preceded by conduct and/or oppositional defiant disorder (AOR, 2.5; 95% CI, 1.1-5.4; AFP, 22%) and juvenile depression (AOR, 3.3; 95% CI, 1.2-9.2; AFP, 13%). Many mania cases had a history of childhood anxiety, but this did not reach statistical significance (AOR, 2.1; 95% CI, 0.9-4.8). Adult schizophreniform disorder was significantly associated with juvenile anxiety (AOR, 2.5; 95% CI, 1.2-5.1; AFP, 22%), depression (AOR, 7.4; 95% CI, 3.5-16.1; AFP, 27%), ADHD (AOR, 4.5; 95% CI, 1.8-

Table 2. Prevalence of Psychiatric Disorder at 26 Years of Age and Developmental History of Treatment Using Cases Treated in the Past Year

Disorder at 26 Years of Age (No. Undergoing Assessment)	Prevalence at 26 Years of Age*		No. (%) With Prior Diagnosis	Mental Health History, No. (%) at First Diagnosis†		
	No. (%) of Total Cohort at 26 Years of Age	M/F Ratio		21 (Years of Age)	18 (Years of Age)	11-15 (Years of Age)
Any disorder (976)	227 (23.3)	0.7‡	196 (86.7)	23 (10.2)	43 (19.0)	130 (57.5)
Anxiety disorders (976)	131 (13.4)	0.6§	114 (87.6)	12 (9.2)	22 (16.9)	80 (61.5)
General anxiety disorder (974)	31 (3.2)	0.8	28 (93.4)	3 (10.0)	5 (16.7)	20 (66.7)
Obsessive-compulsive disorder (974)	14 (1.4)	1.8	12 (85.7)	0	3 (21.4)	9 (64.3)
Posttraumatic stress disorder (970)	32 (3.3)	0.8	32 (100.0)	4 (12.5)	6 (18.8)	22 (68.8)
Panic disorder (974)	31 (3.2)	0.6	28 (90.4)	4 (12.9)	6 (19.4)	18 (58.1)
Agoraphobia (974)	18 (1.8)	0.3‖	16 (94.1)	1 (5.9)	3 (17.6)	12 (70.6)
Simple phobia (974)	33 (3.4)	0.3§	30 (90.9)	2 (6.1)	7 (21.2)	21 (63.6)
Social phobia (976)	47 (4.8)	0.5‖	42 (91.3)	5 (10.9)	11 (23.9)	26 (56.5)
Depressive disorders (976)	110 (11.3)	0.7‖	98 (89.9)	12 (11.0)	24 (22.0)	62 (56.9)
Major depressive episode (976)	98 (10.0)	0.7‖	87 (89.7)	10 (10.3)	23 (23.7)	54 (55.7)
Dysthymia (973)	3 (0.3)	2.0	3 (100)	0	1 (33.3)	2 (66.7)
Manic episode (973)	21 (2.2)	0.9	19 (90.5)	3 (14.3)	3 (14.3)	13 (61.9)
Eating disorders (971)	19 (2.0)	0.3‡	17 (89.5)	2 (10.5)	4 (21.1)	11 (57.9)
Anorexia nervosa (971)	10 (1.0)	0.3‖	9 (90.0)	1 (10.0)	2 (20.0)	6 (60.0)
Bulimia nervosa (971)	13 (1.3)	0.3‖	12 (92.3)	2 (15.4)	2 (15.4)	8 (61.5)
Substance use disorders (976)	105 (10.8)	1.6‖	95 (90.4)	10 (9.5)	18 (17.1)	67 (63.8)
Alcohol dependence (976)¶	73 (7.5)	1.6	68 (93.2)	7 (9.6)	13 (17.8)	48 (65.8)
Marijuana dependence (976)	48 (4.9)	2.0‖	43 (89.7)	3 (6.3)	7 (14.6)	33 (68.8)
Drug dependence (976)	23 (2.4)	3.6‡	22 (95.7)	2 (8.7)	2 (8.7)	18 (78.3)
Schizophreniform disorder (976)	22 (2.3)	0.8	22 (100.0)	2 (9.1)	8 (36.4)	12 (54.5)
Antisocial personality disorder (973)	24 (2.5)	23.0§	24 (100.0)	3 (12.5)	3 (12.5)	18 (75.0)

Abbreviation: M/F, male-female.
*Sample size fluctuates across diagnoses from 970 to 976 because of missing data at 26 years of age.
†Of the 976 cases undergoing assessment at 26 years of age, 951 underwent assessment at 21 years of age, 917 at 18 years of age, and 954 at 11-15 years of age.
‡$P \leq .01$.
§$P \leq .001$.
‖$P \leq .05$.
¶Includes physiological and nonphysiological alcohol dependence.

11.0; AFP, 16%), and conduct and/or oppositional defiant disorder (AOR, 2.8; 95% CI, 1.4-5.8; AFP, 25%). Eating disorders at 26 years of age were significantly associated with a diagnosis of conduct and/or oppositional defiant disorder (AOR, 4.6; 95% CI, 2.0-10.7; AFP, 35%) before 15 years of age.

The proportion of adult psychiatric disorders that can be attributed to any juvenile disorder before 15 years of age ranged from 23% to 46%. The AFPs for the association between child and adult disorders, adjusting for sex, were 26% for adult anxiety, 23% for adult depression, 24% for adult substance use disorder, 32% for adult mania, 46% for adult eating disorder, 25% for adult schizophreniform disorder, and 41% for adult antisocial personality disorder.

COMMENT

In a prospective longitudinal design, half of the individuals who met criteria for a major *DSM-IV* diagnosis at 26 years of age first had a diagnosable disorder at 11 to 15 years of age, and three quarters had a first diagnosis before 18 years of age. This was true whether we used structured diagnostic interviews or use of services to define cases. Most adults with a psychiatric disorder had a diagnosable disorder as children.

Follow-back analyses of adult anxiety, depression, and antisocial personality disorder yielded evidence of homotypic continuity, that is, adults with these disorders had usually had the same disorder in childhood or adolescence. Our study also provided evidence that most adult disorders were preceded in childhood by a variety of diagnoses. For example, adults with anxiety were at elevated risk for having had juvenile externalizing spectrum diagnoses of ADHD and conduct and/or oppositional defiant disorder. In addition, adults with schizophreniform disorder had a juvenile history of multiple disorders, such as anxiety, depression, ADHD, and conduct and/or oppositional defiant disorder. This finding is consistent with associations previously reported between adult psychosis and childhood internalizing and externalizing symptoms.[54-57] One of the most notable findings was that childhood conduct and/or oppositional defiant disorder was a part of the developmental history of every adult disorder.

Several limitations should be considered. First, this study is based on a single New Zealand birth cohort and consists of a largely white sample. Although prevalence rates of psychiatric disorders in New Zealand are similar to those found in national US samples,[32,47] the findings need replication in developmental studies in other parts of the world. Second, we defined adult disorders

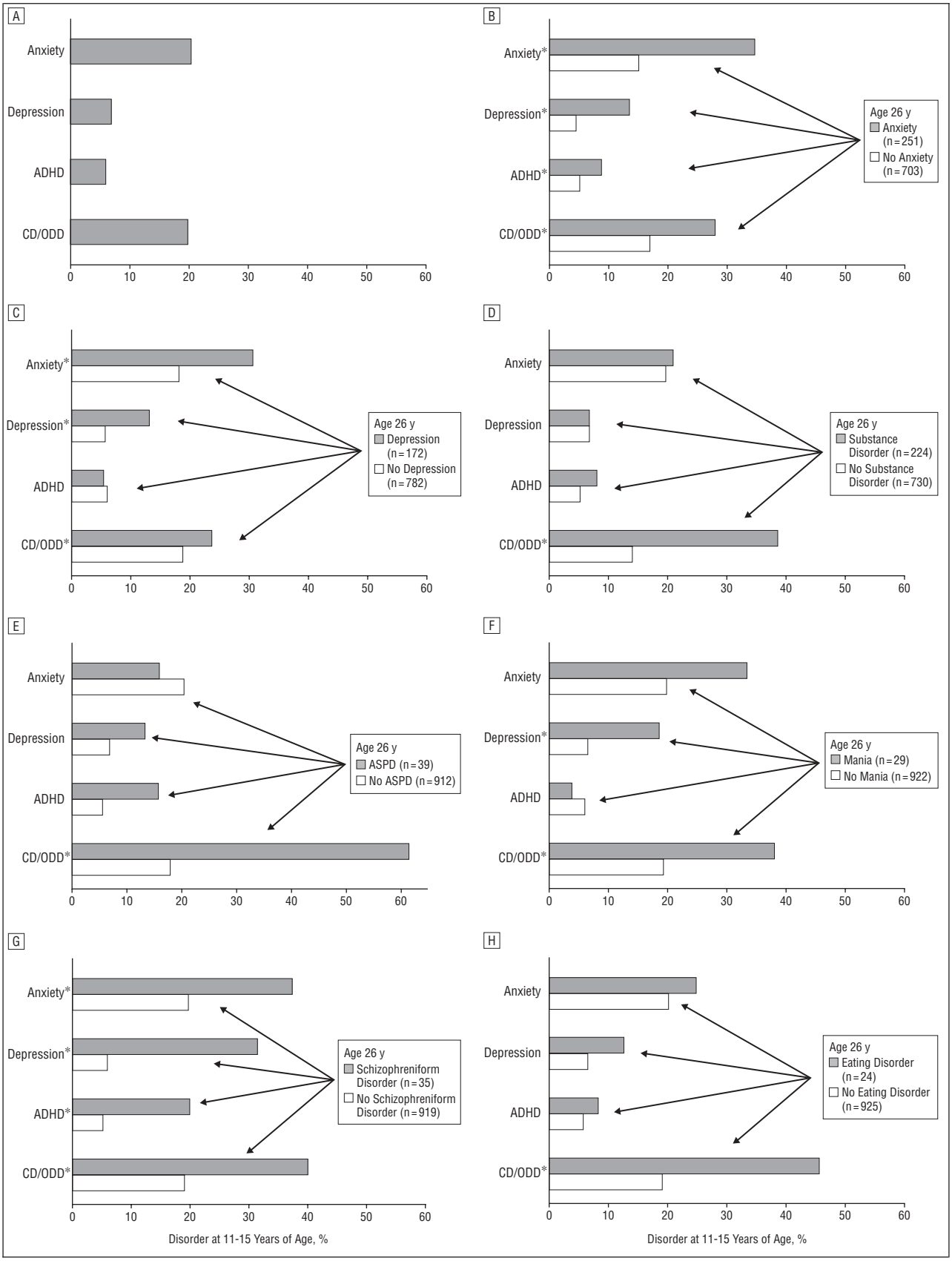

Figure 2. Prevalence (percentages) of psychiatric disorders at 11 to 15 years of age among the 954 study members undergoing assessment (A) and among those with and without a diagnosis of anxiety disorder (B), depressive disorder (C), substance use disorder (D), antisocial personality disorder (ASPD) (E), mania (F), schizophreniform disorder (G), and eating disorder (H) at 26 years of age. Because of missing data, sample sizes fluctuate across analyses from 949 to 954. Asterisk indicates $P \leq .05$, based on the statistical significance of adjusted odd ratios of the association between disorders at 11 to 15 years of age and disorders at 26 years of age, controlling for sex. ADHD indicates attention-deficit/hyperactivity disorder; CD/ODD, conduct and/or oppositional defiant disorder.

only at 26 years of age, and examination of the developmental history of mental disorders in older cohorts is warranted.[2] However, the prevalence of the psychiatric disorders examined in this study peaks in young adulthood,[58] and the new case incidence of these disorders can be expected to decline throughout the adult years. Third, psychiatric assessments in our study focused on the 12-month period before each interview, and reporting periods were separated by 1 year or longer. Therefore, undetected cases may have emerged between assessments. However, such misidentification would have exerted a conservative effect on our analyses by making it more difficult to detect a participant's history, and thus our estimate that approximately three quarters of adults with a diagnosis had a disorder before 18 years of age should be regarded as an underestimate. Fourth, diagnostic assessments began at 11 years of age, and, therefore the age at which a disorder was diagnosed in this study is not necessarily the age at which symptoms first began. It is possible that the age at which disorders first emerged was earlier than that reported herein. However, this limitation would also have a conservative effect on our findings. Fifth, this study did not include the full spectrum of psychiatric disorders, namely somatic disorders, sexual disorders, cognitive impairments, organic mental disorders, and any Axis II disorders other than antisocial personality disorder. Therefore, we were unable to examine the developmental histories of all *DSM-IV* disorders.

This research has implications for etiologic theory, research methods, clinical practice, and primary prevention. First, with respect to etiologic theory, knowledge about the developmental history of psychiatric disorders can contribute information for diagnostic classification. Identifying cases that persist from childhood to adulthood vs cases that are limited to a specific developmental period has reliably distinguished subtypes of antisocial behavior[14,18] and depression.[17,21,59,60] Furthermore, although much has been learned about concurrent comorbidity by looking at cross-sectional snapshots,[32,61-63] our findings point to the importance of new questions about sequential patterns of comorbidity in which certain juvenile disorders reliably precede adult disorders. Our finding herein that most adult disorders have their roots in earlier life obliges research to focus on risk processes occurring during childhood and adolescence to advance the understanding of the etiology and taxonomy of psychiatric disorders.

Second, with respect to measurement methods for diagnosing mental disorders, the use of the Diagnostic Interview Schedule in this epidemiological cohort succeeded in identifying adult cases whose prevalence of juvenile disorders was remarkably similar to the prevalence among individuals who had presented for treatment. It has been argued that applying more stringent clinical significance criteria and clinical judgment to diagnoses made via structured interviews can lead to more valid prevalence rates and more accurate estimates of treatment need.[31,64] However, it has also been argued that the use of clinical significance criteria in epidemiological studies may be no more valid than standardized structured interviews and can lead to increased rates of false-negative findings.[65,66] In the present study—whether identified by a structured psychiatric interview or self-report of treatment—approximately three quarters of adults with a psychiatric disorder had a disorder before 18 years of age, and approximately half had a disorder before 15 years of age. Even among individuals who received a diagnosis using structured interviews, a significant proportion of them are likely to have had mental distress beginning early in life.

Third, with respect to clinical practice, when a clinician is confronted with an adult who has a psychiatric disorder, there is at least a 1-in-2 chance that the patient had some form of a diagnosable disorder dating back to childhood. Prior research has shown that disorders with onset in childhood have more serious adult consequences in terms of recurrence of symptoms and poor prognosis.[15,67] Clinicians who treat adults should, therefore, assess the age at onset and developmental history of disorders to inform treatment strategy. Moreover, the present findings reinforce the recommendation that the *DSM-V* should include a method for characterizing the developmental history of patients' symptoms.[2]

Fourth, with respect to prevention, knowing when disorders are likely to first appear can help in planning for early intervention.[68-71] Population attributable fractions in this cohort suggested that from one quarter to one half of adult cases in the population might be prevented by effective treatment of youths with psychiatric disorders. The present study uncovered findings that are especially relevant for prevention. First, adult anxiety and schizophreniform disorders were preceded by an array of different juvenile disorders. Second, all adult disorders were preceded by conduct disorder; although youths with conduct and/or oppositional defiant disorder were only 20% of the cohort, they became 25% to 45% of adults in whom anxiety disorders, depression, substance dependence, eating disorders, schizophreniform disorder, and even manic episodes developed. Adult psychiatry has tended to ignore conduct disorder, assuming it leads only to adult antisocial personality disorder, a relatively rare disorder that is difficult to treat successfully.[72] However, this study suggests that juvenile conduct disorder cases constitute a vital prevention opportunity for reducing the burden associated with many major adult psychiatric disorders. Fortunately, there are now effective home- and school-based interventions to reduce conduct problems[73-75] and other health-damaging juvenile behaviors such as heavy drinking and risky sexual activity.[76,77]

To the individuals with mental illness, to their families, and to society—all whom shoulder the social and economic burdens of mental illness—the cost of mental distress is enormous.[71] This study's findings reemphasize the importance of targeting prevention efforts early in life. A minority of children with mental disorders now receive effective treatment.[78,79] The application of population-screening methods in primary care settings and in schools to detect and to refer those children most needing intervention is justified.[80,81] Furthermore, etiologic research and prevention policy in psychiatry would benefit from a developmental perspective that acknowledges marked associations between childhood and adult psychopathology.[1,82-84]

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Corresponding author and reprints: Julia Kim-Cohen, PhD, or Terrie E. Moffitt, PhD, PO 80, Institute of Psychiatry, De Crespigny Park, London SE5 8AF, England (e-mail: t.moffitt@iop.kcl.ac.uk).

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