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Article *in* American Journal of Psychiatry · July 1995

DOI: 10.1176/ajp.152.6.889 · Source: PubMed

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Diagnostic Stability in Adolescents Followed Up 2 Years After Hospitalization

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Objective: *The authors examined the stability of DSM-III-R disorders and groups of disorders in adolescent inpatients followed up 2 years after hospitalization.* *Method:* *Seventy hospitalized adolescents were reliably assessed by using structured diagnostic interviews for DSM-III-R disorders. Two years later the subjects were independently assessed with the same interviews. Diagnostic stability was measured by determining both the percentage of persisting cases and the kappa statistic.* *Results:* *Internalizing disorders had the highest percentage of persisting cases (59%) but an insignificant kappa due to many new cases at follow-up. Externalizing disorders had a lower percentage of stable cases (39%) but a significant kappa because of fewer new cases. Substance use disorders were fairly stable (53%) and had a significant kappa, indicating that this may be the most stable group of disorders in adolescents. Personality disorder clusters were relatively unstable, especially clusters A and C.* *Conclusions:* *Diagnostic stability in these hospitalized adolescents was less than that reported for adults. This may indicate that DSM-III-R diagnoses in adolescents have poor construct validity, but it may also reflect the different paths for development of psychopathology during adolescence. For axis I, externalizing disorders appear most specific to adolescence, with some persistence but decreasing incidence over time. Existing cases of internalizing disorders tend to be even more persistent, but the high incidence of new cases during adolescence contributes to lower overall stability. Substance use disorders appear to be most stable, and personality disorders appear to be least stable, in adolescents.*
(Am J Psychiatry 1995; 152:889–894)

Temporal stability of diagnosis is an essential validating feature of a disorder, provides a basis on which to predict course and outcome, and offers insight into meaningful subdivisions within the disorder—leading to improvement of the diagnostic system. Moreover, the study of diagnostic stability in adolescence provides the opportunity to examine the effects of developmental change on the manifestations of psychopathology.

Many have studied the stability of major DSM disorders in adults. The National Institute of Mental Health Collaborative Program on the Psychobiology of Depression (1) showed high levels of stability for schizophrenia, major affective disorders, and substance use disorders. Links et al. (2) found that 60% of inpatients with borderline personality disorder retained this diagnosis at 2-year follow-up. Stanton and Joyce (3) used data from the New Zealand Psychiatric Register to demonstrate good 5-year stability for ICD-9 schizophrenic psychoses, affective disorders, anorexia nervosa, and substance abuse disorders, and Vetter and Köller (4) used a 12-year follow-up interval to demonstrate 93% stability for schizophrenic psychoses, 79% stability for neurotic disorders, 58% stability for affective psychoses, and 46% stability for personality disorders.

Much existing knowledge about diagnostic stability in adolescents derives from studies of children, especially for "externalizing" disorders, such as attention-deficit hyperactivity disorder (ADHD). Follow-up studies of hyperactive children into adolescence (5–7) have shown persistence of ADHD in 30%–80% of probands and higher than average risk for antisocial behaviors and drug use disorders. A follow-up of hyperactive children into adulthood (8) showed an 11% persistence of ADHD and a high risk for antisocial personality and drug use disorders.

Cantwell and Baker's 4-year follow-up of a clinical

Presented in part at the 146th annual meeting of the American Psychiatric Association, San Francisco, May 22–27, 1993. Received May 16, 1994; revision received Nov. 1, 1994; accepted Dec. 8, 1994. From the Yale Psychiatric Institute and the Department of Psychiatry, Yale University School of Medicine, New Haven, Conn. Address reprint requests to Dr. Becker, Menninger-SFBA, Mills-Peninsula Hospitals, 1783 El Camino Real, Burlingame, CA 94010.

sample of 151 children (9) showed better stability of behavioral (externalizing) than of emotional (internalizing) disorders. Overall, 55% of the subjects with a pure behavioral disorder at baseline had the same disorder at follow-up. In contrast, Feehan et al. (10) assessed a birth cohort of 930 New Zealanders for DSM disorders at age 15 and again at age 18. Conduct disorder at age 15 was as likely to result in an internalizing disorder (depression and/or anxiety) as in an externalizing disorder (disruptive behavior disorder and/or substance use disorder).

For internalizing disorders, Cantwell and Baker (9) showed less stability of emotional (i.e., affective and anxiety) disorders than of behavioral disorders; only 24% of subjects with a pure emotional disorder at baseline had the same disorder at follow-up. Kovacs et al. (11) studied a clinic-referred sample of 65 children who had experienced a major depressive episode, and a cumulative 72% risk of another episode over 5 years was found. Harrington et al. (12) retrospectively reviewed the medical records of 80 clinic-referred children and adolescents (42% of whom were prepubertal) and found that substantial levels of depressive symptoms early in life increased the risk of depression, defined by the Research Diagnostic Criteria, almost 20 years later. Although their follow-up interval is impressive, the findings are limited by the broad age range (6–16 years), the retrospective design, and the lack of systematic diagnosis at baseline.

Two prospective studies used large community samples of adolescents. In the Ontario Child Health Study (13), one-quarter of adolescents with a "DSM-III-like major depressive syndrome" went on to experience another episode during the 6 months preceding their 4-year follow-up assessments. Feehan et al. (10) found that 44% of adolescents with an internalizing disorder at age 15 also had an internalizing disorder at age 18. In contrast, 5% had an externalizing disorder. Both studies suggest that internalizing disorders are relatively stable in adolescence. However, to our knowledge, systematic studies of severely disturbed populations have not been done.

Much of what we know about the stability of personality disorders in adolescence also derives from studies of children. Lofgren et al. (14) found that, while a diagnosis of borderline personality in childhood does not predict this diagnosis in adulthood, it predicts an array of adult personality disorders. Bernstein et al. (15) found that most DSM-III-R personality disorders did not persist in 733 community adolescents over a 2-year interval. The Toronto Adolescent Longitudinal Study (16) used DSM-III-R criteria to assess 72 subjects from a community sample at ages 13, 16, and 18 years. Personality dysfunction fluctuated considerably, with only cluster A showing stability. To our knowledge, no prospective studies of adolescents have been conducted with clinical samples.

In summary, studies of diagnostic stability in adolescents are rare. None has used a clinical sample, a prospective design, or repeated systematic assessments. The existing studies suggest that—when stability is defined as percentage of subjects retaining a diagnosis—internalizing disorders have moderate stability, while externalizing disorders and most personality disorders have low stability. To our knowledge, the stability of substance use disorders has not been studied in this age group.

We systematically examined diagnostic stability in an inpatient group of adolescents followed up 2 years after hospitalization. Axis I and II disorders were reliably assessed at baseline by using structured interviews for DSM-III-R diagnoses. Follow-up assessments with the same structured interviews were conducted independently. Stability was examined for groups of disorders (e.g., externalizing disorders, internalizing disorders, substance use disorders, and personality disorder clusters) and for individual disorders.

METHOD

Subjects

In the late 1980s the Yale Psychiatric Institute used structured interviews to conduct diagnostic assessments of all adolescent and adult patients who were admitted. At that time the hospital operated two adolescent inpatient units—one with longer and one with shorter lengths of stay. To examine the differences in outcome between the short- and long-stay units, a 2-year follow-up of a group of adolescents hospitalized between 1986 and 1990 was conducted during the early 1990s.

At baseline evaluation there were 165 such subjects, ranging in age from 12 to 18 years (mean=15.5, SD=1.4). Seventy-two (44%) were female, and 93 (56%) were male. All the subjects were single, and most were middle-class according to the two-factor index of social position (69% were level 3 or higher; mean=2.7). Data on ethnicity were available for 164 subjects: 138 (84%) of the subjects were Caucasian, 12 (7%) were African American, four (2%) were Asian, three (2%) were Hispanic, and seven (4%) were of other ethnicity.

To be eligible for the study, subjects had to have been discharged at least 6 months before the beginning of the study and to have been hospitalized for less than 3 months or longer than 6 months. These criteria were met by 142 patients, and data on general functioning at follow-up were obtained for 101 (71%). Six subjects (4%) could not be reached, and 35 (25%) refused to participate. No differences were found between participants and nonparticipants in any baseline demographic characteristic, prior psychiatric or medical history, Global Assessment of Functioning scores, or diagnosis. Of the 101 participating subjects, 70 completed follow-up axis I interviews and 65 completed follow-up axis II interviews. No differences were found between the subjects who completed the diagnostic interviews and those who did not, except that the latter group had a higher proportion of non-Caucasian subjects. This group difference was not felt to affect the main purpose of the study, which was to examine diagnostic stability.

At the time the subjects were invited to participate in the study, written informed consent was obtained after all study procedures had been explained. If the subject was a minor at the time of recruitment, assent was obtained from the subject and consent was obtained from the subjects' parents.

Measures

Two instruments were administered. The Schedule for Affective Disorders and Schizophrenia for School-Age Children—Epidemiologic Version (K-SADS-E) (17) is a structured clinical interview for DSM-III-R axis I diagnoses for patients younger than 18 years. The

TABLE 1. DSM-III-R Axis I Diagnoses of 70 Adolescents Assessed During Hospitalization and at 2-Year Follow-Up

Diagnosis or Diagnostic Group	Baseline N	Baseline %	Follow-Up N	Follow-Up %
Bipolar disorder	4	6	5	7
Major depression	41	59	27	39
Dysthymia	17	24	5	7
Conduct disorder	29	41	13	19
Oppositional defiant disorder	15	21	6	9
Attention-deficit hyperactivity disorder	14	20	2	3
Psychotic disorders	5	7	3	4
Psychoactive substance use disorders	34	49	26	37
Anxiety disorders	16	23	14	20
Eating disorders	8	11	0	0

TABLE 2. DSM-III-R Axis II Diagnoses of 65 Adolescents Assessed During Hospitalization and at 2-Year Follow-Up

Personality Disorder	Baseline N	Baseline %	Follow-Up N	Follow-Up %
Paranoid	4	6	2	3
Schizoid	1	2	0	0
Schizotypal	4	6	1	2
Borderline	31	48	15	23
Histrionic	7	11	4	6
Narcissistic	3	5	2	3
Dependent	7	11	4	6
Avoidant	5	8	2	3
Obsessive-compulsive	3	5	2	3
Passive-aggressive	14	22	7	11
Not otherwise specified	6	9	3	5

Personality Disorder Examination (18) is a semistructured diagnostic interview that assesses the presence of DSM-III-R personality disorders. In adult subjects the traits must be present and pervasive for a minimum of 5 years. In adolescent subjects a trait is considered present if it has persisted for 3 years (18).

Procedures

At admission each subject received a systematic diagnostic evaluation, which included administration of the K-SADS-E and the Personality Disorder Examination. The interviews were conducted by doctoral- and master's-level clinicians who had been trained to a high level of reliability.

The interrater reliability of the K-SADS-E diagnoses was assessed by means of independent simultaneous ratings by pairs of raters for 45 subjects. The baseline K-SADS-E diagnoses were reliable, as shown by kappa coefficients ranging from 0.65 for ADHD to 1.00 for psychotic disorder not otherwise specified (average kappa=0.77). Axis I diagnoses were established by the best-estimate method, by which information was obtained not only from the K-SADS-E interview but also from the admission notes, hospital chart, and clinician descriptions. This method was in accordance with the LEAD (longitudinal, expert, all data) standard advanced by Spitzer and others (19, 20).

We began assessing axis II diagnoses when structured interviews became available. Accordingly, the Personality Disorder Examination was administered beginning in 1988, and it was given to approximately two-thirds of the subjects. The interrater reliability of the baseline personality disorder diagnoses was assessed by pairs of raters for 26 subjects; the kappas ranged from 0.65 for paranoid personality disorder to 1.00 for histrionic, avoidant, and passive-aggressive personality disorders (average kappa=0.84). Axis II diagnoses were established by using the Personality Disorder Examination plus other information sources, as just described. There was a high degree of agreement (better than 85%) between the Personality Disorder Examination and the best-estimate diagnoses. For patients not receiving the Personality Disorder Examination, axis II diagnoses were not given.

At follow-up the same structured interviews were administered by bachelor's- and master's-level psychiatric assistants, registered nurses, and evaluation specialists—all with at least 1 year of clinical experience (average=3.5 years). The interviewers received 40 hours of intensive training by a doctoral-level psychologist over a 4-week period. The interrater reliability of the structured interview diagnoses was assessed on a subgroup of 20 subjects, yielding results that were comparable to those at baseline. While carrying out all follow-up interviews the clinicians were blind to baseline diagnostic and symptom data.

In the assignment of axis I diagnoses, the age criterion for conduct disorder was suspended so that stability could be assessed without excluding this diagnosis at follow-up because some subjects had had their 18th birthdays during the follow-up interval. Also, no subjects were diagnosed with antisocial personality disorder at follow-up, since the age criterion would have excluded this axis II diagnosis at the baseline evaluation.

Stability of diagnosis was measured in two ways: 1) percentage of subjects diagnosed at baseline who met the criteria for the same diagnosis at follow-up and 2) the kappa statistic. Kappa represents agreement corrected for chance (21). A value close to 1 indicates nearly perfect agreement; a value close to 0 indicates that agreement is no greater than would be expected by chance. This statistic summarizes various ways of looking at stability in the sense that it takes into account stable positive cases, stable negative cases, the number of cases that remit, and the number of new cases (e.g., a high number of either remitting or new cases would reduce the kappa coefficient).

RESULTS

Tables 1 and 2 show the frequencies of axis I and II diagnoses, respectively, at baseline and follow-up. In table 1 we list the most frequently diagnosed specific disorders and other groups of axis I disorders. Major depression and conduct disorder on axis I and borderline personality disorder on axis II were the most frequent specific disorders in our study group.

We examined the diagnostic stability of groups of disorders and of specific disorders that had been examined in previous studies and for which we had sufficient numbers of subjects. We also chose to arrange the data such that we could see the number of cases that persisted from baseline to follow-up, the number of cases that remitted between baseline and follow-up, and the number of new cases that emerged for the first time at follow-up. Tables 3 and 4 show, for axis I and axis II, the number of cases that went from a positive to a negative diagnosis, the number that went from a negative to a positive diagnosis, the numbers of stable negative and positive cases, the percentage of stable positive cases—the measure traditionally used to assess stability of diagnosis—and kappa.

Table 3 shows the stability of externalizing, internalizing, and substance use disorders as groups of diagnoses, as well as the stability of several specific axis I diagnoses that make up these groups. Internalizing disorders (major depression, dysthymia, and anxiety disorders) had the highest percentage of stable cases but an insignificant kappa. This indicates that, although most adolescent patients diagnosed with an in-

TABLE 3. Stability of DSM-III-R Axis I Disorders in 70 Adolescents Assessed During Hospitalization and at 2-Year Follow-Up

Diagnosis or Diagnostic Group	Number of Subjects: Unstable Diagnosis: Present at Baseline, Absent at Follow-Up	Number of Subjects: Unstable Diagnosis: Absent at Baseline, Present at Follow-Up	Number of Subjects: Stable Diagnosis: Absent at Both Times	Number of Subjects: Stable Diagnosis: Present at Both Times	Stability of Diagnosis: Subjects With Diagnosis at Both Times (%)	Stability of Diagnosis: Kappa
Externalizing disorders	28	1	23	18	39	0.28*
Internalizing disorders	19	10	14	27	59	0.16
Psychoactive substance use disorders	16	8	28	18	53	0.31*
Conduct disorder	20	4	37	9	31	0.23*
Oppositional defiant disorder	11	2	53	4	27	0.30*
Attention-deficit hyperactivity disorder	14	2	54	0	0	–0.05
Major depression	22	8	21	19	46	0.18
Dysthymia	16	4	49	1	6	–0.02

*p<0.05.

TABLE 4. Stability of DSM-III-R Axis II Disorders in 65 Adolescents Assessed During Hospitalization and at 2-Year Follow-Up

Diagnosis or Diagnostic Group	Number of Subjects: Unstable Diagnosis: Present at Baseline, Absent at Follow-Up	Number of Subjects: Unstable Diagnosis: Absent at Baseline, Present at Follow-Up	Number of Subjects: Stable Diagnosis: Absent at Both Times	Number of Subjects: Stable Diagnosis: Present at Both Times	Stability of Diagnosis: Subjects With Diagnosis at Both Times (%)	Stability of Diagnosis: Kappa
Any personality disorder	21	6	17	21	50	0.18
Cluster A disorders	8	1	55	1	11	0.14
Cluster B disorders	16	9	25	15	48	0.20
Cluster C disorders	15	5	23	6	29	0.19
Borderline personality disorder	23	8	26	7	23	–0.01
Passive-aggressive personality disorder	11	4	47	3	21	0.16

ternalizing disorder at baseline continued to have this type of disorder at follow-up, many new cases of internalizing disorders were diagnosed at follow-up. Externalizing disorders (conduct disorder, oppositional defiant disorder, and ADHD) had a lower percentage of stable cases, but the kappa was significant for these disorders—meaning that fewer cases persisted but that few new cases of externalizing disorders were diagnosed at follow-up. Substance use disorders had a fairly high percentage of stable cases and a significant kappa, suggesting that these disorders are the most stable in adolescence.

The specific axis I disorders show a similar pattern of results. Major depression had the highest percentage of stable cases, and conduct disorder and oppositional defiant disorder had lower percentages of stable cases. Again, only conduct disorder and oppositional defiant disorder had significant kappa values, indicating that few new cases of these disorders were diagnosed at follow-up. There were no stable cases of ADHD (of the 14 cases diagnosed at baseline, none persisted at follow-up).

Table 4 shows the stability of personality disorder clusters and specific personality disorders. Cluster B (borderline, narcissistic, and histrionic personality disorders) had the highest percentage of stable cases, while cluster A (schizoid, schizotypal, and paranoid personality disorders) had the lowest. No diagnostic cluster had a significant kappa. Similarly, the specific personality disorders had few stable cases and no significant kappas.

Since the subjects for this study included both long- and short-stay patients, we examined the diagnostic stabilities of the two groups separately. This analysis revealed no pattern of difference between groups.

DISCUSSION

These results, taken together, support the general finding in the literature that adolescent diagnoses are relatively unstable. As our study group was drawn from treated patients, some of this instability is presumably due to the beneficial effects of treatment. Nonetheless, as the studies of adults also involved treated subjects, it is reasonable to conclude that diagnosis is less stable in adolescence than in adulthood. Using percentage of overlap, we found diagnostic stabilities for axis I ranging from a low of 0% for ADHD to a high of 59% for major depression. Adult diagnoses, on the other hand, show stability ranging from 44% for major depression—in a study by Clayton et al. (22)—to 93% for schizophrenia—in Vetter and Köller's study (4). For axis II we found 23% stability of borderline personality

disorder, which is markedly lower than the 60% stability found in the comparable study by Links et al. of adult inpatients with this diagnosis (2). In spite of this lower stability, it is important to examine which diagnoses and which groups of diagnoses tend to persist in adolescence versus those that tend to disappear or to emerge for the first time during adolescence.

Externalizing Disorders

We found that externalizing disorders were somewhat likely to persist during adolescence but not likely to emerge for the first time in later adolescence. Our finding supports and extends results of previous studies that have demonstrated stability of externalizing problems diagnosed in childhood. We found relatively good stability of conduct disorder, contradicting Cantwell and Baker's finding of a low stability rate for conduct disorder when diagnosed in childhood (9) but supporting Loeber's contention that childhood antisocial problems become increasingly stable from early adolescence onward (23). This pattern of persistence—amelioration of some cases over time but absence of new cases with time—also suggests that externalizing disorders are specific to adolescence, in contrast to internalizing disorders.

Our finding of a low persistence rate for ADHD in adolescence supports the finding of Mannuzza et al. (8) that this diagnosis does not tend to continue into adulthood. It does not contradict the claim made by other researchers (5, 6), however, that ADHD diagnosed in childhood persists through adolescence and brings high risk for other antisocial behaviors emerging in adolescence. Whereas the adolescents in our study group were diagnosed with ADHD on the basis of retrospective self-report, when the diagnosis is made in childhood it is usually based on parental information about current behavior. This may help to explain why the diagnosis was less stable in our study than in studies examining ADHD diagnoses made in childhood. It seems, then, that ADHD diagnosed in adolescence may not be diagnostically stable but that when diagnosed in childhood it is a major risk factor for later antisocial outcomes.

Finally, we found that substance use disorders tend to persist into later adolescence and to emerge for the first time in later adolescence more frequently than other externalizing disorders: there were eight new cases of substance use disorders versus one new case of externalizing disorder (table 3). This suggests that substance use disorders can certainly emerge during this developmental stage but that they are not as specific to this time as other externalizing disorders.

Internalizing Disorders

We found that internalizing disorders have high persistence rates but are not stable overall, which is explained by the large number of new cases diagnosed in later adolescence. This finding supports previous work (10, 12) showing that a diagnosis of an internalizing disorder is a useful marker for later internalizing problems, but it suggests further that the absence of such a diagnosis does not promise freedom from these problems in later adolescence or young adulthood. In the ongoing debate over the stability of externalizing versus internalizing disorders (9, 10), it seems that both types of problems are useful predictors of future difficulties but that the window of high risk for the onset of externalizing problems may end around midadolescence, whereas risk for the onset of internalizing problems continues well beyond.

Personality Disorders

Our findings regarding personality disorders support previous work showing instability of these diagnoses in childhood and adolescence (14, 16). This result is counterintuitive in that personality disorders are usually seen as relatively chronic. Taken together with data on adults, these findings suggest that personality disorders become stable sometime after adolescence, thus validating the notion that these disorders are essentially developmental in nature.

Comparing the personality disorder clusters, we found that the "dramatic and emotional" cluster of personality diagnoses (cluster B) was more stable than the "eccentric and bizarre" cluster of personality diagnoses (cluster A), which contradicts the finding of Korenblum et al. that only cluster A diagnoses were stable over time (16). This discrepancy may be explained by the different subject groups used in the two studies. Korenblum et al. examined a nonreferred community sample of adolescents, in whom it might be expected that only the "eccentric and bizarre" cluster of personality disturbances would be stable, whereas the "dramatic and emotional" cluster would represent more normative problems of adolescence and thus be relatively unstable. These "emotional" personality symptoms were probably more pathological in our group of disturbed adolescent inpatients and thus likely to be more stable.

CONCLUSIONS

The stability of a diagnostic category over time is traditionally thought of as a measure of the construct validity of that category. In this sense, the lack of stability of some diagnoses during adolescence suggests that these diagnoses lack validity, at least when they are applied to an adolescent group. This may lead us to revise our diagnostic categories when thinking about adolescents or perhaps to approach diagnosis in adolescence from a more dimensional point of view. Although this is a reasonable and useful conclusion to draw from the data presented in studies like ours, it is also useful to think about what else "diagnostic instability" may mean in adolescence.

Our study has focused on the resolution, emergence, and persistence of pathology during a period of adolescence. Because adolescence is a time of rapid change

and development, a certain amount of diagnostic flux is expected and perhaps normative. Changing diagnostic status may provide a way of studying the developmental psychopathology of this period. For adolescents with problems sufficiently severe to require inpatient care, our findings suggest the existence of at least three groups: 1) those who get better (diagnostically transient), 2) those who remain sick with problems that look the same (diagnostically stable), and 3) those who remain sick but in whom the problems change and evolve over time (diagnostically variable or diagnosis with heterotypic continuity [24]). We plan to look further at the nature of the distinctions among such groups.

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