Research report

The relationship between parental diagnosis, offspring temperament and offspring psychopathology: a longitudinal analysis

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Abstract

Background: The study examines the relationship between child temperament and a diagnosis of anxiety and/or depression as an adult and what influence parent psychopathology may have on the temperament-diagnosis relationship. *Methods*: The sample consists of 151 offspring who were initially selected as being at high or low risk for major depression on the basis of the presence or absence of a lifetime history of MDD in their parents. The parents and offspring were independently interviewed with a modified version of the Schedule for Affective Disorders and Schizophrenia-Lifetime (Mannuzza et al., 1986) and completed a battery of instruments which included the Dimensions of Temperament Survey (Lerner et al., 1982). They were interviewed three times during the course of the study: Time 1, Time 2, and Time 10. *Results*: There is a similar distribution of offspring disorders in the same parental diagnostic groups. There is a significant temperamental difference between the offspring of parents with a single disorder in comparison to offspring of parents with comorbid disorder. The former is characterized by significantly greater levels of adaptability/approachability. Low attention span at Time 1 is significantly predictive of an offspring lifetime diagnosis of major depression controlling for ADHD in comparison to offspring with neither disorder. Greater irritability, higher activity level and lower adaptability at Time 1 were significantly predictive of offspring lifetime diagnosis of comorbid disorder in comparison to the MDD only group. *Limitations*: This is a retrospective cohort study using a temperament measure from Time 1 versus lifetime diagnoses and consisting of a relatively small sample size for several of the diagnostic categories. *Conclusions*: There appears to be a link between parental psychopathology and offspring temperament. The data also provide further support for the notion that comorbid anxiety and depression disorder is a distinct entity in comparison to MDD only and new evidence that it may be predicted by a specific underlying temperament profile.
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1. Introduction

There is renewed interest in the relationship between temperament and psychopathology as researchers attempt to understand the etiology and phenomenology of various psychiatric disorders. Temperament has been defined in a variety of ways. Much research has been based upon Thomas and Chess' conceptualization of temperament in which they assume that temperament patterns in early childhood are determined by genetic predisposition to behave in a particular way and that the patterns are stable across time and across encounters with new persons, situations and events (Thomas and Chess, 1977). Akiskal (1996) defines temperament as the "role of hereditary and/or constitutional factors in the origin of many long-term psychological and behavioral attributes that characterize an individual." According to Akiskal (1996), temperament is a biopsychosocial concept that can also viewed as a subclinical variant of psychiatric disorders. Temperamental dysregulation leads to stressors which in turn can precipitate the development of affective psychiatric disorders (Akiskal, 1996). Lerner et al. (1982), in their development of the Dimensions of Temperament (DOTS) defines temperament as referring to the stylistic component of behavior that has age-continuous features across the age span from early childhood to young adulthood. It strongly resembles the definition of Thomas and Chess (1977). Temperament can influence psychosocial development, specifically behavioral difficulties by moderating the quality of one's social interactions.

One of the interesting questions in the field is whether or not one can use measurements of early temperament as a means to identify children at risk for future psychiatric disorders. The research findings suggest that: (1) temperamentally difficult children grow up to be adolescents with more psychiatric disorders (Maziade et al., 1985); (2) temperament can be predictive of later pathology; for example behavioral inhibition can predict anxiety in adolescence (Kagan et al., 1984, 1987, 1988) and difficult temperament can predict antisocial behavior (Jansen et al., 1995); and (3) temperament is moderately stable over time (Maziade et al., 1986, 1989a,b; Mufson et al., 1990). Studies have shown an association between temperament and vulnerability for substance abuse (Wills et al., 1995); adolescent social phobia (Schwartz, 1999; Hayward, 1999); general anxiety disorders later in life (Kagan, 1997; Hirshfeld et al., 1992), and other psychopathology (Kashani et al., 1991; Caspi et al., 1995). Studies have asked the question, how might a specific offspring temperament (behavioral style) interact with parental style and family experience, and how could this interaction contribute to the later development of a psychiatric disorder (Rutter et al., 1997; Blackson, 1994; Kendler, 1996)?

Merikangas et al. (1998) in a study of children and adults from a high risk study on the comorbidity of substance abuse and anxiety examined the relationship between child temperament, child psychopathology, and parental psychopathology. They found that offspring psychiatric comorbidity was associated with specific temperament traits characteristic of the anxiety and depression disorders (low adaptability) and substance use/externalizing disorders (low attention and higher activity). They also found greater impairment and greater severity of psychiatric disorder associated with the comorbidity. Several temperament characteristics in offspring demonstrated specific associations with parental psychiatric disorders. They concluded that temperament is relatively stable in its link to psychopathology across the life span and the variations in the links may reflect diverse familial influences (Merikangas et al., 1998).

There have been several studies specifically examining the link between depression and a specific temperament (affect regulation) (Akiskal, 1983a,b, 1989). Researchers (Akiskal and Mallya, 1987; Cassano et al., 1989) have identified a depressive temperament that has demonstrated longitudinal stability and may be helpful in identifying subtypes of depression disorders. Cassano et al. (1992), in a study of adults with major depression, concluded that temperament dysregulation patterns may be an intermediary in the relationship between familial-genetic factors and the eventual expression of a mood disorder.

While researchers have examined the relationship between temperament and mood disorders (Akiskal, 1996), anxiety (Kagan et al., 1988) and the comorbid disorders of substance abuse and anxiety (Merikan-

gas et al., 1999), the relationship between temperament and the comorbid constellation of anxiety and depression has not been similarly studied. Following up on questions posed by Merikangas et al. (1998), we examine whether a child's temperament (behavioral style) can predict diagnosis of anxiety and/or depression as an adult and what influence parental psychopathology may have on the temperament-diagnosis relationship in a sample consisting of offspring at high or low risk for major depression by virtue of presence or absence of a parental diagnosis of major depression. Our specific questions are: (1) is there a relationship between parental diagnoses of anxiety and/or depression and temperament in their offspring?, (2) is there a specific temperament predictive of or associated with anxiety in comparison to depression in the offspring?, (3) is there a different temperament profile associated with diagnostic comorbidity of anxiety and depression in comparison to the profile associated with single disorder illnesses in the offspring?, and specifically, (4) is initial temperament in the offspring as children and adolescents predictive of lifetime psychiatric diagnosis in the offspring?

2. Methods

2.1. Sample

The sample consists of offspring who were initially selected for the presence or absence of a lifetime history of MDD in their parents. See Weissman et al. (1997) for full description of sample. The depressed probands received treatment at the Yale University Depression Research Unit (New Haven, CT, USA). The normal control subjects came from a 1975 community survey that was conducted in New Haven, CT, USA. They had no history of psychiatric illness based on a minimum of four direct interviews during a 10 year period. All probands were white and group matched for age and sex.

At the initial interview (Time 1), the sample consisted of 220 offspring between the ages of 6 and 23 years from 91 families, including 153 offspring from 65 families with one or more depressed parents and 67 offspring from 26 families with neither parent depressed (Weissman et al., 1997). The sample was

interviewed at Time 1, 2 years later at Time 2, and 10 years after the initiation of the study (Time 10). Eighty-four percent (182/217) of those offspring who were interviewed at Time 1 were reinterviewed at Time 10. This paper groups the probands according to lifetime diagnoses over the three data collection periods. The temperament data is from the Time 1 interview. An earlier study of the sample (Mufson et al., 1990) demonstrated the moderate stability of temperament over time. Attrition for probands and spouses did not vary significantly by age or sex. Attrition of offspring did not differ by sex. However, by Time 10, older as compared to younger offspring (mean age, 28.5 vs. 26.4 years; $t = 2.09$; df = 54.9; $p = 0.04$) were more likely to be interviewed (Weissman et al., 1997).

The present study reports on offspring who completed the self-report package including a temperament survey and their parents (including spouse of proband). One hundred and fifty-four children completed their own self-reports as well as having their parents complete self-report forms on the children at Time 1. There were no significant differences on age, gender, and SES between those who participated in completing the self-report forms at Time 1 ($N = 154$) and those who did not ($N = 28$). The mean age of the sample at Time 10 was 27.6 years. Approximately half the sample was female. The sample for this paper is 151 offspring; three were omitted from the analyses because they could not be logically assigned to the parental disorder groupings since each parent had either depression or anxiety disorder so they did not fit into the single disorder or comorbid category. The information that will be used for this paper is parent diagnosis at Time 1, the child temperament reports on themselves from Time 1 and psychiatric diagnoses for the offspring that were cumulative across Times 1, 2, and 10.

2.2. Assessments

Probands, spouses of probands and offspring were independently interviewed with the Schedule for Affective Disorders and Schizophrenia-Lifetime version that was modified to include Research Diagnostic Criteria and DSM-III and DSM-III-R criteria (Mannuzza et al., 1986). All interviews of offspring were conducted blind to the parents' status and the

offspring's previous assessments. Time 1 and 2 interviews were lifetime and Time 10 covered a period of assessment from the last interview until the present time.

Each parent and offspring completed a battery of self-report measures at the initial contact (Time 1) that contained among other forms, the child and parent report version of the Dimensions of Temperament Survey (DOTS) (Lerner et al., 1982). The survey is designed for adults to report about their offspring and/or themselves and for children of all ages to report about themselves. The DOTS is a 34 item instrument based on the Thomas and Chess dimensions of temperament. Lerner identified five factors: attention span/distractibility, adaptability/approach-withdrawal, activity level, rhythmicity, and irritability (Lerner et al., 1982). The DOTS is a measure of temperament that is designed to be continuous in the behavioral repertoire from early childhood to adulthood. Windle and Lerner (1986) report that the temperament construct is similar across different age groups ranging from early childhood to late adolescence/young adulthood. For further information regarding scale design and scoring see Lerner et al. (1982).

The mother and child report forms were completed independently by the subjects. Parents were asked to complete self-administered reports about themselves and their children. Offspring over 7 years of age were asked to complete the self-administered reports about themselves. This paper uses only the child report of his or her own temperament characteristics.

2.3. Interviewers

Interviewers (i.e., Ph.D. and Master's level experienced mental health professionals) received intensive training and supervision on the instruments. Periodic interviews were monitored by the supervisor to limit interviewer drift. A total of 80 cases were co-rated and interrater reliability kappa coefficients ranged from 0.65 to 0.96 and were reported elsewhere (Weissman et al., 1997).

2.4. Best estimate (BE) diagnosis

Diagnoses of offspring were based on the BE procedure (Leckman et al., 1982). The kappa coefficients were good to excellent (Cohen, 1960),

ranging from 0.68 to 0.92. The diagnoses used for this study were cumulative across Times 1, 2, and 10.

2.5. Data analysis

Offspring were grouped into four diagnostic categories: (1) neither anxiety nor depression; (2) major depression only; (3) anxiety disorder only; and (4) comorbid anxiety and depression. Examination of the distribution of the comorbid disorders, (attention deficit hyperactivity disorder (ADHD), conduct disorder, dysthymia), among the four groups showed that the rates of conduct disorder and dysthymia vary in the four groups with higher rates of dysthymia in the MDD only and comorbid groups ($p = 0.007$) and conduct disorder highest among the MDD only group ($p < 0.0001$). Offspring age, sex, ADHD and conduct disorder as well as parental psychopathology (depression and substance use) were considered potential confounders and were controlled for in the analysis. In the polytomous logistic regression model, offspring age, sex, ADHD, conduct disorder, and psychopathology in the parents (depression and substance use) were considered potential confounders and were controlled for in the analysis.

The probands (parents) were grouped into three diagnostic groupings: (1) having neither anxiety nor depression disorders (neither disorder); (2) having one disorder, either anxiety or depression (single disorder); and (3) having both anxiety and depression disorders (comorbid disorder). The MDD only and the anxiety only groups were combined for the parental diagnostic groupings to form the 'single disorder' category since there were only nine families that fell into the MDD only group. It was possible for parents to have other comorbid disorders other than MDD and anxiety disorder. Eight offspring (8.8%) in the parent comorbid disorder group, one offspring (2.4%) in the parent single disorder group and no offspring in the parent neither disorder group came from families where at least one parent had bipolar disorder. Ten offspring (11.0%) in the parent comorbid disorder group, three offspring (7.3%) in the parent single disorder group, and no offspring in the parent neither disorder group came from families in which one parent had antisocial personality disorder. Twelve offspring (13.6%) in the parent comorbid disorder group, one offspring (2.4%) in the parent single disorder group and no

offspring in the parent neither disorder group came from families in which at least one parent had substance abuse disorder. Analysis of co-variance (ANCOVA) was used to examine the difference in baseline offspring temperament scores among parental diagnostic groups. Offspring age was added in the model as a continuous variable. Sex, ADHD, conduct disorder in offspring, and substance use in parents were entered as dichotomous categorical variables (neither parent vs. either parent with the disorder).

Baseline (Time 1) measures of dimensions of temperament in the offspring were examined as to whether they would predict an offspring's lifetime psychopathology including diagnosis at Time 10. Three series of polytomous logistic regression analyses were conducted [Statistical Analysis System Categorical Model (CATMOD), SAS Institute, Cary, NC, USA], one with the neither disorder group, one with the comorbid disorder group, and the other with the anxiety only group as a reference. Dimensions of temperament were slightly correlated ($0.02 < r < 0.3$); therefore, whether the five dimensions were analyzed simultaneously or singly would not affect the beta estimate greatly. In order to interpret which dimension of the offspring temperament would predict their future psychopathology more easily, we chose to run the five different polytomous logistic regression analyses for each set of comparisons.

The possibility that parental psychopathology might be an effect-modifier was also examined. The sample was insufficient to examine the four-level parental diagnostic variables as a potential confounder or effect modifier of the association between offspring temperament and diagnosis. Therefore, we used the original parental stratification (one or more parent depressed as compared to neither parent depressed) to take into account the original design of the study and to have a sufficient sample size to examine parental diagnosis as a potential effect modifier or confounder. Parental substance use was also dichotomized accordingly.

3. Results

3.1. Characteristics of probands and offspring

Ninety-one families were placed in the comorbid group, 41 in the single disorder group and 19 in the neither disorder group. The three parental groups did not differ significantly in their major demographic variables. The average age of mothers ranged from 42.6 to 42.7 years and the average age of fathers ranged 42.0 to 44.9 years, respectively. Distribution of the SES, measured by Hollingshead Index of Social Positions was very similar among the three groups.

Of the 151 offspring, 67 had neither MDD nor anxiety disorder, 26 had only MDD, 17 had only anxiety disorder, and 41 had both MDD and anxiety disorder. There was a significant age difference between them by diagnostic group [$F(3, 147) = 2.76$, $p = 0.04$]. The mean age for the MDD only (19.28 years) and comorbid (18.22 years) groups is significantly older than that of the neither disorder (16.98 years) and anxiety (15.85 years) groups. The distribution of girls and boys was similar among the neither (53.7 vs. 46.3%) and anxiety only (52.9 vs. 47.1%) groups; however, in the MDD only group (38.5 vs. 62.5%) and the comorbid group (31.7 vs. 68.3%), a larger proportion of the offspring were boys.

3.2. Distribution of offspring disorders in parental diagnostic groups and difference in offspring temperament among parental diagnostic groups

The distribution of offspring disorders can be seen in the top half of Table 1. There was a statistically significant overall association between offspring and parental diagnostic groups (X^2 (6) = 13.3, $p = 0.03$). Offspring with neither MDD nor anxiety were more likely to have parents with neither disorder (73.7%) and those with comorbid disorders were more likely to have parents with both disorders (34.1%). Although a majority of offspring of parents with a single disorder had neither MDD nor anxiety disorder, offspring with MDD only, with anxiety only and with comorbid disorder were similarly distributed in parents with a single disorder.

The bottom half of the Table 1 shows differences in offspring temperament among parental diagnostic groups. ANCOVA was conducted with age, sex, attention deficit disorder and conduct disorder in offspring and parental substance use as covariates to examine the difference in offspring temperament among parental diagnostic groups. We found that there was a marginally significant overall group

Table 1

Numbers and rates per 100 (%) of offspring disorders and mean (S.D.) temperament scores by parental disorder groups

Offspring disorders	Parental diagnostic groups			N (%)	Test statistics (df)
	Group 1 comorbid ($N = 91$) N (%)	Group 2 single ($N = 41$) N (%)	Group 3 neither ($N = 19$) N (%)		
Neither	31 (34.1)	22 (53.7)	14 (73.7)	X^2 (6) = 13.3*	
MDD only	18 (19.8)	7 (17.1)	1 (5.3)		
Anxiety only	11 (12.1)	5 (12.2)	1 (5.3)		
Comorbid	31 (34.1)	7 (17.1)	3 (15.8)		
Temperament	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)		Contrasts
Activity level	1.52 (0.15)	1.56 (0.22)	1.40 (0.35)	$F(2,139) = 0.08$	
Attention span	5.94 (0.31)	6.17 (0.45)	6.19 (0.69)	$F(2,139) = 0.11$	
Adaptability	3.66 (0.18)	4.31 (0.26)	4.13 (0.40)	$F(2,139) = 2.21^+$	1 vs. 2*
Rhythmicity	3.31 (0.22)	3.95 (0.32)	2.72 (0.49)	$F(2,139) = 2.68^+$	2 vs. 3*
Irritability	2.46 (0.18)	2.28 (0.27)	2.66 (0.41)	$F(2,139) = 0.33$	

NB: Sex, age, attention deficit disorder and conduct disorder in offspring and substance use in parents were controlled for in offspring temperament scores and F-statistics shows the main-effect of the DOTS $*0.01 < p \leq 0.05$, $^+0.05 < p \leq 0.10$.

difference on rhythmicity $[F(2,139) = 2.68, p = 0.06]$ and adaptability $[F(2,139) = 2.21, p = 0.09]$. A post-hoc comparison found that any overall difference in adaptability came from the difference between the comorbid disorder and single disorder group ($p = 0.04$). The parental single disorder group in comparison with the parental neither disorder group had significantly higher mean scores on rhythmicity ($p = 0.03$).

3.3. Prediction of offspring diagnostic groups at Time 10 by their baseline scores on Lerner's Dimensions of Temperament

Table 2 shows which dimensions of offspring temperament predicted a difference between the offspring diagnostic groups. First, the neither disorder group was compared to the other three groups. The offspring in the MDD only group as compared to the neither disorder group had lower scores on attention span ($p = 0.04$). Offspring in the comorbid group as compared to the neither disorder group had a higher score on irritability ($p = 0.03$). There was a borderline difference between offspring in the anxiety only and the neither disorder groups on attention span ($p = 0.08$).

No dimension of temperament was predictive of anxiety disorder only as compared to comorbid disorders in offspring. In contrast, several temperament dimensions were predictive of only MDD as compared to comorbid disorders in offspring. The higher scores on activity level ($p = 0.04$) and ir-

Table 2

Prediction of offspring diagnostic groups at Time 10 by their temperament scores controlling for age, sex, attention deficit disorder and conduct disorder in offspring and depression and substance use in parents

DOTS scale $N = 151$	Contrast					
	Neither vs. comorbid beta (S.E.)	Neither vs. anxiety beta (S.E.)	Neither vs. MDD beta (S.E.)	Comorbid vs. anxiety beta (S.E.)	Comorbid vs. MDD beta (S.E.)	Anxiety vs. MDD beta (S.E.)
Activity level	0.10 (0.17)	0.04 (0.21)	− 0.36 (0.20)	− 0.06 (0.22)	− 0.46 (0.21)*	− 0.40 (0.26)
Attention span	− 0.06 (0.09)	− 0.20 (0.10)$^+$	− 0.17 (0.10)*	− 0.11 (0.10)	− 0.14 (0.12)	0.03 (0.13)
Adaptability	− 0.14 (0.15)	− 0.26 (0.18)	0.21 (0.19)	− 0.12 (0.19)	0.35 (0.18)$^+$	0.47 (0.23)*
Rhythmicity	− 0.09 (0.12)	− 0.18 (0.15)	− 0.18 (0.13)	− 0.09 (0.16)	− 0.09 (0.13)	0.004 (0.17)
Irritability	0.33 (0.15)*	0.28 (0.18)	− 0.02 (0.17)	− 0.05 (0.19)	− 0.35 (0.17)*	− 0.30 (0.22)

NB: $*0.01 < p \leq 0.05$, $^+0.05 < p \leq 0.10$.

ritability ($p = 0.05$) and lower scores on adaptability ($p = 0.09$) were predictive of MDD only as compared to comorbid disorders in offspring. Only adaptability scores (higher) were predictive of MDD only ($p = 0.03$) as compared to anxiety disorder only in offspring.

4. Discussion

This paper is an attempt to further elucidate the relationship between temperament, defined as behavioral style, and psychopathology in children and their parents. In regard to our specific questions we found the following: (1) there is a relationship between parental diagnoses of anxiety and/or depression and temperament in their offspring. Specifically, there is a significant temperamental difference between the offspring of parents with a single disorder as compared to comorbid disorder – the former is characterized by significantly greater adaptability/approachability; (2) higher adaptability scores are predictive specifically of MDD only as compared to anxiety disorder only in the offspring; (3) there is a different temperament profile associated with the diagnostic comorbidity of anxiety and depression in comparison to a single disorder illness in the offspring. In addition, greater irritability, higher activity level, and lower adaptability at Time 1 were significantly predictive of offspring lifetime comorbid disorder in comparison to the MDD only group. Offspring temperament scores did not vary signficantly between the comorbid and anxiety only groups; and (4) initial temperament in offspring as children and adolescents (Time 1) is predictive of lifetime psychiatric diagnosis in the offspring. Specifically, a temperament profile at Time 1 characterized by low attention span was significantly predictive of a lifetime offspring diagnosis of major depression only (controlling for ADHD) in comparison to neither disorder. Additionally, the study showed a similar distribution of offspring disorders in the same parental diagnostic groups.

4.1. Limitations

There are several limitations that need to be considered. First, the study is a retrospective cohort with prospective follow-up, not a completely pros-

pective study. Therefore, it is possible that psychopathology could influence the offspring's temperament ratings of themselves. In order to minimize this influence, the authors use the Time 1 ratings of temperament and a cumulative diagnosis across all time periods so that the temperament was reported at the earliest time possible. Still, the temperament data is self-report and dependent upon offspring recall of their own temperament as a young child, therefore it may be subject to biases such as memory distortion, subclinical symptoms, and current psychopathology. Although we are using a temperament measure from Time 1 versus lifetime diagnoses, our earlier paper demonstrated moderate stability for temperament over time (Mufson et al., 1990). Finally, there is a relatively small sample size for several of the diagnostic categories that reduces the power to detect differences in these analyses.

Despite these limitations, several interesting links were apparent between offspring temperament and their own and parental psychopathology. Offspring with neither MDD nor anxiety were more likely to have parents with neither disorder and offspring with comorbid disorders were more likely to have parents with both disorders suggesting that the disorders may be transmitted together from parent to child. The finding of greater rhythmicity in the single disorder group compared to the parental neither disorder group is counterintuitive. It was discovered to be due to the chaotic behavior of one family with six children who skewed the findings of the offspring of the parental neither disorder group due to the small sample size in that group.

The finding of similarities between the comorbid and anxious offspring is theoretically consistent with epidemiological findings that anxiety in children seems to be a precursor to later episodes of depression (Parker et al., 1997; Rohde et al., 1991). Researchers also have consistently found that an adult outcome of childhood anxiety disorders is frequently MDD (Pine et al., 1998; Breslau et al., 1995). Those adolescents who develop a comorbid anxiety and depression disorder may be temperamentally different from those teens who develop an MDD only. The temperament profile of the comorbid offspring appears to be driven by the temperamental characteristics associated with anxiety. This is consistent with Akiskal's view of temperament as a subclinical variant of a psychiatric disorder. These

offspring first manifest a temperament style (increased irritability/reactivity and increased activity level) which when it interacts with their environment results in an early anxiety disorder which later is joined by an MDD sometime in adolescence or early adulthood. The underlying temperament either defined as a behavioral style or defined as emotional dysregulation may be predictive of later development of a comorbid versus a single disorder diagnosis.

The inability to find consistent and complete temperament profiles predictive of specific disorders suggests that a child's temperament interacts with the child's environment and it is that interaction that can precipitate the development of psychiatric disorders. The temperament and environment similarly interact with a genetic predisposition to developing such a disorder as evidenced by the increased likelihood of an offspring having a specific disorder if their parent had it. The results support the notion of an interplay of the three factors of temperament, environment, and genetics and their influence on the development of later psychopathology. They also further support the notion of the comorbid anxiety and depression disorder as being a distinct entity from the single MDD entity. The only other study to examine the relationship between temperament and comorbid disorders was that of Merikangas et al. (1998), however the comorbidity was that of substance abuse and anxiety disorder. Further study is needed to prospectively examine the influence of genetics, temperament and the environment as risk factors for psychopathology and further elucidate the distinctive nature of the comorbid diagnostic entity.

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