

Diversity of Outcomes Among Adolescent Children of Mothers With Mental Illness

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When parents have a serious mental illness, it significantly increases the risk of a psychiatric disorder in their children (Erlenmeyer-Kimling et al., 1997; Weissman, Leaf, Bruce, 1987). In this post-deinstitutionalization era, a sizeable number of children are likely to grow up with a mother who has a serious mental illness; many of these women are single-handedly carrying out parenting responsibilities (Nicholson, Nason, Calabresi, & Yando, 1999). Further, as chronic mental illnesses are episodic, with episodes lasting up to 2 years, children of these parents are likely to experience more than one episode of parental mental illness influencing more than one developmental phase (Hammen, 1997).

At the same time, developmental research has indicated that not all children who grow up in high-risk situations show adverse outcomes. The term *resilience* has been used to encompass the "class of phenomena involving successful adaptation in the context of significant threats to development" (Masten et al., 1999, p. 143). Parental mental illness, in fact, does not always produce psychological or other problems for offspring (Arbelle et al., 1997; Wals et al., 2001). Some researchers have identified subgroups of resilient children—

Children of parents with mental illness are an at-risk population according to research on psychiatric outcomes using White, middle-class samples of depressed parents and infants and pre-school children. The current study expands this evidence by exploring within-group heterogeneity across psychosocial outcomes, in a racially diverse, low-income sample of adolescent children of mothers with mental illness ($N = 166$). Using measures of mental health, academics, behavior problems, and social relationships—and employing cluster analysis methodology—we identified five meaningful subgroups of these youth. Two of five identified clusters evidenced mental health symptoms (15%) or possible behavioral problems (27%). The largest cluster (30%) appeared quite socially and academically competent; another cluster (22%) presented as average in their functioning but adult-oriented. A final small cluster (4.8%) was distinguished by members' social isolation. Cluster membership related to maternal substance abuse history, father's relationship to youth, and social support available to mothers. Implications for planning preventive interventions are discussed.

those whose parents have mental illness but who are competent with no mental health problems (Garber & Little, 1999; Scherer, Melloh, Buyck, Anderson, & Foster, 1996). Garmezy's (1987, 1993) original theory and research on resilience hypothesized that children's competency relates to psychosocial resources available; whereas children growing up in adversity often have fewer "good" resources available to them. If reasonably adequate resources are present, competency outcomes are generally satisfactory, even in the context of chronic, severe stressors. In research on parents with mental illness and their children, most studies have involved infants or toddlers. Unfortunately,

the least amount of research has focused on adolescent offspring of parents with mental illness (Oyserman, Mowbray, Allen-Meares, & Firminger, 2000), who experience more risk factors and also are more likely to have access to psychosocial resources.

MATERNAL PSYCHIATRIC VARIABLES AS PREDICTORS OF ADOLESCENT OUTCOMES

Research has focused on the link between parental depression and children's mental illness (Boyle & Pickles, 1997). Adolescent children of parents with affective dis-

orders have higher rates of diagnosed mental illnesses than do children of non-mentally ill parents (Beardslee, Keller, Lavori, Staley, & Sacks, 1993; Grigoriu-Servanescu, Christodorescu, Totoescu, & Jipescu, 1991). In fact, by early adulthood, children with a depressed parent have nearly a 50% chance of experiencing an episode of major depression themselves (Beardslee, Versage, & Gladstone, 1998; Warner, Weissman, Mufson, & Wickramaratne, 1999), compared to the rate in the general population of 5% to 7% (Jellinek & Snyder, 1998). Parental depression has also been linked to adolescent diagnoses of anxiety disorders and conduct disorder (Boyle & Pickles, 1997; Wickramaratne & Weissman, 1998).

Although research has focused on parents diagnosed with depression, other diagnoses are often considered more severe in terms of their impact on functioning (Oyserman et al., 2000). Thus, children of parents diagnosed with bipolar disorder or schizophrenia may be at even greater risk than are children of parents diagnosed with depression (Goodman & Brumley, 1990). In fact, children whose parents have a bipolar disorder are 2.7 times more likely than other children to develop a mental disorder (Lapalme, Hodgins, & LaRoche, 1997), are at risk for a diagnosis of attention-deficit/hyperactivity disorder (ADHD; Chang, Steiner, & Ketter, 2000), and are also more likely to display a personality disorder (Grigoriu-Servanescu et al., 1991). Chronicity of the mother's mental illness has also been found to significantly affect parenting, across diagnoses (Oyserman et al., 2000).

Although much of the research on adolescent children of mentally ill parents has examined risks for mental health problems or psychiatric diagnosis, less attention has focused on the functioning of these adolescents in academic, social, or behavioral domains. The available research does indicate that parental depression is significantly related to adolescent problems in school (Billings & Moos, 1983; Hammen et al., 1987), lower grade-point averages (Tannenbaum & Forehand, 1994), problems with peer interactions (Billings & Moos, 1983), reduced social competence (Thomas, Forehand, & Neigh-

bors, 1995), teen substance use (Su, Hoffmann, Gerstein, & Johnson, 1997), and higher levels of adolescent internalizing and externalizing behavior problems (Thomas et al., 1995). Academic or cognitive difficulties, as well as emotional-behavioral difficulties, have been reported for adolescent children of mothers with a bipolar disorder (Hammen et al., 1987), schizophrenia (Arbell et al., 1997), and other diagnoses (Rutter & Quinton, 1987).

CONTEXTUAL VARIABLES AS RISK FACTORS FOR ADOLESCENT OUTCOMES

Individuals with serious mental illnesses usually experience concurrent difficulties with health, income levels, relationships, and other important life domains. Thus, mental illness is likely to be only a small part of the total risks that mothers and their children experience. Risks often include family disruptions and conflicts, single-parent status, social isolation, and financial and other stresses from living in impoverished conditions. These difficult life circumstances are often concomitant with chronic long-term mental illness and thus potentiate and exacerbate risk. However, to date, empirical evidence is insufficient to parse out and assess differential contributions of maternal psychiatric variables versus context (Oyserman et al., 2000). Further, many potentially significant contextual variables that could improve parenting and child outcomes have not been fully explored (e.g., children's separations from mother due to her mental illness; the satisfaction women gain from parenting).

LIMITATIONS OF CURRENT RESEARCH KNOWLEDGE

Few studies have examined psychosocial outcomes for teenage children of parents with bipolar disorders or schizophrenia. Investigators have not systematically compared adolescent outcomes across major categories of parental diagnosis. Evidence of the effects of parents' mental illness on their adolescent children has concentrated primarily on parental depression. Even in that research, there are significant limitations—involving mainly White, middle-

class parents. Few investigators have included proportional representation of minorities in their samples, which raises questions about the applicability of findings to more diverse groups. Furthermore, analyses have not simultaneously taken into account SES or race. In fact, many investigators do not specify their participants' race, ethnicity, or economic levels. These omissions are important because the literature on parenting has suggested that poverty can increase stress on parents, decreasing the quality of their parenting (Samaan, 1998), and that the relationship between minority status and parenting is complex (Oyserman, 2003). Studies are also limited in that most do not analyze for differences in the influence of maternal mental illness on girls versus boys, an important omission, given the established gender differences in trajectories for achievement and autonomy and the consequences of parental separation in adolescence. Finally, most researchers have concentrated on the effects of parental mental illness on children's mental health; much less research has examined its effects in academic, social, and behavioral domains. Risk of mental health problems may or may not relate to other important outcomes or to successful engagement with school, social skills, peer relations, or behavior problems in the community (Luthar, Cicchetti, & Becker, 2000). Some children who are at-risk may be functioning well in some domains but not in others, indicating the need to examine a broad constellation of positive and negative outcomes, strengths, and problems. Further, Radke-Yarrow and Klimes-Dougan (2002) concluded that research on offspring of depressed parents has inappropriately examined problem outcomes as either present or absent and that assessments should take into account the form of the problem and any associated co-occurring disorders.

Our aim in the current research was to study diverse outcomes for teenage children of mothers with a serious mental illness and to identify predictors of outcomes from mothers' clinical history, as well as contextual features reflecting stress and resources. Previous gaps in the research were addressed by including a

substantial number of minority youth in our sample, using measures that assessed outcomes of adolescence in all major life domains (academic, social, and behavioral, as well as mental health), and controlling for race/ethnicity, age, and gender as predictors of outcomes. To understand these diverse outcomes across multiple domains, we used a cluster analysis to identify similar groups.

METHOD

Sample

Participants were 166 teenage children and their mothers, participating in National Institutes of Mental Health-funded studies of mothers with serious mental illness and their adolescent children (see Mowbray, Oyserman, & Bybee, 2000). In terms of maternal demographics, 60% were African American, 32% non-Hispanic White, 6% Latina, and 2% other racial/ethnic groups. At the time of the youth interview, mothers were 40.5 years of age on average ($SD = 5.8$, range = 26–56 years); the median family income was \$1,200 per month, with 53% of the participants living below the poverty line; 23.6% of mothers were married; 44.2% were separated, divorced, or widowed; and 32.1% were single (never married); 34.5% had less than a high school diploma, 21.8% had a high school diploma or GED, and 43.7% had some college education or more. Mothers' diagnoses were 23.3% schizophrenia/schizoaffective disorder, 52.3% depression, and 25.4% bipolar disorder. Youth were, on average, 15.0 years old ($SD = 2.04$); 87 were boys, 79 girls. At time of study recruitment, mothers had care responsibilities for an adolescent youth included in this study.

Procedures

Mothers were recruited from the public mental health system in two counties in southeast Michigan (including Detroit) and asked to participate in a longitudinal study about parenting and mental illness. Eligible mothers had received public mental health services for a mental illness

that lasted at least 1 year and interfered with one or more major areas of functioning. Originally, 485 women were identified as meeting study criteria: 46 could not be contacted or scheduled and 59 refused to be involved, producing a 78.4% participation rate. Mothers were interviewed three times over a 5 year period (approximately every 20 months), using a structured questionnaire. The retention rate, overall for the study, was 87.5%. At the third interview for mothers with adolescent children, we requested permission to contact their children about participation in a study of adolescent transitions. The youth selected were mothers' youngest child in the age range of 11 to 17 years. The youngest child was chosen to increase the likelihood that children had not left school; in which case, interpreting the outcome measures across participants would have proved more problematic. Mothers were told that participation was voluntary and confidential and assured that we would not share any information about her situation with the youth, including her identification as a person with mental illness or recipient of mental health services. Written informed consent (guardian) and assent (youth) were obtained before the questionnaire administration. Youth were reimbursed for participating (\$20 at T1 and \$25 at T2). Interviewers were women ages 20 to 45; all had prior experience with children, were university students, or had undergraduate degrees. They received extensive 3-day interviewing training.

In total, 166 guardians (159 mothers and 7 other relatives) and youth consented and 39 refused (81%). The structured interviews with the youth were approximately 2 hours in length and took place in the privacy of participants' homes. Interviewers provided a snack and a break midway through the questionnaire. Participating youth were recontacted, on average, about 40 weeks ($M = 39.1$ weeks, $SD = 13.64$, range = 21–88 weeks) later for a follow-up (T2) questionnaire.

Measures of Adolescent Outcomes

According to the literature, youth's functioning may vary significantly across do-

main. Thus, to produce a comprehensive assessment and to determine the extent to which risk factors may predict differential outcomes, we selected measures from each major domain of adolescent functioning: academic, social, behavioral, and mental health. Details on the specific constructs, measures, and scale characteristics are provided in Table 1.

Predictors of Adolescent Outcomes: Mother's Clinical Characteristics

Diagnoses were determined at Wave 1, using the Depression, Mania, and Psychosis sections of the *Diagnostic Interview Schedule* (DIS; National Institute of Mental Health, 1980), Version III-R, modified for the *Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV)*; American Psychiatric Association, 1994) criteria. A psychologist with a PhD who was trained in the use of the DIS conducted training of lay interviewers. The structured nature of the protocol meant that interviewers had few, if any, decisions to make in its administration. All interviews were audiotaped, and a random 10% were reviewed for reliability. The clinical researcher reviewed completed interviews (blind to the demographic characteristics of the participant) and assigned diagnoses manually using an algorithm based on the DIS protocol revised for the *DSM-IV*. Before being finalized, all diagnoses were rereviewed by the clinical researcher and the interview coordinator; differences in diagnostic determinations were identified and discussed to reach a consensus determination for the final diagnosis.

Chronicity. Women reported their lifetime number of psychiatric hospitalizations ($M = 4.24$, $SD = 7.44$, $Mdn = 2$), which was then adjusted by the number of years since onset to minimize the effect of age, yielding an average number of hospitalizations per year mentally ill ($M = 0.32$, $SD = 0.51$, $Mdn = 0$). This variable was log-transformed to minimize skew. The *Drug Abuse Screening Test* (DAST; Skinner, 1982), a measure of substance abuse history, providing a count of whether

TABLE I
Descriptions of Adolescent Measures

Domain	Construct	Scale	# items and explanation	Sample descriptive statistics
Mental health	Anxiety	<i>Revised Children's Manifest Anxiety Scale</i> (Cole, Hoffman, Tram, & Maxwell, 2000)	21 items (omitted 9 items of Social Desirability); count of endorsed items	$M = 8.21, SD = 6.09$ range = 0–28 $\alpha = .88$
	Depressive symptoms	<i>Children's Depression Inventory</i> (Kovacs, 1992)	24 items; 0 = absence of symptom, 1 = mild symptom, 2 = definite symptom	$M = 8.25, SD = 5.76$ range = 0–24 $\alpha = .88$
	Health limitations	<i>Add Health In-School Questionnaire</i> (Natl. Longit. Study of Adolescent Health, 1998)	6 items; frequency health or emotional problem caused difficulty, 1 = never to 5 = every day	$M = 0.33, SD = 0.40$ range = 0–2.17 $\alpha = .71$
	Coping	<i>Negative Emotional Coping Scale</i> (Eccles, 1995)	3 items; 1 = never to 5 = all the time	$M = 1.96, SD = 0.88$ range = 1–5 $\alpha = .69$
Academic	School competence	<i>Self-Perception Profile for Adolescents</i> (Harter, 1988)	7 items; 1 = least competent to 4 = most competent	$M = 2.86, SD = 0.67$ range = 1–4 $\alpha = .71$
	Grade Point Average ^a	From school records for semester preceding interview, core and elective courses	A = 4 to F = 0	$M = 2.17, SD = 1.00$ range = 0–4
	School attachment	<i>School Bonding Scale</i> (Cernkovich & Giordano, 1992)	4 items; 1 = strongly disagree to 5 = strongly agree	$M = 4.06, SD = 0.64$ range = 2–5 $\alpha = .74$
	Academic work	<i>Student Participation Questionnaire</i> (Finn, Pannozzo, & Voelkl, 1995)	6 items; 1 = never to 5 = always	$M = 3.38, SD = 0.65$ range = 1.67–5 $\alpha = .68$
Social	Peer involvement	<i>Peer Involvement Scale</i> (Elliot, Huizinga, & Morse, 1985)	5 items; support from and satisfaction with friends, 1 = very little to 5 = a great deal	$M = 3.93, SD = 0.77$ range = 1–5 $\alpha = .78$
	Social competence	<i>Self-Perception Profile for Adolescents</i> (Harter, 1988)	5 items; 1 = least competent to 4 = most competent	$M = 3.00, SD = 0.76$ range = 1–4 $\alpha = .68$
	Perceived physical appearance	<i>Self-Perception Profile for Adolescents</i> (Harter, 1988)	5 items; 1 = least attractive to 4 = most attractive	$M = 3.11, SD = 0.81$ range = 1–4 $\alpha = .79$
	Peer hassles	<i>Daily Hassles Microsystem Scale</i> (Seidman et al., 1995)	4 items; 1 = not at all to 4 = a lot	$M = 1.45, SD = 0.64$ range = 1–4 $\alpha = .62$

(table continues)

(Table 1 continued)

Domain	Construct	Scale	# items and explanation	Sample descriptive statistics
Social (cont'd)	Exposure to violence ^c	Violence witnessed or experienced (Buke, Selner-O'Hagan, Kindlon, & Earls, 1996)	16 items; 0 = never, 1 = single exposure, 2 = more than one exposure, summed for a total score	M = 9.51, SD = 6.35 range = 0–29
Behavior	Peer deviant values	Perceived peer endorsement deviant behaviors (Eccles, 1995)	4 items; 1 = very uncool to 5 = very cool	M = 2.35, SD = 1.11 range = 1–5 α = .82
	Problem solving	Adolescent Problems Inventory (Freeman, Rosenthal, Donahue, Schlundt, & McFall, 1978)	9 scenarios—social competency; 5-pt rating scale: 0 = a very incompetent response to 8 = a very competent response ^b	M = 5.24, SD = 1.28 range = 0.67–8.0 α = .69
	Internalizing	Internalizing Problems subscale, Youth Self-Report (Achenbach, 1991)	31 items; 0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true	t scored M = 49.93, SD = 11.61 range = 25–79
	Externalizing	Externalizing Problems subscale, Youth Self-Report (Achenbach, 1991)	31 items; 0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true	t scored M = 48.82, SD = 10.40 range = 26–86
	Police contacts ^c	Police Contact (Elliott et al., 1985)	4 items; questioned or arrested by police or gone to court in the last 12 months, 0 = no, 1 = yes ^d	M = .56, SD = 1.00 range = 1–4
	Delinquency	Add Health In-Home Quest. (Nat. Longitud. St. Adol. Health, 1998)	14 items; 0 = never to 3 = five or more times	M = 0.23, SD = 0.31 range = 0–2.29 α = .85

^aGrade Point Average was based on 4 or more classes (all classes for which we had grades—core classes plus electives), with the exception of the following: 1 was based on 2 classes, 1 was based on 3 classes, and 12 were based on statistical estimation techniques. ^bA competent response was defined as one that effectively resolves the problem situation and makes it less likely that the respondent will have more problems of this type in the future; for coding agreements across scenarios, Kappa = 0.56–0.88. ^cInternal consistency reliability statistics are not provided for count measures. As indicators, rather than items which are manifestations of an underlying hypothetical construct, they do not meet the criteria of classical test theory and therefore are not appropriate for internal consistency statistics (Streiner, 2003). ^dTypical of count measures, this variable was positively skewed and was log-transformed to better meet the distributional assumptions of the analysis.

or not certain behaviors were associated with ever using substances, was adapted to be more appropriate for women ($M = 5.12$; $SD = 4.8$; $\alpha = .94$).

Number of Years Child Separated From Mother. A Life History Calendar was used to help women recall separations from each of their children due to custody loss or other reasons. The total number of years with a 3-month or longer separation from the mother (before age 19) was computed for each child ($M = 1.58$, $SD = 3.17$, range = 0–16).

Predictors: Contextual Characteristics

Demographic Information. Mothers reported their age, race, education, and living arrangements. The Maternal Wave 3 interview included a checklist of income sources to determine total monthly income ($M = \$1,312$, $SD = \$715$, $Mdn = \$1,195$, range = \$0–\$3,900). Household adjusted family income was calculated as a percentage of the poverty level for the household size (U.S. Census Bureau, 1996; $M = 101.72\%$, $SD = 54.0\%$, $Mdn =$

88.7%). Meaning of Motherhood (Oyserman, Bybee, Mowbray, & Kahng, in press), a measure of parenting attitude, was obtained with 6 open-ended questions, coded to consensus by two trained raters on variables such as negativity, restrictiveness, self-efficacy, nurturance, and feeling valued (correlations between coders on a random sample of 50 cases, Spearman rho, ranged from .51 to .86). Coded responses were factor-analyzed, and the largest factor—positive and efficacious parenting—was used in this analysis ($M = -0.066$, $SD = 1.015$, range = -2.43–2.81).

Stressful social life events in the past year were assessed with a subset of 6 items from the *Brief Life Events Questionnaire* (Brugha & Cragg, 1990; e.g., break-up of relationships, conflict with others, deaths/serious illness of family or friends; $M = 1.57$, $SD = 1.38$, range = 0–5). Mothers' total positive social support (Arizona Social Support Interview Schedule; Barrera, 1986) was a count of all those listed as available to provide any type of positive social support ($M = 6.65$, $SD = 3.55$, range = 0–21). Paternal involvement was assessed from youth with one item from the *Social Support Microsystems Scale* (Seidman et al., 1995), a dichotomous question of "in life" versus "not in life" (22.6% yes).

Analysis Plan

The cluster analysis used traditional hierarchical agglomerative and k -means clustering methods because our sample size was not optimal for maximum-likelihood modeling methods such as latent profile (Bartholomew & Knott, 1999) or latent class cluster analysis (Vermunt & Magidson, 2002). We also wanted to avoid imposing unrealistic covariance constraints such as within-class independence, which latent class-based methods often require in order to achieve convergence (Vermunt & Magidson, 2002). Cluster analysis requires the selection of a limited number of variables to be used in the clustering statistical procedure. From Youth Wave 1 data, we selected two measures to exemplify outcomes from each of the four major domains of functioning for adolescents: Mental Health (anxiety and depression), Academic (school competence and school record grade point average [GPA]), Social (peer involvement and social competence), and Behavior (peer deviant values and adolescent problem solving). Within each domain, the measures used as the clustering variables were (a) selected from outside sources (school records, interview rating) and were therefore more likely to be valid representations of the variable, (b) well-respected and highly reliable measures, and (c) relatively independent (except for anxiety and depression, which were both selected because it is possible to have one without

the other; see Grigoriu-Servanescu et al., 1991). In contrast, measures external to the cluster solution (used to further describe the clusters) were related to but not central measures of the variables or represented specific but limited components of the variables (e.g., health limitations and coping for mental health; self-reports of school attachment and academic work for academics; perceptions of physical appearance, peer hassles, and exposure to violence for social outcomes; internalizing, externalizing, police contacts, and delinquency for behavior problems).

Before conducting the cluster analysis, we standardized all variables to reduce differential weighting due to scaling differences. We used a two-stage method for the cluster analysis. The first stage was a hierarchical agglomerative cluster analysis on squared Euclidean distances among the 141 cases with complete data on all cluster-defining variables. Ward's method was used because it minimizes within-cluster variation and tends to produce clusters of relatively similar size (Blashfield & Aldenderfer, 1988). Examination of fusion coefficients suggested an optimal solution consisting of five clusters. We followed the agglomerative procedure by a K -means iterative cluster analysis, based on the mean centroids from the hierarchical method. This second, iterative step allowed cases that had migrated away from cluster centroids during the agglomerative process to be reassigned, resulting in clusters with the smallest possible within-cluster variance. The k -means procedure also assigned to clusters 24 cases (14.4%) with missing values on one or two of the eight clustering variables based on existing data points. One case was dropped because it had valid data on only two clustering variables, resulting in $N = 165$. We assessed the technical adequacy of the cluster solution using measures of within-cluster dispersion and between-cluster distances (Sneath & Sokal, 1973). For all clusters, the smallest between-cluster distance was greater than the within-cluster dispersion. Although quite small, the fifth cluster was retained because it was far removed from the nearest cluster and an alternate four-cluster solution dramatically increased within-cluster dispersion.

Following the cluster analysis, to more fully describe each cluster, we examined cluster differences on other youth variables not included in the cluster solution (i.e., variables external to the cluster analysis). To test differences between clusters on the clustering variables and on the variables external to the cluster analysis, we used MANOVA, followed by univariate ANOVAs and paired comparison tests to assess differences between individual clusters. Following recommendations of Hancock and Klockars (1996) and Wilcox (1987), we examined paired comparisons for all dependent variables, regardless of the significance of the overall univariate F or chi-square. To maintain alpha for each dependent variable at $p < .05$, we used Games-Howell tests (Games, Keselman, & Rogan, 1981) or modified Bonferroni adjustments (Jaccard & Wan, 1996) for the paired comparisons. Given the cluster configuration described in the next section, power exceeded .85 to detect, at $p < .05$, overall cluster differences that were at least "medium-sized," according to Cohen's (1988) thresholds ($w = .3$ for categorical and $d = .5$ for continuous variables). For most of the paired comparison tests, power was sufficient to detect large effects ($w = .50$ or $d = .80$) at Bonferroni-adjusted $p < .05$, ranging from .70 to .88 for all comparisons except those involving the smallest cluster, where power dropped below .50.

To test possible predictors of cluster membership, we used multinomial logistic regression, an extension of logistic regression for nominal dependent variables with more than two categories (Long, 1997). We performed the analysis in a hierarchical manner, entering predictors in ordered blocks to facilitate testing the significance of influences of a more transitory nature (e.g., disruptive life events), controlling for the effects of immutable characteristics (demographics, maternal psychiatric history).

RESULTS

Cluster Derivation

Table 2 presents the cluster means for the eight variables used to define the cluster

TABLE 2
Variables Used to Define Clusters, by Cluster

Dependent variable	Pseudo <i>F</i> (4, 160)	Raw and (Standardized) Means					Total <i>N</i> = 165
		1 (<i>n</i> = 50)	2 (<i>n</i> = 25)	3 (<i>n</i> = 37)	4 (<i>n</i> = 45)	5 (<i>n</i> = 8)	
Anxiety	31.43*	5.24 _a (-0.49)	17.47 _b (1.52)	7.46 _a (-0.12)	6.86 _a (-0.22)	8.55 _a (0.06)	8.20
Depression	67.93*	4.32 _a (-0.68)	18.36 _b (1.75)	7.21 _c (-0.18)	7.43 _c (-0.14)	10.50 _{ac} (0.39)	8.25
School competence	17.24*	3.41 _a (0.83)	2.47 _b (-0.58)	2.67 _b (-0.28)	2.66 _b (-0.29)	2.65 _{ab} (-0.31)	2.86
Grade Point Average	12.31*	2.73 _a (0.57)	1.51 _b (-0.59)	2.37 _a (0.24)	1.56 _b (-0.55)	2.18 _{ab} (0.05)	2.13
Peer involvement	30.27*	4.13 _a (0.27)	4.08 _{ab} (0.19)	3.67 _b (-0.34)	4.20 _a (0.36)	1.90 _c (-2.64)	3.93
Social competence	30.56*	3.60 _a (0.78)	2.53 _b (-0.62)	2.39 _b (-0.81)	3.23 _c (0.30)	2.45 _b (-0.73)	3.01
Peer deviant values	28.77*	1.80 _a (-0.50)	2.96 _b (0.54)	1.56 _a (-0.72)	3.08 _b (0.65)	3.66 _b (1.17)	2.35
Problem solving	21.35*	5.92 _a (0.53)	4.31 _b (-0.72)	5.94 _a (0.55)	4.40 _a (-0.66)	5.28 _{ab} (0.03)	5.24

Note. For each variable, raw scores are in the first row, and standardized (*z* scores) are below. *F* is maximized by the clustering procedure. _{a,b} Means that do not share the same subscript letter are significantly different at $p < .05$, using Games-Howell paired comparison tests. * $p < .001$.

solution, along with ANOVA and paired comparison results. As an example of the latter, means on depression for each cluster plus the total sample are displayed in the second row (raw scores on top; standardized scores in parentheses, underneath). The mean for Cluster 1 (4.32) is identified by superscript "a," indicating that this cluster is significantly different on depression from Cluster 2 (superscript "b") and from Clusters 3 and 4 (superscript "c"), although not significantly different from Cluster 5 (superscript "ac"); Cluster 2 is also significantly different from Clusters 3, 4, and 5, because none of these shares a superscript "b". Examination of cluster differences on these defining variables led to the assignment of labels: (a) Socially and Academically Competent; (b) Anxious and Depressed; (c) Average, Adult-Oriented Youths; (d) Delinquent/Peer-Oriented; and (e) Isolated Non-Conformists (see Figure 1). On

demographic variables (Table 3), clusters differed significantly on age and sex, but not on race. The paired comparisons on age revealed that youths in the Competent and Average clusters were significantly younger than those in the Delinquent/Peer-Oriented cluster. In terms of gender differences, the Delinquent cluster had significantly fewer girls than the Anxious/Depressed or the Average clusters.

Table 4 presents cluster comparisons on mental health, academic, social, and behavior variables that were external to the cluster analysis. Age and sex were covariates in the multivariate and univariate ANCOVAs testing overall differences, as well as in paired comparisons among individual clusters (in order to avoid reporting spurious cluster differences that could be attributed to demographic differences). Means in Table 4 are age- and sex-adjusted. MANCOVA results, by domain, were all significant, as were most of the

univariate ANCOVA results in each domain.

Cluster Descriptions

Cluster 1: Socially and Academically Competent. This was the largest cluster with $n = 50$ (30.1%). It had the lowest mean anxiety score, the lowest depression score, the highest school competence score, and the highest GPA. Average peer involvement score was high, and members also scored significantly higher than all other clusters on social competence, lower on peer deviant values than all clusters but one, and higher than all but one on problem solving. Cluster 1 showed the best adjustment and fewest problems across multiple domains (see Table 4). Thus, in the mental health domain, these adolescents had few health limitations and low scores for negative emotional coping. They were also significantly better in the

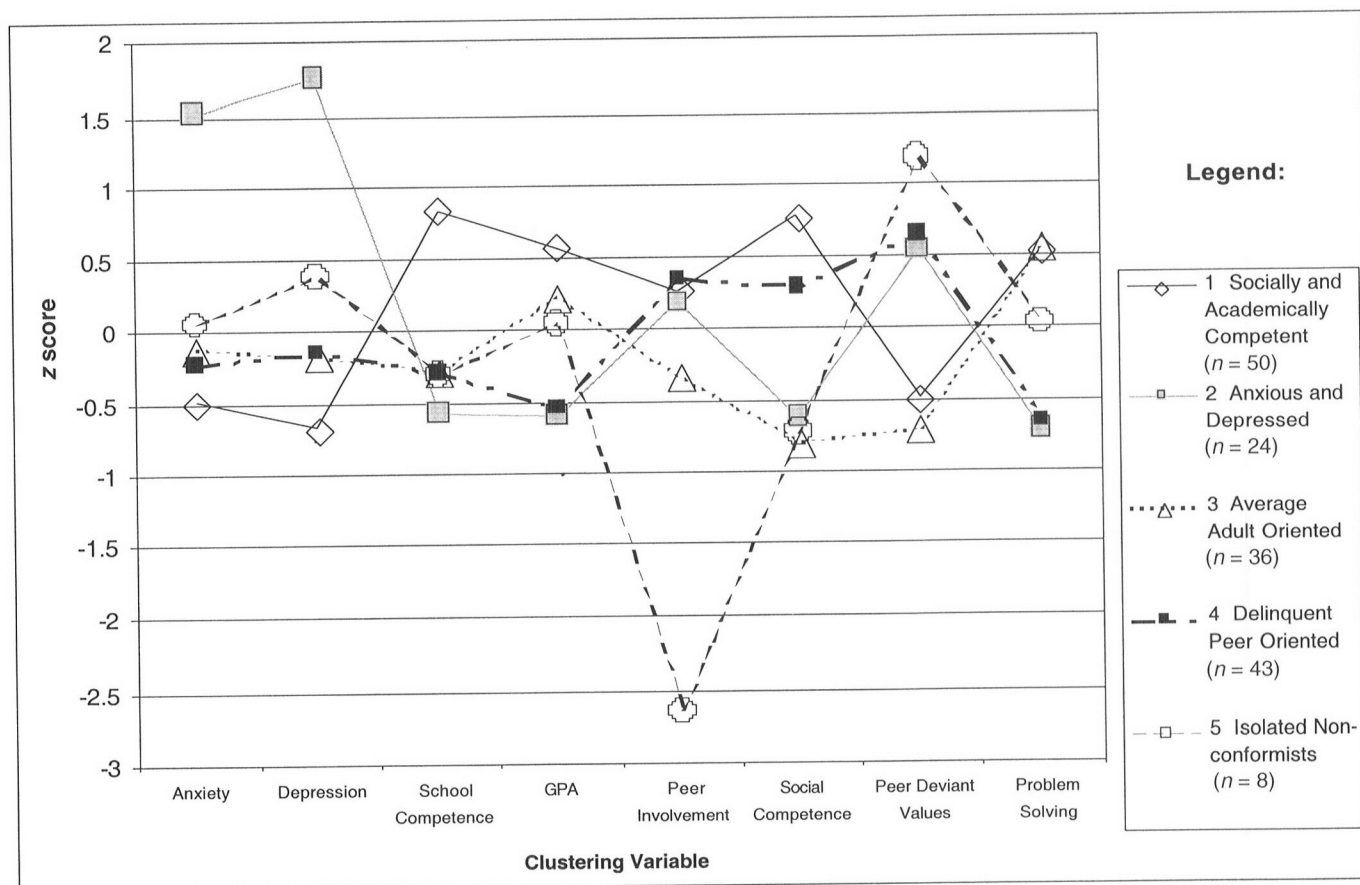


FIGURE 1. Cluster profiles on defining variables.

academic domain, with the highest mean level of school attachment and positive self-report of academic work. In the social domain, this cluster differed from others in having the highest scores on perceived physical appearance. They were less bothered by peer hassles and experienced less exposure to violence than some other clusters. In the behavior domain, they had the lowest scores on internalizing and externalizing behaviors and low scores on police contacts and delinquency.

Cluster 2: Anxious and Depressed.

The second cluster ($n = 25, 15.1\%$) scored significantly higher than all other clusters on the anxiety and depression measures (see Table 2). They had the lowest self-assessed school competence, and their GPA was low. Their peer involvement score was higher than one cluster, but the perceived social competence score was significantly lower than another cluster. They also had significantly higher peer

deviant values and significantly lower problem solving, relative to the Competent and Average clusters. The Anxious/Depressed cluster also differed significantly from other clusters in attitudes and behaviors in multiple domains (see Table 4). On mental health variables, they reported the highest levels of health limitations and negative emotional coping. In the academic area, their reported school attachment was lowest and they were significantly less positive about their academic work than the Competent or Average clusters. In the social domain, they rated themselves low in perceived physical appearance and were significantly more bothered by peer hassles than any of the other clusters; they reported significantly more exposure to violence than any of the other clusters but one. Finally, in the behavioral area, they had the highest scores on internalizing and externalizing problems, were significantly higher on delinquency than two of the other clusters,

but did not differ from other clusters on police contact.

Cluster 3: Average, Adult-Oriented

Youths. This cluster's ($n = 37, 22.3\%$) scores on most variables were midrange, significantly higher than some clusters and lower than others (see Table 2). They were significantly lower on mental health problem variables than the Anxious/Depressed cluster but higher on depression than the Competent cluster. Their self-perceived school competence was significantly lower than the Competent cluster, but their school GPA was significantly higher than the Anxious/Depressed or Delinquent/Peer-Oriented clusters. Peer involvement and social competence were significantly lower than the Competent or Delinquent/Peer-Oriented clusters, but peer involvement was higher than that of the Isolated Non-Conformist cluster. In the behavioral domain, they had the lowest score on peer deviant values and the

TABLE 3
Background Characteristics by Cluster

Characteristic	Comparison statistic	Socially and academically competent (n = 50)	Anxious and depressed (n = 25)	Average adult oriented (n = 37)	Delinquent peer oriented (n = 45)	Isolated non-conformist (n = 8)
Youth age at interview ¹	5.280*	14.306 _a	15.422 _{ab}	14.506 _a	15.839 _b	16.153 _{ab}
Household ratio of poverty threshold ¹	0.295	0.908	0.841	0.973	0.904	0.859
Youth race (% African-American) ²	6.035	67.3%	48.0%	68.6%	56.8%	87.5%
Youth sex (% female respondents) ²	13.784*	49.0% _{ab}	64.0% _a	60.0% _a	27.3% _b	25.0% _{ab}
Child employment (% worked in last year) ²	18.579**	32.7% _a	48.0% _{ab}	31.4% _a	72.1% _b	37.5% _{ab}
Live with mother (% more than half the year) ²	4.453	81.6%	83.3%	71.4%	66.7%	62.5%

¹Cluster means and *F* reported for continuous variables. ²Cluster percentages and chi-square reported for dichotomous variables. _{a,b,c} Cell entries that do not share the same superscript letter are significantly different according to modified Bonferroni tests at $p < .05$, adjusted for multiple comparisons within each dependent variable.
* $p < .01$. ** $p < .001$.

TABLE 4
Cluster Means on Variables External to the Cluster Solution, by Dependent Variable Domain

Variable domain	<i>F</i>	Socially and academically competent (n = 50)	Anxious and depressed (n = 25)	Average adult oriented (n = 37)	Delinquent peer oriented (n = 45)	Isolated non-conformist (n = 8)
Mental health Mult. $F(8, 308) = 4.174^{**}$						
Health limitations	3.989*	0.271 _a	0.608 _b	0.248 _a	0.353 _{ab}	0.190 _{ab}
Negative emotional coping	6.781**	1.644 _a	2.704 _b	1.819 _a	1.969 _a	2.026 _{ab}
Academic Mult. $F(8, 306) = 6.452^{**}$						
School attachment	8.766**	4.410 _a	3.532 _b	4.090 _{ac}	4.011 _c	3.928 _{abc}
Academic work	7.101**	3.621 _a	3.075 _b	3.662 _a	3.174 _b	2.838 _b
Social Mult. $F(12, 450) = 6.276^{**}$						
Perceived physical appearance	7.495**	3.495 _a	2.537 _b	2.923 _b	3.253 _b	3.032 _{ab}
Peer hassles	5.613**	1.299 _a	1.917 _b	1.298 _a	1.498 _a	1.327 _{ab}
Exposure to violence	8.498**	7.148 _a	13.935 _b	7.510 _a	11.890 _b	7.807 _{ab}
Behavior Mult. $F(16, 616) = 3.535^{**}$						
Internalizing problems	8.561**	43.777 _a	57.534 _b	49.852 _c	48.155 _{ac}	49.743 _{abc}
Externalizing problems	4.741*	45.567 _a	56.940 _b	48.597 _a	52.552 _b	48.819 _{ab}
Police contact	3.198*	0.315 _a	0.769 _a	0.369 _a	0.968 _b	-0.024 _a
Delinquency	5.317**	0.118 _a	0.402 _b	0.162 _a	0.343 _b	0.244 _{ab}

Note. For each domain, values reflect an overall MANCOVA plus ANCOVAs for each dependent variable. Means are adjusted for the covariates, age, and gender.

_{a,b,c} Means that do not share the same subscript letter are significantly different according to modified Bonferroni tests at $p < .05$, adjusted for multiple comparison within each dependent variable.

* $p < .01$. ** $p < .001$.

highest score on problem solving—both measures reflect endorsing values and behaviors congruent with adult expectations. For employment, post-hoc comparisons indicated that youth in this cluster were significantly less likely to be working than those in the Delinquent/Peer-Oriented cluster. Average Adult-Oriented Youth (see Table 4) differed primarily from the Anxious/Depressed cluster in the mental health and academic domains, having significantly fewer health limitations, less negative emotional coping, and stronger school attachment; scores on academic work were significantly higher than any cluster except the Competent group. In the social domain, they scored significantly lower than the Competent cluster on perceived physical appearance. The Average Adult-Oriented Youths cluster was bothered less by peer hassles than the Anxious/Depressed cluster and reported lower exposure to violence than that cluster or the Delinquent/Peer-Oriented cluster. For behavioral variables, the internalizing scores for the Average cluster were significantly lower than Anxious/Depressed but significantly higher than the Competent cluster. Members of the Average, Adult-Oriented Youths cluster reported less delinquency than the Delinquent/Peer-Oriented or Anxious/Depressed clusters.

Cluster 4: Delinquent/Peer-Oriented.

Cluster 4 was the second largest cluster ($n = 45, 27.1\%$) and about average on the mental health variables. School competence was significantly lower than the Competent cluster, and GPA was significantly lower than the Competent and Average clusters. Cluster members scored highest on peer involvement and high on social competence. Peer deviant values were significantly higher, and problem solving was significantly lower than in the Competent and Average clusters (see Table 2). On the external variables (see Table 4), the Delinquent/Peer-Oriented cluster showed very high scores in the social and behavioral problems domains. On mental health variables, they had lower negative emotional coping. They showed less school attachment than the Competent cluster (but more than the Anxious/

Depressed) and reported less orientation to academic work than the Competent or Average clusters. In the social domain, there were differences with the Anxious/Depressed cluster (higher perceived physical appearance and fewer peer hassles). There were also differences with the Competent and Average Youth clusters in having more exposure to violence. Finally, differences with other clusters were also found in the behavioral domain, with lower scores on internalizing problems, higher externalizing, more police contacts, and more delinquency.

Cluster 5: Isolated Non-Conformists.

Cluster 5, was the smallest cluster ($n = 8, 4.8\%$). This cluster was generally characterized by average scores, except for the social domain and peer deviant values (see Table 2). Thus, mental health problems were about at the overall mean and only significantly different from the Anxious/Depressed cluster. The school competence and GPA scores were midrange and not significantly different from any other cluster. However, cluster members had the lowest peer involvement and social competence. They also had the highest peer deviant values but were midrange and did not differ from any other clusters on problem solving. The scores on the external cluster variables for this cluster indicated that while these students reported that their peers held deviant values, their own behavior was not especially deviant or delinquent. In fact, in the mental health and social domains, this cluster showed no significant differences from other clusters. In the academic domain, members of this cluster were significantly lower on academic work than the Competent or Average clusters; in the behavior domain, they reported significantly less police contact than the Delinquent/Peer-Oriented cluster (see Table 4).

Predictors of Cluster Membership

The results of the hierarchical multinomial logistic regression analysis, examining potential predictors of cluster membership, are presented in Table 5. For this analysis, sample size was $N = 155$, due to

missing data on one or more variables. To allow us to test the significance of more changeable influences while controlling for the effects of immutable characteristics (e.g., child demographics, maternal psychiatric history), we entered the predictors in ordered blocks: Block 1 contained child demographics, Block 2 maternal psychiatric history variables, Block 3 social context variables, and Block 4 maternal conceptualizations of the meaning of motherhood in her life. Because order of entry had little effect on the coefficients, only the final results (Block 4) are presented in Table 5. The odds ratios in the table indicate the effect of a unit difference in each predictor on the odds that a youth would be in each indicated cluster, rather than in the Socially and Academically Competent cluster, which served as the reference group for all comparisons. The final row of Table 5 contains Hosmer-Lemeshow goodness-of-fit chi-square tests for binomial logistic regressions comparing each cluster with the Academically Competent group. None of these tests is significant, and diagnostic graphs identified no problematic influential or ill-fitting observations, suggesting that the overall model is an adequate fit to the data, although it should be noted that power to reject the null hypothesis of model fit is limited given the current sample size (Hosmer & Lemeshow, 2000).

Block 1 consisted of child demographics as control variables. Child gender was a significant predictor of cluster membership: boys were nearly 4 times as likely to be in the Delinquent/Peer-Oriented as the Academically Competent cluster. Child age was also a significant predictor in this block; older children were significantly more likely to be in the Anxious/Depressed,

Delinquent/Peer-Oriented, or Isolated Non-Conformist clusters.

In Block 2, we examined the effects of variables reflecting maternal psychiatric history, controlling for child gender and age. Depression diagnoses were contrasted with all others, because initial analyses revealed no differences between

TABLE 5
Hierarchical Multinomial Logistic Regression on Cluster Membership From Maternal Predictors

Predictors at final block	Odds ratios relative to academically competent cluster				LR χ^2 ¹ (df = 4)
	Anxious & depressed	Average adult-oriented	Delinquent peer-oriented	Isolated non-conformist	
Block 1 - Child demographics					
Child gender (1 = boy)	0.561	0.811	3.905*	1.210	10.973*
Child age	1.410*	0.975	1.567**	2.630**	21.526***
Block 2 - Maternal psychiatric history					
Maternal diagnosis— affective	1.300	1.450	2.920	0.834	3.806
Maternal substance abuse history	1.060	1.100	1.243***	1.200	14.226**
Year with maternal separation	0.686	0.977	1.069	0.894	6.779
Maternal hospitalizations (lifetime)	0.978	1.070	1.062	0.864	3.096
Block 3 - Social context					
Social life events	0.586*	0.783	0.699	0.279	9.457
Social support available	0.992	1.020	1.080	0.438*	12.189*
Father in child's life	0.425	0.217*	0.138**	0.101	10.316*
Block 4 - Meaning of motherhood					
Positive meaning of motherhood	1.210	0.898	0.536*	1.270	7.439
Intercept	3.687	2.640	0.150	9.340**	19.002**
Hosmer-Lemeshow χ^2 (8 df) ²	4.160	6.730	9.590	0.000	

Note. *N* = 155. All odds ratios involve comparisons with the Academically Competent cluster. Significance of each odds ratio is based on the Wald statistic (value not shown). The logistic regression was done hierarchically, by the numbered blocks; the tabled odds ratios are taken from the final model.

¹Overall likelihood ratio chi-square for each predictor variable.

²Goodness-of-fit tests are for binomial regressions comparing each to the Academically Competent cluster.

p* < .05. *p* < .01. ****p* < .001.

schizophrenia/schizoaffective and bipolar diagnoses. Only maternal substance abuse history was a significant overall predictor of cluster membership, and only one of the comparisons with the Competent cluster was significant: Youth whose mothers had more problematic substance abuse histories were more likely to be in the Delinquent/Peer-Oriented cluster, compared to the Academically Competent. None of the other maternal psychiatric variables—diagnosis, childhood separations from the mother, lifetime maternal psychiatric hospitalizations—had a significant effect on youths' cluster membership.

Adding Block 3 allowed analysis of the significant effects of social context variables, independent of child demographics and maternal psychiatric history. In this block, all three variables were significant predictors of cluster membership. Youth

whose mothers reported more stressful life events in the social domain were less likely to be in the Anxious/Depressed cluster, compared with the Competent cluster. Adolescents whose mothers reported more available social support were significantly less likely to be in the Isolated Non-Conformist cluster. Finally, adolescents who reported a father in their lives were significantly less likely to be in the Average or the Delinquent/Peer-Oriented clusters, compared with the Academically Competent.

In Block 4, we examined the independent effect of the positive meaning of motherhood in predicting cluster membership. Although the variable was not a significant predictor of cluster membership overall, the comparison for the Delinquent/Peer-Oriented cluster versus the Academically Competent was—youth whose mothers more strongly endorsed

the positive meaning of motherhood were less likely to be in the Delinquent cluster.

DISCUSSION

This study examined outcomes for adolescent offspring of mothers with a serious mental illness, using cluster analysis methodology and testing predictors of cluster membership from mother's clinical history and family contextual variables. A five-cluster solution was identified that was technically adequate, in that the smallest between-cluster distance was greater than its within-cluster dispersion. The clusters could be meaningfully described, and cluster differences were found on many variables external to those in the cluster analysis.

Congruent with other research results on mental health problems of adolescents of parents with mental illness (Beardslee

et al., 1993; Rutter & Quinton, 1987), we found one cluster (Anxious/Depressed), about 15% of the sample, that reported a high number of symptoms. These youth also had problems in school and reported feeling more hassled by the social environment. Some studies have found significantly more conduct problems in adolescent offspring of parents with mental illness (Boyle & Pickles, 1997). Congruent with such findings, our study identified a cluster of students, Delinquent/Peer-Oriented, who self-reported high levels of nonnormative behaviors (including police contacts) and deviant peer values. They also had lower school performance as indicated by school grade reports, as well as self-reported feelings of attachment and orientation to school and self-reported ability to solve problems. This cluster comprised more than a quarter of the sample. The largest cluster of adolescents, including 31% of the sample, demonstrated a high level of competence. These results are similar to those reported by Garber and Little (1999), who found that about 28% of children of depressed mothers were high functioning and without psychopathology. Like our Competent cluster, their group of adolescents scored low on symptom indicators and on behavior problems and high on positive coping and school competence.

Our cluster analysis results increased understanding of the heterogeneity of the target population by identifying two additional clusters. One of these clusters—Average, Adult-Oriented Youths—comprised somewhat more than a quarter of the sample. Their scores in the domains of school functioning, symptomatology, and peer relationships were about at the median for the sample. They reported low environmental stressors, good academic work habits, and few behavior problems. The cluster analysis also identified a much smaller group of students (about 5%) with a somewhat unusual pattern of scores; we labeled this cluster Isolated Non-Conformists. Of greatest concern were their extremely low scores on peer involvement and social competence and very high reporting of peer deviant values.

The usefulness of the cluster analysis can also be seen by contrasting our clus-

ter results with measures of central tendency for our sample. Means for the anxiety and depression measures (8.21 and 8.25, respectively) are comparable to or even somewhat lower than those of youth from the general population. For example, on the *Children's Depression Inventory* (CDI; Kovacs, 1992) measure of depression, Aneshensel & Sucoff (1996) reported $M = 10.18$ ($SD = 7.80$) in a teen sample with a mix of ethnicities and SES levels; DuRant, Cadenhead, Pendergrast, Slavens, and Linder (1994), with a low-SES African American sample, reported $M = 7.8$ ($SD = 6.0$); Inderbitzen-Nolan and Walters (2000), with a sample of 2,937 high school students who were mostly White and predominantly blue collar from a Midwest state, reported $M = 9.49$ ($SD = 7.22$). On the *Revised Children's Manifest Anxiety Scale* (RC-MAS; Cole, Hoffman, Tram, & Maxwell, 2000), Weist, Paskewitz, Jackson, and Jones (1998), with a predominantly African American low-income school sample, reported mean anxiety for boys $M = 8.5$ ($SD = 5.1$) and girls $M = 10.6$ ($SD = 6.1$); Inderbitzen-Nolan and Walters (2000) reported $M = 8.93$ ($SD = 5.64$) for their sample. Thus, from the overall descriptive statistics, it would appear that the adolescent offspring of our sample of mothers with mental illness are typical of other high school populations. However, the cluster analysis revealed that descriptive statistics, on the sample overall, obscure the fact that about 15% of the adolescents had anxiety and depression scores much higher than the means reported above, in fact, higher than the suggested clinical cut score of 15 for depression on the CDI (Liss, Phares, & Liljequist, 2001) and close to the clinical cut score of 20 on the RC-MAS (Dadds, Spence, Holland, Barrett, & Laurens, 1997; Hodges, 1990).

Thus, the clustering of multiple variables from major life domains served the intended purpose of identifying subgroups with distinct characteristics and demonstrating the heterogeneity of the entire sample. The cluster analysis also served to uncover heterogeneity within clusters across outcome domains. That is, while evidencing problems in some domains, several clusters displayed strengths in oth-

ers (e.g., the Delinquent/Peer-Oriented cluster showed high levels of peer involvement as well as social and interpersonal competence and a higher percentage working than several other clusters). These findings indicate the importance of including strengths-oriented measures in descriptive studies of at-risk populations.

The cluster analysis results also provided some sense of the extent to which mothers with mental illness had adolescent offspring with serious problems in behavior or symptomatology. We found that about half of our sample fell into one of the problem groups, confirming that these adolescents are, indeed, at risk. However, congruent with the literature on resilience and contrary, perhaps, to some clinicians' assumptions, the majority of adolescents reported functioning competently, overall, at average or above-average levels.

We also found gender differences across the clusters. These seem typical of those found in many adolescent samples (i.e., girls constituted the minority in the Delinquent/Peer-Oriented cluster and the majority in the Anxious/Depressed cluster). It is interesting to note that there were no race differences associated with the five identified clusters, although the total sample size and percentage of African American and White youth were adequate for comparison purposes. It is, of course, possible that more fine-tuned racial differences were not discovered and that future research with measures from multiple perspectives might uncover such differences.

Predictors of Cluster Membership

We examined the relationship of cluster membership and variables identified from the literature as predictors of children's resiliency. Overall, social contextual variables showed more and stronger relationships with cluster assignment than did mothers' clinical characteristics. Cluster assignment was not significantly related to mothers' diagnoses or hospitalizations or to years of maternal separation. Drug/alcohol abuse history was significantly related to cluster membership, with the

Delinquent-Peer/Oriented cluster having mothers who reported a more problematic maternal history of use of substances. This is congruent with other research (Johnson & Leff, 1999), wherein parental drug/alcohol use is a strong predictor of adolescent conduct problems and substance use.

The variables from the family context domain that significantly related to cluster assignment are very similar to those often identified as predictors of resiliency (e.g., support from a particular adult figure). A relationship with cluster assignment was also found for the measure of the total positive support mothers had available to them. In terms of Stressful Social Life Events, mothers of adolescents in the Anxious/Depressed cluster reported experiencing fewer of these. However, we suggest that this finding may actually reflect the lack of connectedness of these mothers; that is, if relationships are few, then the negative effects of relationship changes will be less frequent. Other literature on families with mental illness stress the importance of children having access to resources and supports beyond the mother to serve as an external anchor against her likely instability and inconsistent parenting (Mowbray & Oyserman, 2003). Our results seem congruent with this conclusion. Contrary to expectations, cluster membership showed no relationship with adjusted income, possibly due to a restricted range on this variable in this sample, in which initially about two-thirds of the mothers were living below the poverty level.

Implications for Treatment and Research

In line with the research literature on prevention of mental health problems and promotion of well-being and mental health (Luthar et al., 2000), we found that resilience is multidimensional: Whereas one of the clusters appeared to be functioning in a highly competent manner in all domains, another cluster was mostly average across multiple measures. In three other clusters, there was evidence of functioning problems, but not in all domains. Kellam, Koretz, and Moscicki (1999) rec-

ommended that preintervention risk research should analyze clusters of risk factors at the personal level, rather than just the variable level. That is, they noted that it was important to search for combinations of factors and their impacts rather than assessing single variables. Further, they recognized that among different subgroups, a given intervention may be differentially successful. Experience from prevention demonstrations supports the conclusion that any *one* intervention cannot assure positive outcomes for all individuals from an at-risk population; rather, for some individuals with multiple risk factors, several sequential or simultaneous interventions may be necessary. Prevention research identifying subgroups within at-risk populations and the combinations of risk factors represented is thus appropriate and important for preventive interventions to effectively target subgroups at risk.

Replication of the current findings in other samples is needed to support the generalizability of our results. If the present results were replicated, they would have significant implications for planning prevention and treatment services for adolescent children of mothers with serious mental illness. The results indicate that only about 15% of these children may be in need of clinical treatment and/or medication (the Anxious/Depressed cluster). Some of the children (e.g., Delinquent/Peer Oriented) have problems that may need other services (e.g., adult mentors and role models, assertiveness training to avoid peer influences). Still other adolescents (Isolated Non-Conformists) might benefit from interpersonal and social competence training or from having older adolescent or adult role models. The Average Adult-Oriented Youths might require periodic support and monitoring, to ensure that they continue on a positive trajectory, especially those who are younger or score below average on multiple variables, including having no father attachment.

Limitations

This study did provide a number of improvements in sample size and composition and analytic methods compared to

previous research. Although many measures were self-report, most involved concrete questions about behaviors and events (e.g., having police contacts) and were administered by trained interviewers in the adolescent's home setting to maximize validity and reliability. However, limitations to this study should be recognized. First, even though the sample was larger than in most previous studies, power was adequate only for moderate-to-large cluster differences; the sample size was not sufficient to identify small differences or to test comparisons involving the smallest cluster. The sample of mothers was drawn from existing caseloads of public mental health agencies. Results could be quite dissimilar for adolescents whose mothers are not in treatment. Further, the settings were primarily outpatient, rather than residential or inpatient, implying that this group of mothers may have been somewhat higher functioning than would be typical of women with serious mental illness overall. Also, at study intake, all women had to have some care responsibilities for at least one minor child, although about a quarter had previously lost custody of one or more of their children. The results, therefore, cannot be generalized to children who were no longer in their mothers' care at adolescence. Finally, the population is drawn primarily from an urban area in the Midwest and is predominantly minority and low income. We attempted to find data on our measures from the literature on comparative groups of nonidentified adolescents. However, this was not possible in most cases. Thus, a limitation of the study is the lack of a normative comparison group of adolescents from the same geographical area. And, although we failed to find any racial/ethnicity differences, these results will not necessarily generalize to populations with much higher-income levels or samples with even greater cultural diversity (e.g., involving Latinas, Asian Americans).

We urge more research on this topic using the same or similar paradigms and populations that are different, but large enough to permit use of clustering techniques. Ideally, the sample should be obtained from a large urban school system and thus permit better access to and use of

reliable and comparable measures from school records and teacher ratings (e.g., achievement test scores, IQ, extracurricular participation, discipline and conduct problem indicators). Also, the study could be improved if longitudinal data could be collected on adolescent outcomes over time, to include all school records. This would permit examination of variations in adolescent trajectories over time. Finally, although it would be extremely challenging, attempts should be made to include adolescents whose parents have a serious mental illness but who are not currently receiving treatment.

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