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Rational Service Planning in Pediatric Primary Care: Continuity and Change in Psychopathology Among Children Enrolled in Pediatric Practices

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Objective: **To examine the stability of the occurrence of psychiatric disorders in a nonpsychiatric sample of young children.**
Method: **There were 510 children ages 2–5 years enrolled through pediatric practices, with 391 children participating in the second wave, and 344 in the third wave of data collection 42–48 months later. The assessment battery administered at each wave yielded best-estimate consensus DSM-III-R diagnoses and dimensional assessments of psychopathology.**
Results: **The prevalence of disruptive disorders (DDs) decreased, while emotional disorders (EDs), other disorders, and comorbid DD increased. The DDs were associated with lower family cohesion, more maternal negative affect, stressful life events, and male gender. Comorbid DDs were associated with increasing age and family cohesion. Older children, lower family cohesion, and maternal negative affect were associated with EDs. Time trends for the dimensional assessment of psychopathology was similar to DSM-III-R disorders, but correlates differed.**
Conclusions: **We discuss implications for service planning in pediatric primary care.**

Key words: *epidemiology; disruptive disorders; emotional disorders; internalizing disorders; externalizing disorders; preschoolers; young children; mental health services research.*

The provision of mental health services through pediatric primary care settings is critical. Pediatric practitioners are usually the first professionals coming into contact with families of young children, with routine visits established even before most children reach preschool. This early relationship can be important. Physicians are highly regarded by families and can steer families to appropriate treatment; in a recent study, one of the most powerful influences on families seeking psychological treatment for their young children was a referral by their pediatrician (Lavigne et al., 1998). Early intervention, when appropriate, may offer the greatest opportunity for successful intervention. Certainly, pediatric psychologists have been involved in some primary care settings for many years (Gordon, Schroeder, & Hawk, 1992), but they are often more

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involved in hospital-based, specialty care. With the limited number of psychologists and other mental health professionals who work with children, rational planning for their role in primary care settings will be important to psychological interventions aimed at children's mental health.

Information from two fledgling fields, developmental epidemiology and child mental health services research, can play important roles in devising such rational planning. Classical epidemiology involves the traditional concerns of examining the distribution of disorders, identifying causes and modes of transmission, predicting groups at high risk, and controlling the distribution of disease by prevention and intervention. Developmental epidemiology extends these traditional concerns by examining the continuities and discontinuities of disorder over time. Developmental epidemiology may provide information on the need for mental health services within and across age groups and settings (Costello, Burns, Angold, & Leaf, 1993).

Mental health services research on children concerns "the study of the access, utilization, financing, and clinical- and cost-effectiveness of mental health services provided to children and adolescents, as well as the functioning and effectiveness of child mental health, health, and social service systems of care" (Pumariega & Glover, 1998, p. 303). This research has begun to address a number of these issues in the pediatric primary care system. Recent research has shown that the prevalence of DSM disorders among children in primary care is substantial. For young children ages 2–5 years enrolled in primary care, prevalence rates for DSM disorders among children was over 21.4% for all disorders and 9.1% for severe disorders (Lavigne et al., 1996). Although parents are sometimes told their child "will grow out of" these early-onset problems, the stability of a disorder over 42–48 months is substantial (Lavigne et al., 1998a). School-age children followed in primary care settings show comparable rates of disorder overall (Costello, Costello, et al., 1988). Unfortunately, behavior problems are usually not detected at the primary care level, with pediatricians tending to underidentify children's emotional/behavioral problems (Costello, Edelbrock, et al., 1988; Lavigne et al., 1993). This produces a very high level of "hidden morbidity" for psychological problems in the pediatric primary care system.

The presence of a high rate of disorder, coupled with the demonstrable hidden morbidity and need for treatment, implies a strong need for more active involvement of pediatric psychologists and other mental health professionals in the pediatric primary care arena. In such a setting, psychologists could be playing a role in problem identification, assessment, intervention, and prevention. Rational planning for the kinds of problems that might present in primary care settings depends on an understanding of the types of problems, time of onset, and factors associated with their occurrence. Within a pediatric setting, where children have more frequent contacts with physicians before the age of 5 years than later, understanding the problems of young children is particularly important.

Psychologists working in pediatric specialty care often deal with significant but relatively rare problems. Primary care may need to emphasize the more common psychological disorders of childhood. The two major categories of childhood psychological problems are disruptive (e.g., attention deficit, oppositional defiant disorder) and emotional (anxiety disorders, depression) disorders. The intraindividual stability (e.g., how likely a child with a particular disorder will still have the disorder later) among preschoolers followed in mental health clinics is relatively high, about 50:50 over several years (Campbell, 1995). Problems presenting in mental health settings may have unique characteristics, such as a high degree of diagnostic comorbidity, that would increase problem stability above that seen in pediatric primary care. A recent study of children presenting in pediatric primary care, however, shows similar levels of stability for disruptive disorders among preschoolers (Lavigne et al., 1998a). In most instances, program planners will want to concentrate on problems with high intraindividual stability rather than expending resources on more ephemeral problems.

Determining the correlates of diagnostic stability can be important in understanding and predicting which children may have a more stable psychiatric disorder. In summarizing the results of studies using dimensional ratings of behavior problems using various questionnaires, Campbell (1995) reported that stability is associated with initial problem severity, maternal depression, parenting behavior, cognitive functioning, and family adversity. The studies reviewed examined children with psychological problems; none examined children who met DSM-based diagnostic criteria for psychiatric disorder. In a subsequent study involving children seen in pediatric primary care settings (Lavigne

et al., 1998b), lower levels of family cohesion were associated with greater stability in DSM diagnoses.

A conceptually different form of diagnostic stability concerns the stability of the *prevalence* of a disorder or group of disorders over time. Of interest here is the stability of the rate of disorder across time, even when the individuals with the disorder may differ at each time point as some improve and others develop the condition. Stability in the prevalence of a disorder may vary across time like, for example, seasonal medical disorders. Higher levels of stability in the prevalence of disorder may occur when a disorder has a low incidence rate (i.e., few new cases per year) but the intraindividual stability of the disorder is high, when both the incidence and stability of the disorder are moderate, or when the incidence of problems is high but stability is low.

Understanding the stability of the prevalence of disorder may be important for those engaged in service planning. Knowing the stability of the rates of disorder over time and the risk factors associated with their occurrence can help with the allocation of resources for early screening, monitoring, and intervention. Typically, service administrators would be interested in addressing more stable as well as clinically meaningful problems, although less stable problems of very high risk (e.g., suicide during acute depressive episodes) may sometimes be relevant. In planning services for psychiatric disorders, knowing both the intraindividual stability and the stability in the prevalence of disorder over time may be important as one addresses certain questions. For example, is there a particular age at which screening for a disruptive behavior disorder could best be done? At what age would it be most appropriate to screen for anxiety or affective disorders? Or, if we wanted to develop an intervention program for a particular set of disorders, what age group should we target to reach the most children with that problem?

While there is information pertaining to the intraindividual stability of disorder in young children (Campbell, 1995; Lavigne et al., 1998), to our knowledge, no prior research has examined the stability of the *prevalence* of disorders and their correlates beginning among young children in a pediatric sample that might be used in planning for the allocation of resources.

This study primarily examines the stability in the occurrence of disruptive and emotional disorder, along with factors associated with the occurrence of psychological problems, among a group of children initially recruited through pediatric practices at ages 2–5 years, who were then followed for a 42–48 month period. Jensen et al. (1993) have noted two traditions in the assessment of children's behavioral problems: the taxonomic approach, epitomized in the DSM diagnostic schemas, which categorizes disorder as present or absent, and the dimensional approach, epitomized in questionnaire reports such as the Child Behavior Checklist (CBCL), which views disorder as occurring along continua. Jensen et al. argue for the need for more research examining how the results of studies using these two approaches are related, and both approaches are examined here. Because the correlates of DSM-III-R disorders and the CBCL are statistically significant but only low to moderate (Arend, Lavigne, Rosenbaum, Binns, & Christoffel, 1996), analysis of results using both approaches is timely and warranted. Factors chosen for study follow Campbell's (1990) model of psychological variables influencing preschooler's adjustment, including child (e.g., age, gender) and family (e.g., family cohesion, life stresses) characteristics.

Method

Participants

There were 510 children ages 2–5 years enrolled during an initial 2-year data collection period through the offices of 68 Chicago-area pediatric physicians who were members of the Pediatric Practice Research Group, a consortium of local practitioners interested in primary care pediatric research (Christoffel et al., 1988). Participating children who screened high on the CBCL (total problems above the 90th percentile) were recruited for the study; two were children matched on age, gender, and race, who screened low (below the 90th percentile). The enrolled children, of whom 191 (37.4%) had screened high and 319 (62.6%) had screened low, then participated in a more extensive diagnostic evaluation at wave 1. These children were distributed approximately evenly by age. Almost two-thirds were boys (boys, 59.9%; girls, 40.1%) and white (67.1%; African Americans, 18.8%; Hispanic, 7.2%; other, 6.8%); while all social classes were represented, the majority were from the two lower social class groups. The following sum-

marizes methods used in the longitudinal phase of the study. Fuller details on procedures for selecting the study sample have been presented elsewhere (Lavigne et al., 1993).

There were 391 children (77% of the original sample) who participated in the second wave of data collection, 1 to 3 years after the initial evaluation, and 344 (67% of the original sample) who participated in the third wave of data collection, 12 to 28 months later. The interval across the three data collection points was 42–48 months, and at the end of the third wave of data collection, children ranged in age from 6 to 9 years. Comparisons made between children who completed three waves of data collection versus those who dropped out indicated no significant differences in age, socioeconomic status, gender, race, or presence of a diagnosis at wave 1.

In the first wave of data collection, there were 28 different DSM-III-R Axis I diagnoses assigned. These disorders were grouped into one of four different categories: (1) disruptive disorders (DDs), including oppositional defiant disorder, attention deficit disorders, and conduct disorder; (2) emotional disorders (EDs), including anxiety disorders and mood disorders; (3) adjustment disorders; and (4) other Axis I disorders (Other). Comorbidity was examined for children who included some combination of diagnoses across the five diagnostic groups.

Measures

Demographic Information. Mothers completed a questionnaire concerning socioeconomic status (Hollingshead, 1975), child's age, gender, race, family size and membership, and parents' marital status that was updated at each visit.

CBCL (Achenbach, 1991, 1992). The mothers completed the CBCL at each evaluation. Estimates of total behavior problems, as well as internalizing and externalizing factors are described in this report.

Rochester Adaptive Behavior Inventory (RABI). (Jones, 1977; Seifer & Sameroff, 1981). This is a semi-structured interview administered to parents of preschool children, yielding measures of child cooperation, friendships, timidity, fearfulness, activity level, imaginary play, symptomatic behavior, whininess, demanding attention, depression, and persistence. Interrater reliability was .84–.99 across subscales. This interview was administered to mothers of children ages 2–6 years.

Play Observation. Each dyad was videotaped in child-directed and parent-directed activities (Forehand & McMahon, 1981) at each evaluation for children ages 2–6 years. Videotapes were reviewed by the clinicians as part of the evaluation process after each visit.

Developmental Evaluation. Each child was administered an age-appropriate developmental test, either the Bayley Scales of Mental Development (Bayley, 1969), or the McCarthy Scales of Children's Abilities (McCarthy, 1972), for children under age 7 years, and the WISC-III (Wechsler, 1991) for children ages 8 and above. Data from the developmental evaluation are not presented in this report.

Moos Family Environment Scale (FES) (Moos & Moos, 1986). This 90-item measure provides 11 subscales assessing the family social environment. Principal components analysis with varimax rotation of factors was conducted and the two factors selected for use estimated family cohesiveness/expressiveness/vigorous (Cohesiveness) and family inhibition/control (Inhibited) (Lavigne et al., 1996).

Psychological Screening Inventory (PSI) (Lanyon, 1970). This measure of adult psychological adjustment was completed by participating mothers. Factor analysis yielded two factors: anxious/depressed, and nonconforming/alienated (Lavigne et al., 1996).

Life Events Scale (LES) (Coddington, 1972). This measure of child life stresses was completed by the child's mother. The sum of negative life events occurring in the year prior to the initial evaluation and the year between evaluations at subsequent evaluations were used in data analysis.

Children's Global Adjustment Scale (C-GAS). The psychologists assigning the diagnoses provided a consensus rating of the child's overall level of impairment on the C-GAS (Shaffer et al., 1983), with ratings from most severely impaired (0) to exhibiting superior functioning (100).

Diagnostic Interview for Children and Adolescents (DICA). Reich, Herjanic, and Welner (1990) have developed structured interviews to be conducted separately with a parent (DICA-P) and child (DICA-C) that can be used as a basis for gaining information about the presence or absence of a psychiatric disorder and the type of diagnosis to be given. The interviews are conducted separately for the mother and child. High levels of interrater agreement are obtained for concrete, observable symptoms. Mothers are more likely than children to report that relatively mild symptoms are problematic; the child is more likely to report subjectively experienced

symptoms than the mother. The DICA-P and DICA-C were given to families for children ages 7 years and older.

Procedure

Mothers were invited to participate at the time of a pediatric office visit in 1989–1991. Informed consent was obtained. Those consenting completed a demographic questionnaire and CBCL. Subsequently, participants who screened high on the CBCL and matched screen-low children were seen for the first-wave visit. At that time, all children were ages 2–5 years. Participants received a battery of assessment instruments that included the CBCL, RABI, play observation, and developmental evaluation. These measures were chosen to approximate a battery that might be used on a clinical basis in evaluations, which would include questionnaire data (CBCL), an interview (RABI), observation of the child and parent interacting (play observation), and a developmental assessment. The test battery was administered by a psychology graduate student. This same battery of tests was administered to all children and parents for children ages 2–6 years. For children age 7, the test battery included a CBCL, DICA-C and DICA-P, and the McCarthy Scales. Children ages 8 years or older completed the WISC-III rather than the McCarthy scales.

In the absence of a structured interview for preschoolers, a "best estimate" based on clinicians' ratings was used for diagnosis (Weissman, Fendrich, Warner, & Wickramaratne, 1992) for all children ages 2–6 years. Because there are differences in the approach to combine information gathered from parent and child using structured interviews, and no algorithm is clearly superior, information from the DICA-C and DICA-P was also combined using a best estimate procedure. Two PhD-level, licensed clinical child psychologists reviewed each protocol. Each psychologist independently assigned a DSM-III-R diagnosis (American Psychiatric Association, 1987); rated whether a diagnosis was absent, possible, or probable; and completed the C-GAS. The psychologists were asked to follow the guidelines of the DSM-III-R as closely as possible. The psychologists could assign multiple Axis I diagnoses; two diagnosis proved sufficient at wave 1, while as many as four diagnoses were assigned subsequently. Consensus diagnoses were achieved through regular conferences (Lavigne et al., 1993). The reliability of assigning diagnoses was moderately high (.62–.99 for specific Axis I diagnoses) and comparable to studies of older children (Lavigne et al., 1994). For data analysis, only "probables" were considered "cases." "Possibles" were included as noncases.

We felt initially that time demands for interviewing would prevent mothers from completing any additional information. Experience, however, indicated that the mothers could complete some further information that would be helpful in identifying correlates of behavior problems. As a result, a subgroup of mothers completed the FES, PSI, and LES during the first wave of data collection ($n = 332$). All mothers participating in the study completed those instruments at each subsequent wave of data collection. Consensus diagnoses were established as above.

Statistical Analyses

To assess diagnostic stability, individual diagnoses were categorized into major groups following the DSM system (American Psychiatric Association, 1987). The first group was described as disruptive disorders (DDs; including oppositional defiant disorder and attention deficit disorders); the second group combined anxiety and depressive disorders and was labeled emotional disorders (EDs). Adjustment disorders and psychotic disorders were considered separately, but there were too few cases in these two categories for analyses. The remaining groups were other DSM-III-R disorders (Other), and comorbid diagnoses (Comorbid; including comorbidity between DDs and another diagnostic group).

Examining changes in the probability of disorders occurring over time and in relation to characteristics of the child and his or her environment involves the use of recently developed statistical procedures known as random-effects regression models. In this approach, all subjects are informative whether they have the disorder at baseline or not; thus, it is particularly useful in settings outside of psychiatric clinics, including pediatric practices, where longitudinal studies are following children both with and without disorder initially. Statistical statements can be made regarding the overall rate of change of diagnoses in a sample or population. Random-effects regression models allow the use of the entire longitudinal record for each subject, regardless of the number of available measurements and timing of those measurements (see Gibbons, Hedeker, Charles, & Frisch, 1994, and Gibbons & Hedeker, 1994, for relevant overviews).

To examine changes in DSM-III-R diagnostic

status over time and the effects of associated time-varying (e.g., negative life events) and time-invariant covariates (e.g., subject characteristics such as gender), we conducted random-effects binary probit analyses (Gibbons & Bock, 1987; Gibbons & Hedeker, 1994; Gibbons et al., 1994; Hedeker & Gibbons, 1994). Random-effects probit analysis is appropriate for longitudinal data in which a binary outcome is evaluated (e.g., presence or absence of a diagnosis at each point in time) and incorporates within-subject association by estimating person-specific time trends. Analyses were performed using a statistical program for mixed-effects ordinal regression analysis (MIXOR; Hedeker & Gibbons, 1996a). Because length of follow-up varied across the three waves of data collection, the interval of time between waves of data was included as an independent variable. The random-effects probit analysis yields information concerning changes in diagnosis across three waves of data collection (repeated measures or wave effects), the relationship between covariates and the presence of a diagnosis at any point in time (main effects), and changes in the relationship between covariates and diagnosis over time (wave × covariate interactions).

To examine change in quantitative measures (CBCL) over time and the effects of associated time-varying and time-invariant covariates, random-effect regression analysis was used (Gibbons & Hedeker, 1994). Analyses were performed using the MIXREG computer program (Hedeker & Gibbons, 1996b).

For all the analyses, the analytic approach was to examine three models for each diagnostic group or dimensional variable. First, a model for the main effect of time since first evaluation was examined. Second, a model was examined including both main effects of time and covariates. Third, a model with both main effects and time × covariate interactions was examined to determine if the effects of the covariates were time-dependent. Results are discussed only if each model proved to be a significantly better predictor than the prior model.

Results

DSM-III-R Disorders

Disruptive Disorders. There was a significant decrease in DDs over time (Maximum Marginal Likelihood estimate (MML) = −.014, standard error (*SE*) = .004, $p < .0001$). At wave 1 DD comprised 27.8% of the sample, declining to 18.3% at wave 3.

Significant main effects were found for sex (MML = −.555, *SE* = .221, $p < .012$), with boys exhibiting more DDs; family cohesion (MML = −.009, *SE* = .004, $p < .008$), with less cohesive families having more disruptive disorders; and negative life events (MML = .165, *SE* = .60, $p < .006$), with children experiencing more negative life events having more disruptive disorders. There were no variable × time interactions for risk factors for DDs, suggesting that gender, family cohesion, and negative life events were similarly likely to be risk factors for DDs across time.

Emotional Disorders. The frequency of EDs reflected an increase over time, rising from 5.2% percent at wave 1 to 22.2% at wave 3 (MML = .039, *SE* = .005, $p < .00001$). Significant main effects associated with the presence of an emotional disorder were age (MML = .336, *SE* = .067, $p < .00001$) with older children exhibiting more EDs. Less cohesive and more conflictual families (MML = −.0008, *SE* = .004, $p < .021$), and families in which the mother showed higher rates of maternal negative affectivity (MML = .014, *SE* = .006, $p < .023$), were more likely to have children with an ED. There were no significant variable × time interactions.

Adjustment Disorders. Adjustment disorders occurred infrequently in this sample. There was no significant time effect for adjustment disorders. Analyses of main effects and interaction terms could not be conducted.

Other Disorders. There was a significant increase in other disorders over time, from 4.3% to 10.4% (MML = .018, *SE* = .004, $p < .00001$). Main effects approached significance for age (older children) (MML = .169, *SE* = .091, $p < .060$) and maternal negative affect (MML = .014, *SE* = .008, $p < .060$). No other main effects were significant. Inclusion of the interactions did not significantly improve the fit of the model to the data.

Comorbidity with DDs. In contrast to the overall decline in DDs over time, there was a significant increase in DD diagnoses comorbid with another diagnoses over time (MML = .017, *SE* = .004, $p < .00002$). There were significant main effects for age (older children with more comorbidity) (MML = .218, *SE* = .078, $p < .005$), and family conflict/lack of cohesion (MML = −.010, *SE* = .004, $p < .011$), while maternal negative affectivity approached significance (MML = .014, *SE* = .008, $p < .071$). Variable × time interactions were not significant.

Dimensional Measures of Psychopathology

Total Behavior Problems. An alternative to the taxonomic approach to diagnosis, provided by DSM and discussed above, involves the quantitative or dimensional approach to assessment of behavior problems. This approach is represented by questionnaire-based approaches to assessment, using measures such as the CBCL. Both approaches have their own strengths, and it is probably best to examine which approach is more useful empirically.

Time trends for total behavior problems were nonsignificant. The main effects model was significant, with age (older children) (MML = .879, *SE* = .386, $p < .023$), lower levels of family cohesion (MML = −.044, *SE* = .014, $p < .002$), greater maternal negative affect (MML = .135, *SE* = .024, $p < .00001$), and more negative life events (MML = .693, *SE* = .228, $p < .002$) associated with total behavior problems.

Inclusion of interaction terms yielded a significant improvement in model fit. There was a significant interaction for time × age at initial evaluation (MML = −.088, *SE* = .012, $p < .00001$), with an increase over time in total problems for children age 2 and 3 years at wave 1, while problems for children initially evaluated at age 5 years declined (figures depicting all significant interactions are available from the first author upon request). The time × SES interaction was also significant (MML = −.002, *SE* = .001, $p < .012$), reflecting a slight decline over time for the three highest quartiles of SES, while the lowest quartile of SES scores showed no decline in total behavior problems. The significant time × family cohesion interactions (MML = −.002, *SE* = .001, $p < .002$) demonstrated an increase in total behavior problems across time for the least cohesive families (lowest quartile on cohesion), while there was a decrease over time for the most cohesive families (upper quartile on FES scores), and little change for those in middle two quartiles on cohesion. For the time × negative life events interaction (MML = .061, *SE* = .014, $p < .00002$), there was a decline in total problems for families with no negative life events, a slight increase for those with one negative life event in the prior year, and a large increase for those with at least two negative life events in the prior year.

Externalizing Problems. Time trends for externalizing problems were not significant. Main effects associated with externalizing problems were significant, with lower levels of family cohesion (MML = −.039, *SE* = .013, $p < .003$), greater maternal negative affect (MML = .0114, *SE* = .024, $p < .00001$), and more negative life events (MML = .669, *SE* = .218, $p < .002$) associated with externalizing behavior problems. Interactions were significant for time × age (MML = −.053 *SE* = .012, $p < .00001$), time × SES (MML = −.026, *SE* = .001, $p < .011$), time × family cohesion (MML = −.0002, *SE* = .001, $p < .014$), and time × negative life events (MML = −.059, *SE* = .014, $p < .00003$), all showing trends similar to those for total behavior problems. The significant time × maternal negative affect (MML = .003, *SE* = .001, $p < .045$) interaction reflects an increase in externalizing problems for mothers with higher negative affect, with a decrease for mothers with low negative affect. The near-significant time × sex interaction (MML = −.056, *SE* = .030, $p < .056$) reflected stable rates for boys with slight increases over time for girls on externalizing problems.

Internalizing Problems. There was a significant increase in internalizing problems over time (MML = −.028, *SE* = .013, $p < .035$). Main effects associated with the presence of an internalizing disorder were older children (MML = .861, *SE* = .358, $p < .016$), less cohesive families (MML = −.044, *SE* = .014, $p < .001$), and greater maternal negative affect (MML = .083, *SE* = .024, $p < .00006$). Significant interactions for time × age (MML = −.077, *SE* = .012, $p < .00001$), time × family cohesion (MML = −.002, *SE* = .001, $p < .024$), time × negative life events (MML = .058, *SE* = .014, $p < .00005$) and time × SES interaction (MML = −.0555, *SE* = .221, $p < .012$). These interactions all followed trends described above.

Discussion

This report examines the stability and change in the prevalence of children's behavior problems over time, along with factors associated with the occurrence of those problems. Because differences in taxonomic (DSM-III-R) and dimensional (e.g., CBCL) methods for classifying childhood disorder have not been sufficiently explicated (Jensen et al., 1993), this study examines both approaches.

For the taxonomic approach, the results indicate a decline in the prevalence of DDs accompanied by an increase in EDs and Other disorders. Disorders also became more complex, with an increase in comorbidity of DDs. Time trends for the

dimensional assessment of psychopathology were similar to that for DSM disorders in reflecting an increase in internalizing and comorbid disorders but differed from the trends for DDs by showing no change in the prevalence of externalizing disorders. The difference in results across the two approaches could occur if children initially meeting criteria for a DD had improved over time but only to a limited degree. These children would exhibit a "subthreshold" disorder taxonomically, while still exhibiting enough externalizing symptoms to show little change on dimensional measures of psychopathology. For researchers wishing to deemphasize minor fluctuations in symptomatology while estimating stability in prevalence of disorder, the dimensional approach to classification may be preferable.

It is possible that prevalence of a disorder could decline over time if sufficiently large numbers of children received successful mental health services. This does not appear to have occurred in this sample. Overall, the number of children who received any mental health services in this sample was quite small, approximately 10%; of those, 23% had only one visit (Lavigne et al., 1998). Preliminary analyses showed no impact on diagnostic status among children seen at a mental health visit, so it is unlikely that receiving an evaluation or treatment affected the stability of the prevalence of disorder.

Factors associated with the stability in the prevalence of disorder were also examined. Higher prevalence of DDs was associated at all age levels with lower family cohesion, more maternal negative affect, stressful life events, and male gender. For DDs comorbid with another condition, family cohesion was again associated with higher prevalence rates at all ages. As with DDs, family cohesion and maternal negative affect were associated with EDs.

Time trends for the dimensional assessment of psychopathology were similar to that for DSM disorders, but with some differences. In particular, models that included interaction terms were not significant for DSM disorders but were for dimensional variables. Thus, dimensional variables seem more sensitive to changes in time trends between covariates and the prevalence of these disorders, perhaps because of their ability to detect trends across the whole spectrum of such problems, including subthreshold cases rather than only extreme cases.

Age trends show increased externalizing problems over time for groups at greatest risk due to the presence of greater conflict, maternal psychopathology, and negative life events. Also, whereas groups from higher SES categories improved, those from the lowest quartile showed no improvement. The pattern of results suggests there may be a cumulative effect of risk factors associated with increasing behavior problems over time as measured using dimensional variables.

Higher maternal negative affect, lower family cohesion, and higher age were all associated with internalizing disorders and ED. Again, the regression models for the dimensional variables uncovered significant time $\times$ variable interactions not present in models for DSM-III-R EDs. These interaction patterns reflected increases in internalizing disorders for individuals from families with the greatest levels of conflict/lack of cohesion and most maternal psychopathology.

These results extend the work reviewed by Campbell (1995) and presented by Lavigne et al. (in press a; in press b) previously in several ways. First, prior research was concerned with stability of disorder within individuals, whereas this report examines stability in the prevalence of disorder. Second, no prior studies have examined changes in the prevalence of disorder as it presents in primary care pediatric settings. To our knowledge, no prior studies have demonstrated a decline in the prevalence of DDs without comorbidity over time, accompanied by an increase in more complex, comorbid DDs. Prior studies have shown an increase in the prevalence of anxiety over time (Ollendick and King, 1994); this study confirms that finding and extends it to disorders meeting DSM criteria.

Similarly, prior studies examined correlates of the intraindividual stability of disorder. This study extends those findings by (1) examining psychological variables that are correlates of the prevalence of disorders presenting in primary care settings, and (2) examining correlates of DSM disorders as well as the dimensional assessments of disorder that are more common in prior research. Overall, the correlates of high rates of disorder are similar to the correlates of intraindividual stability noted by Campbell (1995), and these results show that the correlates for DD diagnoses based upon the DSM system are similar to those using other methodologies for disruptive and externalizing disorders. This study also extends prior work (Campbell, 1995) by examining the correlates of high rates of DDs comorbid with another condition, a set of disorders that have received little attention in this age group.

The results of this study, combined with other

reports resulting from this project, have several important service implications. First, the prevalence of disruptive disorders presenting in primary care pediatric settings is high, and the problem generally goes undetected (Lavigne et al., 1993) and untreated (Lavigne et al, 1998). Screening for DDs in primary care could be very helpful. Such screening should start at the preschool level, but this study indicates that such screening needs to extend at least into the early grammar school years to detect late emerging cases and those cases for which comorbidity is present.

Second, screening directly for the presence of disorders at the preschool level will yield cases only when problems have already emerged. Identification of correlates or risk factors at the preschool level, especially those associated with family difficulties and parental negative affect, might allow for earlier identification of late-emerging problems, or problems that develop comorbidity. The time-varying and time-invariant correlates of disorder identified in this study provide clues about how this might be done. For DDs, assessing the level of family conflict and cohesion, and negative life events, particularly among boys, may increase early identification of DDs.

For EDs, there is relatively little need for screening among preschoolers, but by the time of school entry, such problems are increasing. For these disorders, early identification of risk factors and monitoring families at risk might be particularly important. Key variables appropriate for early identification again include low family cohesion and negative life events, but the presence of maternal negative affect (anxiety or depression, in particular) is also important.

Because dimensional variables show stronger relationships to correlates or risk factors, screening for DSM disorders may well involve the administration of quantitative measures. We have found that the CBCL is reasonably effective at identifying children with a DD in preschoolers (Arend et al., 1996), but its use in screening for DDs in older children and ED at any age remains to be determined, as does its utility in screening in active primary care settings. Patterns of screening and intervention relying on dimensional measures would be similar to those for DSM diagnoses even though the quantitative variables seem somewhat more sensitive to variations across time.

While these results argue strongly for the development and implementation of screening procedures for DDs in preschoolers in pediatric primary care, there are also treatment implications. With the development of a variety of parent training procedures (Kazdin, 1997) for children with oppositional behavior, the primary disorder among preschool DDs, the screening process can be supplemented with interventions of proven efficacy. Early interventions are particularly important before disorders with greater comorbidity develops, which may possibly require more complex treatments that are more difficult and costly to implement. With increased emphasis in managed care environments on the delivery of services in the primary care setting, it may be possible to develop interventions for DDs that can be delivered in pediatrician's offices, either by the nurse-physician team or by mental health professionals working in the primary care environment. Such in-office interventions may be most feasible with younger children not exhibiting comorbid disorders, especially if such treatment is delivered by the nurses and physicians. With age and increased comorbidity, interventions by psychologists are more likely to be needed. Screening at the primary care level is particularly important because referral by a pediatrician plays an important role in parents actually seeking services (Lavigne et al., 1998).

This study has several implications for research. One involves the need to carefully develop screening instruments for identifying problem behaviors as well as measures to detect risk factors for the development of future problems in clinical settings. Other implications concern treatment, suggesting that research on interventions for DDs that might be implemented with preschoolers in office settings, before more complex problems develop, could be particularly useful.

Limitations of this study have been discussed previously (Lavigne et al., 1996). Briefly, pediatric practices provide important information about children seen in such settings, an area that is understudied, and also provide a sample of children that will include those with less severe forms of disorder than would be recruited through a psychiatric setting. Nonetheless, the sample underrepresents minority children whose parents could not speak English and children who receive no medical care through office settings. Further, the level of attrition was moderate but similar to other longitudinal studies (e.g., Cohen, Cohen, & Brook, 1983) and did not seem to jeopardize the integrity of the findings. Diagnoses derived from the preschool years were

based upon clinician's "best estimates," while those derived from older children used structured interviews. Diagnoses derived from structured interviews throughout the study would be preferable, but such interviews are not available for preschoolers. Overall, there are concerns about the legitimacy of the DSM system for use with preschoolers. Although research from this project provides some support for the use of the DSM system in this age group, few measures have been developed for use in diagnosing attention deficit disorder, anxiety, and depression for preschoolers, and other diagnostic systems are being developed.

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