

Depressive symptoms over first grade and their response to a developmental epidemiologically based preventive trial aimed at improving achievement

SHEPPARD G. KELLAM,^a GEORGE W. REBOK,^a
LAWRENCE S. MAYER,^{a,b} NICK IALONGO,^a AND
CYNTHIA R. KALODNER^c

^a*Prevention Research Center, Johns Hopkins School of Hygiene & Public Health;*
^b*Arizona State University; and* ^c*Washington College*

Abstract

This article is about the course of depressive symptoms during a classroom-based randomized preventive field trial aimed at improving reading achievement among first-grade children in an urban population of mixed ethnicity and lower middle to low socioeconomic status. In the fall, children reported high levels of depressive symptoms, a risk factor for major depressive disorder. There was a linear relationship in the fall between depressive symptoms and achievement test scores. Among male children in intervention classrooms whose gain in achievement was at least the national average, depression from fall to spring was decreased, compared to those whose achievement gain was lower. Among female children both in the control and in the intervention classrooms, there was also a significant relationship between gain in achievement and the course of depression.

The contributions of the City of Baltimore, its families and children, and the administration of the Baltimore City Public Schools continue to be enormous. The work of the Prevention Program would not have been possible without the participation and support of the leadership, faculty, and staff of the School District. Dr. Walter Amprey, Superintendent of Baltimore City Public Schools, Deputy Superintendent Dr. Lillian Gonzales, and Director Dr. Juanita Lewis have overseen and guided the current follow-up and the new work on the next stages of intervention development and evaluation. Ms. Alice Pinderhughes, former Superintendent of the Baltimore City Schools, originally worked out the collaborative arrangements with the Prevention Research Center. The assistance and support of Dr. Leonard Wheeler, former Assistant Superintendent for Elementary Schools, and Dr. Carla Ford, former Supervisor, Office of Early Childhood Education, have been vital to our program.

The original search for a behavioral intervention to address the social adaptational process between teacher and children was led by Dr. Alan Harris, and the first implementor and supervisor was Dr. Jaylin Turkkkan. Dr. Lawrence Dolan was the first field supervisor, followed by Dr. Lisa Werthamer-Larsson, a Department of Mental Hygiene faculty member who continues to play a leadership role. Dr. James C. Anthony is P.I. of the drug abuse aspects of the Center's work and a leader in the original design of the two intervention trials. Dr. C. Hendricks Brown has played a key biostatistical and methodological role and continues to consult with us and analyze the direct observation data. The leadership of Ms. Elva Edwards in community base-building and crisis back-up is gratefully acknowledged. Our editor, Ms. Fionnuala Regan, and our manuscript producer, Ms. Alice Brogden, did their usual fine job.

The studies on which this article is based have been supported by the following grants, with supplements from the National Institute on Drug Abuse: National Institute of Mental Health, NIMH grant number P50 MH38725, Epidemiologic Prevention Center for Early Risk Behavior; NIMH grant number 1R01 MH42968, Periodic Outcome of Two Preventive Trials; and NIMH grant number 1R01 MH40859, Statistical Methods for Mental Health Preventive Trials; and for the follow-up NIDA grant DA-00787.

Address correspondence and reprint requests to: Dr. Sheppard Kellam, Prevention Research Center, Mason F. Lord Building, Suite 500, 4940 Eastern Avenue, Baltimore, MD 21224.

Unlike males, however, there was no additional effect of the intervention among females beyond that resulting from raising achievement test scores. These results support the hypothesis that an intervention specifically targeting poor reading achievement reduced the continuity of depressive symptoms over first grade. We discuss these results in regard to the role of mastery in the etiology, course, and prevention of depression in children.

Developmental epidemiological studies suggest that failure to master core tasks such as learning to read can lead to depressive symptoms and disorder among vulnerable children; or depression can lead to failure to master; or depressive symptoms and failing to master core tasks can be reciprocally related, with each reinforcing the other in individuals vulnerable to depression (Kellam et al., 1991; Kellam, Branch, Agrawal, & Ensminger, 1975; Kellam, Brown, Rubin, & Ensminger, 1983; Kohlberg, Ricks, & Snarey, 1984; Rutter, 1986; Rutter, Tizard, & Whitmore, 1970). Thus, the role of mastering core social task demands in the etiology and course of depressive symptoms early in life is an important research area for developmental psychopathology and prevention research. We hypothesize that failure to master core social adaptive tasks may initiate the onset or intensify the course of depression in vulnerable individuals, and that by inducing a higher level of mastery the onset or course of depression can be interrupted.

We described the relationships among gains in reading achievement and the course of depressive symptoms among first-grade children in a previous report (Kellam et al., 1991). The opportunity to examine the relationships between the course of reading achievement and that of depression over first grade was provided by the control children in this same epidemiologically based randomized field trial. Among the control children, depressive symptoms led to poor gains in reading achievement in both boys and girls, while poor gains in reading led to depressive symptoms in girls but not boys. We hypothesized from these results that girls in first grade placed more importance on their failure to learn than boys and possibly based more importance on what their teachers and others thought of the adequacy of their performance, at least at that age and in the classroom social field.

This article is concerned with the results on depressive symptoms of experimentally inducing higher levels of reading achievement during first grade, the transition year into formal schooling. Hypothetically, such improvement in achievement would interfere in the stability of depressive symptoms over the year if the relationships we reported earlier had etiological significance. The underlying mechanism we hypothesize is concerned with the child's attributions of self-efficacy, particularly among those children who show early symptoms of depression, although this aspect of the developmental modeling has not yet been tested. The significance of this testing, however, is highlighted by the fact that prior to the middle to late elementary school years, children have been reported to be invulnerable to the decrements in self-worth and self-efficacy seen in older children upon encountering failure (Heyman, Dweck, & Cain, 1992). Although some investigators have contended that a trait-like concept of ability does not emerge until the middle to late elementary school years (Stipek & Daniels, 1988), we have found strong evidence of a link between poor reading achievement and depression in first-grade children in both the Woodlawn (Kellam et al., 1975) and the Baltimore (Kellam et al., 1991) developmental epidemiologic trials.

Mastering the task of learning to read is central to the role of a student in first grade. A cognitive model of depression would postulate that children vulnerable to depression who repeatedly experience failure would develop an attributional style that centers on low self-competence, reliance on external control, hopelessness, and low expectations for success—all of which are often components of depression (Beck, 1976; Graham, 1991; Seligman et al., 1984).

The elementary school classroom appears particularly salient as a place where success or failure is frequently and publicly

labeled and experienced and where children are reinforced in blaming themselves as inherently not smart, or as not trying hard enough (Dweck, 1977). Gender differences appear to be prominent in how the teacher may respond to the child's failure on a particular occasion, with girls being "forgiven" whereas boys are chided for not trying harder. Based on this concept of depression and its relation to achievement in the classroom context, we hypothesize that improving reading achievement will result in lower frequencies of depressive symptoms among first-grade children and that, particularly among children already depressed, improving achievement will result in reduced depression over the course of first grade.

Since the 1960s in Woodlawn and more recently in Baltimore, we have elaborated a developmental epidemiological framework for understanding the course of psychological well-being (PWB) and psychopathology and their relationships to social adaptation or maladaptation. This framework is an integration of community epidemiology, a life-course developmental orientation, and preventive intervention trials used as field experiments on developmental models in defined populations (Kellam, 1990, 1991; Kellam & Ensminger, 1980; Kellam & Rebok, 1992; Kellam et al., 1975). The developmental epidemiological perspective employed here required following representative cohorts of first-graders and their families and classmates within defined populations over significant periods of the life course. Characteristics of the child, the social contexts, and the social task demands and behavioral responses of the child are central foci.

Developmental epidemiology is ecological in nature, as is analytic epidemiology more generally. A core purpose of defining the population epidemiologically is to ensure that generalizations can be drawn to known populations, not only about central tendencies but also about variation. Developmental epidemiology facilitates the mapping of variation in developmental paths as well as calculation of incidence and prevalence rates of mental health and disorder for

the defined population. Equally important is that rates as well as variation in functions can be assessed for hypothesized mediators or moderators, in this case school achievement, and for its associated antecedent and/or consequence, depression.

The preventive trial we present here involves observing variation in the roles of achievement and depression in developmental models under both experimental and control conditions. Such epidemiological specification should reduce selection bias in the sampling, in the developmental modeling, and in generalizing from the experimental preventive interventions that volunteer or clinic samples may introduce (Greenley & Mechanic, 1976; Greenley, Mechanic, & Cleary, 1987; Kellam, 1990).

Within the developmental epidemiologic framework, there is an important distinction between PWB and social adaptational status (SAS) (Kellam, 1990; Kellam & Ensminger, 1980; Kellam et al., 1975). PWB refers to internal states such as depression, anxiety, and bizarre feelings and thoughts at the symptom or disorder levels. By contrast, SAS refers to the degree to which the individual's behavioral responses to specific social task demands are viewed as adequate by the person or persons empowered to define the tasks and judge the adequacy of responses in specific social fields. Poor reading achievement is an example of poor SAS, while the depression that may have preceded and/or followed it is an example of PWB. The judgment of the adequacy of performance of behavioral responses to these developmentally relevant tasks is made by important others, so-called *natural raters*, in each of these social fields. Parents in the family, teachers in the classroom, and peers in the peer groups are examples of natural raters in developmentally relevant social fields. Each of these has the role of defining tasks and rating adequacy of behavioral responses.

Social task demands vary across the social fields in which development unfolds (Kellam & Rebok, 1992). Over the life course, individuals are seen as facing specific social task demands within each social

field relevant to each stage of life. Maladaptation at a particular developmental level reflects a failure to resolve the social task demands that are most salient for that stage or period of development (Cicchetti & Schneider-Rosen, 1986). The adequacy of responses to these demands may be related to one's antecedent PWB, and the adequacy of responses may influence subsequent PWB. Individuals who function well in response to stage-salient demands early in the life course should continue to show a pattern of adaptation and positive PWB in later years (Sroufe, 1979). Conversely, failure to adequately respond early in life makes later social adaptation and integration of earlier competencies that much more difficult and can lead to depressive symptoms or a vulnerability to depression. However, it is important to mention that the developmental consequences of adaptation and maladaptation for depression are extremely complex and will depend on the particular life stage and social field being examined (Cicchetti & Schneider-Rosen, 1986).

Transitions across the life span are important times not only of changing social fields, but also of changing social task demands and of definitions of acceptable social behavioral responses (Caspi & Moffitt, 1991; Kellam & Rebok, 1992; Kellam, Rebok, Ialongo, & Mayer, 1994). The first-grade classroom is the context of a major transition, with its demands for adaptive innovation in perceiving the role of the teacher as a powerful definer of tasks and rater of success or failure. The child is faced with interpreting teacher's task demands, assessing what acceptable responses might be, assessing the responses and roles of both teacher and classmates, and more (Kellam et al., 1975). The tasks associated with first grade center on learning to read and write, participating in the class, paying attention, obeying rules, and not fighting (Kellam et al., 1975; Werthamer-Larsson, Kellam, & Wheeler, 1991). Depression, with its associated dysphoric mood and poor self-efficacy, may play a prominent role as both antecedent and consequence of the processing and responding of the child.

Ratings of SAS mark what people commonly experience as success or failure in each social field throughout the life course. In earlier work, we have presented data from the poor African-American neighborhood of Woodlawn in Chicago and in Baltimore demonstrating that SAS is integrally linked to PWB within and across social fields and over the developmental course. Throughout the Woodlawn/Baltimore research, our focus has been on the developmental course of relationships between SAS in specific social fields and PWB. In some cases poor PWB leads to poor SAS, whereas in others poor SAS leads to poor PWB. Gender differences are very prominent in these developmental relationships (Ensminger, Kellam, & Rubin, 1983; Kellam et al., 1975, 1983, 1991).

The general thesis regarding SAS is that succeeding or failing at specific social tasks in specific main social fields such as classroom, peer group, and/or family can have important developmental influence on later specific outcomes. The theoretical importance of SAS in contrast to the internalizing/externalizing dichotomy is that it enlarges and contextualizes the idea of externalizing symptoms and places these in a dynamic relationship to internalizing symptoms. The internalizing/externalizing framework seems to place the locus of attention in the individual rather than also including the way the individual's behavior and condition fit with the context and with the natural rater's view of acceptable behavior. SAS focuses attention on the specific social field and stage of life and on the interactive demand/response qualities of the processes leading to ratings of adaptation or maladaptation.

Some investigators have questioned the existence of depressive symptoms or syndromes in children age 8 or younger in light of assumed developmental constraints on the young child's ability to experience the cognitive features included in current conceptualizations of depression (Digdon & Gotlib, 1985; Kovacs, 1986). Indeed, it has been suggested that prior to the middle to late elementary school years children's reports of depressive symptoms represent

nothing more than transient developmental phenomena with little clinical significance (Lefkowitz, 1980; Lefkowitz & Burton, 1978).

Strong evidence that children's reports of depressive symptoms were meaningful by early in first grade was found in our prior analyses of developmental epidemiological modeling of SAS measures with depressive symptoms. Children's self-reports of depressive symptoms were found to be reliable and valid when derived from carefully administered instruments in the context of the classroom (Edelsohn, Ialongo, Werthamer-Larsson, Crockett, & Kellam, 1992; Ialongo, Edelsohn, Werthamer-Larsson, Crockett, & Kellam, 1993; Kellam et al., 1991). For example, in the Baltimore study population in the fall of first grade, depressive symptoms on a modified Child Depression Inventory (CDI) were clearly associated with California Achievement Test (CAT) scores (Edelsohn et al., 1992; Ialongo et al., 1993; Kellam et al., 1991).

We have used preventive intervention trials to test developmental models and hypotheses by precisely targeting an element of a model and assessing the consequences of changing that element (Kellam & Rebok, 1992). In this article, achievement, an SAS measure, was selected as an intervention target because it has been found to be an antecedent of depressive and other psychiatric symptoms and possibly disorders in childhood and beyond (Kellam, 1991; Kellam, Adams, Brown, & Ensminger, 1982; Kellam et al., 1975, 1983; Rutter et al., 1970; Shaffer et al., 1979). In the Woodlawn studies, children who were rated as poor achieving by their first-grade teacher or performed poorly on the Metropolitan Readiness for School test were twice as likely to have high levels of depressive and other symptoms 10 years later compared to their first-grade classmates who were mastering basic learning tasks (Kellam et al., 1983).

The studies of achievement and depression reported here are part of a larger developmental epidemiologically based prevention research program involving two preventive trials in a parallel design, one di-

rected at achievement and the other directed at aggressive behavior. These targets are important antecedents of later specific problem outcomes and are correlated with each other. The purpose of the two trials has been to study the etiological roles of each target on the other and on their longer term distal outcomes (Kellam & Rebok, 1992). The first, Mastery Learning (ML), is an enriched curriculum designed to improve reading achievement; the second, the Good Behavior Game (GBG), is a team-based classroom behavior management strategy designed to reduce aggressive behavior. Both interventions had significant and specific impact from fall to spring of first grade on their proximal targets (Dolan et al., 1993). For the ML intervention, we found short-term impact on reading achievement by spring of first grade for both males and females. There was no direct effect of ML on aggressive behavior. The GBG had a significant impact on aggressive behavior for both males and females (Dolan et al., 1993). There was no direct effect of GBG on achievement.

Method

By introducing the experimental curriculum of ML, we were able to examine the relationship between gains in reading competence and depressive symptoms and test whether improving competence lessens such symptoms. We hypothesized that depressive symptoms would improve by improving achievement through the ML intervention; no direct effect of ML on depression was expected. Such a result would provide evidence that competence to perform a salient social task demand in a developmentally relevant social field of young children is intimately tied to the developmental course of depressive symptoms. Follow-up study will test potential ties to depressive disorder.

The population

The Baltimore City Public Schools and the Prevention Research Center (PRC) staff designated a widely varied set of elementary

schools in five urban areas in the eastern half of Baltimore. The choices were made without restrictions other than neighborhood and school characteristics since there was widespread interest by principals, teachers, and parents. As described in Werthamer-Larsson et al. (1991), these areas vary by ethnicity, type of housing, family structure, and income. Area 1 is predominantly composed of Caucasian, middle-income, married, two-parent families, living in well-maintained rowhouses in close proximity to extended family members. Area 2 is a predominantly African-American area, characterized by low to very low income, multigenerational families living in large public housing projects. Area 3 is a totally African-American area characterized by middle income, multigenerational families living in well-maintained rowhouses. Area 4 is an integrated area characterized by moderate income, two-parent families, living in detached frame houses. Area 5 is a predominantly Caucasian area, characterized by moderate income, married, two-parent families living in small detached or semidetached houses.

Three to four schools—closely matched on a variety of social and demographic variables as well as school size, achievement levels, and child failure rates—were selected from each of the five areas in eastern Baltimore. The sample involved 44 representative first-grade classrooms in the 19 participating schools in the fall of 1985. The epidemiologically based design included two cohorts of roughly 1,000 children each and their families. In schools with three or fewer regular first-grade classrooms all classrooms participated, whereas in larger schools three first-grade classrooms were randomly selected. Children had been randomly assigned to classrooms prior to the selection of the classrooms.

The total sample for the first phase of the intervention research consisted of 1,197 children who entered the first grades of the 19 schools during the 1985–1986 academic year and were registered at first report card time when the first measures were done prior to intervention. The sample was 49% male. Of the sample, 56.9% was African-

American, 19.2% was Caucasian, 1% represented other ethnic groups, and 22.8% was unspecified. At first grade, the children ranged in age from 4.7 to 9.4 years (M age = 6.3 years, SD = 0.49). Of the 1,197 children registered, 1,084 were actually present for fall assessment. Of the remaining children, 27 either had transferred out of the participating schools prior to consent being requested or could not be reached for response to the consent request. About 5.0% of the parents refused to allow their children to participate. Chi-square analyses revealed that refusal rates, although fairly low, varied as a function of geographic area, $\chi^2(4) = 31.45, p < .0001$. The highest rates of refusals were in Areas 1 and 4. For the studies reported here, 685 children remained in their intervention or control classroom from fall through spring of first grade and had available depression and achievement data for both time points.

We used the fall data to examine potential differences between the 685 children who met those conditions and the 345 who changed intervention conditions or had incomplete data by spring. Analyses of t tests and chi-square analyses revealed no differences in fall self-reports of depression, standardized achievement scores, gender, types of control or intervention classrooms, or urban area.

The analyses that follow focus on the results of the 1985–1986 cohort of students (Cohort 1) exposed to ML, internal control, or external control. The sample for the ML condition was 207 from 9 classrooms, the sample for the ML internal control condition was 156 from 7 classrooms, and the sample for the external control condition was 212 from 12 classrooms. Our strategy is to develop analyses and hypothetical models from the first cohort and test them on the second after careful assessment of the overall results from the first cohort, including periodic follow-up analyses.

Design and procedures

Three or four schools within each urban area were assigned to either of three intervention conditions: ML, GBG, or an

external control condition with no experimental intervention activities, but similar attention to teachers. The assignment of schools to each of the intervention conditions was made by the toss of a coin.

Both the ML and GBG interventions were administered at the classroom level. To avoid confounding intervention status with school effects, we divided classrooms in intervention schools (ML and GBG schools) into two types: those that received the intervention (i.e., ML or GBG) and those that served as internal control classes (classes in the same school that did not receive either intervention). Individual first-grade classrooms were randomly assigned to intervention or internal control within the intervention schools. Prior to beginning the intervention work, the school principals assigned the entering first-grade children to classroom membership in a random fashion to obtain balanced distributions for gender, preschool, and kindergarten (K-level) experience, K-level conduct grades, and K-level achievement test scores. Randomizing, backed up by our corrections in assignments as needed, produced similar classrooms of children. Gender, preschool, K-level, and conduct grades were assessed to ensure good balance.

Measures

CAT. Reading achievement, a measure of classroom SAS, was assessed by the total reading score (standard scores) from the CAT (Forms E and F) administered during the fall and spring of first grade. The CAT represents one of the most frequently used standardized achievement batteries (Wardrop, 1989) and has been standardized on a national representative sample of 300,000 children. Internal consistency coefficients for almost all of the subscales exceed .90. Alternate-form reliability coefficients are generally in the .80 range. The CAT was administered to entire classes as part of the scheduled testing program in the Baltimore City Public Schools.

CDI. The depression rating measure was a version of the CDI (Kovacs, 1983) designed to assess affective, cognitive, and behav-

ioral symptoms associated with depression. The original CDI scale was modified for ease of classroom administration and comprehension by first-grade students. Previous administration procedures have relied on either the child reading the items and placing an "x" next to the sentence he or she selects or having an examiner read the items aloud while the child follows along and marks his or her choices. Given the variation in reading skills among first-graders, we developed a procedure that required no reading skills and used recognition of simple symbols and pictures to indicate answer choices and to show the place of each item on the answer sheet. All items were read aloud twice to the children. The instrument was administered by two carefully trained assessors, one playing the lead role and the other supporting the process. Careful explanations were given at the start of the administration, anxieties allayed, and rapport established (Edelsohn et al., 1992; Kellam et al., 1991).

The CDI consists of 27 items; for each item, the child endorses one of three sentences (scale range = 0-2) that best describes the child over the past 2 weeks. Coefficient alpha on three different administrations ranged from .84 to .86. Test-retest reliability was .60 over 1 week. The pool of items was reduced from 27 to 24 to separate the measures of SAS and PWB so that their interrelationships could be studied. The three items deleted from the original scale (school work inhibition, lack of enjoyment at school, and poor school performance) overlapped or focused on classroom SAS rather than on PWB (Edelsohn et al., 1992). We divided the raw total score by 24 and multiplied by 27 to bring the scores onto the same scale as the original CDI and to achieve comparability with other studies using the CDI.

The interventions

ML is the primary experimental intervention of interest in this article. It was designed to improve poor reading achievement and thereby reduce subsequent risk of depression. It consists of an extensive and

systematically applied enrichment of the instructional strategy in the reading curriculum. Two critical aspects of the intervention program are the development of a group-based approach to mastery and a more flexible corrective process. With this version of ML, students did not proceed to the next learning unit until 80% of the class achieved 80–85% of the learning objectives of the previous unit. The corrective process was tailored to the specific weaknesses of individual students and was flexible in terms of time, grouping strategy, and variety of correctives (Dolan et al., 1993).

GBG was designed to reduce aggressive behavior (e.g., breaking rules, fighting) as well as shy behavior (e.g., sitting alone, not participating in class or with classmates). A fuller description of both interventions and the results of their short-term impact is given in Dolan et al. (1993).

Results

The epidemiology of depressive symptoms in fall of first grade and their relationship to reading achievement

The distribution of scores on the modified CDI for males and females in the fall of first grade are shown in box plots (Figure 1). The distributions for both genders reveal considerable numbers of children at higher levels of depressive symptoms, as shown by the upper whiskers representing the upper quartiles. The genders are almost identical in their distributions and levels of severity. The distributions of symptoms by levels of achievement are shown in Figures 2 and 3, one box plot for each achievement quartile on the CAT. These figures show that although the response variation is large the median and quartiles of depressive symptoms tend to decrease in a linear relationship as achievement gain increases. Simple analyses of variance of the quartiles of fall achievement on fall depression is significant for both females and males, $F(3, 513) = 7.174, p < .001$, for females, and $F(3, 500) = 11.79, p < .0001$, for males. Examination of the cell means shows that for both genders, as the quartile rises, the aver-

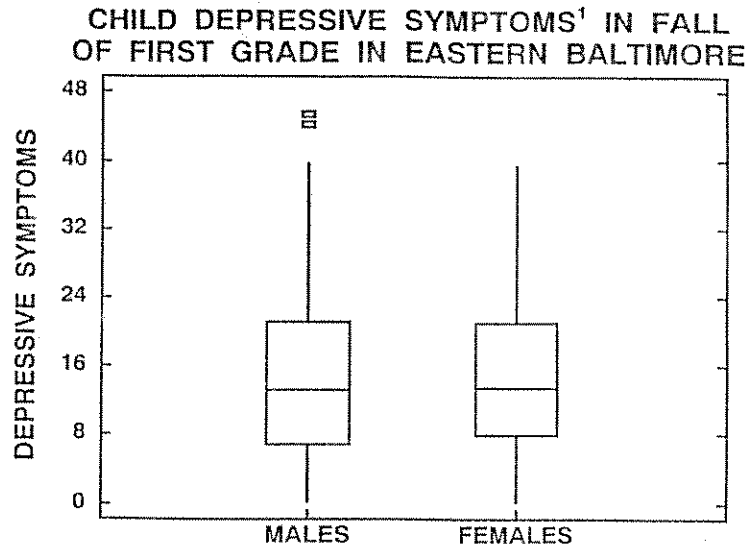
age level of depressive symptoms decreases. The regression of fall depression on fall achievement is significant for both genders, $t(255) = -5.23, p < .001$, for females, and $t(260) = -5.54, p < .001$, for males. The actual percentage of variance explained is fairly small (5% for females and 6% for males), but the systematic character of the relationship suggests that for many children higher achievement corresponds with lower depression. The residuals do not support the hypothesis of nonlinear effects or changes in variances across the levels of achievement gain. We conclude that the level of achievement is related to the level of depressive symptoms across children at the fall of first grade.

The relationship between depressive symptoms on the CDI and Major Depressive Disorder (MDD) has been reported by Kovacs (1983). We examine the relationship here, first using Kovacs's suggested approximate cutpoint of 19. The MDD percentages using the Kovacs criterion vary systematically by achievement level, with higher achievement being associated with fewer MDD cases on the CDI. This is similar to the depressive symptom frequencies, which also vary by achievement level.

Even among the top achievers, these percentages of depressive disorder are very high given the much lower percentages found in studies of older children and adults (Kashani et al., 1983; Lefkowitz & Tesiny, 1985). The prevalence rates are much lower if we use the more conservative process based on core symptoms of major depressive disorder derived by Edelson et al. (1992) for CDI scores meeting DSM-III-R criteria (American Psychiatric Association, 1987) for major depression. The use of this scoring process still resulted in a clear relationship between MDD relevant levels of symptoms and achievement scores for both girls and boys.

Testing the hypothesis that depressive symptoms will improve by improving achievement through ML

Three different models of the relationships among achievement, depressive symptoms,



1. Child Depression Inventory

Figure 1. Child depressive symptoms in fall of first grade in eastern Baltimore.

DEPRESSIVE SYMPTOMS IN FALL OF FIRST GRADE BY ACHIEVEMENT QUARTILES AMONG MALES

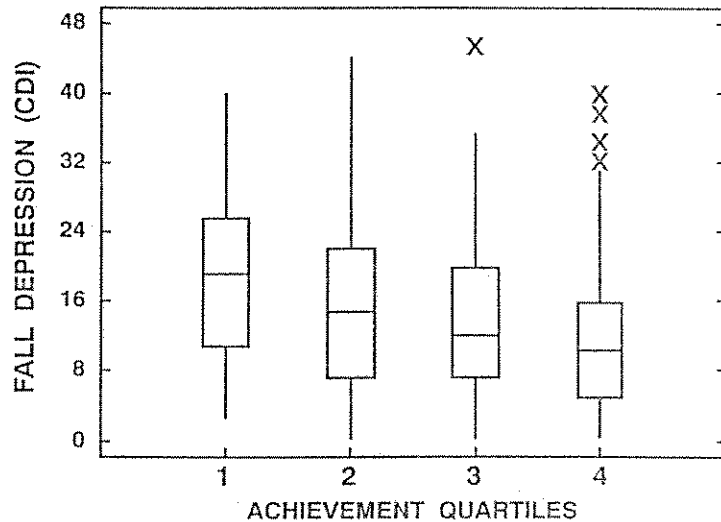


Figure 2. Depressive symptoms in fall of first grade by achievement quartiles among males. CDI = Child Depression Inventory.

and ML will be considered. The first is theoretically possible, but not predicted. It consists of a direct effect for unplanned reasons of ML on depression possibly because of the increased attention on depressed children. These results did not occur. The

means and standard deviations for fall depression and spring depression for each gender by intervention condition are shown in Table 1. Considering the hypotheses of interest in this article, omitting achievement in the model limits its usefulness, particu-

DEPRESSIVE SYMPTOMS IN FALL OF FIRST GRADE
BY ACHIEVEMENT QUANTILES AMONG FEMALES

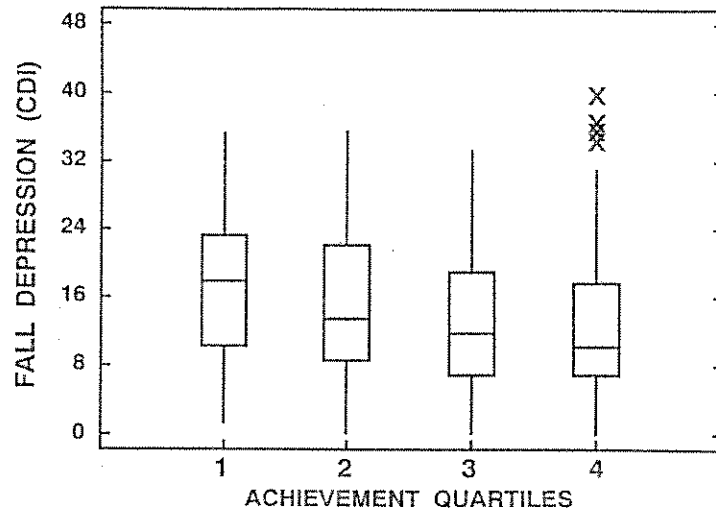


Figure 3. Depressive symptoms in fall of first grade by achievement quartiles among females. CDI = Child Depression Inventory.

Table 1. Means and standard deviations for males and females on the Children's Depression Inventory: Mastery Learning, internal control, external control

	Males			Females		
	Mastery Learning	Internal Control	External Control	Mastery Learning	Internal Control	External Control
Depression (fall, Grade 1)						
<i>M</i>	13.77	14.58	15.39	13.50	14.31	15.66
<i>SD</i>	9.18	10.26	9.72	8.37	8.37	8.64
<i>n</i>	93	84	114	111	74	112
Depression (spring, Grade 1)						
<i>M</i>	12.42	11.34	10.53	10.53	11.88	11.88
<i>SD</i>	9.18	9.45	7.56	7.83	8.91	7.56
<i>n</i>	82	81	106	97	66	96

larly in the light of known relationships of achievement to depression and to ML (Dolan et al., 1993; Kellam et al., 1991). In any case, there was no direct effect found of ML on depression.

The second model is the mediational model. As we use the term here, a mediational model consists of *A* affecting *B*, which in turn affects *C*. This model of effects posits that ML will improve achievement, and through improving achievement will improve spring depression, taking into

account fall depression. This is the straight mediational model (Baron & Kenny, 1986; James & Brett, 1984; Judd & Kenny, 1981). There are three conditions necessary to support a mediational relationship of ML, gain in achievement, and depression: (a) ML results in changing the mean of the proximal target, achievement gain; (b) across levels of the proximal, the slope of the regression of the distal on its covariate is constant; and (c) by changing the mean level of achievement and controlling for baseline depres-

sion, the mean level of spring depression is changed. However, because the second condition was not met, the mediational relationship of ML is not supported. The regression lines were not parallel for either gender, and the model could not be tested. These results will be demonstrated later in Figures 4 and 5.

The third model we have somewhat hesitantly termed the moderational model. The lack of parallel slopes, coupled with the evolving relationships we reported in two earlier articles among achievement gain, depression, and ML raised the possibility of interactions among the three variables that had not been taken into account in the mediational model (Dolan et al., 1993; Kelliam et al., 1991). The most cogent explanation is that achievement gain interacts with fall depression and/or intervention to influence spring depression. Calling it the moderational model (Baron & Kenny, 1986; James & Brett, 1984; Judd & Kenny, 1981), we postulated that gain in achievement and/or experiencing ML affected the course of depression from fall to spring, not merely spring depression.

This model regresses spring depressive symptoms on fall depressive symptoms, achievement gain, the interaction between the two predictors, and intervention (ML vs. controls). For both genders this model was significant, $F(4, 251) = 16.05, p < .0001$, for females, and $F(4, 236) = 18.31, p < .0001$, for males. For females, the interaction of achievement gain and fall level of depressive symptoms is significant, $t(251) = -2.59, p < .05$. For males, the effect includes the role of ML, without which the interaction is not significant, $t(256) = .19, p > .84$.

To interpret the interaction, we dichotomized achievement gain at 50 points, a level considered to be appropriate for first grade on the CAT. For females, the regression of spring depressive symptoms on fall depressive symptoms, dichotomized achievement gain, and intervention yields the regression lines in Figure 5. The regression lines are displayed by intervention condition to allow

comparison to the regression lines for males, even though the role of intervention was not significant for females.

The interaction term is significant for females, $t(251) = -2.37, p < .02$. The higher the achievement gain was, the lower the slope of spring depressive symptoms on fall depressive symptoms. The design effect is not significant, $t(251) = -0.40, p > .69$. Females with high achievement gains (over 50 points) had a significantly lower slope (.33 vs. .60), a significantly higher intercept (.24 vs. .09), and a significantly lower squared correlation (.14 vs. .36) than females with low achievement gains. The differences in slope between the low and high gain groups are highly significant, $t = 2.96, p < .05$. They suggest that for females high achievement gain was associated with disruption in the continuity of depression from fall to spring. The more depression the girls reported in the fall, the more this association held.

Among males there was a similar tendency, but with much less support for the hypothesis that achievement gain influenced the developmental course of depression from fall to spring. For males, the achievement/depression interaction term is not significant ($t(254) = -0.09, p > .92$), but the intervention factor is almost significant ($t(254) = 1.90, p < .06$).

To add the treatment effect to the model, we regressed spring depressive symptoms on fall depressive symptoms, dichotomized achievement gain, and added a dummy variable that distinguished the ML group from the pooled internal and external control groups. We included the three two-way interactions and the three-way interaction. For females, the three-way interaction is not significant ($t(250) = -0.66, p > .55$), but the two-way interaction of dichotomized achievement gain and fall depressive symptoms is still significant. For males, the three-way interaction is significant, $t(253) = -1.96, p < .05$. The squared correlations and slopes from the regression analyses are shown in Table 2.

For males in ML compared to males in the control group, the higher the achieve

Table 2. Depression from fall to spring of first grade among lower and higher levels of achievement gain (Mastery Learning, all controls)

	R^2	b	n
Males			
Mastery Learning			
≤ 50 points ^a	.37	.80	22
> 50 points	.16	.36	51
All controls			
≤ 50 points	.34	.48	100
> 50 points	.13	.34	88
Females			
Mastery Learning			
≤ 50 points	.43	.59	26
> 50 points	.05	.18	61
All controls			
≤ 50 points	.31	.49	76
> 50 points	.12	.32	92

^aCalifornia Achievement Test.

ment gain was, the lower the slope. In fact, the interaction displayed in Figure 4 is primarily driven by the high slope for males in ML who gained less than 50 points in achievement. Failing to have an achievement gain of at least 50 points produces a higher slope and, thus, greater stability of depressive symptoms for males in ML than males in the control groups.

Among females in ML, note that at the lower end of the fall depression scale (the left end on the X axis in Figure 5), higher achievement gains predict slightly higher spring depression. This result, if not accidental, could be due to an increased risk of depressive symptoms among females in ML, possibly because of conflicting pressures around girls' achieving. Since it is more visible in ML and less in controls, regression to the mean is less likely.

Exploring the relationship of depression to achievement gains among the more depressed children in ML

To look more closely at the males in ML who were better achievers compared to worse achievers, we present the scatter plot and the two slopes showing the stability of

depression from fall to spring among the two populations (see Figure 6). The markedly lower slope among higher achievers and the high slope among the poor achievers demonstrates the difference in course of depressive symptoms.

We next selected children at different levels of depression in the fall and regressed depression differences from fall to spring on achievement gain by intervention condition. These results in the residual patterns for the ML condition show that males in ML who exhibit above the median depressive symptoms in the fall and improve in achievement, all improve in depressive symptoms over the course of first grade. This pattern among more depressed males occurs only among those in ML. The results for males who report higher and lower depression in the fall are shown in Figures 7 and 8. This is an exploratory result on a small number of males that leads to further hypotheses about the effects of ML on achievement gain and the development of depressive symptoms.

Discussion

The main results of the analyses reported in this article are the following:

- The prevalence of depressive symptoms among beginning first-grade children is at high levels that have been considered clinically significant.
- For both first-grade boys and girls, the greater the level of the child's reports of depressive symptoms in the fall of first grade, the lower the level of achievement.
- Among girls whose achievement gain is low over the course of first grade, the stability of depressive symptoms is very high.
- However, the stability of depressive symptoms is greatly reduced among girls whose achievement gain is at or above the national average. ML increases the numbers of such girls, as we reported elsewhere, but it had no additional effect.

DEPRESSION FROM FALL TO SPRING IN MALES IN MASTERY LEARNING AND CONTROL: HIGH ACHIEVEMENT GAIN VS. LOW ACHIEVEMENT GAIN

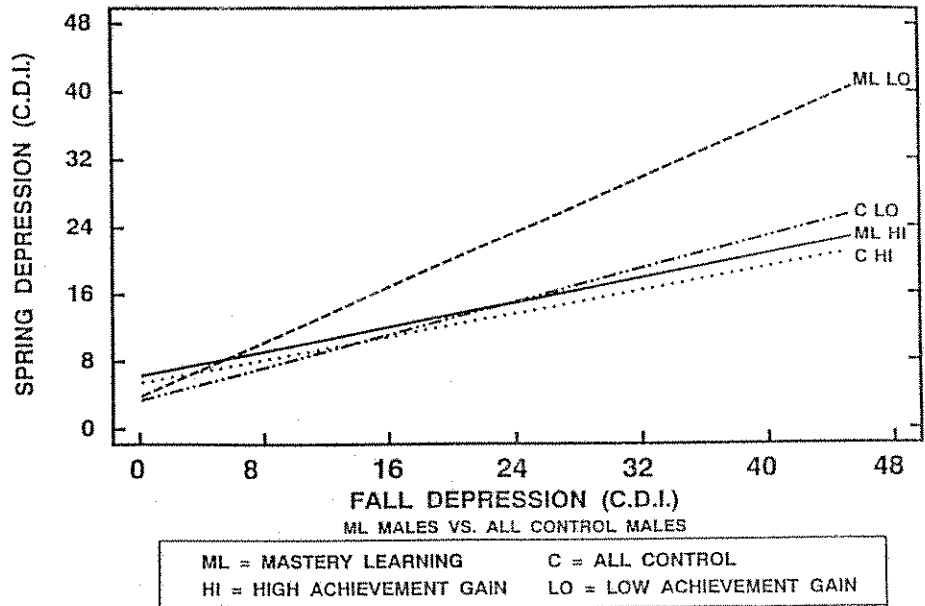


Figure 4. Depression from fall to spring in males in Mastery Learning and control: high achievement gain versus low achievement gain. CDI = Child Depression Inventory.

DEPRESSION FROM FALL TO SPRING IN FEMALES IN MASTERY LEARNING AND CONTROL: HIGH ACHIEVEMENT GAIN VS. LOW ACHIEVEMENT GAIN

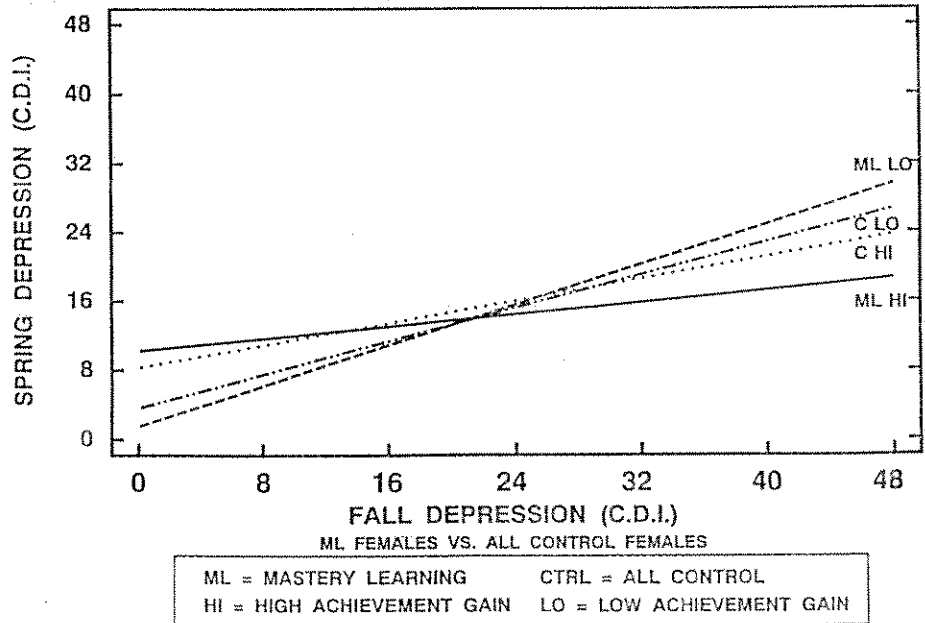


Figure 5. Depression from fall to spring in females in Mastery Learning and control: high achievement gain versus low achievement gain. CDI = Child Depression Inventory.

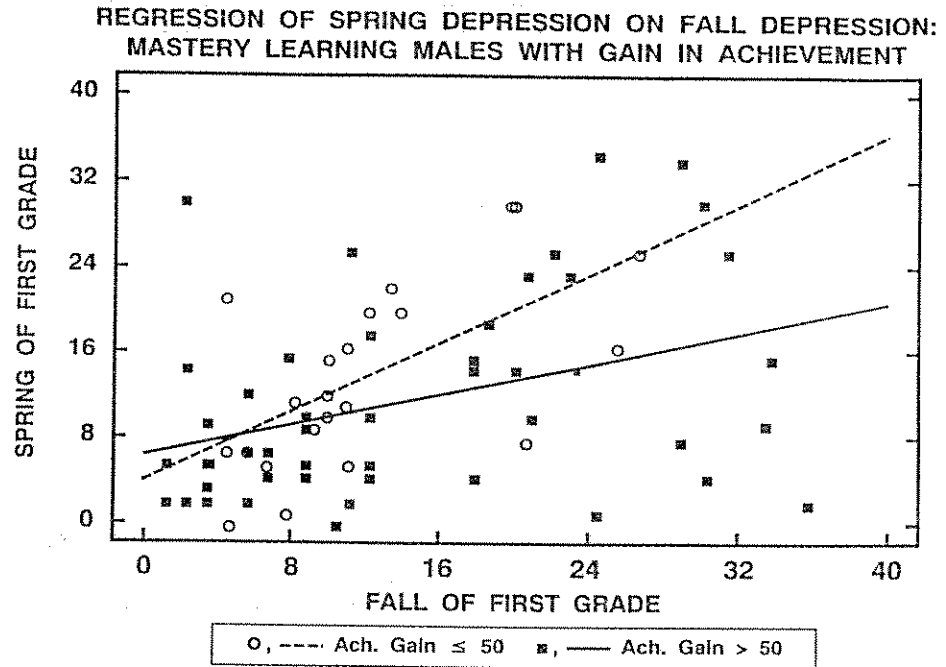


Figure 6. Regression of spring depression on fall depression: Mastery Learning among males with gain in achievement.

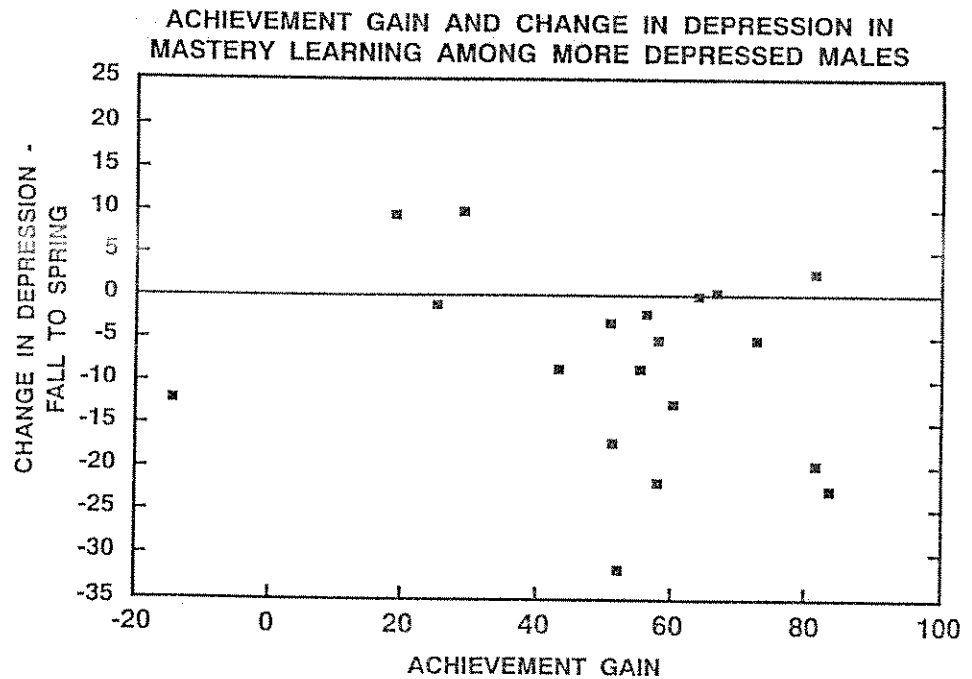


Figure 7. Achievement gain and change in depression in Mastery Learning among more depressed males.

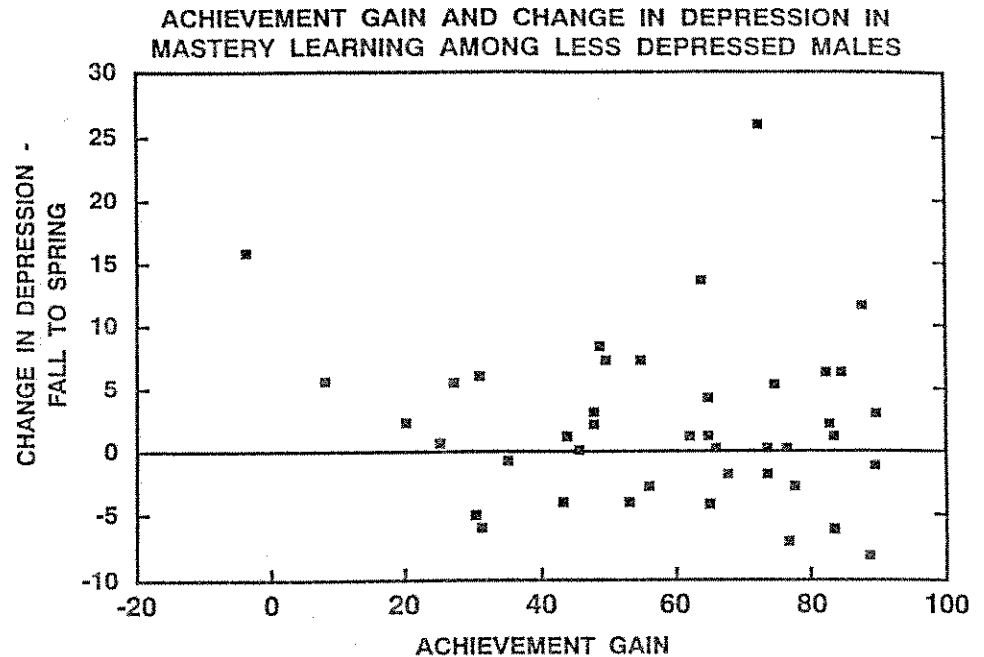


Figure 8. Achievement gain and change in depression in Mastery Learning among less depressed males.

- Boys in the ML intervention classrooms improved in achievement, as did the girls, and this improvement in achievement was linked to a marked reduction in the stability of depressive symptoms, and a reduction in depressive symptoms among the boys who had been more depressed in the fall. Depressive symptoms among those boys who did not gain appreciably in achievement were very stable from fall to spring, in contrast to the higher achievers.

This link of achievement to depressive symptoms among boys only occurred in ML classrooms, not in the control classrooms as it did among girls. This finding can be interpreted by remembering that in the Kellam et al. (1991) article on these same control children, depressive symptoms led to poor achievement in both genders, whereas poor achievement led to depressive symptoms only among girls. We hypothesized in that article that girls were more attuned to the teacher's responses to the adequacy of their performance, and when they performed

poorly they experienced depressive symptoms. Hypothetically, they had internalized the teacher's view of their SAS, and because these views mattered to them, the result was self-blame and attributions of failure.

Boys did not manifest that kind of response to the teacher. Possibly the boys were less caring or self-blaming, or forgave themselves, as Dweck (1977) concluded, by inferring that they merely had to try harder. The cognitive processing involved is an important area for further study. Based on the ML findings, we now hypothesize that ML induced some level of concern about the teacher's approval; the teacher's judgments became more important to the PWB of the boys.

A more cognitive developmental process also may have operated. A number of investigations have reported a major change in children's self-understanding that occurs at about 8 years of age (Broughton, 1978). It has been reported that before age 7 or so, when children are asked to evaluate themselves, they tend to do so in absolute terms,

that is, in terms of some standard rather than in terms of what others do. After age 7, however, children have been reputed to evaluate their performance or characteristics by social comparison with others ("I am a better baseball player than my best friend, but I am worse at schoolwork than my brother") (Livesley & Bromley, 1973). The transition from absolute to comparative self-evaluations may be a prerequisite for personal attributions of helplessness that are relatively stable and global (Stipek & MacIver, 1989). When children are capable of conceiving that others would have succeeded in situations in which they have failed, they may be more likely to make personal attributions that reflect relatively stable trait-like conceptions of their personal character (Cicchetti & Schneider-Rosen, 1986). The ML intervention may have induced the ability or tendency among males to compare one's SAS in reading to that of others and to attribute better or worse self-efficacy from the comparison, with consequent effect on their PWB. Girls may already have this attributional characteristic, at earlier ages than previously thought, and boys may gain it through the ML.

These results suggest that attachment to the teacher is malleable and may be induced with precisely defined preventive interventions aimed at the social adaptational process in the classroom and hypothetically in other social fields. The linkage of the social adaptational process and depressive symptoms and possibly disorder is strongly supported by these analyses. Depressive symptoms (PWB) led to poor achievement (SAS). Poor SAS led to low PWB in girls but not boys, but apparently was induced in boys through the preventive intervention aimed at this very interactive teacher/student process.

It is important to note that the decrement in achievement among children reporting depressive symptoms extends well into the less severe levels, and from the viewpoint of the children's social adaptation to the classroom and to later social adaptation in other social fields, this decrement in achievement may have profound and long-lasting impor-

tance. Poor achievement is a predictor not only of depressive symptoms but also of school drop-out among girls, and when coupled with aggressive behavior it predicts drop-out among boys as well (Ensminger & Slusarcick, 1992).

The interest in diagnosis over the last decade or so has tended to focus on the more severely depressed children and to seek evidence of a cutpoint demarking MDD from depressive symptoms. These data point in another direction, one in which levels of depression covering many more children are associated over time with decrements in centrally important social adaptational tasks. The results from these developmental epidemiological studies and preventive trials suggest that the nosology of depression should focus on the antecedents and consequences of all levels of depressive symptoms, while searching for cutpoints or evidence of categorically distinct MDD cases. A concept of depression as a continuum is supported by these results, while the possibility of more serious subgroups of individuals possibly with different etiological paths within the population is not negated.

The subpopulation of children who did not improve in achievement in ML classrooms, but did not manifest depressive symptoms in fall or spring, are of great interest for comparison to those who showed the achievement/depression link. Similarly, those who were depressed in fall and/or spring but achieved well are of great interest to compare to those who showed the linkage and to those who achieved poorly but did not report depression. It is worthwhile to recall that the boys who had been depressed in the fall and who achieved well over the year in ML classrooms uniformly reported fewer depressive symptoms in the spring. This did not occur in any other classrooms.

For research on etiology and for prevention of depression, these results strongly suggest the potential usefulness of preventive interventions aimed at increasing mastery among children vulnerable to depressive symptoms and possibly to depressive disorder. This universal intervention was carried out in total classrooms without la-

being for very little expense. By altering the social adaptational processes within the classroom, a natural ecological setting, positive changes in social adaptation were promoted and depressive symptoms were thereby apparently decreased.

These results are consistent with the hypothesis that mastery of a highly salient social task in a social field of central importance appears to be intimately related to the developmental and etiological course of depression among vulnerable children. A second implication is that preventive interventions can be a vital tool for experimentally determining the meaning of depressive symptoms and etiologically important aspects of variation in the responses of children to social task demands.

As a major life transition, the first-grade classroom provided the opportunity to examine the variation in the expression of children's depression. Maladaptation prior to this transition in response to SAS demands of parents, peers, or preschool/kindergarten teachers may have produced the high levels of depressive symptoms observed among children on entry into first grade. With the follow-up of children over the course of elementary school and into middle school now being completed, the course of depression and its relationship to achievement can be assessed over a longer developmental period. We can also assess how other aspects of PWB and SAS affect developmental linkages between depression and achievement.

The nature of the relationships between depressive symptoms and achievement was very illuminating from a developmental psychopathological viewpoint. It was the course of depressive symptoms, not the level at a point in time that was linked to achievement. Similarly, it was the variation in the course of depression and achievement, rather than the means, that were more revealing of evolving relationships. Depressive symptoms play an important and possibly critical role as an antecedent and moderator of response to the classroom task demand to learn to read. The course of depressive symptoms in turn is affected

fairly dramatically by the course of progress in learning to read.

The ML results raise the issue of the fate of poor responders to the preventive intervention trials. Did they end the year at greater risk than if they had been in control classrooms? In Woodlawn, the ratings of children who received the intervention demonstrated a strong association between adaptation or maladaptation to the social tasks of the classroom and the risk of psychiatric symptoms. It appeared that in the Woodlawn intervention classrooms, the increased importance of classroom tasks plus the failure to satisfactorily perform these tasks increased the stress of failure in school (Kellam et al., 1975). This outcome will be followed up in the Baltimore trials in subsequent analyses. Although fewer children were left behind who did not achieve well in the Baltimore ML classrooms, those few may well have suffered greater loss of self-efficacy than did their classmates, particularly among girls.

The alternative explanation for the effects of the intervention—that the changes were due to the general attention that the children received in ML (i.e., the Hawthorne effect)—is not supported by the findings. The GBG intervention, which was directed at aggressive behavior, entailed attention and training time closely comparable to the ML intervention. In earlier analyses of the specificity of effects for the ML and GBG interventions on their proximal targets, there was no evidence of nonspecific effects on other than the proximal targets of each intervention (Dolan et al., 1993).

Possibly the most important outcome of linking developmental epidemiology and preventive trials is that such population-based experimental interventions allow the study of malleability and function of developmental models and their components. The course and evolving relationships can be assessed by focusing on proximal targets and examining their malleability as well as that of the distal developmental outcomes. If the changes incurred are enduring, we can borrow from Weiss (1949) and call such changes evidence of plasticity. If they are

short lived, such changes can be termed elastic. With regard to developmental relationships between depression and achievement, it would seem important to determine whether the changes in depression (ML's distal target) resulting from changes in achievement (ML's proximal target) are enduring, whether they are episodic, or whether they are transient improvements that dissipate when the preventive interven-

tion is no longer being implemented. These properties of models are essential to study in the next stage of developmental psychopathology and prevention research, where the dynamic relationships leading to mental health or disorder, social adaptation, or maladaptation, may be the basis for promoting socialization of the children of the next generation.

References

- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Beck, A. T. (1976). *Cognitive therapy and emotional disorders*. New York: Guilford Press.
- Broughton, J. (1978). Infants' reactions to unfamiliar persons and novel objects. *Monographs of the Society for Research in Child Development, 37*(Serial No. 148).
- Brown, C. H. (1993). Statistical methods for preventive trials in mental health. *Statistics in Medicine, 12*, 289-300.
- Caspi, A., & Moffitt, T. E. (1991). Individual differences are accentuated during periods of social change: The sample case of girls at puberty. *Journal of Personality and Social Psychology, 61*, 157-168.
- Cicchetti, D., & Schneider-Rosen, K. (1986). An organizational approach to childhood depression. In M. Rutter, C. Izard, & P. Read (Eds.), *Depression in young people: Developmental and clinical perspectives* (pp. 71-134). New York: Guilford Press.
- Digdon, N., & Gotlib, I. (1985). Developmental considerations in the study of childhood depression. *Developmental Review, 5*, 162-199.
- Dolan, L. J., Kellam, S. G., Brown, C. H., Werthamer-Larsson, L., Rebok, G. W., Mayer, L. S., Laudolff, J., Turkkan, J., Ford, C., & Wheeler, L. (1993). The short-term impact of two classroom-based preventive interventions on aggressive and shy behaviors and poor achievement. *Journal of Applied Developmental Psychology, 14*, 317-345.
- Dweck, C. S. (1977). Learned helplessness: A developmental approach. In J. G. Schulerbrandt & A. Raskin (Eds.), *Depression in childhood: Diagnosis, treatment, and conceptual models* (pp. 127-130). New York: Raven Press.
- Edelsohn, G., Ialongo, N., Werthamer-Larsson, L., Crockett, L., & Kellam, S. (1992). Self-reported depressive symptoms in first-grade children: Developmentally transient phenomena? *Journal of the American Academy of Child and Adolescent Psychiatry, 31*, 282-290.
- Ensminger, M. E., Kellam, S. G., & Rubin, B. R. (1983). School and family origins of delinquency: Comparisons by sex. In K. T. Van Dusen & S. A. Mednick (Eds.), *Prospective studies of crime and delinquency* (pp. 73-97). Boston: Kluwer-Nijhoff.
- Ensminger, M. E., & Slusarcick, A. L. (1992). Paths to high school graduation or dropout: A longitudinal study of a first-grade cohort. *Sociology of Education, 65*, 95-113.
- Graham, S. (1991). A review of attribution theory in achievement contexts. *Educational Psychology Review, 3*, 5-39.
- Greenley, J. R., & Mechanic, D. (1976). Social selection in seeking help for psychological problems. *Journal of Health and Social Behavior, 17*, 249-262.
- Greenley, J. R., Mechanic, D., & Clearly, P. (1987). Seeking help for psychological problems: A replication and an extension. *Medical Care, 25*, 1113-1118.
- Heyman, G. D., Dweck, C. S., & Cain, K. M. (1992). Young children's vulnerability to self-blame and helplessness: Relationship to beliefs and goodness. *Child Development, 63*, 401-415.
- Ialongo, N., Edelsohn, G., Werthamer-Larsson, L., Crockett, L., & Kellam, S. (1993). Are self-reported depressive symptoms in first-grade children developmentally transient phenomena? A further look. *Development and Psychopathology, 5*, 431-455.
- James, L. R., & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology, 69*, 307-321.
- Judd, C. M., & Kenny, D. A. (1981). Process analysis: Estimating mediation in treating evaluations. *Evaluation Review, 5*, 602-619.
- Kashani, J., McGee, R., Clarkson, S., Anderson, S., Walton, L., Williams, S., Silva, P., Robins, A., Cytryn, L., & McKnew, D. H. (1983). Depression in a sample of 9-year old children. *Archives of General Psychiatry, 40*, 1217-1223.
- Kellam, S. G. (1990). Developmental epidemiologic framework for family research on depression and aggression. In G. R. Patterson (Ed.), *Depression and aggression in family interaction* (pp. 11-48). Hillsdale, NJ: Erlbaum.
- Kellam, S. G. (1991). A developmental epidemiological research program for the prevention of mental distress and disorder, heavy drug use, and violent behavior. In W. Parry-Jones & N. Queiroz (Eds.), *Mental health and deviance in inner cities* (pp. 101-108). Geneva: World Health Organization.

- Kellam, S. G., Adams, R. G., Brown, C. H., & Ensminger, M. E. (1982). The long-term evolution of family structure of teenage and older mothers. *Journal of Marriage and the Family*, *44*, 539-554.
- Kellam, S. G., Branch, J. D., Agrawal, K. C., & Ensminger, M. E. (1975). *Mental health and going to school: The Woodlawn program of assessment, early intervention, and evaluation*. Chicago: University of Chicago Press.
- Kellam, S. G., Brown, C. H., Rubin, B. R., & Ensminger, M. E. (1983). Paths leading to teenage psychiatric symptoms and substance use: Developmental epidemiological studies in Woodlawn. In S. B. Guze, F. J. Earls, & J. E. Barrett (Eds.), *Childhood psychopathology and development* (pp. 17-55). New York: Raven Press.
- Kellam, S. G., & Ensminger, M. E. (1980). Theory and method in child psychiatric epidemiology. In F. Earls (Ed.), *Studies of children* (pp. 145-180). New York: Prodist.
- Kellam, S. G., & Rebok, G. W. (1992). Building developmental and etiological theory through epidemiologically based preventive intervention trials. In J. McCord & R. E. Tremblay (Eds.), *Preventing antisocial behavior: Interventions from birth through adolescence* (pp. 162-195). New York: Guilford Press.
- Kellam, S. G., Rebok, G. W., Ialongo, N., & Mayer, L. S. (1994). The course and malleability of aggressive behavior from early first grade into middle school: Results of a developmental epidemiologically-based preventive trials. *The Journal of Child Psychology and Psychiatry*, *35*, 259-281.
- Kellam, S. G., Werthamer-Larsson, L., Dolan, L. J., Brown, C. H., Mayer, L. S., Rebok, G. W., Anthony, J. C., Laudolff, J., Edelsohn, G., & Wheeler, L. (1991). Developmental epidemiologically-based preventive trials: Baseline modeling of early target behaviors and depressive symptoms. *American Journal of Community Psychology*, *19*, 563-584.
- Kohlberg, L., Ricks, D., & Snarey, J. (1984). Childhood development as a predictor of adaptation in adulthood. *Genetic Psychology Monographs*, *110*, 91-172.
- Kovacs, M. (1983). *The Children's Depression Inventory: A self-rated depression scale for school-age youngsters*. Unpublished manuscript, University of Pittsburgh, Pittsburgh, PA.
- Kovacs, M. (1986). A developmental perspective on methods and measures in the assessment of depressive disorders: The clinical interview. In M. Rutter, C. Izard, & P. Read (Eds.), *Depression in young people* (pp. 435-465). New York: Guilford Press.
- Lefkowitz, M. M. (1980). Childhood depression: A reply to Costello. *Psychological Bulletin*, *87*, 191-194.
- Lefkowitz, M. M., & Burton, N. (1978). Childhood depression: A critique of the concept. *Psychological Bulletin*, *87*, 191-194.
- Lefkowitz, M. M., & Tesiny, E. P. (1985). Depression in children: Prevalence and correlates. *Journal of Consulting and Clinical Psychology*, *53*, 647-656.
- Livesley, W. J., & Bromley, D. B. (1973). *Person perception in childhood and adolescence*. New York: Wiley.
- Rutter, M. L. (1986). Child psychiatry: The interface between clinical and developmental research. *Psychological Medicine*, *16*, 151-169.
- Rutter, M. L., Tizard, J., & Whitmore, K. (Eds.). (1970). *Education, health and behavior: Psychological and medical study of childhood development*. New York: Wiley.
- Seligman, M. E. P., Peterson, C., Kaslow, N. J., Tanenbaum, R. L., Alloy, L. B., & Abramson, L. Y. (1984). Attribution style and depressive symptoms among children. *Journal of Abnormal Psychology*, *93*, 235-238.
- Shaffer, D., Stokman, C., O'Connor, P. A., Shafer, S., Barmack, J. E., Hess, S., & Spaulten, D. (1979, November). *Early soft neurological signs and later psychopathological development*. Paper presented at the meeting of the Society for Life History Research in Psychopathology and Society for the Study of Social Biology, New York.
- Sroufe, L. A. (1979). The coherence of individual development: Early care, attachment, and subsequent development issues. *American Psychologist*, *34*, 834-841.
- Stipek, D., & Daniels, D. (1988). Declining perceptions of competence: A consequence of changes in the child or in the educational environment? *Journal of Educational Psychology*, *80*, 352-356.
- Stipek, D., & MacIver, D. (1989). Developmental changes in children's assessment of intellectual competence. *Child Development*, *60*, 521-538.
- Wardrop, J. L. (1989). Review of the California Achievement Tests, Forms E and F. In J. Close Conoley & J. Kramer (Eds.), *The tenth mental measurements yearbook* (pp. 128-133). Lincoln: University of Nebraska Press.
- Weiss, P. (1949). The biological basis of adaptation. In J. Romano (Ed.), *Adaptation* (pp. 7-14). Ithaca, NY: Cornell University Press.
- Werthamer-Larsson, L., Kellam, S. G., & Wheeler, L. (1991). Effect of first-grade classroom environment on shy behavior, aggressive behavior, and concentration problems. *American Journal of Community Psychology*, *19*, 585-602.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author outlines the various methods used to collect and analyze the data. This includes both primary and secondary data collection techniques. The primary data was gathered through direct observation and interviews, while secondary data was obtained from existing reports and databases.

The third part of the document details the results of the analysis. It shows that there is a significant correlation between the variables studied. The data indicates that as one variable increases, the other also tends to increase, suggesting a positive relationship.

Finally, the document concludes with a summary of the findings and some recommendations for future research. It suggests that further studies should be conducted to explore the underlying causes of the observed trends and to test the findings in different contexts.