Research Article

# PREVENTION OF DEPRESSIVE SYMPTOMS IN SCHOOLCHILDREN: Two-Year Follow-Up

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Abstract—*After teaching cognitive and social-problem-solving techniques designed to prevent depressive symptoms, we followed 69 fifth- and sixth-grade children at risk for depression for 2 years. We compared these children with 49 children in a matched no-treatment control group. The prevention group reported fewer depressive symptoms through the 2-year follow-up, and moderate to severe symptoms were reduced by half. Surprisingly, the effects of the prevention program grew larger after the program was over. We suggest that psychological immunization against depression can occur by teaching cognitive and social skills to children as they enter puberty.*

As many as 20% of children will experience an episode of major depression by the time they finish high school, and between 7% and 9% of children will experience a depressive episode by the time they are 14 years old (Garrison, Schluchter, Schoenbach, & Kaplan, 1989; Lewinsohn, Hops, Roberts, & Seeley, 1993). Cognitive therapy is an effective treatment for depression in adults, and group interventions based on cognitive therapy have been successful in treating depression in children and adolescents (Evans, Hollon, DeRubeis, & Piasecki, 1992; Kahn, Kehle, Jenson, & Clark, 1990; Lewinsohn, Clarke, Hops, & Andrews, 1990; Reynolds & Coats, 1986; Stark, Reynolds, & Kaslow, 1987).

Given the success of cognitive treatments in adults and children, we designed a cognitively based program to prevent depressive symptoms in children. We targeted children who reported depressive symptoms, parental conflict, or both because these factors increase children's risk for future depression (Jaycox & Repetti, 1993; Lewinsohn, Hoberman, & Rosenbaum, 1988; Nolen-Hoeksema, Girgus, & Seligman, 1992; Stark, Humphrey, Crook, & Lewis, 1990).

We use the term *prevention* to refer to two related concepts, and we tested for both effects: (a) enduring relief that persists after the end of treatment among children experiencing depressive symptoms initially and (b) the nonoccurrence of expected depressive symptoms in children who are not experiencing many symptoms initially. We also examined our program's effect on explanatory style because research indicates that explanatory style is linked to depressive symptoms in children (Nolen-Hoeksema et al., 1992), and reduction of depressive symptoms following cognitive therapy is linked to improvement in explanatory style (DeRubeis et al., 1990; Seligman et al., 1988).

The initial results of our prevention program were discussed in a previous article (Jaycox, Reivich, Gillham, & Seligman, 1994). Briefly, we found that children who participated in the prevention program reported fewer depressive symptoms than children in the control group through a 6-month follow-up. In the present article, we discuss the long-term results of the prevention program. We explore the program's effects through a 2-year follow-up period.

## METHOD

The method and procedures of this study were discussed in detail in Jaycox et al. (1994). We briefly review them here.

### Subjects

Our subjects were fifth and sixth graders in two school districts in suburbs of Philadelphia. We recruited children in the first district to participate in a prevention program. Children whose parents gave consent completed two screening questionnaires, the Children's Depression Inventory (CDI) and the Child's Perception Questionnaire. To create a single selection criterion of initial risk, scores on these measures were converted to $z$ scores and summed. We invited all children who had a distress score of .50 or higher to participate.

We also recruited children from a neighboring school district to participate in the long-term control group. Children whose parents gave consent completed the same screening questionnaires used to select the prevention group. The 49 children whose scores most closely matched the scores of the prevention group were selected as the control group. Children were also matched on sex, race, and parental marital status.

The final sample consisted of 118 children: 69 children in the prevention condition and 49 children in the long-term control group.

### Measures

Screening questionnaires were administered approximately 2 months before the prevention program began. Children who were selected to participate in the study completed a battery of questionnaires at six assessment points over the course of the study. This battery was completed 2 weeks before the program began, 1 week after the program ended, and every 6 months through the 2-year follow-up period.

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*Screening questionnaires*

Two screening questionnaires were used: the CDI and the Child's Perception Questionnaire. The CDI (Kovacs, 1985) is a commonly used self-report measure of depressive symptoms. The Child's Perception Questionnaire assesses the degree to which a child perceives conflict between his or her parents (Emery & O'Leary, 1982; Kurdek & Sinclair, 1988).

*Self-report measures of depressive symptoms*

At each assessment, children completed two self-report questionnaires measuring current depressive symptoms: the CDI and one of the Reynolds depression scales, the Reynolds Child Depression Scale (RCDS; Reynolds, 1989) or the Reynolds Adolescent Depression Scale (RADS; Reynolds, 1986, 1992). The RCDS was developed for use with children ages 8 to 13, and the RADS was developed for use with children ages 12 through 18. We used the RCDS through the 12-month follow-up and began using the RADS at the 18-month follow-up, when the average age of children in our study was 12 years and 11 months.

*Explanatory style*

Children also completed the Children's Attributional Style Questionnaire (CASQ; Kaslow, Tannenbaum, & Seligman, 1978).

### The Depression Prevention Program

Children in the prevention condition met in six groups of 10 to 12 children each. The program met for 1½ hr each week for a total of 12 weeks (or 18 hr). Each group was led by one of the first three authors, who were then graduate students in clinical psychology at the University of Pennsylvania. The leaders followed a detailed manual that gave minute-by-minute descriptions of the activities and concepts to cover in each session.[1]

Our program contained two major components: a cognitive component and a social-problem-solving component. The cognitive component was based on therapies developed by Beck (1967, 1976), Ellis (1962), and Seligman (1991). Children were taught to identify negative beliefs, to evaluate these beliefs by examining evidence for and against them, and to generate more realistic alternatives. This component also contained explanatory style training. Children were taught to identify pessimistic explanations and to generate alternative explanations that were more optimistic (and more realistic).

The social-problem-solving component focused on the conduct problems and interpersonal problems that are often associated with depression in children (Leon, Kendall, & Garber, 1980). Children were taught to think about their goals before acting, to generate lists of possible solutions for problems, and to make decisions by weighing the pros and cons of each option. Programs using similar techniques have been found to increase self-esteem and reduce antisocial behavior in aggressive boys (Lochman & Curry, 1986; Weissberg et al., 1981). Children were also taught techniques for coping with parental conflict and behavioral techniques to enhance assertiveness, negotiation, and relaxation.

1. The prevention program manual is available from the authors.

### Statistical Procedures

Repeated measures analyses of covariance (ANCOVAs) were used to test our hypotheses. We used a mixed-method nested design with unbalanced groups. Children were nested within schools, which were tested within treatment conditions. In each analysis, the initial level of depressive symptoms or explanatory style was statistically controlled, school group effects were controlled, and change in the individual child was evaluated as a function of whether the child participated in a prevention or control condition. Because we had clear predictions that the prevention program would decrease depressive symptoms and improve explanatory style, we used one-tailed $p$ values for these analyses.

## RESULTS

Children who went through the prevention program were much less depressed than the matched control subjects, and the prevention effect grew over time.

### Preintervention Differences and Attrition

There were no significant differences between the prevention and control groups on any of the initial measures of risk level, depressive symptoms, or explanatory style. Prevention and control children also did not differ significantly in age, race, parents' marital status, or father's level of education. There were, however, group differences on two indices of socioeconomic status. Control families had significantly higher incomes than prevention families, and mothers of children in the control group had significantly higher levels of education than mothers of children in the prevention group (see Table 1). In order to control statistically for these differences, each of the analyses presented here was also conducted with family income and mother's education level entered as covariates. Our results were unchanged in these analyses.

Seventy-two percent of children in the prevention group and 67% of children in the control group completed the 24-month assessment battery. We tested for differential attrition at each of the long-term follow-up assessments (12, 18, and 24 months) but found no significant preintervention differences between prevention and control group children who left the study.

### Depressive Symptoms

There was a high correlation between the CDI and the Reynolds measures at each assessment point (all $rs > .67$), and our findings with the two instruments were virtually identical. In this report, we discuss results for analyses using the CDI, but results for the Reynolds depression scales are included in Table 2.

Our screening criteria successfully selected a group of children at risk for depressive symptoms. By the end of the 2-year follow-up, children in the control group had an average CDI score of 13.3, within the range of scores used to indicate mod-

Table 1. *Demographic characteristics of the subjects*

| Variable | Prevention group | Control group | Statistic |
|---|---|---|---|
| Mean age of child in years | 11.36 ($SD$ = 0.70) | 11.38 ($SD$ = 0.55) | $T = -1.36$ |
| Sex of child | | | |
| Male | 50.7% | 57.1% | |
| Female | 49.3% | 42.9% | $\chi^2(1, N = 118) = 0.47$ |
| Race of child | | | |
| Caucasian | 79.7% | 86.4% | |
| African American | 17.2% | 6.8% | |
| Other | 3.1% | 6.8% | $\chi^2(2, N = 108) = 3.06$ |
| Parents' marital status | | | |
| Married | 52.2% | 73.3% | |
| Separated | 20.3% | 6.7% | |
| Divorced | 26.1% | 17.7% | |
| Other | 1.4% | 2.2% | $\chi^2(3, N = 114) = 6.34$ |
| Total family income | | | |
| Less than $20,000 | 16.4% | 10.1% | |
| $20,001–$40,000 | 44.3% | 24.3% | |
| $40,001–$60,000 | 26.2% | 32.4% | |
| $60,001–$80,000 | 6.6% | 16.2% | |
| More than $80,000 | 6.6% | 16.2% | $\chi^2(4, N = 98) = 13.15^*$ |
| Education of father | | | |
| Some high school | 8.1% | 4.1% | |
| High school graduate | 35.5% | 16.3% | |
| Some college | 19.4% | 20.4% | |
| College graduate | 22.6% | 32.7% | |
| More than college | 14.5% | 26.5% | $\chi^2(4, N = 111) = 7.45$ |
| Education of mother | | | |
| Some high school | 3.0% | 6.1% | |
| High school graduate | 47.0% | 22.4% | |
| Some college | 23.8% | 20.4% | |
| College graduate | 13.6% | 30.6% | |
| More than college | 7.6% | 20.4% | $\chi^2(4, N = 115) = 13.47^*$ |

*Note.* Percentages do not always add up to 100% because of rounding. Information on demographic variables was not available for all subjects.
$^*p < .05$

erate levels of depression (Kazdin, Colbus, & Rodgers, 1986; Kovacs, 1992). Indeed, 44% of children in the control group reported moderate to severe levels of depressive symptoms (CDI greater than or equal to 15) at the 2-year follow-up.

The program prevented depressive symptoms. The prevention group reported fewer depressive symptoms than the control group during the follow-up period (see Fig. 1). A repeated measures ANCOVA, in which baseline depression score was covaried, showed that this difference was statistically significant, $F(1, 48) = 8.90$, $p < .01$. Planned comparisons indicated that the difference was significant at the 18- and 24-month assessments, $F(1, 48) = 6.35$, $p < .01$, and $F(1, 48) = 10.43$, $p < .01$, respectively (see Table 2).

Children in the prevention group were less likely than those in the control group to report moderate or severe depressive symptoms. Using a cutoff score of 15 on the CDI to indicate moderate levels of depressive symptoms, we found that at the 12-month follow-up, 29% of the children in the control group had CDI scores at or above this threshold. In contrast, only 7.4% of the children in the prevention group had CDI scores at or above this level. At the 18-month follow-up, these percentages were 33 and 12, respectively. At the 24-month follow-up, they were 44 and 22, respectively (see Fig. 2). A repeated measures analysis of categorical data (in which initial depression score was covaried) revealed that the prevention group was significantly less likely to report symptoms in the moderate to severe range across the follow-up period, $\chi^2(1, N = 59) = 7.28$, $p < .01$. Chi square tests revealed that this difference was significant at each assessment point (Fisher one-tailed exact probabilities $p < .01$, phi = .284; $p < .01$, phi = .265; $p < .05$, phi = .232, at 12, 18, and 24 months, respectively).

There was evidence that the program produced enduring relief of depressive symptoms. We analyzed our results separately for those children whose preintervention CDI scores were greater than or equal to the sample median (8.0). A repeated measures ANCOVA indicated that the initially symptomatic children in the prevention group reported fewer depressive symptoms than children in the control group during the follow-up period, $F(1, 19) = 6.10$, $p < .025$ (for results at each of the long-term follow-up assessments, see Table 3). In addi-

Table 2. *Group differences in depressive symptomatology*

| Assessment | Mean score: Prevention group | Mean score: Control group | Statistic[a] |
|---|---|---|---|
| | Children's Depression Inventory | | |
| Screening | 11.7 (7.00) ($n$ = 69) | 11.1 (5.72) ($n$ = 49) | — |
| Pretest | 9.1 (6.68) ($n$ = 67) | 10.1 (6.92) ($n$ = 46) | — |
| Posttest | 7.6 (6.00) ($n$ = 62) | 8.9 (7.19) ($n$ = 37) | — |
| 6 months | 7.8 (6.69) ($n$ = 56) | 9.9 (6.54) ($n$ = 42) | — |
| 12 months | 6.4 (4.74) ($n$ = 54) | 9.5 (6.81) ($n$ = 31) | $F(1, 48) = 0.23$ |
| 18 months | 7.3 (5.64) ($n$ = 49) | 12.4 (11.28) ($n$ = 39) | $F(1, 48) = 6.35$* |
| 24 months | 9.1 (7.08) ($n$ = 49) | 13.3 (9.12) ($n$ = 34) | $F(1, 48) = 10.43$* |
| | Reynolds depression scales[b] | | |
| Screening | Not administered | Not administered | — |
| Pretest (RCDS) | 51.3 (11.20) ($n$ = 67) | 53.5 (11.85) ($n$ = 46) | — |
| Posttest (RCDS) | 46.4 (9.46) ($n$ = 61) | 51.1 (10.37) ($n$ = 38) | — |
| 6 months (RCDS) | 48.2 (10.69) ($n$ = 55) | 50.5 (10.72) ($n$ = 42) | — |
| 12 months (RCDS) | 45.2 (8.08) ($n$ = 50) | 50.8 (10.68) ($n$ = 33) | $F(1, 44) = 0.54$ |
| 18 months (RADS) | 48.8 (10.83) ($n$ = 50) | 60.9 (15.37) ($n$ = 39) | $F(1, 44) = 19.83$** |
| 24 months (RADS) | 52.1 (13.66) ($n$ = 48) | 61.0 (14.38) ($n$ = 34) | $F(1, 44) = 10.85$* |

*Note.* Standard deviations are given in parentheses after the means.
[a]Analyses of covariance, planned comparisons, were performed on the scores from the 12-, 18-, and 24-month follow-ups and included only subjects who completed questionnaires at all three of these follow-up assessments. Depressive symptoms at pretest were covaried.
[b]RCDS is the Reynolds Child Depression Scale. RADS is the Reynolds Adolescent Depression Scale.
*$p < .01$. **$p < .001$.

tion, a repeated measures analysis of categorical data revealed that these children in the prevention group were significantly less likely to report symptoms in the moderate to severe range across the follow-up period, $\chi^2(1, N = 28) = 4.32, p < .05$.

We also found evidence that the program prevented depressive symptoms in children with few or no initial symptoms (the nonoccurrence-of-expected-symptoms hypothesis) by analyzing results for children with preintervention CDI scores below the sample median. A repeated measures ANCOVA revealed that in this sample, the children in the prevention group reported significantly fewer depressive symptoms during the follow-up period than the children in the control group, $F(1, 20) = 7.87, p < .01$ (for results at each of the long-term follow-up assessments, see Table 3). However, a repeated measures analysis of categorical data revealed that the difference in the two groups' reports of moderate to severe levels of symptoms was not statistically significant.

### Explanatory Style

The prevention program improved children's explanatory style. A repeated measures ANCOVA, covarying initial score for explanatory style, revealed that children who participated in the prevention group had a significantly more optimistic explanatory style (less stable, global, and internal for negative events) than children in the control group during the follow-up period, $F(1, 50) = 10.15, p < .01$. Planned comparisons indicated that this difference was significant at all three long-term follow-up assessments (12 months: $F[1, 50] = 7.48, p < .01$; 18 months: $F[1, 50] = 6.81, p < .01$; 24 months: $F[1, 50] = 6.36, p < .01$).

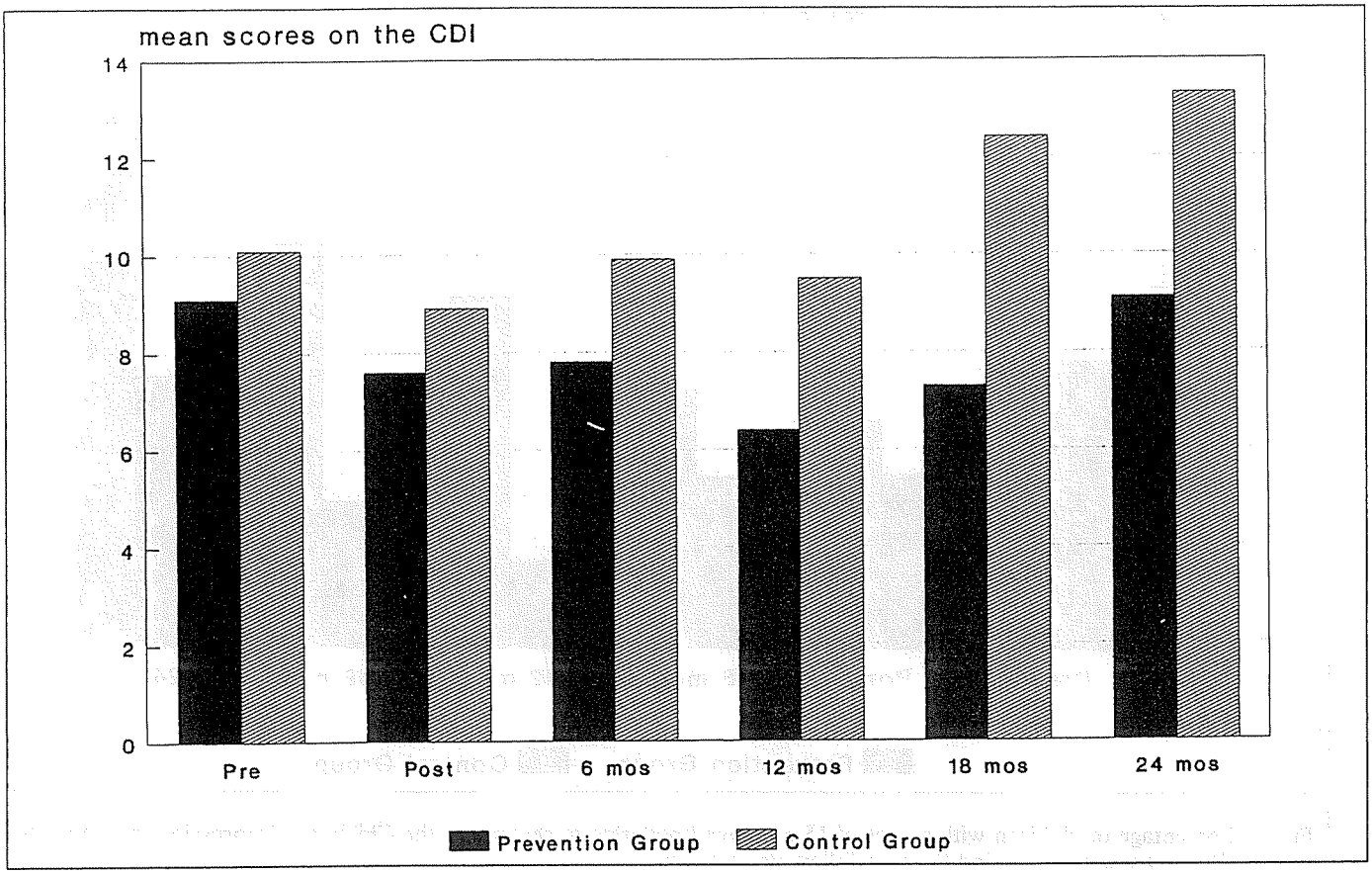


Fig. 1. Mean scores on the Children's Depression Inventory (CDI) at pretest (Pre), posttest (Post), and the four follow-up assessments.

Changes in explanatory style for negative events were significantly correlated with changes in depressive symptoms over the 2-year period ($r = .51$, $N = 76$, $p < .001$), with improvements in explanatory style associated with reductions in depressive symptoms.

### Relationship Between Explanatory Style Change and Symptom Change

Did the changes in explanatory style produce the changes in depressive symptoms we observed? To test for mediation, we followed statistical procedures recommended by Baron and Kenny (1986; see also DeRubeis et al., 1990). Briefly, Baron and Kenny recommended a four-step regression approach to assess mediation: Step 1—regress the dependent variable (DV) on the independent variable (IV); Step 2—regress the mediator on the IV; Step 3—regress the DV on the mediator; Step 4—regress the DV on both the IV and the mediator. To satisfy mediation, the IV must affect both the DV and the mediator in the predicted direction in Steps 1 and 2; the mediator must affect the DV in the predicted direction in Step 3; and the effect of the IV must be less in Step 4 than in Step 1.

We ran regressions using preintervention depression scores as a covariate in each analysis and using residualized scores to represent the change in explanatory style scores from preintervention to 24-month follow-up. We followed Baron and Kenny's regression recommendations and found all the requirements for mediation were satisfied. In Step 1, children in the prevention condition reported a greater reduction of depressive symptoms than children in the control condition, $t(73) = 2.67$, $p < .01$. In Step 2, children in the prevention condition reported greater improvement in explanatory style than children in the control condition, $t(73) = 2.52$, $p < .01$. In Step 3, change in explanatory style was significantly associated with change in depressive symptoms over the 2-year period, $t(72) = 4.68$, $p < .001$. Finally, when both explanatory style and treatment condition were included in the regression equation, the effect of treatment condition was reduced: the $p$ value for treatment went from .009 (in Step 1) to .118 (in Step 4). The standardized coefficient for treatment dropped from .290 to .158. These analyses indicate that change in explanatory style for negative events is a mediator of the program's effect on depressive symptoms.[2]

2. Using mediational analyses recommended by Sobel (1982), we found similar results: Changes in explanatory style emerged as a significant mediator of the program's effect on depressive symptoms. The mediational tests described by Baron and Kenny (1986) and by Sobel (1982) assume that the dependent variable does not cause the mediator (in this case, that depressive symptoms do not cause changes in explanatory style). It is possible that this assumption was not met. In future studies of our prevention program, we plan to test mediation

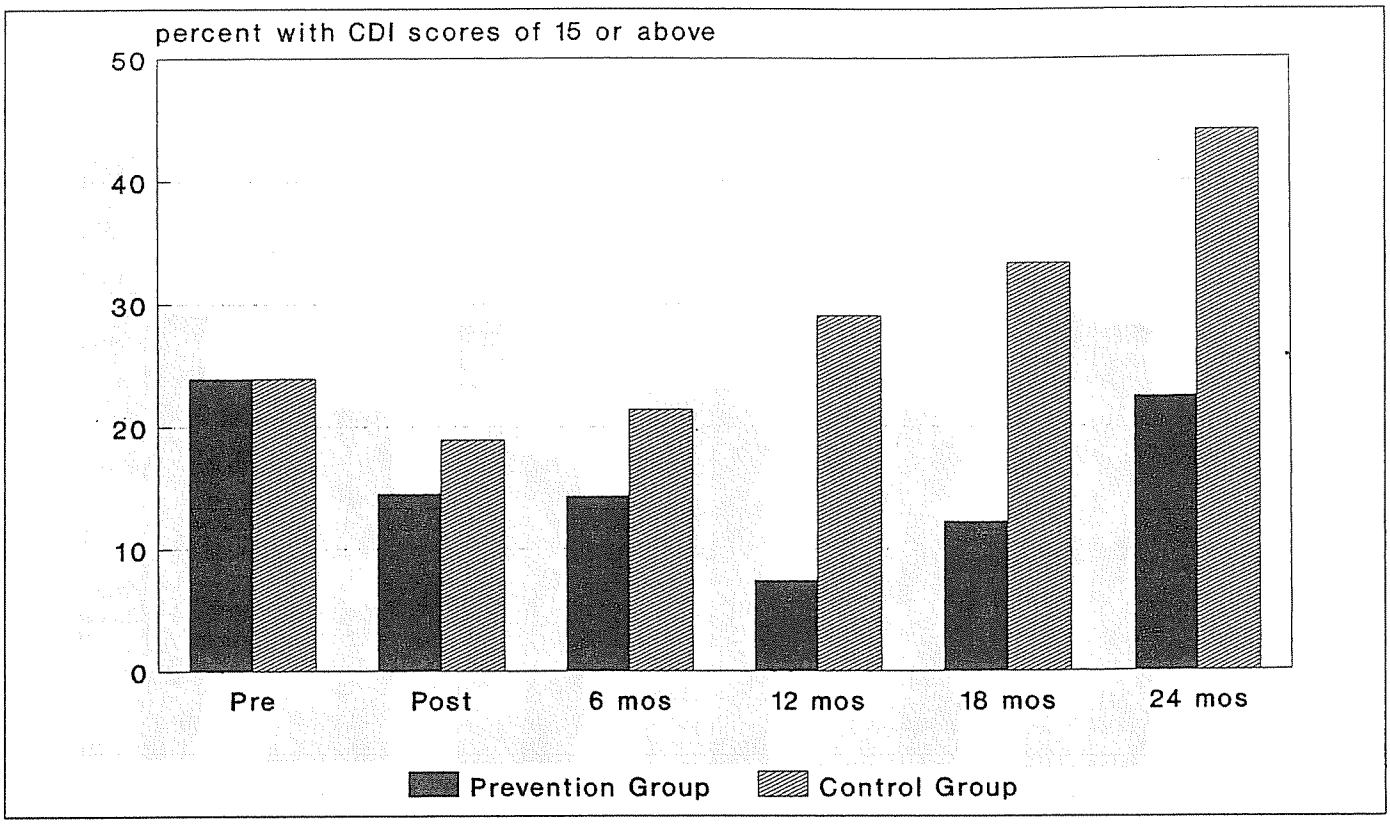


Fig. 2. Percentage of children with scores of 15 or above (moderate to severe) on the Children's Depression Inventory (CDI) at pretest (Pre), posttest (Post), and the four follow-up assessments.

### Effects Over Time

It is a universal finding in the therapy outcome literature that effects begin to wane after therapy terminates (e.g., see Stark et al., 1990). Therefore, we expected diminution of effects over time. We found a significant linear effect for time, indicating that depressive symptoms increased in both groups as the children got older, $F(1, 48) = 8.41$, $p < .01$. There was also a significant interaction of time with condition, $F(1, 48) = 10.37$, $p < .01$, indicating that the control group showed a greater increase in depressive symptoms than the prevention group. These analyses indicate that the prevention effect on depressive symptoms grew over time after the treatment had ended.

## DISCUSSION

The prevention program produced substantial positive long-term results. Two years after the program ended, children who participated in it reported fewer depressive symptoms, on average, than children in the control group. Moreover, children in the program were only half as likely as children in the control group to report symptoms in the moderate to severe range.

There was evidence for both prevention hypotheses. First, the program produced enduring relief of depressive symptoms. Among children who initially experienced symptoms of depression, those in the prevention group reported fewer depressive symptoms than those in the control group during the 2-year follow-up period. In addition, the former children were less likely than the latter to report symptoms in the moderate to severe range. Second, the nonoccurrence-of-expected-symptoms hypothesis, the most important meaning of prevention, was partially supported. Among children with few or no initial symptoms, those in the prevention group were less likely than those in the control group to report depressive symptoms over the 2-year follow-up. There was no significant difference in reports of symptoms in the moderate to severe range, however. Our results suggest that cognitive interventions begun in late childhood may prevent depressive symptoms from developing in early adolescence. Recent research by Clarke and his colleagues also indicates that depression can be prevented in at-risk adolescents (Clarke et al., 1994).

The program improved children's explanatory style, and changes in explanatory style correlated with changes in depressive symptoms. This result is consistent with the finding that successful outcome in cognitive therapy is linked to improvement in explanatory style (DeRubeis et al., 1990; Seligman et al., 1988).

Our most surprising result is that the prevention effect grew stronger with time. Why? It is possible that as time passed, there was more room for an effect. As children enter adolescence, reports of depressive symptoms and the percentage of

further by following DeRubeis et al. (1990) and including midpoint assessments of mediators.

Table 3. *Group differences in depressive symptomatology: High- versus low-symptom groups*

| Assessment | Mean score: Prevention group | Mean score: Control group | Statistic[a] |
|---|---|---|---|
| | High-symptom group | | |
| Pretest | 14.4 (5.27) ($n$ = 33) | 13.96 (6.25) ($n$ = 28) | — |
| Posttest | 11.1 (6.23) ($n$ = 30) | 10.42 (6.57) ($n$ = 22) | — |
| 6 months | 10.54 (7.27) ($n$ = 27) | 11.61 (5.63) ($n$ = 23) | — |
| 12 months | 7.75 (4.57) ($n$ = 24) | 9.83 (6.76) ($n$ = 18) | $F(1, 19) = 1.20$ |
| 18 months | 8.14 (6.22) ($n$ = 23) | 12.54 (10.36) ($n$ = 23) | $F(1, 19) = 1.47$ |
| 24 months | 10.01 (7.46) ($n$ = 23) | 15.10 (9.20) ($n$ = 18) | $F(1, 19) = 8.16$** |
| | Low-symptom group | | |
| Pretest | 3.88 (2.45) ($n$ = 34) | 4.17 (1.89) ($n$ = 18) | — |
| Posttest | 4.45 (3.49) ($n$ = 32) | 6.67 (6.71) ($n$ = 15) | — |
| 6 months | 5.17 (4.95) ($n$ = 29) | 7.90 (7.12) ($n$ = 19) | — |
| 12 months | 5.40 (4.68) ($n$ = 30) | 9.00 (7.13) ($n$ = 13) | $F(1, 20) = 0.28$ |
| 18 months | 6.62 (5.10) ($n$ = 26) | 12.31 (12.83) ($n$ = 16) | $F(1, 20) = 11.44$** |
| 24 months | 8.39 (6.77) ($n$ = 26) | 11.33 (8.88) ($n$ = 16) | $F(1, 20) = 4.05$* |

*Note.* The high-symptom group is composed of children whose preintervention scores on the Children's Depression Inventory (CDI) were greater than or equal to the sample median. The low-symptom group is composed of children whose preintervention CDI scores were below the sample median. Standard deviations are given in parentheses after the means.

[a]Analyses of covariance, planned comparisons, were performed on CDI scores from the 12-, 18-, and 24-month follow-ups and included only subjects who completed questionnaires at all three of these follow-up assessments.

*$p < .05$. **$p < .01$.

children experiencing moderate to severe depressive symptoms increase markedly (Rutter, 1986). As children move from elementary school through middle school, social rejections increase. School work gets more difficult, grading becomes more stringent, and children report that they enjoy school less (Eccles & Midgley, 1989). Thus, as the control group encountered more difficulty, the effects of the prevention program could have become more apparent.

Another intriguing possibility is that children in the prevention group became better at using the techniques over time. For example, a child may have found that when she made the transition to middle school, assertiveness helped her maintain friendships and feel better. With each success, she may have used the technique more frequently. The stressful events associated with puberty and the transition to middle school may provide an especially good training ground for the use and consolidation of the antidepressive skills taught in the program.

This study has several weaknesses. One is the lack of random assignment of children to condition. It is our experience that school districts and parents are reluctant to allow their children to participate in a long-term, no-treatment control group—particularly when other children in the same school district are known to be receiving a possibly efficacious intervention. This reluctance is particularly strong in the case of children at risk for depression. We selected children from another school district for the long-term control group and did our best to compensate for the difference in school districts by matching children carefully on initial distress scores, sex, race, parents' marital status, and children's perceptions of parental conflict. It is a possibility, however, that our results are due at least in part to other differences between the groups of which we are unaware. We are currently in the process of replicating this study within one school district with random assignment to the long-term control condition. To date, our results are consistent with those we report here.

A second weakness is that the experiment did not include a placebo control. Group cohesion, added adult attention, and expectation of gain all might have contributed to the effects observed. Our strategy, as in typical first tests of new therapies, has been to find an effect first, and to dismantle the program in search of the active ingredients in subsequent experiments. We are presently so engaged.

A third weakness has to do with our reliance on self-report measures of depressive symptoms. Several researchers have argued that these self-report measures do a poor job of distinguishing clinically depressed children from other children who have depressive symptoms (Hodges, 1990; Saylor, Finch, Spirito, & Bennett, 1984). It is possible that our program prevented dysphoria, demoralization, and other depressive symptoms in children without preventing actual episodes of clinical depression. In our replication of this study, we are using diagnostic interviews to assess the program's effect on clinical depression.

The rates of depression in children are astonishingly high. Depression is the most frequently reported mental health problem in adolescents (Lewinsohn et al., 1988). It is associated with many other difficulties: poor academic achievement, isolation, and, in the worst cases, suicide. Once a child has experienced an episode of depression, it becomes a template for reacting to bad events and may kindle future episodes (Post, 1992). Our results suggest that children can be taught cognitive and social skills that will buffer them against the alarmingly high rate of depression that occurs during puberty. Our program and other cognitive interventions are designed to be deliverable on a wide-scale basis in the schools. It is our hope that psychological immunization given to children as they enter puberty will alleviate this public health problem and the suffering that comes with it.

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# Forthcoming Papers

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Technical Commentary

# PREVENTION OF DEPRESSIVE SYMPTOMS IN SCHOOLCHILDREN: A Research Update

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Recent research suggests that cognitive vulnerabilities implicated in adult depression are relevant to depression in children, at least by middle childhood. For example, a pessimistic explanatory style is associated with depressive symptoms in children and has been found to predict depressive symptoms in some studies (for reviews, see Gladstone & Kaslow, 1995; Joiner & Wagner, 1995). Intervention programs that target these cognitive vulnerabilities are effective in treating and preventing depression symptoms and episodes (Clarke et al., 1995; Gillham, Reivich, Jaycox, & Seligman, 1995; Lewinsohn, Clarke, & Rohde, 1994). Clarke and colleagues found a prevention effect that lasted through 12 months of follow-up. Little is known about the even longer-term benefits of such programs. Do children who participate in these programs continue to benefit throughout their school years, or do the effects dissolve with time?

In 1995, we reported long-term follow-up results of a school-based program designed to prevent depressive symptoms (Gillham et al., 1995). In this study, 69 fifth and sixth graders who participated in the prevention group were compared with a control group of 49 children. The children completed an assessment battery that included the Children's Depression Inventory (CDI; Kovacs, 1985) and the Children's Attributional Style Questionnaire (CASQ; Kaslow, Tannenbaum, & Seligman, 1978) before the program, following the program, and every 6 months thereafter for 2 years. The prevention group reported significantly fewer depressive symptoms throughout the 2-year follow-up period. Children in the prevention group were also less likely to report moderate to severe symptoms. Explanatory-style scores became more optimistic in the prevention group, and there was evidence that improvements in explanatory style, in part, mediated the program's effect on depressive symptoms.

We have since completed our final follow-up. Sixty-nine of these children (37 from the prevention group and 32 from the control group) completed questionnaires 2 1/2 years after the program, and 67 children (40 from the prevention group and 27 from the control group) completed questionnaires at the 3-year follow-up. To examine the possibility of differential attrition, we ran a series of analyses comparing prevention- and control-group children who left the study on demographic variables and questionnaire scores obtained at baseline. No significant differences were found.

Our results indicate the prevention program's effect on explanatory style persisted (see Table 1). A repeated measures analysis of covariance (ANCOVA) predicting explanatory style for negative events (CASQ composite negative, or CN, scores) at the 30- and 36-month assessments revealed a significant effect of condition, $F(1, 50) = 10.12$, $p < .01$. Additional ANCOVAs demonstrated that the difference in explanatory style was significant at both assessment points, $F(1, 60) = 4.30$, $p < .05$, and $F(1, 60) = 7.91$, $p < .01$, at the 30- and 36-month follow-ups, respectively. Baseline explanatory style was covaried in these analyses.

**Table 1.** *Group differences in explanatory style (mean composite negative, CN, scores)*

| | Prevention group | Control group |
|---|---|---|
| Assessment | Mean (*SD*) | Mean (*SD*) |
| Baseline | 7.49 (2.63) ($n = 67$) | 8.28 (2.76) ($n = 47$) |
| 12 months | 7.09 (2.88) ($n = 57$) | 9.03 (3.08) ($n = 38$) |
| 24 months | 7.77 (3.50) ($n = 50$) | 10.05 (3.11) ($n = 32$) |
| 30 months | 7.30 (3.35) ($n = 34$) | 9.76 (3.20) ($n = 29$) |
| 36 months | 7.51 (3.33) ($n = 37$) | 10.21 (3.57) ($n = 26$) |

In contrast, the program's effect on depressive symptoms diminished with time (see Table 2). We conducted a repeated measures ANCOVA (with baseline depression score covaried) predicting depressive symptoms at the follow-ups and found no significant effect of condition. This failure to find an effect was not due solely to reduced power (because of decreased sample size). The gap between the two groups in mean CDI scores lessened at the longer-term follow-ups. The prevention and control groups also did not differ in reports of moderate to severe levels of depressive symptoms (CDI scores above 14).

The consequences of optimistic versus pessimistic explanatory styles should be most apparent when individuals confront adversity. In order to evaluate the program's effect on depressive symptoms in children experiencing negative events, we reran the CDI analyses for children scoring at or above the median on a negative-life-events scale (Coddington, 1972). No significant effect of condition was found.

In summary, our results suggest that the depression prevention program's benefit on depressive symptoms faded after 2 years. In contrast, the effect on explanatory style was maintained. Because our study has ended, we do not know whether this difference in explanatory style will translate into prevention of subsequent depressive symptoms.

It is intriguing that the prevention and control groups differed in explanatory style but not depressive symptoms. Further, although depressive symptoms decreased in the control group from the 24- to 36-month follow-ups, explanatory style remained fairly stable. These discrepancies suggest that explanatory style does not mediate the program's effect on depressive symptoms and may not be a risk factor for depressive symptoms in early adolescence. This conclusion is also supported by the initial results of the prevention program. Although depressive symptoms decreased significantly from preintervention to postintervention in the prevention group relative to the control group,

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**Table 2.** *Group differences in depressive symptoms: Scores on the Children's Depression Inventory*

| | Prevention group | | Control group | |
|---|---|---|---|---|
| Assessment | Mean (*SD*) | Percentage scoring above 14 | Mean (*SD*) | Percentage scoring above 14 |
| Baseline | 9.1 (6.68) ($n$ = 67) | 24 | 10.1 (6.92) ($n$ = 46) | 24 |
| 12 months | 6.4 (4.74) ($n$ = 54) | 7 | 9.5 (6.81) ($n$ = 31) | 29 |
| 24 months | 9.1 (7.08) ($n$ = 49) | 22 | 13.3 (9.12) ($n$ = 34) | 44 |
| 30 months | 9.3 (7.89) ($n$ = 37) | 22 | 10.5 (7.48) ($n$ = 32) | 31 |
| 36 months | 7.7 (6.11) ($n$ = 40) | 18 | 9.2 (7.48) ($n$ = 27) | 22 |

the improvement in explanatory style for negative events (CASQ CN score) was not significant until the 12-month follow-up. A significant postintervention effect was found for only one dimension (negative stable) of explanatory style (Gillham et al., 1995; Jaycox, Reivich, Gillham, & Seligman, 1994).

Although disappointing, these results may provide clues as to how best to promote psychological well-being during childhood and adolescence. After 2 1/2 years, children may have forgotten many of the skills they learned in the program. The intervention lasted 10 weeks, and we did not have any other contact with the children, except for the assessments. At the final assessment point, children in our sample were nearing the completion of the eighth and ninth grades. Our findings may indicate that a booster program could be helpful, particularly if it occurs around the transition to high school. An alternative possibility, of course, is that the skills covered in the program may have become less relevant to the children as they matured. Although this theory is plausible, we do not believe it is correct. The skills taught in the intervention have been demonstrated to reduce depressive symptoms not only in children, as in our work, but also in 18-year-olds (Seligman, Schulman, DeRubeis, & Hollon, 1998) and adults (DeRubeis & Crits-Cristoph, 1998).

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