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The prevention of depressive symptoms in low-income, minority children: Two-year follow-up

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Abstract

We present 2-year follow-up data on the efficacy of the Penn Resiliency Program (PRP), a school-based depression prevention program, with low-income, racial/ethnic minority children. This program taught cognitive and social problem-solving skills to 168 Latino and African American middle school children who were at-risk for developing depressive symptoms by virtue of their low-income status. We had previously reported beneficial effects of the PRP up to 6 months after the conclusion of the program for the Latino children, but no clear effect for the African American children. In this paper, we extend the analyses to 24 months after the conclusion of the PRP. We continue to find some beneficial effects for the Latino children and no differentially beneficial effect for the African American children. Implications of findings and future research directions are discussed.

Keywords: Depression; Prevention; Minority; Children

Introduction

Researchers have estimated that up to 25% of adolescents will experience a depressive episode by the end of high school (Lewinsohn, Rohde, Klein, & Seeley, 1999). Moreover, children and adolescents who experience depressive episodes have an elevated risk for future depressive episodes (Lewinsohn et al., 1999). These high rates of depression are not insignificant, since depression in children and adolescents is accompanied by a broad array of negative life consequences, including increased risk for comorbid mental disorders, school problems, drug use, teenage pregnancy, and loss of life (e.g., Petersen et al., 1993; Wagner, 1997). At least partially in response to the growing numbers of children and adolescents who experience depression, researchers have developed a number of efficacious treatments (e.g., Lewinsohn & Clarke, 1999; Rosselló &

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Bernal, 1999; Weisz, Thurber, Sweeney, Proffitt, & LeGagnoux, 1997) and prevention programs (e.g., Clarke, Hawkins et al., 1995; Clarke, Hornbrook et al., 2001; Gillham, Reivich, Jaycox, & Seligman, 1995) for children and adolescents.

The majority of this intervention research has focused on Caucasian, middle-class children. Developing interventions for low-income, racial/ethnic minority populations can be difficult, particularly given the underutilization of mental health services by both low-income and minority clients (Cheung & Snowden, 1990; Dworkin & Adams, 1987; US Department of Health and Human Services, 2001). And yet, there is reason to believe that properly designed and implemented prevention programs can engage participants who might not otherwise seek mental health services, as they can be presented in non-stigmatizing ways, they can be delivered in a variety of settings, and they can potentially be delivered by paraprofessionals (Cardemil, 2002).

We believe that low-income, minority children represent a population that could potentially reap large benefits from a depression prevention program. Although some studies have found no differences in the prevalence of depression among African American, Latino, and Caucasian adolescents (e.g., Roberts, Chen, & Solovitz, 1995), others have found elevated symptoms of depression among African American and Latino adolescents (e.g., Emslie, Weinberg, Rush, Adams, & Rintelmann, 1990). Further, low-income minority children may be particularly vulnerable to experiencing depression as many of them are exposed to chronic levels of neighborhood violence and other uncontrollable life events (Barreto & McManus, 1997), which may put them at risk for the development of depression (Freeman, Mokros, & Poznanski, 1993).

And so, building on the emerging success of depression prevention programs in general (e.g., Clarke et al., 1995), and with low-income and racial/ethnic minority adults in particular (Muñoz et al., 1995; Vega & Murphy, 1990), we tailored the Penn Resiliency Program (PRP) for low-income, minority populations. The PRP is a cognitive-based depression prevention program that had been previously developed and demonstrated to be effective with middle-class, suburban children (Gillham et al., 1995; Jaycox, Reivich, Gillham, & Seligman, 1994). Using a randomized, controlled trial, we evaluated whether the modified PRP would also be effective for a sample of low-income Latino and African American children (Cardemil, Reivich, & Seligman, 2002). In this article, we present analyses examining the efficacy of the PRP through two years of follow-up.

Summary of 6-month results

We conceptualized the original project to include elements of both universal and selective prevention programs (Muñoz, Mrazek, & Haggerty, 1996). This study could be viewed as a universal prevention effort in that we did not identify children who were specifically at-risk for the development of the disorder, either through elevated symptoms, a negative explanatory style, or increased levels of family conflict. However, some researchers have documented elevated risk for depression among both racial/ethnic minorities (Emslie et al., 1990; Vega & Rumbaut, 1991) and low-income populations (e.g., Bruce, Takeuchi, & Leaf, 1991; Vega et al., 1998). Thus, the children who participated in this study could be considered at-risk by virtue of their demographic backgrounds, making this prevention program similar to selective prevention efforts.

There were two principal findings in our initial evaluation of the efficacy of the PRP (see Cardemil et al., 2002, for a detailed description of these results). First, the PRP produced clearly positive results with the Latino children up to 6 months after the conclusion of the program, as the Latino prevention children reported fewer depressive symptoms, fewer negative automatic thoughts, fewer hopeless thoughts, and higher self-esteem than the randomly assigned controls. In addition, the PRP appeared to be highly efficacious for those Latino children who were initially symptomatic, and there was a trend for it to be efficacious for those Latino children who were initially nonsymptomatic.

The second major finding was that the success of the PRP did not extend to the African American children. There was no difference between the control group and the prevention group on any of the outcome measures. We noted that the African American prevention children did in fact report significantly fewer depressive symptoms over the course of the program; however, the control children unexpectedly reported a similar natural improvement. The same pattern was true for both the initially symptomatic and nonsymptomatic children.

In sum, the PRP was very effective with the Latino children up to 6 months after the program ended, but it was not differentially effective with the African American children. In this paper, we extend the analyses to 2 years following the termination of the intervention and address two specific questions: (a) does the PRP continue to be efficacious for the Latino and children, and (b) would the PRP eventually be efficacious for the African American children?

Method

Participants

As previously described by Cardemil et al. (2002), this research was conducted in two different middle schools located in low-income, urban parts of Philadelphia. One school had 977 students in grades 5–8, of whom 77.2% were Latino children predominantly of Puerto Rican descent ($n = 754$). Over 90% of the students from this school were eligible for the free-lunch program based on their family income status (National Center for Education Statistics, 2004). The second school had 828 students in grades 5–8, of whom 98.9% were African American ($n = 819$). Approximately 85% of the students from this school were eligible for free-lunch based on their family income status (National Center for Education Statistics, 2004).

The recruitment procedure at the two schools was identical. We contacted by mail the parents of all the fifth-grade and sixth-grade children and invited their children to participate in the research program. In this letter, we provided them with information about the research program, including the fact that the school was supportive of it and that their child would be randomly assigned to participate in either the PRP or a no-intervention condition. No mention was made of depression in this letter. Instead, we described the program as a coping-skills program and noted that the assessments would focus on children's thoughts and feelings, as well as experiences at school, home, and with peers. Parents were informed that their child would receive a one-time payment of $5 for participating during the first year, a one-time payment of $10 for the second year, and a one-time payment of $15 for the third year, irrespective of the condition to which he or she was assigned. This payment was made directly to the child at the end of each academic year.

A total of 173 children from both schools received parental consent and provided their own assent to participate in the study. These children were then randomly assigned to either the PRP or the no-intervention control. Because the vast majority of the children in the sample self-identified as either Latino or African American, we limit our analyses to those 168 children. Of the 53 children in our sample who were Latino, 25 were in the prevention condition and 28 were in the control condition. Of the 115 children in our sample who were African American, 50 were in the prevention condition and 65 were in the control condition. The discrepancy in sizes between the prevention and control condition resulted from the decision to limit the size of the PRP groups to ten children each. Our sample was equally divided between boys ($n = 84$) and girls ($n = 84$). There were slightly more fifth graders (54%, $n = 90$) than sixth graders (46%, $n = 76$). The mean age of the participants was 11.12 (SD = 0.94).

Parental income data were consistent with the fact that the children were from low-income families. Of the 101 parents who provided income information, approximately 60% ($n = 61$) indicated that their yearly total family income was less than $20,000. Twenty-six percent ($n = 26$) reported earning between $20,001 and $40,000 per year. Only 13% ($n = 13$) reported earning more than $40,000 per year. See Cardemil et al. (2002) for a more extensive description of the participants and their families.

Procedure

All children followed the same procedure. Immediately before the beginning of the PRP, children completed a series of questionnaires (see below). Members of the research staff supervised children in this task, assisting any children having difficulty with the instruments by reading selected portions to them. Those children assigned to the PRP then participated in the 12-week program (see below), while those children assigned to the control condition did not. Upon completion of the PRP, all children again completed the same measures under the same supervised conditions, and then again at specific follow-up periods (3, 6, 12, and 24 months after the completion of the program).

Measures

All of the measures completed by the children, parents, and teachers are instruments that are standard in the field and have been shown to have good reliability and validity. Below is a brief description of the instruments.

The Children's Depression Inventory

The Children's Depression Inventory (CDI; Kovacs, 1985) is a standard 27-item symptom checklist that assesses depressive symptoms in children. Children report how often they experience a variety of depressive symptoms over the preceding 2 weeks. Higher scores reflect higher levels of depressive symptoms. In the current study, Cronbach's α ranged between 0.82 and 0.87.

The Automatic Thoughts Questionnaire

The Automatic Thoughts Questionnaire (ATQ; Kazdin, 1990) is a 30-item questionnaire that assesses the occurrence of negative thoughts and attributions on a five-point Likert scale. Children indicate how often in the previous week they experience a series of negative thoughts. Higher scores indicate more negative cognitions. In the current study, Cronbach's α ranged between 0.94 and 0.96.

The Hopelessness Scale

The Hopelessness Scale (H-Scale; Kazdin, Rodgers, & Colbus, 1986) is a 17-item true/false questionnaire that assesses the degree to which the child feels hopeless about the future. Higher scores reflect more hopelessness. In the current study, Cronbach's α ranged between 0.63 and 0.73.

Harter Self-Perception Profile for Children

The Self-Perception Profile for Children (SPPC; Harter, 1982, 1985) is a 36-item self-report questionnaire designed to measure perceived competence in five specific domains (scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct) as well as to provide a measure of global self-worth. Each question is scored on a five-point Likert scale. Higher scores are indicative of higher perceived competence. In the current study, Cronbach's α ranged between 0.82 and 0.92.

The Penn Resiliency Program

Children in the 12-week program learned about the links between thoughts and emotions, they learned how to generate a list of possible explanations for negative events in their lives, and they learned how to use evidence to choose the most plausible explanations for these events. We also taught children appropriate ways to handle conflict, including those with family members and those with peers. These conflict management skills were consistent with those advocated by the school, and extended directly from some of the research in the literature that has examined the role of cognitions in aggressive behavior (e.g., Dodge & Coie, 1987). Children also received weekly homework assignments that they completed between sessions.

As described by Cardemil et al. (2002), we modified the original PRP (Jaycox et al., 1994) in order to make it culturally relevant for low-income and minority children while keeping it true to its theoretical origins in cognitive theory. The majority of the modifications to the PRP were content in nature, as we attempted to make the role-plays, exercises, and other activities more relevant to the lives of the children in the program, all of whom were living in urban, low-income communities.

Children participated in weekly 90-min groups, composed of ten children each. Each group was led by a master's level graduate student and assisted by an undergraduate psychology student. All group leaders received at least 20 h of training prior to the leading of their group and then followed a flexible manual (Cardemil, Reivich, Gillham, Jaycox, & Seligman, 1997) that provided structure, guidelines, and suggestions to be used during each session. Biweekly supervision, which consisted of evaluation of audiotapes to ensure adherence to the manual and assist in problem solving, helped to ensure that the leaders were appropriately following the protocol.

Statistical procedures

Using Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 2002), we conducted intent-to-treat analyses that examined change in symptoms over the 2-year period. HLM is ideal for these analyses because it accommodates missing data among repeated measurements using Empirical Bayesian estimates. Moreover, HLM makes fewer unrealistic assumptions regarding within-subject correlations and change in correlations over time. All analyses were conducted using the Proc Mixed module of SAS and estimated unstructured error covariance matrices for the Level 2 residuals and a homoscedastic structure for the Level 1 residuals (Singer, 1998; Singer & Willett, 2003).

The analyses we conducted extend directly from the results reported in the original article (Cardemil et al., 2002). In addition, because we are primarily interested in examining the course of symptoms over the follow-up period, we analyzed time in a piecewise manner in which we conceptually divided the study into the acute phase (pre- to post-treatment) and the follow-up phase (2 years of post-treatment follow-up). The use of this piecewise approach was supported by examination of the mean CDI scores over the 2 years of follow up, in that there was a greater drop in symptoms during the acute phase than over the follow-up phase. To analyze the data in this piecewise manner, we thus included two variables for time, one representing time during the acute phase and one representing time during the follow-up phase (see Willett, Singer, & Martin, 1998).

Given our expectation that there would be a differential intervention effect for the Latino and African American children, we began our analyses with a full model that included four main effects (acute time, follow-up time, intervention assignment, and racial/ethnic status), 5 two-way interactions (acute time-intervention, follow-up time × intervention, acute time × racial/ethnic status, follow-up time × racial/ethnic status, and intervention × racial/ethnic status), and 2 three-way interactions (acute time × intervention × -racial/ethnic status and follow-up time × intervention × racial/ethnic status).[1]

Using the notation described by Raudenbush and Bryk (2002), change during the acute phase can be understood along five parameters: (a) linear change for individuals with an intervention value of 0 and whose race/ethnicity has a value of 0 (β_{10}), (b) linear change for individuals with an intervention value of 1 and whose race/ethnicity has a value of 0 (β_{11}), (c) linear change for individuals with an intervention value of 0 and whose race/ethnicity has a value of 1 (β_{12}), (d) linear change for individuals with an intervention value of 1 and whose race/ethnicity has a value of 1 (β_{13}), and (e) unexplained error. In each case, the significance test compares the linear change to the reference group, in this case the individuals with an intervention value of 0 and race/ethnicity of 0 (β_{10}). Change over the follow-up phase can be understood along a similar five parameters (i.e., β_{20}–β_{23} for the corresponding parameter estimates during the follow-up phase).

Piecewise analyses allow for the possibility that change in symptoms might be different across the two time periods. For example, there might be significant differences between the two conditions during the acute phase, but no differences between the two conditions during the follow-up phase. This scenario would represent a maintenance of gains across the follow-up period. One way to confirm that a lack of differences during the follow-up phase represents maintenance of the initial intervention effect (as opposed to a diminution of the initial intervention effect) is to examine between-group differences at specific follow-up points (1-year and 2-year post-intervention). Significant between-group differences at the follow-up points would support the premise that the initial gains were maintained. HLM allows for relatively straightforward comparisons at the follow-up points through intercept analyses in which we re-centered the intercept from the preintervention starting point to the time point of interest (see Singer & Willett, 2003).

In this paper, we conduct 1-year and 2-year intercept analyses, and as with the change analyses, the estimated score for an individual at the specific time point of interest is represented by the following five parameters: (a) score for individuals with an intervention value of 0 and whose race/ethnicity has a value of 0 (β_{00}), (b) score for individuals with an intervention value of 1 and whose race/ethnicity has a value of 0 (β_{01}), (c) score for individuals with an intervention value of 0 and whose race/ethnicity has a value of 1 (β_{02}),

[1]In addition, we ran the full models with and without a covariate to account for the fact that the PRP was delivered in small groups of ten children. While the ideal analytic strategy would be to treat the grouping variable as a nesting variable, we only had eight such groups, making it impractical to use this approach. In none of our analyses did inclusion of the covariate change the substantive results, and so we present our findings without this variable.

(d) score for individuals with an intervention value of 1 and whose race/ethnicity has a value of 1 (β_{03}), and (e) unexplained error. Again, in each case, the significance test compares the added change to the reference group, in this case the individuals with an intervention value of 0 and race/ethnicity of 0 (β_{00}).

With both the change and intercept analyses, interpretation of results is made simpler by presenting our findings from two statistically equivalent perspectives. In the first set of analyses, children assigned to the no-intervention control condition have an intervention value of 0, and children assigned to the PRP have an intervention value of 1. The Latino children were assigned the race/ethnicity value of 0 and the African American children were assigned the race/ethnicity value of 1. Therefore, significance tests for β_{11} reflect whether the Latino children assigned to the PRP differed significantly from the Latino control children during the acute phase. Similarly, significance tests for β_{21} evaluate whether this difference extended across the follow-up phase.

The second set of analyses also gives the control children an intervention value of 0 and the PRP children an intervention value of 1. However, in the second set of analyses, we reverse the race/ethnicity assignment such that the African American children are assigned the race/ethnicity value of 0 and the Latino children were assigned the race/ethnicity value of 1. This allows us to use the African American control children as the reference group, so that significance tests for β_{11} and β_{21} reflect whether the African American children assigned to the PRP differed significantly from the African American control children over the acute and follow-up phases.

Results

As presented by Cardemil et al. (2002), there were no significant differences between the participants in the prevention group and those in the control group on any of the demographic variables. In addition, there were there no significant differences on any of the measures administered at the pre-intervention assessment point. Given the intriguing racial/ethnic differences in outcome that we found in the original article (Cardemil et al., 2002), we also paid particular attention to the possibility that baseline differences might exist between the African American and Latino children. A series of ANOVAs indicated that at baseline, the Latino children were reporting more negative automatic thoughts [$F(1, 152) = 4.90$, $p < 0.05$] and more hopeless thoughts [$F(1, 156) = 5.04$, $p < 0.05$] than the African American children. There were no differences between the two groups on either depressive symptoms or self-esteem. In addition, and of particular importance to the analyses in this paper, there were no significant race/ethnicity by condition interactions on any of the outcome measures at baseline.

A total of 117 of the original 168 children completed the 24-month assessment (70%). The majority of those children who stopped their participation did so because their families moved out of the area. Chi-square analyses comparing those children who participated in the study through the 24-month assessment period and those who stopped their participation revealed no statistically significant demographic differences between the two groups. In addition, there were no significant differences on any of the outcome measures (i.e., CDI, ATQ, H-Scale, or SPPC) at pre-intervention between the children who left the study and those who stayed.

Of the 77 children in the PRP condition, 64 completed the 24-month assessment (83%). Fifty-three of the 88 children in the control condition completed the 24-month assessment (58%). This difference in dropout from the follow-up assessments was statistically significant (χ^2 (1, $N = 168$) = 14.42, $p < 0.0001$). However, chi-square analyses comparing the PRP and control children who dropped out of the study yielded no significant demographic differences between the two groups. Similarly, there were no significant differences on any of the measures at pre-intervention between the prevention and control children who left the study. Of particular relevance to this paper, there were no significant differences in dropout as a function of race/ethnicity.

Depressive symptoms: overall effects[2]

The results for depressive symptoms over the 2-year follow-up period mirror the results we reported earlier (Cardemil et al., 2002). Using the Latino control children as the statistical reference point, we found that the

[2]The CDI data were not normally distributed, but when we normalized the data using a square root transformation, the results were not substantively different from the nontransformed analyses. In fact, in every case, the results were mildly strengthened in the direction of our current findings. Given the similarity across findings, we present the results with non-transformed results for ease of interpretation.

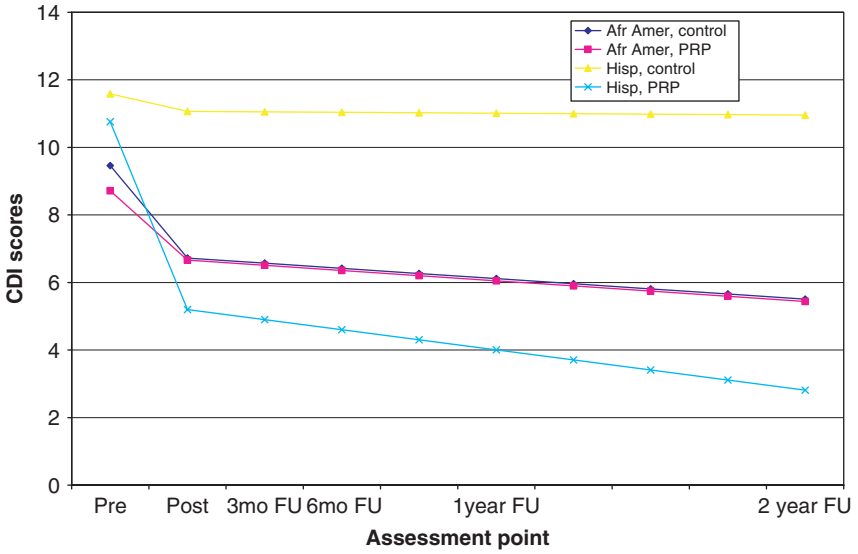

Fig. 1. Overall sample: Simple regression lines for change in CDI scores over 2-year follow-up.

Latino children who went through the PRP reported a significantly greater linear decrease in CDI scores than the Latino control children during the acute phase [$\beta_{11} = -1.68$, $t(602) = -3.06$, $p < 0.01$, effect size $r = 0.12$].[3] There was no difference in change in CDI scores between the two groups over the course of the 2-year follow-up phase [$\beta_{21} = -0.10$, $t(602) = -1.24$, $p =$ n.s., effect size $r = 0.05$], indicating that the groups maintained their post-treatment difference during follow-up. Re-centering the intercept to the 1- and 2-year follow-up points confirms this finding, as the Latino children who went through the PRP reported significantly lower CDI scores than the Latino control children at both time points [1 yr: $\beta_{01} = -7.01$, $t(158) = -4.11$, $p < 0.0001$, effect size $r = 0.31$; 2 yr: $\beta_{01} = -8.15$, $t(158) = -3.83$, $p < 0.001$, effect size $r = 0.29$].[4]

In contrast, when we used the African American control children as the reference point, we found that the African American control children reported a significant linear decrease in CDI scores during the acute phase [$\beta_{10} = -0.91$, $t(602) = -3.79$, $p < 0.001$, effect size $r = 0.15$], but there was no difference between the African American control and intervention children in the rate of decrease in CDI scores [$\beta_{11} = 0.22$, $t(602) = 0.63$, $p =$ n.s., effect size $r = 0.03$]. There continued to be no difference between the two groups over the course of the follow-up phase [$\beta_{21} = 0.001$, $t(602) = 0.03$, $p =$ n.s., effect size $r = 0.00$]. Moreover, intercept analyses yielded no differences between the two groups at either the 1-year or the 2-year points. As per Curran, Bauer, and Willoughby (2004), we probed all of these interactions (see Fig. 1).

In addition to these fixed effects, the best-fitting model was one in which we allowed both the intercept and the acute slope to vary randomly [when compared to the null model, $\chi^2(3, N = 162) = 394.13$, $p < 0.0001$; when compared to just allowing the intercept to vary randomly, $\chi^2(2, N = 162) = 11.9$, $p < 0.01$], although not the follow-up slope. In this model, there was statistically significant random variation for both the intercept [$\tau_{00} = 35.84$, $Z = 6.32$, $p < 0.0001$] and the acute slope [$\tau_{11} = 1.11$, $Z = 2.85$, $p < 0.01$], but not the follow-up slope. Random variation in the intercept suggests that there remains significant unexplained variation in the starting point of depressive symptoms for the children in the sample. Random variation in the slope suggests that there remains significant individual variability in the rate of change in depressive symptoms over the acute period not explained by the intervention.

[3] As an approximation of effect size, we present the effect size correlation, which is calculated as $r_{Y\lambda} = \sqrt{t^2/(t^2 + df)}$. Using Cohen's conventions, small, medium, and large effect size rs are 0.10, 0.24, and 0.37, respectively.

[4] Consistent with our original findings (Cardemil et al., 2002), we found no sex differences in efficacy of the intervention across any of the outcome measures.

Initially symptomatic versus nonsymptomatic children

In addition to the aforementioned random effects, we found that the intercept and acute slope covaried significantly [$\tau_{01} = -3.10$, $Z = -2.48$, $p < 0.05$], suggesting that children who reported higher CDI scores at baseline had a steeper acute slope than children who reported lower CDI scores at baseline. This finding is consistent with our previous work in which we had reported that the PRP was more efficacious for Latino children who were initially symptomatic than for children who were initially nonsymptomatic (Cardemil et al., 2002). In order to follow up on these findings, we divided our sample into two groups: those children whose pre-intervention CDI scores were at or above the overall median ($Mdn = 8.0$) and those children who were below the sample median. We then ran separate HLM analyses on these two subsamples.

For the Latino children who initially reported scores above the median, those children who went through the PRP reported a significantly greater reduction in CDI scores than the control children during the acute phase [$\beta_{11} = -2.68$, $t(288) = -3.40$, $p < 0.001$, effect size $r = 0.20$], but not during the follow-up phase [$\beta_{21} = -0.21$, $t(288) = -1.60$, $p =$ n.s., effect size $r = 0.09$], again indicating that the groups maintained their post-treatment difference during follow-up. Intercept analyses confirmed this finding, as the two groups were significantly different at both the 1-year [$\beta_{01} = -11.00$, $t(79) = -4.52$, $p < 0.0001$, effect size $r = 0.45$] and the 2-year [$\beta_{01} = -13.56$, $t(79) = -4.09$, $p < 0.0001$, effect size $r = 0.42$] follow-up points. This pattern was not evident for the African American children, as there continued to be no difference in linear change between the control and intervention children during either the acute phase [$\beta_{11} = 0.79$, $t(288) = 1.42$, $p =$ n.s., effect size $r = 0.08$] or the follow-up phase [$\beta_{21} = -0.01$, $t(288) = -0.10$, $p =$ n.s., effect size $r = 0.01$]. There were also no differences between the two groups in the intercept analyses. See Fig. 2 for results of our probing these interactions.

The best-fitting model for the initially symptomatic children was one in which we allowed both the intercept and the acute slope to vary randomly [when compared to the null model, $\chi^2(3, N = 83) = 128.05$, $p < 0.0001$; when compared to just allowing the intercept to vary randomly, $\chi^2(2, N = 83) = 8.80$, $p < 0.05$]. In this model, there was statistically significant random variation for the intercept [$\tau_{00} = 11.02$, $Z = 2.00$, $p < 0.05$], but not for the acute slope [$\tau_{11} = 0.46$, $Z = 0.67$, $p =$ n.s.]. These findings suggest that there is significant residual variation in the starting point of depressive symptoms, but not any remaining variability in the rate of change in depressive symptoms over time.

In contrast, for the Latino children who were initially nonsymptomatic, there was no difference in linear change between the control children and the PRP children during either the acute phase [$\beta_{11} = -0.42$,

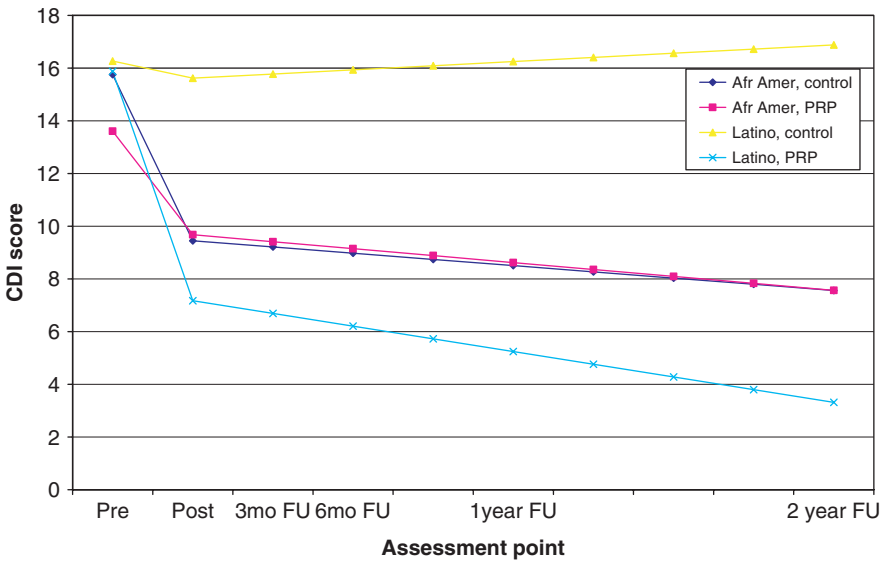

Fig. 2. Initially symptomatic children: Simple regression lines for change in depressive symptoms over 2-year follow-up.

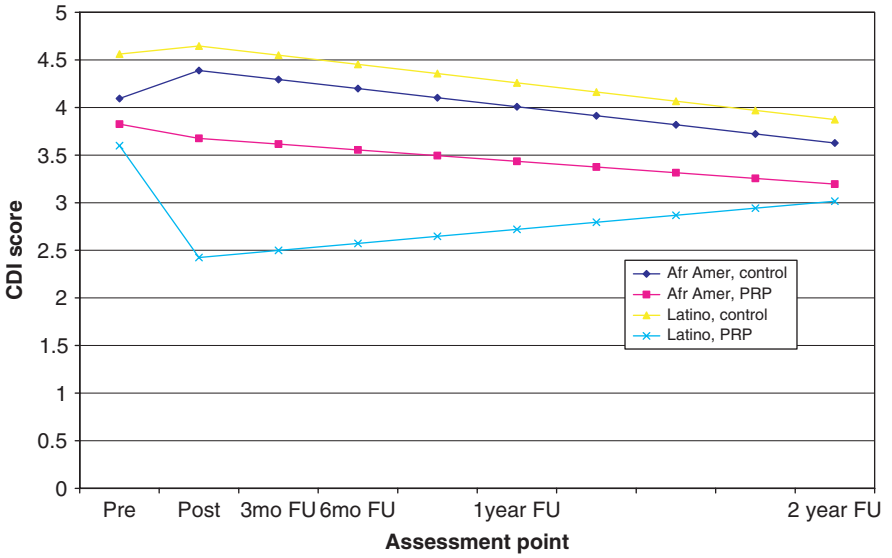

Fig. 3. Initially nonsymptomatic children: Simple regression lines for change in CDI scores symptoms over 2-year follow-up.

$t(306) = -0.88$, $p =$ n.s., effect size $r = 0.05$] or the follow-up phase [$\beta_{21} = 0.06$, $t(306) = 0.72$, $p =$ n.s., effect size $r = 0.04$]. We also found no differences between the two groups of Latino children in our intercept analyses at either the 1-year or 2-year follow-up points. The same pattern was evident for the African American children who were initially nonsymptomatic, as there was no difference in linear change of CDI scores between the control and intervention children during the acute phase [$\beta_{11} = -0.15$, $t(306) = -0.54$, $p =$ n.s., effect size $r = 0.03$] or the follow-up phase [$\beta_{21} = -0.01$, $t(306) = -0.28$, $p =$ n.s., effect size $r = 0.02$]. Intercept analyses also indicated no group differences at either the 1-year or 2-year follow-up points (see Fig. 3).

The best-fitting model for the initially nonsymptomatic children was one in which we allowed only the intercept to vary randomly [when compared to the null model, $\chi^2(1, N = 79) = 111.79$, $p < 0.0001$]. There was also significant random variation of the intercept [$\tau_{00} = 5.23$, $Z = 4.88$, $p < 0.0001$], suggesting that there is significant remaining variation in the starting point of depressive symptoms for the children in the sample. The fact that there was not support for a model that allowed random variation in either the acute slope or the follow-up slope suggests that there was not significant individual variability in the rate of change in depressive symptoms over time.

Negative cognitions

In Cardemil et al. (2002), we found that the PRP led to fewer negative automatic thoughts (ATQ) and fewer hopeless thoughts (H-Scale) for the Latino children across the 6-month follow-up period. Using the same analytic strategy described earlier, we found a similar pattern of results. Specifically, the Latino children who went through the PRP reported a significantly greater linear decrease in ATQ scores than the Latino control children during the acute phase [$\beta_{11} = -5.23$, $t(578) = -3.14$, $p < 0.01$, effect size $r = 0.13$], but not over the course of the 2-year follow-up phase [$\beta_{21} = 0.39$, $t(578) = 1.35$, $p =$ n.s., effect size $r = 0.16$]. Intercept analyses indicated that the difference between the Latino children who went through the PRP and the Latino control children only reached a trend level of significance at the 1-year follow up point [$\beta_{01} = -8.42$, $t(157) = -1.78$, $p < 0.10$, effect size $r = 0.14$] and was no longer significant at the 2-year follow-up point [$\beta_{01} = -3.85$, $t(157) = -0.59$, $p =$ n.s., effect size $r = 0.05$].

Analyses of scores on the H-Scale indicated that the differences in linear change between the two groups of Latino children did not reach statistical significance during either the acute phase [$\beta_{11} = -0.40$, $t(592) = -1.46$, $p =$ n.s., effect size $r = 0.06$], or the 2-year follow-up phase [$\beta_{21} = -0.02$, $t(592) = -0.51$,

p = n.s., effect size $r = 0.02$]. However, intercept analyses indicated that the Latino children in the PRP reported significantly lower H-Scale scores than the Latino control children at the 1-year follow-up point [$\beta_{01} = -1.73$, $t(157) = -2.38$, $p < 0.05$, effect size $r = 0.19$]. This difference was only a statistical trend at the 2-year follow-up point [$\beta_{01} = -2.02$, $t(157) = -1.90$, $p < 0.10$, effect size $r = 0.15$].

For the two groups of African American children, we again found no differences in scores on the ATQ or H-Scale during either the acute phase or the follow-up phase. Moreover, intercept analyses yielded no differences on any of the measures between the two groups at either the 1-year or the 2-year points.

Self-esteem

We had previously found that the Latino children who went through the PRP reported higher self-esteem (SPPC) across the course of the 6-month follow-up period (Cardemil et al., 2002). These benefits did not continue across the 2-year follow-up period, however, as there were no differences between the two groups of Latino children. There continued to be no differences between the two groups of African American children.

Additional follow-up analyses

In addition to these outcome analyses, we also followed up on two sets of findings from the Latino children that we presented in the original paper (Cardemil et al., 2002). First, we originally had described a nonsignificant trend for there to be fewer Latino children in the PRP condition to report clinically significant CDI scores (i.e., greater than or equal to 20). This nonsignificant pattern continued, but the numbers were too low to allow for any meaningful statistical analyses: 1 child in the PRP condition and 2 in the control condition scored over 20 on the CDI at both the 1-year and 2-year follow-up periods.

The second additional finding in Cardemil et al. (2002) that we explored in this article related to mediation analyses that we conducted, also with the Latino children. In the original article, we found that for the Latino children, change in ATQ scores over the course of the PRP was a significant mediator of the effect on depressive symptoms through the 6-months of follow-up. However, the intercept analyses at the 1-year and 2-year follow-up points indicated that the ATQ scores did not significantly differ between the Latino prevention and control children. This non-finding precluded us from conducting mediation analyses, since the first condition outlined by Baron and Kenny (1986) was not met.

Treatment adherence

In an exploratory fashion, we were interested in examining the extent to which treatment adherence might be related to outcome for those children who participated in the PRP, and whether or not treatment adherence might explain some of the racial/ethnic differences we found and have reported earlier (Cardemil et al., 2002). Thus, for our index of treatment adherence, we calculated sessions attended. Children who attended fewer than three sessions were considered *low attenders*; those who attended between four and six sessions were considered *medium attenders*; and those who attended over seven sessions were considered *high attenders*. Using dummy variables to code for attendance, we conducted HLM analyses with only the children who were randomized to the intervention condition.

Overall, there was only a modest effect of treatment adherence on outcome. In particular, there was no effect of treatment attendance on change in CDI scores over the course of either the acute phase or the 2-year follow-up phase. Intercept analyses, however, indicated that children who were *high attenders* reported significantly lower CDI scores than children who were *medium attenders* at post-intervention [$\beta_{02} = 4.31$, $t(68) = 2.11$, $p < 0.05$, effect size $r = 0.25$], the 3-month follow-up point [$\beta_{02} = 4.24$, $t(68) = 2.16$, $p < 0.05$, effect size $r = 0.25$], the 6-month follow-up point [$\beta_{02} = 4.17$, $t(68) = 2.17$, $p < 0.05$, effect size $r = 0.25$], and at the 1-year follow-up point [$\beta_{02} = 4.04$, $t(68) = 2.01$, $p < 0.05$, effect size $r = 0.24$]. This difference was no longer significant at the 2-year follow-up point [$\beta_{02} = 3.77$, $t(68) = 1.42$, p = n.s, effect size $r = 0.17$]. The difference between *high attenders* and *low attenders* was in the same direction at each of the follow-up points, but did not meet statistical significance [post-intervention: $\beta_{01} = 4.26$, $t(68) = 1.89$, $p < 0.10$, effect size $r = 0.22$; 3-month: $\beta_{01} = 4.15$, $t(68) = 1.92$, $p < 0.10$, effect size $r = 0.23$; 6-month: $\beta_{01} = 4.15$, $t(68) = 1.91$,

$p<0.10$, effect size $r = 0.23$; 1-year: $\beta_{01} = 3.85$, $t(68) = 1.76$, $p<0.10$, effect size $r = 0.21$]. The differences between *high attenders* and *medium* and *low attenders* was not significant at the 2-year follow-up point. None of the interactions between attendance and race/ethnicity were significant, suggesting that attendance did not differentially affect the response of the Latino and African American children to the PRP.

Discussion

In Cardemil et al. (2002), we found that the PRP produced beneficial results for the Latino children, but not for the African American children. These effects encompassed depressive symptoms, negative cognitions, and self-esteem and extended over 6 months of follow-up. In this article, we examine the extent to which the effects of the PRP continued over a 2-year follow-up period. Specifically, we investigated whether the Latino children who participated in the PRP would continue to demonstrate a beneficial effect as compared to the no-intervention control children. In addition, we were interested in determining whether the PRP would show a delayed effect with the African American children over the 2-year follow-up period.

Latino children

Our first set of findings, which is consistent with that reported by Cardemil et al. (2002), demonstrated that the Latino children who went through the PRP continue to report some benefit from the PRP as compared to the control children. This beneficial effect was attenuated as compared to the 6-month results, however, since the significant differences in negative cognitions only existed at the 1-year follow-up point, and there was no differential effect on self-esteem. Our results also suggest the Latino children who particularly benefited were those who were initially symptomatic, not those children who were initially nonsymptomatic.

These results add to the growing body of evidence suggesting that depression prevention programs can be efficacious. The PRP is a low-cost, short-term intervention that can be implemented during the school day, and the fact that we were able to provide a particular benefit to mildly symptomatic children highlights the role that schools can play in the delivery of coping skills to low-income, racial/ethnic minority children. This role can be potentially quite important, since many parents of low-income, racial/ethnic minority children might not utilize formal mental health services for a variety of reasons (US Department of Health and Human Services, 2001).

Although the PRP did not benefit the initially nonsymptomatic children, it is difficult to determine the extent to which we were able to truly address this question since so few of the nonsymptomatic children reported an increase in depressive symptoms. While it is conceivable that the nonsymptomatic children were particularly resilient, it is also possible that a longer follow-up period would have produced more variability in depressive symptoms (and thus a possible PRP effect). Clearly, more research is needed with regards to the developmental trajectory of depressive symptoms through adolescence, particularly for low-income, racial/ethnic minority children like those in our sample.

African American children

The second set of findings, also consistent with our earlier results, was that the PRP was not differentially efficacious for the African American children. It is important to highlight the fact that the African American children who went through the PRP did report a significant reduction in depressive symptoms over the 2-year follow-up period. Thus, the primary reason for the lack of a differential effect was that the African American control children also reported a significant natural reduction in symptoms over the follow-up period. This pattern was the same for both the initially symptomatic and the initially nonsymptomatic children. In support of the premise that the lack of an effect with the African American children was due primarily to a natural improvement in the control children was the absence of any relevant race/ethnicity differences at baseline, any race/ethnicity differences in attendance during the intervention itself, or any differences in dropout over the course of the follow-up period.

Thus, we believe that there is more to gain by focusing on understanding the reduction in depressive symptoms reported by the African American control children, since it is counter to the general pattern of

increasing depressive symptoms reported in the literature on early adolescence (e.g., Petersen et al., 1993). Some other researchers have also found that African American children report fewer depressive symptoms than Caucasian and Latino children (Twenge & Nolen-Hoeksema, 2002), but these findings are far from conclusive (e.g., Roberts & Sobhan, 1992), highlighting the need to conduct more research with understudied populations.

In our study, we remain unable to convincingly explain the reduction in depressive symptoms reported by the African American control children. It is possible, as others have speculated, that African American children living in low-income, urban communities begin to underreport depressive symptoms as they grew older due to concerns about being perceived as weak (Attar, Guerra, & Tolan, 1994). But this explanation would have to account for why the Latino children, who live in similar low-income, urban communities did not also underreport symptoms. Other researchers have suggested that race, ethnicity, and culture can affect the manifestation of depressive symptoms (e.g., Kleinman & Good, 1985). While intriguing, studies that have examined this possibility in the United States have found more similarities than differences among racial/ethnic groups (e.g., Roberts et al., 1995). Finally, perhaps the mental health of the African American children improved as they grew older. And yet, conversations with parents, teachers, and school administrators lead us to doubt this explanation. Thus, given the lack of research that directly addresses these possibilities, we can only add our support to the call to conduct more research with understudied groups (McLoyd & Steinberg, 1998; Sue, 1999).

Prevention versus treatment effects

In addition to the intriguing differential efficacy for the Latino and African American children who participated in the PRP, the results of this study also raise nosological questions with regards to the difference between prevention and treatment. As we described earlier, we conceptualized this intervention as a hybrid of a universal and selective intervention effort. And yet, the fact that the largest effects were found in the subsample of children who were initially symptomatic makes it reasonable to wonder if this intervention could be better understood as treatment for mild depression, rather than prevention of depression.

We continue to conceptualize this work under the umbrella of prevention for three reasons. First, we did not a priori selectively recruit only those children who were experiencing depressive symptoms. Rather, we explicitly extended invitations to all children (and their parents) who were interested in participating. Second, depressive symptoms are a robust predictor of more severe depression (Lewinsohn, Solomon, Seeley, & Zeiss, 2000). Thus, targeting mild symptoms of depression could also be understood as an effort to prevent the development of major depressive disorder; base rates of severe depression were too low in this sample to test this possibility in the present study. And finally, we were interested in examining the long-term effects of the PRP, which can more readily be understood from a prevention, rather than a treatment, perspective.

Nevertheless, the results from this study highlight the blurry boundary between prevention and treatment that others have also noted (e.g., Clark, 2004; Ingram, Odom, & Mitchusson, 2004; Muñoz, Le, Clarke, & Jaycox, 2002). This blurry boundary might be particularly salient for individuals who might normally avoid formal mental health treatment, since it has been argued that prevention programs can provide mental health services to individuals who might normally avoid formal treatment programs (Cardemil, 2002; Cardemil, Kim, Pinedo, & Miller, 2005). It will be interesting to see how future prevention research that works with underserved populations works through the distinctions between prevention and treatment interventions.

Limitations of the study

There are several limitations to this study that warrant mention. First, we only sampled children from two schools. As a result, our findings have limited generalizability, given that our sample came from two schools in one city in northeastern United States. In addition, the demographic breakdown of the two schools was such that there was a natural statistical confound between race/ethnicity and school. Because most of the Latino children came from one school and most of the African American children came from the second school, we cannot disentangle the effects of race/ethnicity from that of school. Thus, we cannot address the intriguing possibility that actual differences in depressive symptoms are culture-wide or school-specific.

A second limitation concerns the differential drop-out in our follow-up data. While HLM is well-equipped to handle missing data (Raudenbush & Bryk, 2002), it still must use estimates rather than actual data. As such, it is possible that some of our findings may be influenced by non-random dropout. For example, if the children in the control condition who dropped from the follow-up phase of our study were exhibiting lower depressive symptoms than the children who remained in our study, then the intervention effect would likely be less strong. However, we are skeptical about this possibility, as these results are broadly consistent with those reported by Cardemil et al. (2002), in which attrition rates never exceeded 26% through the 6-month follow-up period.

A third limitation concerns our reliance on self-report measures that have not been well-validated with low-income, racial/ethnic minority children. One way that future research could overcome the limited availability of measures that have been validated with low-income, minority groups is to incorporate additional sources of information, including clinical interviews and teacher and parent reports. Multiple perspectives can increase the confidence with which to interpret findings.

Future directions

We continue to be encouraged by the results from this study, because despite the aforementioned limitations, this study remains the only published work that has specifically focused on preventing depression with low-income, racial/ethnic minority children. In addition, this research highlights interesting larger conceptual issues about traditional categories of prevention and treatment research. We believe that the results from this work show that depression prevention is feasible and potentially valuable to its participants. And while this research raised as many questions as it answered, it is likely that these questions can be answered within a prevention research framework. It is this framework, building on itself in an iterative fashion, which ultimately may be the best way to reach and improve the mental health of children living in low-income, urban communities.

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