Mediators and Moderators of Outcome in the Behavioral Treatment of Childhood Social Phobia

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ABSTRACT

Objective: The current study examined mediators and moderators of treatment response among children and adolescents (ages 7–17 years) with a primary diagnosis of social phobia. **Method:** Participants were 88 youths participating in one of two randomized controlled treatment trials of Social Effectiveness Therapy for Children. Potential mediators included changes in observer-rated social skill and child-reported loneliness after 12 weeks of Social Effectiveness Therapy for Children. Age and depressive symptoms were examined as potential moderators. **Results:** Loneliness scores and social effectiveness during a role-play task predicted changes in social anxiety and overall functioning at posttreatment. Changes in social anxiety were mediated by child-reported loneliness. Outcomes were not moderated by age or depressive symptoms. **Conclusions:** Findings support the role of loneliness as an important mechanism of change during treatment for childhood social phobia. *J. Am. Acad. Child Adolesc. Psychiatry,* 2009;48(9):945–953. **Key Words:** social phobia, treatment, mediators, moderators.

Behavioral and cognitive-behavioral therapies (CBT) for childhood anxiety disorders are highly efficacious.[1] Across randomized controlled treatment trials, approximately one half to two thirds of anxious youths are considered to be responders (i.e., show significant reductions in anxiety and/or improvements in functioning) after treatment. These data are particularly encouraging, given the long-term correlates and deleterious outcomes associated with untreated (or unsuccessfully treated) anxiety.[2,3] On the other hand, the fact that as many as one half of anxious youths do not benefit substantially from these interventions underscores a need to better understand specific factors associated with treatment response.

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Within this context, several studies have examined predictors of treatment outcome among children with anxiety disorders. Using data from two treatment trials,[4,5] Berman et al.[6] examined the contribution of sociodemographic and diagnostic characteristics and child- and parent-reported symptoms as potential predictors of outcome in youths with heterogeneous anxiety disorders. A comorbid diagnosis of depression and higher levels of child-reported trait anxiety were found to predict treatment failure. In other investigations using children with various anxiety disorders, older child age, high levels of maternal depression and family dysfunction, and increased parental stress have been associated with poorer CBT outcomes.[7–9]

Although findings from such investigations are ultimately aimed at increasing the likelihood of treatment success, in fact, these data provide limited information about the variables of interest. Predictor analyses highlight significant associations between two variables, such as pretreatment maternal depression and posttreatment child anxiety, for all of the subjects in a given sample without regard to whether these associations vary for certain subgroups of participants. Furthermore, despite the fact that CBT has been shown to be effective for a majority of anxious youths, relatively little is known about "why" or "how" these treatments actually work.

Theoretical models have continued to flourish despite a general lack of data documenting changes in mechanisms hypothesized to underlie these childhood disorders. In the absence of a systematic understanding of active treatment ingredients, as well as the specific patients who are most likely to benefit from these interventions, tailoring treatments to match individual patient characteristics would seem unpromising.

As described in the literature, a moderator variable affects the direction and/or strength of a relation between independent and dependent variables, whereas a mediator variable refers to any patient characteristic that is changed during treatment and can account for observed changes in dependent measures.[10] Compared with those in adults, examinations of mediators and moderators of treatment outcome in anxious children are sparse. Moreover, in conjunction with theoretical models, research among adults has begun to advance beyond broad CBT-based models of anxiety, focusing on unique factors associated with outcomes for individual disorders.[11–14] For example, based on the frequent co-occurrence of social phobia (SP) and depression, as well as findings suggesting that SP patients with high levels of pretreatment depressive symptoms benefit less from CBT,[15] Moscovitch and colleagues[14] examined changes in social anxiety and depression during group treatment for adults with primary SP. Reductions in social anxiety fully mediated subsequent changes in depressive symptoms, whereas the reverse relation was not found. Thus, beyond a broad association between comorbid depressive symptoms and less positive treatment outcomes, these results imply that depression improves during treatment primarily as a function of diminished social anxiety.

In children, the vast majority of treatment outcome research has been conducted among youth with varied anxiety disorders: most commonly, generalized anxiety disorder (GAD), separation anxiety disorder, and SP.[16–19] "The high degree of overlap in symptoms and the distinction from other anxiety disorders (e.g., obsessive-compulsive disorder)" are cited as guiding factors in this methodological design.[19] Despite high rates of comorbidity, however, unique symptoms and impairments clearly exist, and research suggests that these disorders represent distinct constructs with potentially unique etiologic factors.[20] Among youth with SP, there is consistent evidence for social skill deficits and feelings of social isolation as core features of the disorder,[21–24] and behavioral treatment programs directly targeting these problems have produced positive findings. For example, using a CBT program that included social skills training, Spence and colleagues[25] reported that youth with SP evidenced significantly greater reductions in social anxiety and increases in social skill compared with a waitlist condition. Two other treatment outcome studies have produced similarly positive results.[26,27] After treatment with Social Effectiveness Therapy for Children (SET-C), which includes social skills training and unstructured peer generalization activities, more than half of youth with SP across both studies were treatment responders. A school-based adaptation of SET-C resulted in similar improvements in social anxiety, avoidance, and overall social functioning among SP adolescents.[28]

Because most treatment studies have included children with GAD, separation anxiety disorder, and SP and have not assessed unique features of these disorders (e.g., loneliness in SP), determination of specific mediators and moderators of change is hindered. Emerging treatment outcome data among youth with SP offer a unique opportunity to examine potential disorder-specific mediators associated with successful treatment. The current study therefore examined the role of several factors associated with changes during treatment in children and adolescents treated with SET-C. In selecting variables for consideration, we were guided by both the childhood anxiety treatment literature as well as developmental models of childhood SP.[23] Consistent with findings from previous research, we examined whether child's age and depressive symptoms moderated treatment outcomes. We hypothesized that an older age and greater levels of depressive symptoms would moderate posttreatment response to SET-C. We also examined whether observer-rated social skill during two behavioral tasks and child-reported loneliness mediated changes during treatment. We hypothesized that improved social skill and decreased loneliness would mediate improvements in social anxiety, global impairment, and overall functioning.

METHOD

Participants

Eighty-eight children and adolescents (ages 7–17 years) who completed one of two treatment trials for SP were included in the current study (n = 31 from reference 26 and n = 57 from reference 27).

Both studies were approved by the appropriate institutional review boards, and children and their parents provided informed assent/consent before participation. Recruitment occurred through media announcements (i.e., newspaper, radio, television) or through referrals from local professionals.

All of the youths met criteria for a primary diagnosis of *DSM-IV* SP (generalized subtype) based on child and parent semistructured diagnostic interviews (Anxiety Disorders Interview Schedule for Children [ADIS-C/P]).[29] To receive a diagnosis of SP, symptoms had to be of at least moderate severity (four or higher on an eight-point scale) and result in impairments in daily functioning. Symptoms associated with SP were required to be more severe/impairing than any other diagnosis based on ADIS-C/P clinical severity ratings (CSRs). Secondary diagnoses were allowed, provided that severity ratings and resulting impairments in functioning were less severe than those associated with SP. Youth with comorbid bipolar disorders, psychosis, conduct disorder, autism spectrum disorders, mental retardation, or moderate-severe depression who expressed active suicidal ideation were excluded. All children had at least average IQ based on assessment using the Wechsler Abbreviated Scale of Intelligence.[30]

Sociodemographic and diagnostic characteristics for the full sample are presented in Table 1. One half of all youths (n = 44) had at least one comorbid diagnosis including, most commonly, GAD (n = 19), specific phobias (n = 9), and attention-deficit/hyperactivity disorder (n = 8). Across the two treatment trials, there were no significant differences with respect to sociodemographic or diagnostic characteristics with the exception of age. The children participating in the 2007 study[27] were older on average (11.6 years [SD 2.6] versus 10.5 years [SD 1.6]) ($t_{86} = -2.07$, $p < .05$) than children participating in the 2000 study.[26]

In the 2000 study,[26] a total of 67 children with SP were randomized to either SET-C or an active nonspecific intervention called *Testbusters*.[31] Testbusters is a study-skills and test-taking strategy program that addresses skills such as establishing and practicing good study habits and test preparation. In the 2007 study,[27] a total of 122 children with SP were randomized to receive either SET-C, fluoxetine, or pill placebo. The SET-C assessments and treatment were identical across studies. Youths in both studies were considered treatment responders if they no longer met criteria for an SP diagnosis and/or if they had high-end state functioning (i.e., both a score <18 on the Social Phobia and Anxiety Inventory for Children [SPAI-C][32] and a Children's Global Assessment Scale [C-GAS][33] rating of 8 or 9) at posttreatment. Based on these criteria, 53 (60%) of the 88 participants were treatment responders at posttreatment.

Diagnostic Interviews

Diagnostic interviews were conducted by trained clinicians using the ADIS-C/P.[29] Adequate test-retest reliabilities for the ADIS-C/P anxiety disorder categories have been reported.[34] The parents and children were interviewed separately, and final diagnoses were based on composite ratings derived from both interviews. The interviewer also assigned a CSR for each disorder using a scale of 0 to 8. Twenty percent of the interviews were audiotaped and scored by a second interviewer to determine interrater agreement. Reliability for the diagnosis of SP was $\kappa = 0.85$ for reference 26 and $\kappa = 0.78$ for reference 27.

Independent Evaluator Ratings

An assessment of children's overall level of functioning was completed by interviewers at pretreatment and by an independent evaluator unaware of the child's treatment group assignment at all subsequent evaluations. Independent evaluators did not serve as therapists for either study. Interviewers and independent evaluators also completed the C-GAS,[33] a widely used measure of global impairment in functioning. Interrater reliability for the C-GAS was based on a random 20% of participants and was excellent: $r = 0.85$ for reference 26 and $r = 0.80$ for reference 27.

Self-Report Measures

The SPAI-C[32] is a 26-item instrument that assesses potentially fearful social situations in youth. For each item, children are given three choices from which they select the one that best describes how they feel/think/behave in different social situations. Internal consistency, concurrent validity, and 2-week test-retest reliability for the SPAI-C among the SP and nonanxious children are all excellent.

The Children's Depression Inventory[35] is the most widely used self-report depression inventory for children and adolescents and has been shown to be valid and reliable. For each of the 27 items, the children are given three choices from which they select the one that best describes how they have felt for the previous 2 weeks.

The Loneliness Scale (LS)[36] is a 24-item questionnaire focused on feelings of loneliness and social dissatisfaction. Children respond to each item on a five-point scale, indicating the degree to which each statement is true for them. Higher scores indicate greater loneliness and social dissatisfaction. Adequate internal consistency and reliability estimates have been reported.

Behavioral Assessment of Social Anxiety and Skill

At pretreatment and posttreatment, the participants completed two behavioral tasks: five brief role-plays and a read-aloud task. All role-plays were conducted with one same-age peer (i.e., within 2 years) trained to respond in a friendly but neutral manner. Sex of the peer was random, and participants and peers did not know each other before the assessment. Role-play scenes were designed to assess participants' ability to start a conversation, give a compliment, and respond assertively. For the read-aloud, participants read an age-appropriate story in front of the same peer for 10 minutes. All of the tasks were videotaped to establish interrater reliability, which was excellent (see references 26 and 27). For both tasks, social effectiveness (i.e., skill) and anxiety were rated on a four-point scale by observers naive to diagnostic status and treatment assignment.

Social Effectiveness Therapy for Children

Social Effectiveness Therapy for Children[26] is a 12-week manual-based treatment for youth with SP that includes social skills training, peer generalization experiences, and in vivo exposure. Social skills training and peer generalization is conducted in small groups (four to five youths), whereas in vivo exposure is conducted individually. Treatment consisted of one individual and one group session per week. Group sessions are 150 minutes in length (60 minutes of social skills training and 90 minutes of peer generalization) and were constituted with no more than a 3-year age span (e.g., 8–11 years). Social skills training was modified as needed as to be age appropriate. Peer generalization experiences directly followed social skills groups to allow children with SP to practice newly learned skills in a naturalistic setting. Peer activities varied depending on group age but typically included activities such as bowling, laser tag, and pizza parties. Same-age friendly peers recruited from the community were trained as facilitators and participated in peer generalization sessions.

TABLE 1

Means and SDs for the Primary Measures and Correlations

	Mean	SD	%	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Age, y	11.20	2.35															
Boys			51.1														
Ethnicity																	
White			70.1														
African American			20.7														
Other			9.2														
1 ADIS-C/P CSR	5.90	1.09		—													
2 SPAI-C	27.86	8.38		0.32*	—												
3 C-GAS	5.60	.98		−0.34*	−0.18	—											
4 LS	41.80	11.89		0.01	0.32*	−0.28*	—										
5 Role-play	2.05	.89		−0.06	−0.07	0.09	0.02	—									
6 Reading	2.68	1.03		−0.17	−0.23*	0.19	0.05	0.44*	—								
7 CDI	11.24	7.11		0.20	0.32*	−0.23*	0.65*	0.04	−0.01	—							
8 ADIS-C/P CSR	1.90	1.90		0.26*	0.28*	−0.20	0.15	−0.12	−0.26*	0.16	—						
9 SPAI-C	16.99	9.86		0.30*	0.44*	−0.16	0.32*	−0.25*	−0.32*	0.36*	0.61*	—					
10 C-GAS	7.40	1.03		−0.24*	−0.027*	0.31*	−0.19	0.21	0.35*	−0.18	−0.81*	−0.55*	—				
11 LS	34.94	10.54		0.06	0.25*	−0.22*	0.67*	−0.13	−0.15	0.51*	0.36*	0.59*	−0.41*	—			
12 Role-play	2.58	.93		−0.11	−0.20	0.08	0.17	0.65*	0.50*	0.12	−0.38*	−0.47*	0.44*	−0.12	—		
13 Reading	3.02	1.02		−0.15	−0.09	0.11	0.15	0.33*	0.54*	−0.11	−0.30*	−0.29*	0.28*	0.01	0.57*	—	
14 CDI	7.83	7.38		0.10	−0.30*	−0.06	0.50*	0.02	−0.13	0.50*	0.25*	0.48*	−0.17	0.54*	−0.06	−0.17	—

Note: Pretreatment: 1 to 7; posttreatment: 8 to 14. ADIS-C/P CSR = Anxiety Disorders Interview Schedule for Children for *DSM-IV* Child and Parent Clinical Severity Ratings; CDI = Children's Depression Inventory; C-GAS = Children's Global Assessment Scale; LS = Loneliness Scale; SPAI-C = Social Phobia and Anxiety Inventory for Children.

*$p < .05$.

Individual sessions, which averaged 60 minutes in length, targeted children's unique social fears through the use of in vivo exposures.

RESULTS

Preliminary Analyses

Outlier analyses were conducted to identify cases that might mask trends in the dataset. A leverage score was calculated for each case based on its multivariate profile for each of the variables entered in the models. An outlier was defined as any case having a leverage score four times the value of the mean leverage value[37] or a standardized *df* β larger than 2.0. No meaningful outliers were found. Missingness was tested by creating a dummy variable for each case, which was then correlated with sociodemographic data and scores on the variables of interest. Less than 2% of the data were missing, and missingness was not significantly correlated with any of the variables. Data were assumed to be missing at random, and thus, the full information maximum likelihood estimator was implemented in Mplus (version 5.10).[38]

Moderator Analyses for SET-C Outcomes

Regression analyses were used to examine whether pretreatment ADIS-C/P CSR, SPAI-C, and C-GAS scores interacted with age or pretreatment depressive symptoms to predict posttreatment ADIS-C/P CSR, SPAI-C, and C-GAS scores, respectively. All predictors were centered to reduce multicollinearity by subtracting the mean of a variable from each participant's score,[39] and interaction terms were the product of the two centered predictors. A total of six multiplicative interaction terms were created using the two putative moderators and three independent variables. Six hierarchical regression models were conducted in which the components of an interaction term were entered on the first step (e.g., age, SPAI-C), and the corresponding interaction term was entered in the second step (e.g., age × SPAI-C). No statistically significant moderator effects were found.

Mediator Analyses for SET-C Outcomes

We tested mediational hypotheses by testing the significance of the indirect effects of pretreatment variables on posttreatment variables through LS scores and social effectiveness on the two behavioral tasks.[40] Mplus offers the advantage of applying a product of coefficients strategy in the assessment of indirect effects. Specifically, partial mediation is assessed by a single variable (i.e., a partial indirect effect) in relation to the z distribution, with the ratio of the product of the (a) and (b) path coefficients over the normal-theory SE for that product. To assess the indirect effect operating through multiple mediators, the sum of the products of coefficients is taken over the square root of the asymptotic variance of the sum of those products, which provides a ratio to be evaluated in relation to the z distribution. With this approach, an approximate z statistic above 1.96 (absolute value) is considered statistically significant at the $p < .05$ level. Because the product of two coefficients is often skewed and highly kurtotic, we report confidence limits.[41] An indirect effect is considered significant if the interval between the upper and lower confidence limits does not contain zero. This approach has been shown to have higher power and lower type I error rates than other approaches.[41,42]

Three multiple mediation path models were estimated (Fig. 1A–C). As shown, the LS and social effectiveness variables were conceptualized as mediators of the relation between pretreatment and posttreatment scores on three outcomes: ADIS-C/P CSR, SPAI-C, and C-GAS. Figure 1 depicts a simplified version of the models as it excludes the covariates of pretreatment LS scores and social effectiveness ratings as well as the correlations among variables (although these variables were included in analyses). Pretreatment scores for the putative mediators were included in the model as control variables because partialling-out these variables essentially converts the posttest scores into a residual change variable.[43,44] Figure 1 shows the paths of interest and their associated standardized effect coefficients, whereas Table 2 shows test statistics corresponding to the total direct, total indirect (mediation), and total effects (direct + indirect) for each model.

The model shown in Figure 1A accounted for 39% of the variance in estimating posttreatment ADIS-C/P CSR ($z = 3.51$, $p < .001$). The pretreatment to posttreatment direct (c1) path approached significance ($\beta = .18$, $p = .05$). Results revealed significant direct (b) paths from LS scores and role-play social effectiveness to posttreatment ADIS-C/P CSR ($\beta = .29$, $p = .02$; $\beta = -.37$, $p = .005$) (b1, b2). However, none of the three direct (a1, a2, and a3) paths from pretreatment ADIS-C/P CSR to the mediator variables reached

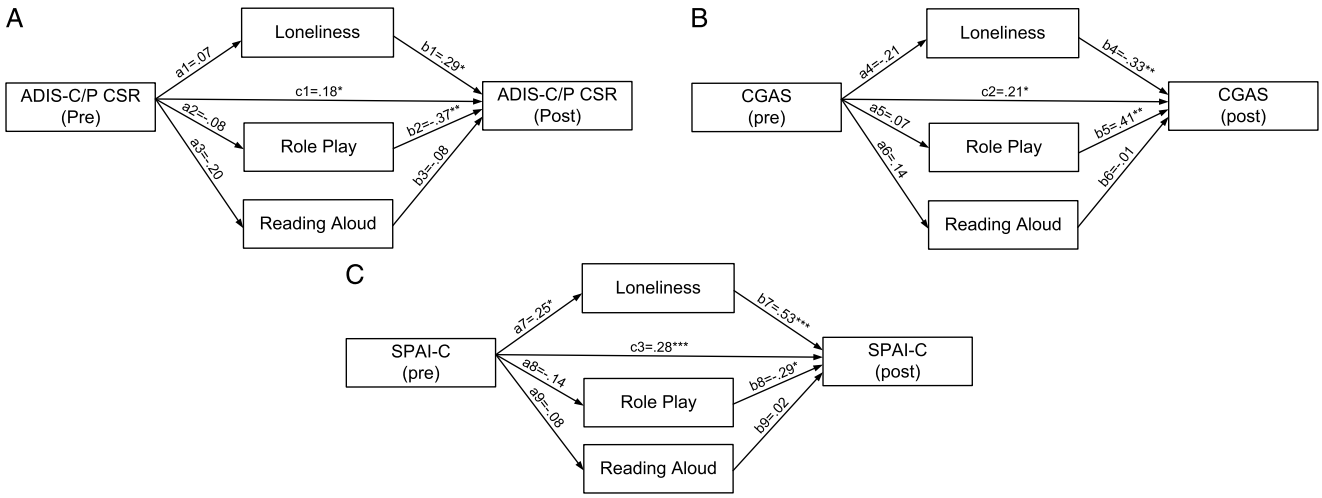

Fig. 1 The figure (A–C) excludes the covariates of pretreatment Loneliness Scale scores and social effectiveness ratings on the role-play and read-aloud tasks as well as the correlations among variables to avoid clutter, but these variables were included in tests of the model. Standardized effect coefficients for direct effects are shown. ADIS-C/P CSR = Anxiety Disorders Interview Schedule for Children for *DSM-IV* Child and Parent Clinical Severity Ratings; C-GAS = Children's Global Assessment Scale; SPAI-C = Social Phobia and Anxiety Inventory for Children. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

significance. In terms of total indirect effects, multivariate path analysis revealed that the association between pretreatment and posttreatment ADIS-C/P CSR was not mediated by the three hypothesized mediators (β = .07, p = .32). Additionally, the relation between pretreatment and posttreatment ADIS-C/P CSR was not mediated by any variable while controlling for the effects of pretreatment mediator scores.

The model shown in Figure 1B accounted for 42% of the variance in estimating posttreatment C-GAS scores (z = 4.26, p < .001). The pretreatment to posttreatment direct (c2) path was statistically significant (β = .21, p = .02). Results revealed significant direct (b) paths from LS scores and role-play social effectiveness to posttreatment C-GAS (β = −.33, p = .005; β = .41, p = .001) (b4, b5). However, none of the three direct (a4, a5, and a6) paths from pretreatment C-GAS scores to the hypothesized mediators were significant. Multivariate path analysis (total indirect effects) revealed that the association between pretreatment and posttreatment C-GAS scores was not mediated by the inclusion of the mediators (β = .10, p = .15). For specific indirect effects, the relation between pretreatment and posttreatment C-GAS scores was not mediated by any variable while controlling for the effects of pretreatment mediator scores.

The model shown in Figure 1C accounted for 57% of the variance in estimating posttreatment SPAI-C scores (z = 7.01, p < .001). A statistically significant pretreatment to posttreatment direct (c3) path was found (β = .28, p < .001). Results revealed significant direct (b) paths from LS scores and role-play social

TABLE 2
Standardized Effect Coefficients and Test Statistics for Multiple Mediation Model

	Direct Effects			Indirect Effects (Mediation)			Total Effects (Indirect + Direct)			
Outcome	β	SE	z Score	β	SE	z Score	β	SE	z score	Mediated Proportion of Total Effect
ADIS-C/P CSR	.03	0.14	0.53	.02	0.16	0.29	.05	0.21	0.58	0.40
SPAI-C	.22	0.10	2.63	.17	0.09	2.26	.39	0.13	3.54	0.44
C-GAS	.15	0.07	2.34	.08	0.07	1.19	.23	0.10	2.51	0.35

Note: Critical z scores of 1.96, 2.58, and 3.29 correspond to p values of .05, .01, and .001, respectively. All of the standardized effect coefficients associated SEs are rounded to the nearest hundredth. The model controlled for the pretreatment scores on each putative mediator. ADIS-C/P CSR = Anxiety Disorders Interview Schedule for Children for *DSM-IV* Child and Parent Clinical Severity Ratings; C-GAS = Children's Global Assessment Scale; SPAI-C = Social Phobia and Anxiety Inventory for Children.

effectiveness to posttreatment SPAI-C scores ($\beta = .53$, $p < .001$; $\beta = -.29$, $p = .02$) (b7, b8). The direct (a) path from pretreatment SPAI-C scores to LS scores also was significant ($\beta = .25$, $p = .02$) (a7). Additionally, multivariate path analysis revealed that the association between pretreatment and posttreatment SPAI-C scores to be partially mediated by the inclusion of the mediator variables ($\beta = .17$, $p = .02$). The LS scores significantly mediated the relation between pretreatment and posttreatment SPAI-C scores ($\beta = .13$, $p = .03$, lower control limit = .01, upper control limit = .31) while controlling for the effects of pretreatment LS scores.

DISCUSSION

Research has begun to examine predictors of treatment response among youth with heterogeneous anxiety disorders. However, emerging data reveal these disorders to represent distinct constructs with unique features and impairments and potentially unique etiologic mechanisms. Thus, there are compelling reasons to examine specific moderators and mediators of treatment outcome for individual disorders. Based on developmental models of SP, the current study examined several theoretically relevant moderators and mediators of treatment response among children participating in a trial of SET-C. Results revealed loneliness and social effectiveness ratings (while interacting with a peer) predicted SP severity, C-GAS and SPAI-C scores at posttreatment. Neither child's age nor depressive symptoms moderated SET-C outcomes. Additionally, changes in loneliness mediated posttreatment changes in social anxiety.

Contrary to our hypothesis, age did not moderate posttreatment outcomes. Rather than simply comparing treatment responders and nonresponders, however, the current study examined whether age moderates treatment outcomes among younger and older youth with SP. Although adolescents often present with a more pervasive pattern of social avoidance and greater levels of impairment,[45] the content of SET-C sessions were modified as needed to be age appropriate for younger and older children (e.g., using age-appropriate conversation topics). This likely resulted in a more robust and ecological validity treatment for all of the youths and may account for similar improvements across the age groups. Despite the current finding, explanations for why age may be associated with differential treatment outcomes are complex and several possibilities remain unexplored. For example, the extent to which a longer course of illness, timing of onset, and developmental changes in peer relationships and social demands have an impact on treatment responsiveness is generally unknown.

Similarly, depressive symptoms did not moderate treatment outcomes. Although not specifically examined among children with SP, Berman et al.[6] previously reported a comorbid diagnosis of depression to predict treatment failure, whereas Southam-Gerow et al.[8] did not find the Children's Depression Inventory scores to predict treatment response. The degree to which depressive symptoms may have an impact on treatment outcome may of course vary among disorders. In adults with SP, reductions in social anxiety fully mediate changes in depressive symptoms at posttreatment,[14] implying that depression both develops and improves as a function of changes in social anxiety. In children with SP, for whom comorbid depressive disorders are less common,[22] feelings of social isolation (i.e., loneliness) as opposed to hopelessness or anhedonia, for example, may be a more salient co-occurring feature of the disorder.

With respect to mediators, changes in feelings of loneliness partially accounted for changes in social anxiety. Although it is somewhat surprising that improved social skill did not also help to explain treatment outcomes, relations between social anxiety and children's social behaviors, peer interactions, and social appraisals are notably complex.[24,46,47] Although 12 weeks of group training may have produced only small changes in objective social skill, peer reactions and opportunities for social interaction may have significantly improved during the same period. Furthermore, self-perceptions of social effectiveness and peer acceptance, which are important factors in the maintenance of social anxiety[21,48,49] may improve at a different rate than actual skill and help to explain meditational findings. LS scores capture not only the number of friends a child has but also the child's perceived ability to make and keep friends in the future. Findings therefore highlight the importance of attending to overall social functioning and peer relationships during treatment. Moreover, because social effectiveness did predict changes in social anxiety and functioning at posttreatment, it will be important for future research to specifically examine the acceleration of change in social

skill (i.e., growth curve analyses) as a potential mediator of treatment response.

Notably, data were drawn from two separate treatment trials and not from one study specifically designed to assess mediators and moderators of treatment outcome. Although SET-C procedures were identical across trials, these studies did include different comparison conditions, and the potential impact of this is unclear. Additionally, although not the purpose of this study, the current design does not allow for the assessment of temporal associations as mediators were assessed conjointly with outcomes.[50] Future research will need to confirm that loneliness improves before improvements in social anxiety to adequately establish a mediational effect. The retrospective design also did not allow us to specifically examine more discrete aspects of children's peer relationships and social activities to more fully understand how changes in loneliness are linked to certain facets of socialization. However, based on the apparent relevance of loneliness for treatment, prospective investigations should examine these relationships.

Despite its limitations, this study represents the first attempt to examine mediators and moderators of treatment in youth with primary SP. Results suggest that improvements in social anxiety and overall functioning are predicted by decreases in loneliness and improvements in social skill irrespective of age and depressive symptoms. Decreases in loneliness specifically mediated improvements in social anxiety, supporting a focus on and inclusion of assessments of loneliness and social functioning as part of treatment. Clinicians may want to specifically assess these variables as children with SP proceed in treatment because changes in loneliness may herald upcoming decreases in social anxiety.

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