

## Original Investigation

# Prolonged Exposure vs Supportive Counseling for Sexual Abuse–Related PTSD in Adolescent Girls

## A Randomized Clinical Trial

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**IMPORTANCE** Evidence-based treatments for posttraumatic stress disorder (PTSD) have not been established for adolescents despite high prevalence of PTSD in this population.

**OBJECTIVE** To examine the effects of counselor-delivered prolonged exposure therapy compared with supportive counseling for adolescents with PTSD.

**DESIGN, SETTING, AND PARTICIPANTS** A single-blind, randomized clinical trial of 61 adolescent girls with PTSD using a permuted block design. Counselors previously naive to prolonged exposure therapy provided the treatments in a community mental health clinic. Data collection lasted from February 2006 through March 2012.

**INTERVENTIONS** Participants received fourteen 60- to 90-minute sessions of prolonged exposure therapy (n = 31) or supportive counseling (n = 30).

**MAIN OUTCOMES AND MEASURES** All outcomes were assessed before treatment, at mid-treatment, and after treatment and at 3-, 6-, and 12-month follow-up. The primary outcome, PTSD symptom severity, was assessed by the Child PTSD Symptom Scale–Interview (range, 0-51; higher scores indicate greater severity). Secondary outcomes were presence or absence of PTSD diagnosis assessed by the *DSM-IV* Schedule for Affective Disorders and Schizophrenia for School-Age Children and functioning assessed by the Children's Global Assessment Scale (range, 1-100; higher scores indicate better functioning). Additional secondary measures, PTSD severity assessed by the Child PTSD Symptom Scale–Self-Report (range, 0-51; higher scores indicate greater severity) and depression severity assessed by the Children's Depression Inventory (range, 0-54; higher scores indicate greater severity), were also assessed weekly during treatment.

**RESULTS** Data were analyzed as intent to treat. During treatment, participants receiving prolonged exposure demonstrated greater improvement on the PTSD symptom severity scale (difference between treatments in improvement, 7.5; 95% CI, 2.5-12.5;  $P < .001$ ) and on all secondary outcomes (loss of PTSD diagnosis: difference, 29.3%, 95% CI, 20.2%-41.2%;  $P = .01$ ; self-reported PTSD severity: difference, 6.2; 95% CI, 1.2-11.2;  $P = .02$ ; depression: difference, 4.9; 95% CI, 1.6-8.2;  $P = .008$ ; global functioning: difference, 10.1; 95% CI, 3.4-16.8;  $P = .008$ ). These treatment differences were maintained through the 12-month follow-up: for interviewer-assessed PTSD (difference, 6.0; 95% CI, 1.6-10.4;  $P = .02$ ), loss of PTSD diagnosis (difference, 31.1; 95% CI, 14.7-34.8;  $P = .01$ ), self-reported PTSD (difference, 9.3; 95% CI, 1.2-16.5;  $P = .02$ ), depression (difference, 7.2; 95% CI, 1.4-13.0;  $P = .02$ ), and global functioning (difference, 11.2; 95% CI, 4.5-17.9;  $P = .01$ ).

**CONCLUSION AND RELEVANCE** Adolescents girls with sexual abuse–related PTSD experienced greater benefit from prolonged exposure therapy than from supportive counseling even when delivered by counselors who typically provide supportive counseling.

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Adolescence is a unique developmental stage that is associated with increased exposure to traumatic events<sup>1</sup> that can lead to posttraumatic stress disorder (PTSD).<sup>2</sup> In turn, PTSD is associated with significant distress and functional impairment, increased risk for sexual revictimization,<sup>3</sup> substance abuse,<sup>4</sup> depression, anxiety disorders, and suicidality.<sup>5</sup> Prolonged exposure therapy<sup>6</sup> is the most studied evidence-based, theory-driven treatment<sup>7</sup> for adults with PTSD,<sup>8</sup> but it is rarely provided to adolescents because of concern that it may exacerbate PTSD symptoms<sup>9</sup> or the belief that patients must master coping skills before exposure can safely be provided.<sup>10</sup>

To our knowledge, there are no controlled studies on treatments for adolescents with PTSD except for one pilot study suggesting prolonged exposure is beneficial for this population.<sup>11</sup> The present study addresses this gap by comparing a prolonged exposure program modified for adolescents (prolonged exposure-A)<sup>12</sup> with supportive counseling among adolescent girls with sexual abuse-related PTSD. Whereas most PTSD treatment studies were conducted in academic clinic settings, the current study was conducted in a community mental health clinic by counselors who received relatively minimal training and supervision.

We hypothesized that prolonged exposure-A would be superior to supportive counseling, when measured after treatment and at 12-month follow-up, in reducing interviewer-assessed PTSD severity, rate of PTSD diagnosis, self-reported PTSD severity and depression, and improving general functioning. We also hypothesized that the degree of improvement of PTSD and depression would be greater during prolonged exposure-A than supportive counseling.

## Methods

Participants were adolescent girls seeking treatment at a rape crisis center in Philadelphia, Women Organized Against Rape (WOAR). Inclusion criteria were female sex, age 13 to 18 years, and a primary diagnosis from the *Diagnostic and Statistical Manual of Mental Disorders* (Fourth Edition, Text Revision) of chronic or subthreshold PTSD related to sexual abuse that occurred at least 3 months prior to assessment for the study. Subthreshold PTSD was defined as: 1 or more re-experiencing symptoms, 2 or more avoidance symptoms, 2 or more arousal symptoms, and a total score of 14 or greater on the Child PTSD Symptom Scale-Interview.<sup>13</sup> Exclusion criteria were current suicidal ideation with intent, uncontrolled bipolar disorder, schizophrenia, conduct disorder, pervasive developmental disorder, initiation of psychotropic medication within the previous 12 weeks, and current inpatient psychiatric treatment. Adolescents with substance use or suicidality without imminent threat were not excluded.

### Procedure

The study was approved by the University of Pennsylvania institutional review board and the executive board of WOAR. Sample size was determined by examining within-group effect sizes from Cohen et al.<sup>14</sup> Potential participants called WOAR's 24-hour hotline and completed an initial screening with

a WOAR counselor who assessed for sexual abuse and length of time since trauma. Adolescents who met these criteria and their nonoffending primary guardians were invited to participate in a pretreatment assessment with a doctoral-level clinical psychologist, who served as an independent evaluator blind to treatment condition. Participants and their primary guardians signed informed consent/assent forms and then completed a 2- to 3-hour baseline evaluation comprising a clinical interview to assess eligibility and self-report measures.

After the baseline evaluation, participants completed 1 to 3 preparatory sessions to address case management issues such as safety concerns, legal issues, parental involvement, and interest in receiving treatment. If safety issues (eg, active suicidal plans) were identified during the preparatory sessions, participants were excluded from the study and referred elsewhere. Participants who completed the preparatory phase were randomized to receive prolonged exposure-A or supportive counseling using a parallel design and a permuted block procedure with 10 randomizations per block (1:1 ratio), generated prior to beginning enrollment. On completing the preparatory phase but prior to the patient beginning treatment, a research assistant consulted the randomization table and notified the therapist of the patient's treatment condition.

### Assessment

Participants' demographic characteristics were collected at the baseline evaluation. Participants were asked to self-identify as black, white, Hispanic, biracial, other, or no response. Race/ethnicity data were collected for future moderator analyses.

Participants completed self-report measures of PTSD and depression prior to each treatment session and at all blinded independent evaluations, which occurred before treatment, at mid-treatment, and after treatment and at 3-, 6-, and 12-month follow-up.

### Primary Outcome

The Child PTSD Symptom Scale-Interview (CPSS-I)<sup>13,15</sup> assesses PTSD diagnosis and symptom severity for ages 8 to 18 years. Scores range from 0-51 (0-10, below threshold; 11-15, subclinical; 16-20, mild; 21-25, moderate; 26-30, moderately severe; 31-40, severe; 41-51, extremely severe). It has excellent internal consistency (Cronbach  $\alpha = .83-.89$ )<sup>13,15</sup> and test-retest reliability (.84-.86).<sup>13,15</sup> Convergent validity and discriminant validity are high.<sup>13,15</sup>

### Secondary Outcomes

The *DSM-IV* Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS)<sup>16</sup> is a semistructured interview assessing current and lifetime psychiatric disorders. It has excellent psychometric properties.<sup>16</sup> The K-SADS PTSD module was administered at all independent evaluator assessments to determine presence/absence of PTSD diagnosis.

The Child PTSD Symptom Scale-Self-Report (CPSS-SR)<sup>13,15</sup> assesses PTSD severity for ages 8 to 18 years. Scores and anchors are the same as those of the CPSS-I. The CPSS-SR has excellent psychometric properties that are equivalent to those of the CPSS-I. Diagnostic agreement between the CPSS-SR and CPSS-I is excellent (85.5%).<sup>15</sup>

The Children's Depression Inventory (CDI)<sup>17</sup> is a self-report scale for ages 7 to 17 years that evaluates depression severity. Scores range from 0 to 54 (0-13, no depressive disorder; 14-19, possible depressive disorder; 20-54, depressive disorder).<sup>18</sup> It has good internal consistency and test-retest reliability.<sup>19</sup>

The Children's Global Assessment Scale (CGAS)<sup>20</sup> is a clinical judgment rating of functioning for children aged 4 to 18 years. Scores range from 1 to 100 (1-10, needs supervision; ...51-60, variable functioning with sporadic difficulties; ...91-100, superior functioning in all areas). It has excellent interrater reliability ( $r = 0.85$ ).<sup>20</sup> The CGAS was completed by the independent evaluator at all of their assessments.

The Expectancy of Therapeutic Outcome for Adolescents (ETO-A) assesses participants' expectancy of treatment efficacy using 4 items inquiring about the logic of the treatment, its success in reducing trauma-related symptoms and other problems, and how confident the adolescent would be in recommending the treatment. The ETO-A was completed at session 1, after the treatment rationale was explained to the participant.

### Treatments

Treatment was delivered by 4 master's-level counselors at WOAR who received group supervision every other week from 2 of the authors (E.B.F. and S.C.). Counselors attended a 4-day prolonged exposure training workshop (E.B.F.) and two 2-day supportive counseling trainings conducted by Judith Cohen, MD, and Esther Deblinger, PhD.<sup>14</sup>

The prolonged exposure–A program<sup>12</sup> consists of up to 14 weekly 60- to 90-minute sessions. Treatment comprises 8 modules, each focusing on illustrating a particular component in the session. Homework exercises provide the opportunity for repeating the material outside of session. The program format allows flexibility for the counselor to present a module in 1 or more sessions depending on the adolescent's developmental level, attention span, and specific needs.

Module 1 presents the treatment rationale. Module 2 includes information gathering, identifying an index trauma, and conducting a breathing retraining exercise. Module 3 presents common reactions to trauma. Module 4 includes discussion of the rationale for in vivo exposure (confronting trauma reminders in real life), creation of the in vivo hierarchy, and assignment of in vivo homework. Module 5 includes presentation of the rationale for imaginal exposure (revisiting and recounting the traumatic memory), conducting imaginal exposure for 15 to 45 minutes, and processing this revisiting experience. This module is repeated for 2 to 5 sessions. In module 6, the imaginal exposure focuses on the worst moments of the trauma. Module 6 is repeated for 4 to 7 sessions. Module 7 focuses on generalization of skills learned in treatment and on relapse prevention. Module 8 comprises a "final project," such as making booklets detailing the trauma and the gains made in treatment.

Supportive counseling consisted of up to 14 weekly 60- to 90-minute sessions of client-centered therapy<sup>21</sup> for traumatized children. Client-centered therapy is based on the Traumatic Dynamics Model<sup>22</sup> of symptom formation after child

sexual abuse and the Rogerian psychotherapy model.<sup>23</sup> Supportive counseling sessions focus on establishing a trusting, empowering, and validating therapeutic relationship. Participants are allowed to choose when, how, and whether or not to address their trauma. In session 1, participants are oriented to supportive counseling. Counselors provide active listening, empathy, and encouragement to talk about feelings and express belief in the participant's ability to cope. In sessions 4 and 8, participants are asked how they feel about their trauma. With this exception, participants direct the sessions. Counselors note discussion of the trauma and the time devoted to such discussions. No participants in the supportive counseling condition described their trauma during the sessions.

### Treatment Adherence

Counselors' adherence to treatment protocols was monitored via review of session videos during supervision meetings. Additionally, 20% of treatment sessions were randomly selected and rated by trained adherence raters who were otherwise uninvolved in the study. Raters assessed adherence to essential components of each treatment and monitored protocol violations.

### Data Analysis

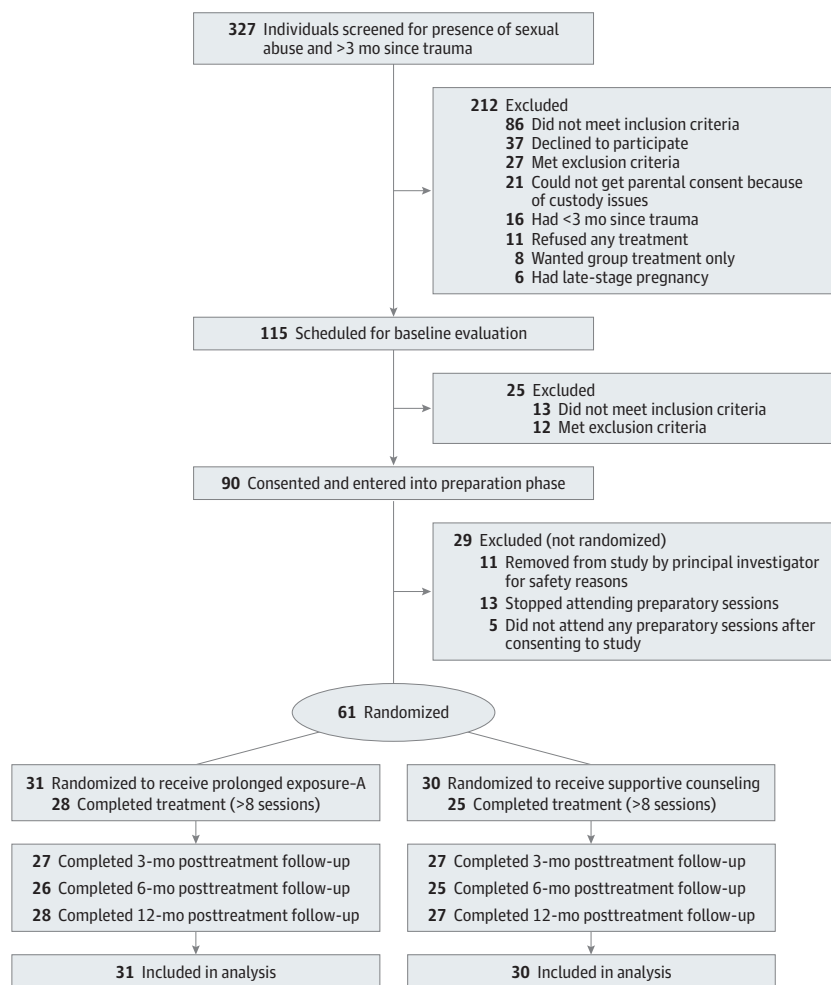
Piecewise linear mixed models (LMMs) using SPSS version 19 (IBM SPSS) were used to analyze the continuous data. Generalized LMM, using the logistic linking function of HLM version 7.0 (Scientific Software International), was used to analyze the dichotomous outcome of PTSD diagnosis. The LMMs include all randomized participants regardless of missing data. Piecewise analyses calculate separate models for treatment and follow-up. Change during each of these 2 phases was first modeled as quadratic, but nonsignificant quadratic terms were dropped. Age and baseline diagnosis of depression were included as covariates in all analyses. The LMM effect sizes were calculated for treatment differences on the primary outcome (CPSS-I). Pattern mixture modeling, which codes different patterns of missing data (eg, no missing, sporadic missing, dropouts),<sup>24</sup> was used to investigate whether the LMM results varied according to the pattern of missing data.

We obtained 90.1% of the possible assessments for our primary outcome, CPSS-I. For the secondary outcomes, we obtained 91.8% of the possible K-SADS assessments, 84.5% of the CPSS-SR assessments, 69.5% of the CDI assessments, and 86.3% of the CGAS assessments. We found no evidence that missing data affected any of the results reported herein.

Consistent with Jacobson and Truax,<sup>25</sup> "good response" was defined as CPSS-I scores greater than 2 SD below the baseline mean. Fisher exact tests compared proportion of participants with good response across treatments. We used multiple imputation (10 imputed samples) to impute CPSS-I scores for calculating "good response" for participants with missing data.

Power analyses using the program PinT, version 2.12,<sup>26</sup> indicated greater than 0.95 power to detect a medium effect size ( $d = 0.50$ ) for differences between group means after treatment or at follow-up. Thus, we had sufficient power to detect

Figure. Consort Diagram of Participant Flow Through the Protocol



Prolonged exposure-A indicates prolonged exposure program modified for adolescents.

differences of 4.75 on the CPSS-I, 4.82 on the CPSS-SR, 3.77 on the CDI, and 6.48 on the CGAS (these differences constitute medium effect sizes).

To correct for possible inflation of type I error due to multiple dependent variables, we used the Benjamini-Hochberg-Yekutieli<sup>27</sup> procedure to correct the *P* values of the tests. All *P* values reported are the corrected *P* values.

## Results

The Figure depicts participant flow through the study. Table 1 provides demographic data for the sample. From February 2006 through March 2012, 115 adolescent girls completed the baseline evaluation; 90 adolescents were judged eligible for the study and entered the prerandomization preparatory phase (range = 1-3 sessions; mean [SD] 1.5 [0.72] sessions); 61 adolescents were randomized to receive either prolonged exposure-A (n = 31) or supportive counseling (n = 30) and were included in analyses. Recruitment was concluded when the proposed number of participants was reached. Treatment completion was defined as receiving at least 8 of the possible

14 treatment sessions (60-90 minutes each). Three participants in prolonged exposure-A (9.7%) and 5 in supportive counseling (16.6%) did not complete at least 8 treatment sessions (*P* = .47). Adherence to prescribed components of the treatments was 90.8% for prolonged exposure-A and 90.5% for supportive counseling. There were no baseline differences between prolonged exposure-A and supportive counseling on any of the demographic or psychological variables (all *P* > .17).

### Acute Treatment Phase

#### Primary Outcome

Table 2 shows that both prolonged exposure-A and supportive counseling participants demonstrated significant improvement from baseline to posttreatment on PTSD symptom severity as measured by the CPSS-I (prolonged exposure-A improvement, 20.1; 95% CI, 16.7-23.6; *t*<sub>57</sub> = 11.35; *P* < .001; *d* = 2.72; supportive counseling improvement, 12.6; 95% CI, 9.0-16.2; *t*<sub>60</sub> = 6.83; *P* < .001; *d* = 1.71). However, consistent with our hypothesis, improvement in prolonged exposure-A was significantly greater than improvement in supportive counseling (difference in improvement, 7.5; 95% CI, 2.5-12.5; *t*<sub>59</sub> = 2.93; *P* < .001; *d* = 1.01).

**Table 1. Demographic Variables for the Intent-to-Treat Sample (N=61)**

|   | Total Sample (N = 61) | Prolonged Exposure-A (n = 31) | Supportive Counseling (n = 30) | P Value |
|---|-----------------------|-------------------------------|--------------------------------|---------|
| Age, mean (95% CI)  | 15.3 (15.0-15.7)      | 15.4 (14.9-15.8)              | 15.3 (14.7-15.9)               | .89     |
| Race/ethnicity, No.   |                       |                               |                                |         |
| Black   | 34                    | 19                            | 15                             |         |
| White   | 11                    | 5                             | 6                              |         |
| Hispanic  | 10                    | 3                             | 7                              |         |
| Biracial  | 2                     | 0                             | 2                              |         |
| Other or no response  | 4                     | 4                             | 0                              |         |
| Had ≥1 comorbid psychiatric diagnoses, No.                    | 35                    | 20                            | 15                             |         |
| No. of preparatory sessions, mean (95% CI)                    | 1.5 (1.3-1.7)         | 1.5 (1.2-1.7)                 | 1.5 (1.3-1.8)                  | .79     |
| No. of treatment sessions, mean (95% CI)                      | 11.5 (10.6-12.4)      | 12.0 (11.0-13.0)              | 11.0 (9.5-12.5)                | .29     |
| Treatment completers, No. (%) <sup>a</sup>                    | 53 (86.9)             | 28 (90.3)                     | 25 (83.3)                      | .47     |
| Expectancy of therapeutic outcome, mean (95% CI) <sup>b</sup> | 25.3 (23.8-26.7)      | 24.9 (22.4-27.4)              | 25.6 (23.9-27.2)               | .68     |

Abbreviation: prolonged exposure-A, prolonged exposure therapy for adolescents.

<sup>a</sup> Those adolescents who completed ≥8 treatment sessions.

<sup>b</sup> Participants' rating of their expectancy concerning the efficacy of the treatment. These numbers indicate moderate to high expectancy that the treatment will be effective. No difference between groups indicates that both treatments were perceived as equally effective.

**Table 2. Primary and Secondary Outcomes at Baseline, After Treatment, and at 12-Month Follow-up<sup>a</sup>**

|  | Total Sample (N = 61) | Prolonged Exposure-A (n = 31) | Supportive Counseling (n = 30) | Between-Treatment Differences in Improvement From Baseline | P Value            |
|--|-----------------------|-------------------------------|--------------------------------|--|--------------------|
| <b>Primary Outcome</b>                                   |                       |                               |                                |  |                    |
| Interviewer-rated PTSD (CPSS-I), mean (95% CI)           |                       |                               |                                |  |                    |
| Baseline   | 28.3 (26.5-30.2)      | 27.3 (24.7-29.9)              | 29.4 (26.7-32.0)               |  |                    |
| Posttreatment  | 11.3 (8.7-13.8)       | 6.7 (3.2-10.2)                | 16.1 (12.5-19.7)               | 7.5 (2.5-12.5)   | <.001 <sup>b</sup> |
| 12-mo follow-up  | 10.9 (8.3-13.5)       | 7.3 (4.0-10.5)                | 15.1 (11.7-18.4)               | 6.0 (1.6-10.4)   | .02 <sup>b</sup>   |
| Good responders, % (95% CI) <sup>c</sup>                 |                       |                               |                                |  |                    |
| Posttreatment  | 50.7 (38.2-63.4)      | 73.3 (58.6-89.8)              | 27.3 (10.7-42.7)               |  | .001               |
| 12-mo follow-up  | 55.9 (46.6-71.4)      | 71.7 (62.5-92.3)              | 39.7 (22.3-57.7)               |  | .02                |
| <b>Secondary Outcomes</b>                                |                       |                               |                                |  |                    |
| Lost diagnosis of PTSD (K-SADS), % (95% CI) <sup>d</sup> |                       |                               |                                |  |                    |
| Baseline   | 0.0 (0.0-0.0)         | 0.0 (0.0-0.0)                 | 0.0 (0.0-0.0)                  |  |                    |
| Posttreatment  | 68.9 (57.3-80.6)      | 78.4 (60.6-89.6)              | 44.8 (26.5-64.1)               | 29.3 (20.2-41.2)   | .01 <sup>b</sup>   |
| 12-mo follow-up  | 72.7 (61.5-84.0)      | 89.0 (74.2-95.8)              | 54.7 (35.7-72.5)               | 31.1 (14.7-34.8)   | .01 <sup>b</sup>   |
| Self-reported PTSD (CPSS-SR), mean (95% CI)              |                       |                               |                                |  |                    |
| Baseline   | 30.0 (28.0-32.0)      | 28.6 (25.6-31.5)              | 31.4 (28.7-34.2)               |  |                    |
| Posttreatment  | 10.0 (7.5-12.6)       | 9.9 (6.1-13.7)                | 16.1 (12.3-20.0)               | 6.2 (1.2-11.2)   | .02 <sup>b</sup>   |
| 12-mo follow-up  | 11.8 (8.9-14.8)       | 7.1 (2.9-11.3)                | 17.0 (12.7-21.3)               | 9.3 (1.2-16.5)   | .02 <sup>b</sup>   |
| Depression (CDI), mean (95% CI)                          |                       |                               |                                |  |                    |
| Baseline   | 18.2 (16.5-20.0)      | 17.3 (15.0-19.6)              | 19.3 (16.6-21.8)               |  |                    |
| Posttreatment  | 8.3 (6.4-10.3)        | 6.1 (3.1-9.1)                 | 10.9 (7.8-13.9)                | 4.9 (1.6-8.2)  | .008 <sup>b</sup>  |
| 12-mo follow-up  | 8.9 (6.6-11.2)        | 5.9 (2.6-9.2)                 | 12.6 (9.2-16.1)                | 7.2 (1.4-13.0)   | .02 <sup>b</sup>   |
| Global functioning (CGAS), mean (95% CI)                 |                       |                               |                                |  |                    |
| Baseline   | 57.3 (55.4-59.1)      | 57.0 (54.3-59.7)              | 57.6 (55.0-60.2)               |  |                    |
| Posttreatment  | 69.8 (66.5-73.2)      | 74.4 (69.9-78.9)              | 65.8 (61.0-70.5)               | 10.1 (3.4-16.8)  | .008 <sup>b</sup>  |
| 12-mo follow-up  | 70.0 (66.4-73.5)      | 74.3 (69.4-79.1)              | 65.5 (60.5-70.5)               | 11.2 (4.5-17.9)  | .01 <sup>b</sup>   |

Abbreviations: CDI, Children's Depression Inventory; CGAS, Children's Global Assessment Scale; CPSS-I, Child PTSD Symptom Scale-Interview; CPSS-SR, Child PTSD Symptom Scale-Self-Report; K-SADS, Schedule for Affective Disorders and Schizophrenia for School-Age Children; prolonged exposure-A, prolonged exposure therapy for adolescents; PTSD, posttraumatic stress disorder.

<sup>a</sup> Baseline and total sample data reflect the raw means. Means for the treatment conditions at posttreatment and at 12-month follow-up and differences in improvement are taken from the linear mixed model growth curve analyses.

<sup>b</sup> This P value is for between-treatment differences in improvement.

<sup>c</sup> Those who had a score of ≤8 on the CPSS-I (≥2 SD below the baseline mean).

<sup>d</sup> Loss of PTSD diagnosis means that the participant no longer met DSM-IV criteria for PTSD based on K-SADS administered by an independent evaluator.



### Secondary Outcomes

Both prolonged exposure-A and supportive counseling participants showed significant decreases in rates of PTSD diagnosis on the K-SADS from baseline to posttreatment (% who lost PTSD diagnosis baseline to posttreatment in prolonged exposure-A, 83.3%; 95% CI, 77.2%-85.4%;  $t_{270} = 8.92$ ;  $P < .001$ ; % losing PTSD diagnosis in supportive counseling, 54.0%; 95% CI, 49.1%-56.5%;  $t_{270} = 8.33$ ;  $P < .001$ ). However, compared with supportive counseling participants, prolonged exposure-A participants showed a significantly greater decrease in rate of PTSD diagnosis (difference in loss of PTSD diagnosis between prolonged exposure-A and supportive counseling, 29.3%; 95% CI, 20.2%-41.2%;  $t_{270} = 2.65$ ;  $P = .01$ ).

From baseline to posttreatment, both prolonged exposure-A and supportive counseling participants reported significant improvement in self-reported PTSD severity, as measured by the CPSS-SR (prolonged exposure-A improvement, 20.6; 95% CI, 16.7-24.5;  $t_{202} = 10.23$ ;  $P < .001$ ; supportive counseling improvement, 14.4; 95% CI, 10.3-18.5;  $t_{208} = 6.79$ ;  $P < .001$ ). However, again the improvement was greater in prolonged exposure-A than in supportive counseling (difference in improvement, 6.2; 95% CI, 1.2-11.2;  $t_{209} = 2.41$ ;  $P = .02$ ). A similar pattern of results was reported for depressive symptoms as measured by the CDI. Both prolonged exposure-A and supportive counseling participants reported significant improvement in depressive symptoms from baseline to posttreatment (prolonged exposure-A improvement, 11.4; 95% CI, 9.2-13.6;  $t_{135} = 10.04$ ;  $P < .001$ ; supportive counseling improvement, 6.5; 95% CI, 4.0-9.0;  $t_{139} = 5.17$ ;  $P < .001$ ). However, the improvement in prolonged exposure-A was greater than in supportive counseling (difference in improvement, 4.9; 95% CI, 1.6-8.2;  $t_{137} = 2.91$ ;  $P = .008$ ). Finally, prolonged exposure-A and supportive counseling participants both showed improved functioning on the CGAS from baseline to posttreatment (prolonged exposure-A improvement, 17.8; 95% CI, 13.2-22.4;  $t_{55} = 7.53$ ;  $P < .001$ ; supportive counseling improvement, 7.7; 95% CI, 2.9-12.5;  $t_{58} = 3.13$ ;  $P = .003$ ). However, prolonged exposure-A participants demonstrated greater improvement in functioning than those receiving supportive counseling (difference in improvement, 10.1, 95% CI, 3.4-16.8;  $t_{57} = 2.95$ ;  $P = .008$ ).

### Follow-up Phase

#### Primary Outcome

During follow-up, neither treatment showed significant improvement on the CPSS-I (both  $P > .88$ ), nor were the treatment differences in improvement significant (both  $P > .89$ ). However, both treatments showed significant improvement from baseline to follow-up (prolonged exposure-A improvement, 19.8; 95% CI, 16.8-22.8;  $t_{52} = 12.87$ ;  $P < .001$ ;  $d = 2.67$ ; supportive counseling improvement, 13.8; 95% CI, 10.6-17.0;  $t_{62} = 8.33$ ;  $P < .001$ ;  $d = 1.87$ ). Consistent with our hypothesis, improvement in prolonged exposure-A was significantly greater than improvement in supportive counseling (difference in improvement, 6.0; 95% CI, 1.6-10.4;  $t_{57} = 2.67$ ;  $P = .02$ ;  $d = 0.81$ ).

#### Secondary Outcomes

There were no significant improvements on any of the secondary outcomes (loss of PTSD diagnosis, self-reported PTSD

symptom severity, depressive symptoms, or functioning) from posttreatment to follow-up (all  $P > .19$ ) (Table 2). Similarly, there were no differences between treatments in improvement on any of the secondary outcomes from posttreatment to follow-up (all  $P > .57$ ). However, there was significant improvement from baseline to follow-up in both treatments on all secondary outcomes (all  $P \leq .001$ ). Consistent with our hypothesis, the improvement from baseline to follow-up was greater for prolonged exposure-A participants than for supportive counseling participants on all secondary outcomes (for loss of PTSD diagnosis: difference in improvement between prolonged exposure-A and supportive counseling, 31.1; 95% CI, 14.7-34.8;  $t_{59} = 2.95$ ;  $P = .01$ ; for self-reported PTSD severity: difference in improvement, 9.3; 95% CI, 1.2-16.5;  $t_{59} = 2.55$ ;  $P = .02$ ; for depressive symptoms: difference in improvement, 7.2; 95% CI, 1.4-13.0;  $t_{139} = 2.43$ ;  $P = .02$ ; and for functioning: difference in improvement, 11.2; 95% CI, 4.5-17.9;  $t_{60} = 3.25$ ;  $P = .01$ ).

### Exploratory Analyses

We examined the proportion of participants who achieved good response to treatment (defined as CPSS-I  $\leq 8$ , which is equivalent to  $\geq 2$  SDs below the baseline mean) after treatment and at 12-month follow-up. Missing data were imputed using multiple imputation. Means and significance tests were pooled over the 10 imputed samples. After treatment, more prolonged exposure-A participants (pooled imputed  $n = 22.7$  of 31; 73.3%) were good responders than supportive counseling participants (pooled  $n = 8.2$  of 30; 27.3%;  $P = .001$ ). At 12-month follow-up, more prolonged exposure-A participants (pooled  $n = 22.2$  of 31; 71.7%) were good responders than those in supportive counseling (pooled  $n = 11.9$  of 30; 39.7%;  $P = .02$ ). No differences were found in the proportion of good responders after treatment who maintained good response at the 12-month follow-up (prolonged exposure-A, 81.5%, vs supportive counseling, 70.0%;  $P = .53$ ).

## Discussion

The results of this study indicate that after treatment, participants who received prolonged exposure-A showed greater improvement in PTSD symptoms and were more likely to lose their PTSD diagnosis and be classified as good responders (CPSS-I score  $\leq 8$ ) than those who received supportive counseling. Symptoms of PTSD for prolonged exposure-A participants were in the nonclinical range after treatment and at follow-up (below 10), whereas symptoms were in the low end of the clinical range (above 15) for supportive counseling participants. Moreover, participants who received prolonged exposure-A demonstrated greater improvement in depressive symptoms and functioning than those who received supportive counseling. The superiority of prolonged exposure-A over supportive counseling was also evident at 12-month follow-up. These results are consistent with those of Gilboa-Schechtman et al<sup>11</sup> and the adult PTSD treatment literature in which prolonged exposure has been found superior to supportive counseling treatments for both PTSD symptoms and associated problems.<sup>28</sup> It is inter-

esting to note that improvements made during treatment were maintained throughout the follow-up period, regardless of the type of treatment received.

There are 2 important aspects of the study. First, we adopted a rigorous randomized clinical trial design that affords clear conclusions from the results. Second, treatments were delivered by counselors at a community mental health clinic to treatment-seeking adolescents at that clinic. These counselors had no prior experience with manualized therapy or evidence-based approaches, including prolonged exposure–A. It is particularly compelling that prolonged exposure–A was superior to supportive counseling in the hands of counselors who were more accustomed to delivering counseling than prolonged exposure–A.

Several caveats should be noted. First, the prerandomization preparatory sessions may reduce generalizability to treatment studies in which participants are randomized immediately after the baseline evaluation. On the other hand, the preparatory sessions parallel routine clinical practice in which therapists typically spend some sessions preparing the patient before initiating an intervention. Notably, the average number of preparatory sessions was minimal: 1.48 for prolonged exposure–A and 1.53 for supportive counseling. Second, the preparatory sessions occurred prior to randomization, which may have biased the sample by excluding inappropriate participants and including more motivated ones. However, the preparatory sessions ensured participant safety by providing the flexibility to discuss important issues (eg, personal safety, information sharing with parents) germane to the developmental stage of adolescence. Notably, there were no differences between randomized and nonrandomized samples on any pretreatment variables. Third, because the sample comprised female adolescents whose PTSD was related to sexual abuse, the results may not generalize to PTSD related to other

types of traumas or to males. However, prolonged exposure for adolescents includes all the active components of prolonged exposure for adults, which has been found to be effective among men and women with PTSD related to a wide range of traumas. The close similarity between the 2 protocols strongly suggests that our results are generalizable to PTSD in adolescence in general. In addition, the study by Gilboa-Schechtman et al<sup>11</sup> found that prolonged exposure–A was effective for adolescent boys and girls with mixed traumas.

An important clinical implication of these results is the feasibility of disseminating and implementing prolonged exposure–A in community mental health clinics for adolescents who are motivated to participate in treatment. Prolonged exposure–A was successfully implemented by counselors with no prior training in evidence-based treatments and with relatively little supervision from experts. This is important because the need for evidence-based treatment of PTSD far exceeds the availability of these services. To address this disparity, the Veteran Affairs (VA) system and Department of Defense (DoD) have recommended prolonged exposure as a first-line treatment for PTSD and have promoted widespread dissemination of prolonged exposure.<sup>29–31</sup> Like the VA and DoD, community mental health clinics, and especially rape crisis clinics, which routinely treat traumatized patients, are a logical target for disseminating prolonged exposure.

## Conclusions

Adolescents with sexual abuse-related PTSD experienced greater benefit from prolonged exposure therapy than from supportive counseling even when treatment was delivered by counselors at a community mental health clinic who typically provide supportive counseling.

### ARTICLE INFORMATION

**Author Contributions:** Dr Foa had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

*Study concept and design:* Foa.

*Acquisition of data:* Capaldi.

*Analysis and interpretation of data:* McLean, Rosenfield.

*Drafting of the manuscript:* Foa, McLean, Capaldi, Rosenfield.

*Critical revision of the manuscript for important intellectual content:* Foa, Capaldi, Rosenfield.

*Statistical analysis:* Rosenfield.

*Obtained funding:* Foa.

*Administrative, technical, or material support:* Foa, Capaldi.

*Study supervision:* Foa, Capaldi.

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