

# Psychometric Properties of the Mini-Social Phobia Inventory

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**Objective:** Although a potentially useful measure, to date, there has been only one published test of the psychometric properties of the Mini-Social Phobia Inventory (Mini-SPIN). Therefore, the psychometric properties of the Mini-SPIN, a brief 3-item screen for social anxiety disorder, were examined.

**Method:** Participants were 186 patients diagnosed with social anxiety disorder (*DSM-IV* criteria) attending a specialized anxiety disorders clinic for treatment, and 56 nonclinical participants were recruited to serve as comparisons. Participants were diagnosed using the Anxiety Disorders Interview Schedule for *DSM-IV*, and they also completed the Mini-SPIN, the Social Interaction Anxiety Scale (SIAS), and the Social Phobia Scale (SPS). Construct validity for the Mini-SPIN was assessed by its correlations with the SIAS and the SPS. Reliability, internal consistency, discriminant validity, and sensitivity to change were also examined, and receiver operating characteristic curve analysis was conducted to determine guidelines regarding cutoff scores for the Mini-SPIN. The study was conducted between April 1999 and December 2001.

**Results:** Supporting findings from a previous study, strong support was found for the Mini-SPIN's ability to discriminate individuals with social anxiety disorder from those without the disorder. Receiver operating characteristic analysis revealed that using a cutoff score of 6 or greater ( $P < .001$ ), the Mini-SPIN demonstrates excellent sensitivity, specificity, and positive and negative predictive values.

**Conclusions:** Findings suggest that the Mini-SPIN is a reliable and valid instrument for screening social anxiety disorder in adults. Importantly, the use of the Mini-SPIN in primary care may be one way to address the underrecognition of social anxiety disorder in such settings. Due to the ease and brevity of the measure, it also shows potential for use in epidemiology. Given that this study has revealed the ability of the Mini-SPIN to reflect treatment change, the Mini-SPIN may also be considered for use in treatment outcome studies that specifically require minimal assessment.

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**T**he *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision (*DSM-IV-TR*)<sup>1</sup> stipulates that the central feature of social anxiety disorder is a marked and persistent fear of social or performance situations in which embarrassment may occur. Persons with generalized social anxiety disorder fear various social situations, including meeting new people and public speaking and situations that require assertive behaviors. Lifetime prevalence of social anxiety disorder has been reported to be as high as 12% of the general population.<sup>2</sup>

Social anxiety disorder can produce significant impairment for both the individual and for society at large.<sup>3–5</sup> For individuals with social anxiety disorder, it is typical that the social, interpersonal, and also the occupational aspects of their lives are significantly compromised.<sup>6,7</sup> In comparisons with the general population, it has been found that individuals with generalized social anxiety disorder are less likely to graduate from college, earn approximately 10% less in wages, report higher rates of unemployment, and are more frequently placed on disability or welfare.<sup>8</sup> Social anxiety disorder is a highly chronic condition that is unlikely to remit spontaneously.<sup>9,10</sup> Fortunately, social anxiety disorder responds moderately well to treatment with both cognitive-behavioral therapy (CBT) and medication.<sup>11,12</sup>

Despite research that shows there are efficacious treatments for social anxiety disorder, many persons with this disorder do not access treatment.<sup>13,14</sup> One possible reason is the documented underrecognition of social anxiety disorder in primary care settings.<sup>15,16</sup> Several factors may contribute to poor recognition. First, recognition of anxiety, as well as mood disorders, is hindered by the presentation of multiple, ill-defined complaints by primary care patients.<sup>17–19</sup> Hence, only the more severe cases may tend to be recognized.<sup>20</sup> Second, general practitioners' limited time for assessment is thought to contribute to low recognition rates of anxiety and mood disorders.<sup>21</sup> Third, low detection rates may also stem from a lack of comprehensive diagnostic knowledge of psychopathology by general practitioners.<sup>22</sup> Recognition of these issues has led to the recent development of screening tools designed for administration in primary health care settings. These measures generally consist of a number of questionnaire items calculated to screen patients who may suffer from psychiatric disorders and identify those who may need further assessment. One such measure is the Social Phobia

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## CLINICAL POINTS

- ◆ A short-form measure can facilitate the screening for social anxiety disorder.
- ◆ Social anxiety disorder is highly treatable, and physicians can help patients identify the need for treatment using a 3-item screening tool.

Inventory (SPIN), which was designed to assess the fear, avoidance, and physiologic symptoms common to social anxiety disorder.<sup>23</sup> The SPIN is a 17-item, self-rated measure that was found to have good psychometric properties in its original development.<sup>23</sup> More recent evaluations of the instrument have confirmed its usefulness.<sup>24</sup> While the SPIN appears to be of value as a measure of social anxiety disorder, one of its limitations as a screening tool, especially for use in primary care, is the relatively large number of items.

Given the importance of brevity in screening tools, the Mini-SPIN, a brief version of the SPIN, was designed to screen for individuals with generalized social anxiety disorder in primary care, psychiatric, and other medical settings.<sup>25</sup> The Mini-SPIN consists of a subset of 3 SPIN items that has shown high sensitivity and specificity for the diagnosis of generalized social anxiety disorder.<sup>25</sup>

Although a potentially useful measure, to date, there has been only one published test of the psychometric properties of the Mini-SPIN. The originators of the Mini-SPIN, Connor and colleagues,<sup>25</sup> found that, using a cutoff score of 6 or greater, the Mini-SPIN demonstrated a sensitivity of 88.7%, specificity of 90.0%, positive predictive value of 52.5%, and negative predictive value of 98.5%. They found that the scale possessed 90% accuracy (efficiency) in diagnosing the presence or absence of generalized social anxiety disorder in a managed care population.<sup>25</sup> However, some of the study's limitations included its manner of assessment: although structured clinical interviews were utilized, interviews were not conducted in person, and diagnostic reliability was not assessed. Further, no comparisons were made between the Mini-SPIN and other standard measures of social anxiety symptoms, and neither stability nor sensitivity to treatment was assessed in this initial study.

A brief diagnostic screen such as the Mini-SPIN is potentially valuable for use in medical practice as a time-efficient means of improving detection of social anxiety disorder and may serve as the first phase in facilitating assessment and treatment options. Moreover, a brief diagnostic screen such as the Mini-SPIN would lend itself to large scale epidemiologic research as well as other public health applications. For such purposes, any self-report instrument would need not only to be brief but also to possess excellent psychometric properties. Thus, the present study was designed to both replicate aspects of Connor

and colleagues' 2001 study<sup>25</sup> and further explore the psychometric properties of the Mini-SPIN.

## METHOD

## Participants

A total of 186 (51% female) clinical participants presented to the Macquarie University Anxiety Research Unit for assessment and treatment for social anxiety disorder. An additional 56 (63% female) nonclinical participants were recruited to serve as comparisons. The mean ages of the clinical and control groups were 34.6 (SD = 10.0) and 33.6 (SD = 11.2) years, respectively. There were no significant differences between the clinical and control groups on mean age ( $t_{240} = 0.6$ ,  $P = .53$ ), gender distribution ( $\chi^2 = 2.3$ ,  $df = 1$ ,  $N = 242$ ,  $P = .13$ ), marital status ( $\chi^2 = .4$ ,  $df = 4$ ,  $N = 242$ ,  $P = .84$ ), education ( $\chi^2 = 5.3$ ,  $df = 4$ ,  $N = 241$ ,  $P = .26$ ), employment status ( $\chi^2 = 4.5$ ,  $df = 3$ ,  $N = 240$ ,  $P = .21$ ), or income ( $\chi^2 = 13.6$ ,  $df = 7$ ,  $N = 240$ ,  $P = .06$ ).

All participants were interviewed by trained clinicians using the Anxiety Disorders Interview Schedule for *DSM-IV* (ADIS-IV).<sup>26</sup> Interrater reliability for a principal diagnosis of social anxiety disorder using the ADIS-IV was calculated for our clinic using  $\kappa$  coefficients and showed excellent agreement ( $\kappa = 0.87$ ). Avoidant personality disorder was diagnosed using the *International Classification of Disease, Tenth Revision (ICD-10)* International Personality Disorder Examination.<sup>27</sup> Interrater reliability was also calculated for avoidant personality disorder diagnoses for our clinic using  $\kappa$  coefficients and showed substantial agreement ( $\kappa = 0.78$ ). Interrater reliability was conducted by taping interviews and having second trained raters, who were blind to the original diagnoses, recode 25% of these interviews. All clinical participants met *DSM-IV* criteria for a principal diagnosis of social anxiety disorder. Additional rates of comorbidity for the clinical group included 54.3% avoidant personality disorder, 34.9% major depressive disorder, and 25.3% other anxiety disorder, and 4.3% were diagnosed with alcohol abuse/dependence. The control group did not meet criteria for any Axis I disorder, with the exception that 19.6% received a diagnosis of a specific phobia; data for these participants were retained. Among the clinical group, 5.9% were currently taking anxiolytic medication, and

19.4% were prescribed antidepressant medication; none of the control group reported current psychotropic use. Further, the control group reported having never sought help for any mental health difficulties.

### Measures

Participants were diagnosed by clinical psychologists or graduate students in clinical psychology (under supervision) using the ADIS-IV. The ADIS-IV is a semistructured interview with demonstrated reliability for the diagnosis of *DSM-IV* anxiety disorders and related affective disorders.<sup>26</sup> The ADIS-IV is considered the “gold standard” for assessment and diagnosis of anxiety disorders. All interviewers were trained to criteria on the administration of the ADIS-IV.

In addition to completing the ADIS-IV interview, participants also completed the following questionnaires:

The Mini-SPIN<sup>25</sup> is a 3-item self-rated measure. Answers to questions are rated on a 5-point scale as follows: 0 = not at all, 1 = a little bit, 2 = somewhat, 3 = very much, and 4 = extremely.<sup>25</sup> The 3 Mini-SPIN items include (1) “Fear of embarrassment causes me to avoid doing things or speaking to people,” (2) “I avoid activities in which I am the center of attention,” and (3) “Being embarrassed or looking stupid are among my worst fears.”

The Social Interaction Anxiety Scale (SIAS) and the Social Phobia Scale (SPS) are 20-item self-rated companion questionnaires designed to assess symptoms of social anxiety.<sup>28</sup> The SIAS was designed to measure fears related to social interaction defined as “distress when meeting or talking with other people,”<sup>28(p457)</sup> whereas the SPS provides a measure of more specific fears of being scrutinized during regular activities (such as eating or drinking in public).<sup>28</sup> Participants rate items on a 5-point scale, and total scores for both measures range from 0 to 80; a higher score indicates greater severity. Both scales have been shown to exhibit good reliability and validity and are sensitive to treatment change.<sup>28–30</sup>

### Procedure

Potential clinical participants contacted the anxiety unit following referral, publicity, or word of mouth and were screened for potential suitability over the telephone. Nonclinical participants similarly contacted the unit following publicity calling for research participants. All suitable participants were sent a questionnaire pack by mail for completion at home that included the Mini-SPIN and other symptom measures. Participants returned completed measures when they presented at the unit for their ADIS-IV interview. The clinical group completed the questionnaire battery and ADIS-IV interview again following either a cognitive-behavioral group treatment program for social anxiety disorder or a 12-week waiting list period.

The CBT program, a group program consisting of 6–8 participants with 2-hour-long weekly sessions over 12 weeks, was based on Rapee and Sanderson<sup>31</sup> and included psychoeducation about social anxiety, cognitive restructuring of unrealistic predictions and negative underlying beliefs, graded exposure, behavioral experiments, and attention training. This program has been validated by Rapee et al.<sup>32</sup>

The study was approved by the Macquarie University Human Research Ethics Committee and was conducted between April 1999 and December 2001. Participants provided informed consent to take part in the study.

## RESULTS

### Construct Validity

Construct validity for the Mini-SPIN was assessed by its correlations with the SIAS and SPS. The Mini-SPIN showed significant positive correlations with the SIAS ( $r = 0.81$ ,  $P < .001$ ) and the SPS ( $r = 0.77$ ,  $P < .001$ ). The Mini-SPIN was not correlated significantly with either age ( $r = -0.01$ ) or gender ( $r = -0.03$ ).

### Reliability and Internal Consistency

A subset of participants ( $n = 26$ ) completed the Mini-SPIN again, 12 weeks following their initial administration, without receiving treatment in the interim. The intraclass correlation was calculated as a measure of test-retest reliability and showed good reliability,  $r = 0.70$ . The Mini-SPIN items also showed excellent internal consistency,  $\alpha = .91$ , especially for such a small number of items.

### Discriminant Validity

The ability of the Mini-SPIN to discriminate between diagnostic groups was examined by comparing mean scores on the measure between the 2 diagnostic groups. The clinical sample showed a mean score of 8.8 (SD = 2.7), which was significantly higher than the mean for the nonclinical group of 1.8 (SD = 1.6),  $t_{240} = 18.7$ ,  $P < .001$ . In addition, there was a significant difference between scores of those participants with comorbid social anxiety disorder and avoidant personality disorder (mean = 9.3, SD = 2.5) and those with only social anxiety disorder (mean = 8.3, SD = 2.8),  $t_{184} = 2.6$ ,  $P < .01$ .

### Receiver Operating Characteristic Curve Analyses

In order to provide guidelines regarding cutoff scores for the Mini-SPIN that identify social anxiety disorder, receiver operating characteristic (ROC) analyses were conducted. ROC analysis provides a test to discriminate clinical cases from normal cases (or in this case, social phobic cases from non-social phobic cases).<sup>33</sup> The area under the ROC curve (AUC) summarizes the ability of the instrument to discriminate between those with the disorder

**Table 1. Results From Receiver Operating Characteristic Curve Analyses Discriminating Social Anxiety Disorder (SAD) and Nonclinical Groups as Well as Those Participants Diagnosed With SAD With or Without an Avoidant Personality Disorder (APD) Diagnosis**

Comparison	Cutoff	Sensitivity	Specificity	PPV	NPV	AUC
SAD vs nonclinical	6	87.6	98.2	99.4	70.5	0.97**
SAD with APD vs SAD without APD	9	70.3	49.4	62.3	58.3	0.61*

\* $P < .01$ .

\*\* $P < .001$ .

Abbreviations: AUC = area under the curve, NPV = negative predictive value, PPV = positive predictive value.

of interest and those who do not have the disorder.<sup>34</sup> The AUC value can also be used to compare the diagnostic performance of 2 or more tests.<sup>35</sup> In addition to the ROC analysis, 4 indicators of test performance were calculated for the Mini-SPIN to allow recommendations for the best cutoff score to be made: sensitivity (proportion of true positives), specificity (proportion of false negatives), positive predictive value (PPV; probability that the disorder is present when the test is positive), and negative predictive value (NPV; probability that the disorder is not present when the test is negative). The MedCalc program (MedCalc Software, Mariakerke, Belgium) was used for these analyses.

Table 1 presents the test performance indicators for our sample. A score of 6 or greater was shown to be the best discriminator and hence was used as a clinical cutoff score for the Mini-SPIN. The AUC for distinguishing between social anxiety and nonclinical cases was 0.97 (95% CI = 0.94 to 0.99,  $P < .001$ ). Sensitivity and specificity were 87.6 (95% CI = 82.0 to 95.4) and 98.2 (95% CI = 90.4 to 99.7), respectively. The 95% confidence intervals around the AUC value included a value of 0.5 indicating that the test performs better than chance in discriminating between those who have social anxiety disorder and those who do not. Since these indicators can be computed for each possible cutoff score on the test, only the values for the cutoff that were determined by the ROC analysis to be the best cutoff score are presented (the full range of values is available on request from the authors).

The Mini-SPIN was not designed to discriminate cases of social anxiety disorder from those with an additional diagnosis of avoidant personality disorder. However, a substantial comorbidity remains between these diagnoses, which are often conceptualized as differing in degrees on a continuum of social anxiety. Thus, the Mini-SPIN may also serve as a useful tool for identifying severe cases of social anxiety disorder for sufferers experiencing an additional diagnosis of avoidant personality disorder. Therefore, Table 1 also summarizes the ROC curve analyses for discriminating cases of social anxiety disorder with

avoidant personality disorder from those without avoidant personality disorder. As expected, the cutoff for cases of avoidant personality disorder was a score of 9 or greater, which is markedly higher than the cutoff for social anxiety disorder alone. The AUC was 0.61 (95% = 0.54 to 0.68,  $P = .01$ ). Sensitivity and specificity were 70.3 (95% CI = 60.4 to 79.0) and 49.4 (95% CI = 38.4 to 60.5), respectively.

Given that prevalence rates of social anxiety vary across clinical settings, we repeated our analyses of the performance of the Mini-SPIN in discriminating between cases and noncases under conditions of varying prevalence. Prevalence rates of 3%, 7%, and 13% were chosen as they reflect those most often reported for social anxiety disorder.<sup>36-38</sup> It is noteworthy that assessing the impact of varying prevalence rates only affects their PPV and NPV rather than other characteristics such as AUC, sensitivity, and specificity estimates. The PPVs for social anxiety disorder prevalence rates of 3%, 7%, and 13% were 60.3, 78.7, and 88.0, respectively, while the NPVs were 99.6, 99.1, and 98.2, respectively.

Further analyses comparing the relative performance of the Mini-SPIN against the SIAS and SPS in discriminating social anxiety disorder cases from noncases were conducted. The AUCs were not found to be significantly different for the Mini-SPIN and the SIAS (difference = 0.02, 95% CI = 0.00 to 0.03,  $P = .09$ ), although a trend was observed indicating a marginally better performance for the SIAS. No significant difference was found between the Mini-SPIN and the SPS (difference = 0.01, 95% CI = 0.02 to 0.03,  $P = .54$ ). These results demonstrate that the Mini-SPIN is similar to standard social anxiety measures in its ability to discriminate cases with social phobia from noncases but has the added benefit of being substantially shorter.

### Sensitivity to Treatment Change

Participants in the clinical group were readministered the Mini-SPIN following either a 12-week group CBT program for social anxiety ( $n = 89$ ) or following a 12-week waiting period during which they received no treatment ( $n = 26$ ). Sensitivity to treatment change analyses are based on completer data. A repeated-measures analysis of variance (ANOVA) was conducted to assess any significant effects of time and group and any time-by-group interactions. Mean Mini-SPIN scores for the treated group were 8.9 (SD = 2.8) and 6.5 (SD = 3.6) at pretreatment and posttreatment assessments, respectively. By comparison, mean pretreatment and posttreatment Mini-SPIN scores were 8.8 (SD = 2.3) and 8.3 (SD = 2.6), respectively, for the waitlist group. The repeated-measures ANOVA showed no significant overall effect of group,  $F_{1,113} = 2.4$ , not significant. However, there was a significant main effect of time,  $F_{1,113} = 20.8$ ,  $P = .000$ , qualified by a significant time-by-group interaction,



$F_{1,113} = 7.8$ ,  $P = .006$ . Follow-up paired samples  $t$  tests indicated no significant pretreatment to posttreatment change for the waitlist group,  $t_{25} = 1.6$ ,  $P = .11$ , but significant reductions in Mini-SPIN scores were found following the group treatment program,  $t_{88} = 7.1$ ,  $P < .001$ . Cohen  $d$  effect sizes were markedly stronger for pretreatment to posttreatment change in Mini-SPIN scores for the treated group ( $d = 0.74$ ) relative to the waitlist group ( $d = 0.20$ ).

Similarly, repeated-measures ANOVAs were conducted assessing effects of group, time, and time-by-group interactions for the SIAS and the SPS. Mean (SD) pretreatment to posttreatment scores for the treated sample were 53.4 (13.2) and 42.7 (15.8) for the SIAS and 36.3 (16.3) and 26.1 (16.2) for the SPS. Pretreatment to posttreatment scores for the waitlist sample were 56.1 (15.3) and 54.9 (14.6) for the SIAS and 40.8 (17.9) and 36.1 (18.8) for the SPS. Again, time-by-group interactions were significant for the SIAS,  $F_{1,112} = 15.0$ ,  $P = .000$ , and the SPS,  $F_{1,112} = 4.8$ ,  $P = .03$ . Follow-up  $t$  tests clarified significant reductions in SIAS scores for the treated group,  $t_{88} = 8.6$ ,  $P = .000$ , but not the waitlist group,  $t_{25} = .88$ , not significant. Social Phobia Scale scores showed larger significant reductions for the treated group,  $t_{87} = 8.4$ ,  $P = .000$ , compared with the waitlist group,  $t_{25} = 2.2$ ,  $P = .04$ .

In order to assess the relative sensitivity to treatment effects for the Mini-SPIN compared with established measures, changes in Mini-SPIN scores from pretreatment to posttreatment were correlated with pretreatment to posttreatment change scores for the SIAS and SPS. The results showed significant correlations between change scores for the Mini-SPIN and the SIAS ( $r = 0.59$ ,  $P < .001$ ) and for the Mini-SPIN and the SPS ( $r = 0.52$ ,  $P < .001$ ), suggesting comparable sensitivity to cognitive-behavioral treatment effects across measures.

## DISCUSSION

This article describes psychometric characteristics of the Mini-SPIN, a 3-item screening instrument to identify possible social anxiety disorder in adults. Until now, the originators of the Mini-SPIN have conducted the only psychometric evaluation of this instrument.<sup>25</sup> However, given the potential utility of such a brief screen, further assessment of the Mini-SPIN is warranted, and some of the previous study's methodological limitations were addressed in this study. Social anxiety disorder and avoidant personality disorder were diagnosed by trained clinicians using a structured diagnostic interview that was completed in person. In-person assessments were conducted based on a widely used structured interview that has shown excellent interrater reliability for the diagnosis of social anxiety disorder in our own as well as other clinics.

Also, unlike the study by Connor et al,<sup>25</sup> the current study compared the Mini-SPIN to other self-report measures of social anxiety. Finally, in the current psychometric

analysis of the Mini-SPIN, tests of both stability and sensitivity to treatment were conducted. We showed that the Mini-SPIN is both stable over a 12-week period and sensitive to treatment effects.

Our findings suggest that the Mini-SPIN is a reliable and valid instrument for identifying social anxiety disorder in adults. Strong support for the construct validity of the Mini-SPIN is evident by its ability to discriminate individuals with social anxiety disorder from those without the disorder. Using a cutoff score of 6 or greater, the Mini-SPIN demonstrated excellent sensitivity, specificity, and positive and negative predictive values. It is important to note that the Connor et al study<sup>25</sup> found similar results including the cutoff score of 6 or greater. However, we found a considerably higher PPV (99.4%) than was found previously (52.6%), revealing even more robust findings for the Mini-SPIN. However, we also acknowledge that the higher PPV observed in the present study may be a result of the higher base rate of people with social anxiety disorder included. Interestingly, we also found that using a cutoff score of 9, the Mini-SPIN may be a potentially useful tool for identifying persons who may carry the additional diagnosis of avoidant personality disorder. This study's replication and extension of the results of Connor et al<sup>25</sup> lends further evidence that the Mini-SPIN is a valuable screen for social anxiety disorder.

One of the primary limitations of this study is that it was conducted through a specialized anxiety clinic and included only participants with social anxiety disorder and those with no mental disorder. Therefore, we conducted analyses to simulate prevalence rates that are more typical of the general population. However, while our study demonstrated that the Mini-SPIN is able to discriminate between those persons with social anxiety disorder and those who do not have the disorder, we do not know if it is also able to discriminate between social anxiety disorder and individuals with other mental disorders. Further, mathematically adjusting for prevalence rates does not replace the need to test the instrument in the population for which it is intended (ie, primary care settings). The authors acknowledge that these differences in population may reflect not only different prevalence rates, but also other differences (eg, recognition of symptoms and different weight given to various behaviors). Hence, the authors urge other researchers to replicate this study in both general and primary care populations.

Social anxiety disorder carries a substantial burden for the individual and society at large. Yet, once recognized, it is a moderately treatable disorder. Many assessments for social anxiety disorder are time consuming and do not lend themselves to primary care settings. One way to address the underrecognition of social anxiety disorder in primary care settings may be through the development of brief screens. Given the brevity of the Mini-SPIN, we think that it is a potentially useful screen for such settings. Of course,

detection of social anxiety disorder is simply the first step along the way to improved mental health care. There is a vast literature that indicates that increased detection of disorders does not necessarily translate to improved care. Hence, the increased detection associated with the Mini-SPIN must be supported by improvements in health care systems and patient management to ultimately result in reductions in social anxiety disorder. Also, because of the ease and brevity of this measure, the Mini-SPIN may be a useful tool for use in epidemiologic studies. Finally, given that we show that the measure reflects treatment change, another potential use for the Mini-SPIN would be as a treatment outcome measure in studies that specifically require minimal assessment (eg, effectiveness studies or community program evaluations).

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