Implementation of Evidence-Based Services for Youth: Assessing Provider Knowledge
Roxanna E. Stumpf, Charmaine K. Higa-McMillan and Bruce F. Chorpita

Behav Modif 2009; 33; 48 originally published online Aug 22, 2008;
DOI: 10.1177/0145445508322625

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Implementation of Evidence-Based Services for Youth

Assessing Provider Knowledge

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Although provider knowledge is a potential barrier in the dissemination of evidence-based services for youth, research in this area is currently limited by a lack of instrumentation. The present study examined the utility of the Knowledge of Evidence-Based Services Questionnaire (KEBSQ), a 40-item self-report measure designed to assess reporter knowledge of evidence-based practices (EBPs) in the treatment of youth psychopathology. The KEBSQ items encompass practice elements identified in both empirically supported and unsupported protocols used in the treatment of four prevalent childhood problem areas: anxious/avoidant, depressed/withdrawn, disruptive behavior, and attention/hyperactivity. Findings from the present investigation lend support for the basic psychometric properties of the KEBSQ. Results supported temporal stability, discriminative validity, and sensitivity to training. Practical implications to the dissemination of EBPs, areas for future research, and limitations are discussed.

Keywords: dissemination; assessment; children; evidence-based treatment; knowledge

The field of mental health has encountered an era in the development and implementation of treatments supported by empirical research (e.g., Chambless & Hollon, 1998). For more than a decade, the Society of Clinical Psychology (Division 12) has focused increasing attention on two influential trends: (a) the movement toward evidence-based practice (EBP) and (b) the increasing pressure for accountability in both clinical science and practice (Weisz, Hawley, Pilkonis, Woody, & Follette, 2000). As a result, there has been a proliferation of initiatives to review and evaluate the
empirical evidence for various psychological treatments, with the goal of identifying the best-supported psychosocial interventions (Barlow, 2000; Weisz et al., 2000). This trend is evident in both adult (e.g., Chambless et al., 1996; Chambless et al., 1998) and youth (e.g., Lonigan, Elbert, & Bennett Johnson, 1998; Ollendick & King, 2000) populations. The next great challenge in the field of mental health services is the successful implementation of these findings in clinical practice (Barlow, 2000; Chorpita et al., 2002; Fixsen, Naom, Blase, Friedman, & Wallace, 2005).

Dissemination of Evidence-Based Practices

Despite ongoing efforts to summarize the literature on EBPs, interventions used in actual clinical practice are often not based on empirical evidence (Daleiden, Lee, & Tolman, 2004; Weersing, Weisz, & Donenberg, 2002). The apparent discrepancy between research and practice underscores the need for a better understanding of the dissemination of EBPs. In recent years, scholars have recognized the need for a systematic exploration addressing the mechanisms of dissemination and factors associated with the adoption of new practices (Corrigan, Steiner, McCracken, Blaser, & Barr, 2001; Schoenwald & Hoagwood, 2001).

Multiple theories have been proposed to explain the process through which an individual or a system implements change (e.g., Andrasen, 1995), with several focusing on the progression through individual stages (e.g., Prochaska & DiClemente, 1982; Rogers, 2004). Specifically, the dissemination of EBPs has been conceptualized within the framework of innovation diffusion (Aarons, 2004; Schoenwald & Hoagwood, 2001). Rogers (2004) described the innovation-decision process in which an individual (or decision-making unit) passes through five stages: (a) knowledge—exposure to an innovation’s existence and gaining some understanding of how it functions, (b) persuasion—forming a favorable or unfavorable attitude toward an innovation, (c) decision—engaging in activities that lead to a choice to adopt or reject an innovation, (d) implementation—putting an innovation into use, and (e) confirmation—seeking reinforcement for or reversing an innovation decision already made.

Although research has supported the presence of all five stages in the diffusion process, the strongest support exists for the knowledge and decision stages, with adequate support for the persuasion stage (Rogers, 2004). Scant data are available supporting the implementation and confirmation stages. As a result, many researchers have focused on the first three stages of the diffusion process, otherwise known as the knowledge-attitude-practice (KAP) process (Rogers, 2004). Thus, with respect to the dissemination of EBPs,
research evaluating each of these three stages has the potential to be helpful in identifying potential barriers.

Whereas preliminary investigations have emerged regarding attitudes toward (Aarons, 2004) and practice of (e.g., Weersing et al., 2002) EBPs, little research has exclusively targeted provider knowledge. Though the empirical evidence is inadequate, an emerging supposition is that clinician knowledge may be a potential barrier to the dissemination of EBPs (Higa & Chorpita, 2007; Stuart, Burland, Ganju, Levounis, & Kiosk, 2002). For example, it is suggested that clinicians often believe that all therapies are equally effective (Persons, 1995) despite evidence to the contrary (e.g., Chambless et al., 1998; Lonigan et al., 1998) and that most practicing clinicians do not read the treatment outcome literature (Persons, 1995). Furthermore, many practicing clinicians continue to lack familiarity with the terms evidence-based practice and empirically supported treatment (Aarons, 2004). Given such limitations, it seems plausible that practitioners lack sufficient knowledge to begin to adequately implement EBPs in clinical settings.

**Assessing Knowledge of Evidence-Based Practices**

Research investigating provider knowledge of EBPs as a potential barrier to dissemination is significantly limited by a lack of instrumentation. To our knowledge, there are currently no existing psychometrically supported instruments designed to gauge provider awareness of EBPs for youth populations. The existence of such an instrument would allow for the assessment of baseline levels of knowledge as well as provide a means for evaluating the effectiveness of various education efforts.

The assessment of knowledge regarding EBPs for youth psychopathology inherently encompasses a broad range of evidence-based treatment strategies. However, targeting knowledge related to the most common childhood disorders for which EBPs are available would likely provide a reasonable estimate of overall knowledge. The following mental health concerns are widely prevalent in youth and, therefore, warrant considerable attention: anxiety, depression, attentional difficulties, and disruptive behavior (Jensen & Weisz, 2002). Furthermore, each of these problem domains has a large body of treatment outcome literature that has identified efficacious interventions (Child and Adolescent Mental Health Division [CAMHD], 2004; Daleiden et al., 2004; Weisz, Doss, & Hawley, 2005).

It is also necessary to carefully consider the level of specificity with which treatments are defined when assessing knowledge of EBPs. For example, generic labels (e.g., cognitive-behavioral therapy, parent training)
are often applied to independent treatment packages that tend to share a number of features but also typically have distinguishing characteristics and foci (Weisz & Hawley, 1998). Another common method for defining interventions is at the level of specific manuals (e.g., Barkley, 1997), which frequently evolve as a result of multiple revisions and/or adaptations (Weisz & Hawley, 1998). Although both of these levels of analysis have been used in summarizing the existing evidence base (Chorpita, Daleiden, & Weisz, 2005), it is possible that such methods are not ideal for targeting provider knowledge of EBPs for youth psychopathology. Specifically, assessing knowledge of treatments at the level of generic labels or particular manuals only demonstrates whether providers have a general or superficial awareness of evidence-based treatment. To illustrate, an individual may be aware that cognitive-behavioral therapy is empirically supported in the treatment of childhood anxiety problems but remain uninformed regarding the actual procedures (e.g., exposure to feared stimuli) encompassed within a given treatment protocol.

An alternative method for defining treatment has been proposed wherein clinical interventions are conceptualized as composites of individual strategies or practice elements (Chorpita et al., 2005). Practice elements are defined as discrete clinical techniques or strategies, such as relaxation or self-monitoring, that are typically used as part of a larger intervention plan (e.g., a manualized treatment program for depression). Practice elements are defined by content—as opposed to duration, periodicity, or location within a treatment protocol. They may be delivered individually, simultaneously, in a single session, or across multiple sessions.

Defining interventions at the level of practice elements provides a more detailed analysis of clinical interventions that may be more discriminating in assessing provider knowledge of EBPs than traditional levels of analysis. This taxonomy is based on the assumptions that practice elements can be explicitly defined, reliably coded, and derived from various intervention protocols (Chorpita et al., 2005). It is important to note that, at present, there is no empirical evidence regarding the use of individual practice elements in the treatment of youth psychopathology.

**The Present Investigation**

The purpose of the present investigation was to evaluate the utility of the Knowledge of Evidence-Based Services Questionnaire (KEBSQ). The KEBSQ was developed to assess reporter knowledge regarding the application of EBPs in the treatment of prevalent child and adolescent mental
health problems. Specifically, the instrument requires providers to identify practice elements included in treatment protocols that have demonstrated empirical support in the treatment of youth anxious/avoidant, depressed/warned, disruptive behavior, and/or attention/hyperactivity disorders. Data were collected from community behavioral health practitioners and university graduate students as a preliminary evaluation of the KEBSQ's psychometric properties. Specifically, the goals of the present study were to (a) obtain test–retest reliability data, (b) evaluate discriminative validity, and (c) assess the sensitivity of the KEBSQ to within-therapist shifts in knowledge as a result of education efforts.

Method

Participants

Practitioners. Practitioners were recruited from the state of Hawaii, Department of Education (DOE) and included school-based behavioral health practitioners, school psychologists, school counselors, and administrators. Practitioners participated on a voluntary basis and received training in evidence-based approaches to common childhood emotional and behavioral problems as a benefit of participation.

Practitioners (n = 184) ranged in age from 23 to 65 (M = 42.1, SD = 10.8) and were 70.8% female. The ethnic distribution was White (34.4%), Asian (32.5%), multiethnic (9.6%), Hawaiian/Pacific Islander (7.6%), African American (4.5%), Hispanic (2.5%), and other (8.9%). Practitioners reported an average of 5.1 years professional/clinical training and 8.9 years professional/clinical experience. Job titles included school-based behavioral health practitioner (55.6%), psychologist (14.2%), counselor (13.0%), social worker (7.4%), student services coordinator (4.3%), administrator (1.9%), and other (3.7%).

Practitioners were assigned to one of the two training days, forming Group 1 (n = 93) and Group 2 (n = 91). Although most practitioners were randomly assigned (n = 149, 81.0%) to a training day, a subset of participants (n = 35, 19.0%) were not assigned randomly due to scheduling constraints (e.g., traveling from outer-islands, attendance without preregistration, attendance on nonassigned training day). To evaluate potential differences between groups, practitioners randomly assigned to Group 1 were compared with those randomly assigned to Group 2 using t tests for continuous measures (i.e., age, baseline KEBSQ total score) and χ² tests for discrete measures (i.e., gender, ethnicity). Participants not randomly assigned to group (n = 35) were
excluded from the comparison analyses. Across measures, no significant differences were found between Group 1 and Group 2 participants.

**Graduate students.** Graduate students were recruited from six clinical child and/or adolescent psychology training programs nationwide with an emphasis on training in empirically supported treatments. Programs targeted for recruitment were selected based on the following criteria: (a) American Psychological Association (APA) accreditation to increase the likelihood of EBP coverage in coursework and (b) available practicum sites in youth clinic settings that use empirically supported treatment approaches. Graduate students were included in the study given the following criteria: (a) completion of a graduate level course in child psychopathology and/or treatment and (b) a minimum of one year experience in a child clinic setting. Graduate students participated on a voluntary basis.

Of the 23 graduate students who returned complete KEBSQ data, 21 met the inclusionary criteria outlined above. Graduate students ranged in age from 22 to 36 ($M = 28.1$, $SD = 3.1$) and were predominantly female (66.7%). The ethnic distribution of the graduate sample included White (81.0%), Asian (9.6%), African American (4.8%), and other (4.8%). Graduate students had an average of 4.4 years of professional/clinical training and 3.1 years of professional/clinical experience.

**Knowledge of Evidence-Based Services Questionnaire**

The KEBSQ is a 40-item self-report measure of knowledge regarding practice elements included in empirically supported and unsupported protocols in the treatment of common childhood psychological disorders. The response scale of the KEBSQ requires each item to be classified as included in efficacious treatment protocols (by circling the corresponding letter) or as not included in efficacious treatment protocols (by omitting response or endorsing not applicable) for each of the following problem areas: anxious/avoidant (A), depressed/withdrawn (D), disruptive behavior (B), and/or attention/hyperactivity (H), with none (N) as the default selection. Respondents are instructed to circle all problem areas for which the target practice element has been included in evidence-based protocols. To illustrate, the item stem for the practice element Relaxation is as follows: Teaching the child calming techniques, such as muscle relaxation, breathing exercises, meditation, and similar activities, with the goal of reducing physiological arousal. As relaxation has been identified as commonly included in evidence-based protocols for all of the targeted problem areas,
## Table 1
### KEBSQ Items and Scoring Key

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Practice Element</th>
<th>Scoring Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exposure</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>Modeling</td>
<td>A, D, B, H</td>
</tr>
<tr>
<td>3</td>
<td>Relaxation</td>
<td>A, D, B, H</td>
</tr>
<tr>
<td>4</td>
<td>Therapist praise/rewards</td>
<td>A, D</td>
</tr>
<tr>
<td>5</td>
<td>Self-monitoring</td>
<td>A, D</td>
</tr>
<tr>
<td>6</td>
<td>Psychoeducation—child</td>
<td>A, D</td>
</tr>
<tr>
<td>7</td>
<td>Activity scheduling</td>
<td>D</td>
</tr>
<tr>
<td>8</td>
<td>Skill building/behavioral rehearsal</td>
<td>D, B, H</td>
</tr>
<tr>
<td>9</td>
<td>Self-reward/self-praise</td>
<td>A, D, B, H</td>
</tr>
<tr>
<td>10</td>
<td>Commands/limit setting</td>
<td>B, H</td>
</tr>
<tr>
<td>11</td>
<td>Psychoeducation—parent</td>
<td>A, D, B, H</td>
</tr>
<tr>
<td>12</td>
<td>Response cost</td>
<td>B, H</td>
</tr>
<tr>
<td>13</td>
<td>Tangible rewards</td>
<td>A, B, H</td>
</tr>
<tr>
<td>14</td>
<td>Parent praise</td>
<td>B, H</td>
</tr>
<tr>
<td>15</td>
<td>Parent-monitoring</td>
<td>B, H</td>
</tr>
<tr>
<td>16</td>
<td>Directed play</td>
<td>B, H</td>
</tr>
<tr>
<td>17</td>
<td>Stimulus/antecedent control</td>
<td>B, H</td>
</tr>
<tr>
<td>18</td>
<td>Social skills training</td>
<td>D, B</td>
</tr>
<tr>
<td>19</td>
<td>Family engagement</td>
<td>D, H</td>
</tr>
<tr>
<td>20</td>
<td>Crisis management</td>
<td>D</td>
</tr>
<tr>
<td>21</td>
<td>Play therapy</td>
<td>N</td>
</tr>
<tr>
<td>22</td>
<td>Supportive listening</td>
<td>N</td>
</tr>
<tr>
<td>23</td>
<td>Parent coping</td>
<td>B</td>
</tr>
<tr>
<td>24</td>
<td>Emotional processing</td>
<td>N</td>
</tr>
<tr>
<td>25</td>
<td>Mentoring</td>
<td>N</td>
</tr>
<tr>
<td>26</td>
<td>Family therapy</td>
<td>N</td>
</tr>
<tr>
<td>27</td>
<td>Relationship/rapport building</td>
<td>A</td>
</tr>
<tr>
<td>28</td>
<td>Educational support</td>
<td>N</td>
</tr>
<tr>
<td>29</td>
<td>Maintenance/relapse prevention</td>
<td>A, D, H</td>
</tr>
<tr>
<td>30</td>
<td>Peer modeling/pairing</td>
<td>D</td>
</tr>
<tr>
<td>31</td>
<td>Cognitive/coping</td>
<td>A, D, B</td>
</tr>
<tr>
<td>32</td>
<td>Natural/logical consequences</td>
<td>B</td>
</tr>
<tr>
<td>33</td>
<td>Insight building</td>
<td>N</td>
</tr>
<tr>
<td>34</td>
<td>Assertiveness training</td>
<td>N</td>
</tr>
<tr>
<td>35</td>
<td>Problem solving</td>
<td>A, D, B, H</td>
</tr>
<tr>
<td>36</td>
<td>Time-out</td>
<td>B, H</td>
</tr>
<tr>
<td>37</td>
<td>Ignoring or DRO</td>
<td>B, H</td>
</tr>
<tr>
<td>38</td>
<td>Communication skills</td>
<td>D, B</td>
</tr>
<tr>
<td>39</td>
<td>Line of sight supervision</td>
<td>N</td>
</tr>
<tr>
<td>40</td>
<td>Milieu therapy</td>
<td>N</td>
</tr>
</tbody>
</table>

Note: KEBSQ = Knowledge of Evidence-Based Services Questionnaire; A = anxious/avoidant; D = depressed/withdrawn; B = disruptive behavior; H = attention/hyperactivity; N = none; DRO = differential reinforcement of other behaviors.
the correct response set would include circling the letters A, D, B, and H, while leaving N unmarked. The KEBSQ items are scored on a scale from 0 to 4, with each correctly endorsed or correctly omitted response receiving 1 point for a total possible score of 160 (see Table 1 for KEBSQ items and scoring key).

The development of the KEBSQ is described in detail below with regard to selection of targeted content, item construction, and response format. In accord with recommended item development techniques (see, for example, Haynes, Richard, & Kubany, 1995; Loevinger, 1957), multiple sources of information were included when developing KEBSQ items, including (a) the published psychotherapy literature, (b) rational deduction and clinical experience, and (c) communications with child therapy researchers.

**Item content.** Given that providers report using practice elements identified in evidence-based protocols as well as practice elements that are not part of evidence-based protocols in actual care (Daleiden et al., 2004), it was necessary to include both types as a means of measuring reporter ability to differentiate between the two domains (compare Loevinger, 1957). A review of the literature addressing treatment outcome research as well as actual clinical practice was referenced to determine which practice elements from each domain should be represented in the KEBSQ. To these author’s knowledge, the Hawaii CAMHD Biennial Report (CAMHD, 2004) and the Hawaii CAMHD Annual Evaluation Report (Daleiden et al., 2004) are the only comprehensive reviews of the treatment literature and actual care practices for childhood mental health disorders that include detailed analyses of treatment components (i.e., practice elements) and, therefore, served as the basis for item development.

To identify practice elements that have been included in evidence-based treatment protocols, the Hawaii CAMHD Biennial Report (CAMHD, 2004) was referenced. Specifically, practice elements identified in treatment protocols supported at Level 2 (Good Support) or higher (i.e., equivalent to APA’s well-established and probably efficacious levels) were included in Selection Pool A. Practice elements that were represented in less than 10% of the reviewed studies were excluded from Selection Pool A and included in Selection Pool B. To identify additional practice elements that have not been included in treatment protocols with empirical support for Selection Pool B, the Hawaii CAMHD Annual Evaluation Report (Daleiden et al., 2004) was reviewed for practice elements that were frequently endorsed as used by CAMHD providers in the treatment of the targeted problem areas.
Practice elements for Selection Pool A and Selection Pool B were identified as related to the four most common childhood problem areas: anxious and avoidant, depressed and withdrawn, disruptive behavior, and attention and hyperactivity. This yielded a total of eight clusters of practice elements (Selection Pool A, Selection Pool B × Four problem areas). Practice elements within each cluster were then ranked in descending order from most to least prevalent in empirically supported treatment protocols and/or in practice. The top five practice elements were selected from each of the eight clusters, resulting in a total of 40 unique practice elements.

**Item construction.** Two questionnaire items were constructed for each of the 40 selected practice elements, for a total of 80 items. Item content was based on the formal practice element definitions provided in the Hawaii CAMHD Biennial Report (CAMHD, 2004). Content validity of the items was subsequently evaluated by experts in the field of youth psychotherapy research.

A panel of four experts was recruited from known representatives in the treatment of child and adolescent disorders, with a focus on empirically supported treatments. All panel experts had earned doctoral degrees in psychology and, at the time of their participation, had published on average 32 articles in psychological, psychiatric, or other mental health related journals. Experts averaged 6.5 years of professional/clinical training beyond undergraduate degree, with an average of 77.5% of their training focused on work with children and adolescents. Furthermore, experts averaged 7 years of full-time professional/clinical experience posttraining, with an average of 98.8% of their experience focused on work with children and adolescents.

The goal of the panel was to evaluate each of the 80 potential items with regard to two separate dimensions: (a) overall quality of the item (i.e., wording, clarity) and (b) relevance to the targeted construct. Ratings were provided on a scale of 1 (poor) to 5 (excellent). Items with an average rating of less than 3 on either dimension were eliminated from the sample. For each practice element, the item with the higher mean ratings (assuming greater than 3) was retained for the final measure. In the event of a tie, the authors selected the item to be retained. After the initial expert rating procedure, both potential items for one practice element (milieu therapy) failed to meet the criteria outlined above with regard to the quality rating. As such, two new items were generated and resubmitted for review, and the item with the higher mean ratings was included on the final measure.

**Item format.** A multiple true-false (MTF) item format was used on the KEBSQ. This format requires the respondent to evaluate every response option as to whether it is correct or incorrect as related to the item stem
This MTF format has the advantage of capturing more specific information about a respondent’s level of knowledge with respect to each item than more traditional scoring formats (e.g., multiple choice). Furthermore, MTF formats compare favorably with multiple choice items with respect to the reliability and validity of the evidence they yield (Kreiter & Frisbie, 1989).

Training Description

A doctoral level professional with expertise in EBPs presented two similar half-day trainings on EBPs for youths with psychological disorders to practitioners in the Hawaii DOE. The overarching rationale for these training sessions was to provide practitioners with comprehensive information about evidence-based services for youth with prevalent classes of childhood disorders: anxious/avoidant, depressed/withdrawn, disruptive behavior, and attention/hyperactivity. Content of the trainings addressed the current understanding of practice elements included in treatment protocols that have demonstrated efficacy with regard to the aforementioned problem areas. The material, therefore, focused mainly on the components of cognitive-behavioral therapy for anxiety and mood disturbances in addition to behavior management strategies for attentional difficulties and disruptive behavior. Specific attention was paid to the data from the Hawaii CAMHD Biennial Report (CAMHD, 2004) and the Hawaii CAMHD Annual Evaluation Report (Daleiden et al., 2004) regarding practice elements included in evidence-based protocols and those frequently used but not included in efficacious protocols for the targeted classes of childhood disorders.

Design and Procedure

The present study used a pretest–posttest control group design using switching replications, with random assignment occurring after pretest. Three weeks prior to the trainings, participants were e-mailed the pretraining survey packet. When possible, participants with completed packets were randomly assigned to attend one of the two identical training sessions (i.e., Group 1, Group 2), provided on consecutive days. On the first training day, 70 randomized and 23 nonrandomized participants attended the training to form Group 1. Attendees at the second training day comprised Group 2, consisting of 79 randomized, 8 nonrandomized, and 4 persons who were not registered prior to the training. Participants in Group 2 were asked to complete the KEBSQ a second time immediately prior to the
training. All participants in both groups were asked to complete the instrument a final time immediately following the training. Thus, practitioners in Group 1 were asked to complete the KEBSQ twice and those in Group 2 were asked to complete the instrument a total of three times.

To collect the graduate student data, potential participants were e-mailed the survey packet and instructed to return measures via fax or mail. Graduate students were only asked to complete the measure once.

**Results**

**Descriptive Statistics**

Descriptive statistics for the KEBSQ total scores across administrations for all samples, including Group 1, Group 2, and the graduate students are presented in Table 2. The 40 KEBSQ items were also evaluated using DOE participant data for their distributional properties and their relations with other items. All items showed acceptable variance and most used the full range of possible scores.

DOE participant data were used to examine the KEBSQ items exhibiting the highest and lowest scores at baseline as well as those exhibiting the most improvement from pretraining to posttraining. Specifically, the KEBSQ items exhibiting the five highest scores at baseline were as follows: (a) exposure ($M = 3.76$), (b) time-out ($M = 3.31$), (c) ignoring/differential reinforcement of other behavior (DRO; $M = 3.26$), (d) response cost ($M = 3.19$), and (e) commands/limit setting ($M = 3.14$). All of these practice elements are identified as evidence based for at least one of the target problem areas (see Table 1). Specifically, the highest scoring item, exposure, is identified as evidence based for anxiety problems. The other four items represent practice elements identified as evidence based for disruptive behavior and attention/hyperactivity problems.

On the other hand, the five lowest KEBSQ item scores at baseline were as follows: (a) relationship/rapport building ($M = 1.87$), (b) supportive listening ($M = 1.85$), (c) modeling ($M = 1.80$), (d) parent monitoring ($M = 1.47$), and (e) therapist praise/rewards ($M = 1.03$). Four of these practice elements are identified as evidence based for at least one of the target problem areas (see Table 1). Specifically, relationship/rapport building is identified as evidence based for anxiety problems. Supportive listening is not identified as evidence based for any of the target problem areas, whereas modeling is identified as such for all of the target problem areas. Parent monitoring is identified as evidence based for disruptive behavior and
attention/hyperactivity problems. Finally, therapist praise/rewards is identified as evidence based for anxious and depressive problems.

The five KEBSQ items exhibiting the most improvement following training are as follows: (a) supportive listening \((\text{mean difference} = 1.57)\), (b) family therapy \((\text{mean difference} = 1.29)\), (c) educational support \((\text{mean difference} = 1.07)\), (d) relationship/rapport building \((\text{mean difference} = 1.02)\), and (e) insight building \((\text{mean difference} = 0.91)\). Four of these practice elements are not identified as evidence based for any of the target problem areas (see Table 1). In addition, the one that is identified as evidence based (i.e., relationship/rapport building) is only identified as so for anxiety problems. Higher scores on these items represent practitioner improvement in refraining from endorsing practice elements that have not been identified as evidence based.

### Scale Reliability

Although it is a common practice to investigate internal consistency as a measure of scale reliability, such analyses were not conducted in the present investigation. The structure of the KEBSQ is designed such that each item represents an independent and unique technique that may be used in the treatment of youth psychopathology. Therefore, it was not predicted that knowledge of individual items would necessarily correlate with each other. For example, it is likely that respondents may be highly knowledgeable about evidence-based use of certain techniques (i.e., exposure, relaxation) while being relatively uninformed about others (i.e., tangible rewards, modeling).

#### Table 2

Descriptive Statistics for KEBSQ Total Scores

<table>
<thead>
<tr>
<th>Sample</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration 1</td>
<td>86</td>
<td>74</td>
<td>116</td>
<td>96.02</td>
<td>8.03</td>
</tr>
<tr>
<td>Administration 2</td>
<td>80</td>
<td>91</td>
<td>150</td>
<td>110.01</td>
<td>11.02</td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration 1</td>
<td>76</td>
<td>79</td>
<td>119</td>
<td>97.92</td>
<td>8.57</td>
</tr>
<tr>
<td>Administration 2</td>
<td>87</td>
<td>70</td>
<td>116</td>
<td>96.71</td>
<td>9.77</td>
</tr>
<tr>
<td>Administration 3</td>
<td>87</td>
<td>63</td>
<td>148</td>
<td>109.96</td>
<td>12.87</td>
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<tr>
<td>Graduate students</td>
<td>21</td>
<td>104</td>
<td>133</td>
<td>116.41</td>
<td>7.98</td>
</tr>
</tbody>
</table>

Note: KEBSQ = Knowledge of Evidence-Based Services Questionnaire.
As a measure of scale stability, a test–retest paradigm was used with data collected from Group 2 \((n = 77)\) at the baseline and pretraining assessment time points. The analysis targeted a 2-week time interval, in which data were included if the time elapsed between targeted time points ranged from 7 to 21 days. When analyzed over the 2-week time interval \((n = 60)\), time elapsed ranged from 7 to 20 \((M = 13.98)\) days. Test–retest reliability of KEBSQ scores was acceptable \((r = .56)\).

**Discriminative Validity**

Given the theory that practicing clinicians may lack detailed knowledge of EBPs (Higa & Chorpita, 2007; Stuart et al., 2002), it was predicted that the graduate student sample would be more knowledgeable about EBPs for youth psychopathology than would the practitioners. To examine the KEBSQ's ability to discriminate between participants that should, theoretically, have different levels of knowledge regarding evidence-based services, a \(t\) test was conducted comparing baseline scores on the KEBSQ for graduate students \((n = 21)\) with those of practitioners \((n = 162)\). Results indicated that KEBSQ scores significantly discriminated graduate students from practitioners, \(t(181) = −10.16, p < .001\), with the graduate students scoring significantly higher than the practitioners at baseline (see Table 2).

**Sensitivity to Change**

To examine whether the KEBSQ is sensitive to changes in knowledge regarding practice elements included in efficacious treatment protocols for common childhood disorders, a \(2 (\text{group}) \times 2 (\text{time})\) repeated measures analysis of variance was conducted using data from participants who were randomly assigned to training day. Specifically, baseline \((n = 63)\) and post-training \((n = 60)\) data from Group 1 (exposed to training) were compared with baseline \((n = 67)\) and pretraining \((n = 76)\) data from Group 2 (not yet exposed to training). Results indicated a significant group by time interaction, \(F(1, 118) = 55.55, p < .001\), demonstrating that the KEBSQ was sensitive to participation in a training in EBPs (see Table 2).

**Discussion**

The enduring gap between clinical research and practice in the face of dissemination efforts remains a considerable challenge in the field of mental health services for youth (e.g., Higa & Chorpita, 2007; Schoenwald
& Hoagwood, 2001). To evaluate potential obstacles in this process, systematic research investigating the individual stages of dissemination (i.e., knowledge, attitude, and practice) is essential (Rogers, 2004). However, the investigation of knowledge as a potential barrier is currently limited by a lack of instrumentation.

The present study was conducted to investigate the utility of the KEBSQ, a measure developed to assess knowledge of EBPs in the treatment of youth psychopathology. Based on a review of the existing literature, items were generated to represent practice elements (Chorpita et al., 2005) that constitute empirically supported treatments as well as those strategies that are frequently used but not consistently part of evidence-based treatments for youth (Chorpita et al., 2002; CAMHD, 2004). All KEBSQ items were subsequently evaluated as acceptable with regard to item quality and relevance to the targeted construct by a panel of experts in the field of youth psychopathology. The final measure consisted of 40 items representing practice elements to be classified as included in evidence-based treatment protocols or not with regard to each of the four major problems areas in youth, including anxious/avoidant, depressed/withdrawn, disruptive behavior, and attention/hyperactivity.

Overall, the KEBSQ performed in the manner that it was designed to. Although relatively moderate, test–retest reliability was satisfactory. The KEBSQ also appeared to discriminate between individuals with theoretically different levels of knowledge regarding the targeted construct. Specifically, graduate students from psychology programs with an emphasis on EBPs scored significantly higher on the measure than practitioners providing mental health services to youth, who theoretically are less knowledgeable regarding EBPs. Finally, the KEBSQ appeared to be sensitive to within-practitioner changes in knowledge of EBPs for common childhood disorders following training on the subject matter. Thus, preliminary psychometric data on the KEBSQ appear promising.

Looking to the future, several potential applications of the KEBSQ are anticipated. First, the KEBSQ may help researchers address the long-standing dearth of information regarding clinician knowledge of EBPs in dissemination research. As noted in the introduction, this gap in information has limited the emerging body of research regarding potential barriers in the dissemination process. The evidence presented here suggests that the KEBSQ can provide a psychometrically sound method of assessing therapist knowledge of EBPs in the treatment of youth psychopathology. This type of information would make it feasible to investigate whether knowledge is a barrier in dissemination efforts and how changes in knowledge may affect other factors in the dissemination process, such as attitude and practice.
As a second application, the KEBSQ may be used as a screening instrument within mental health organizations to assess current levels of knowledge and identify potential strengths and/or weaknesses within a given system. For example, descriptive data from the current study has provided valuable insight into the knowledge levels of practitioners in the Hawaii DOE. Specifically, results suggested that DOE practitioners were most knowledgeable at baseline about practice elements identified as evidence based, especially with regard to disruptive behavior and attention/hyperactivity problems. On the other hand, DOE practitioners appeared relatively less knowledgeable with regard to practice elements that are either not identified as evidence based or those identified as evidence based for internalizing problem areas (i.e., anxiety, depression). These results may be an indication that DOE practitioners are (a) more knowledgeable about EBPs, as opposed to nonevidence-based practices and/or (b) more knowledgeable about externalizing problems in youth, as opposed to internalizing problems.

As a third related research application, the KEBSQ may be used to evaluate the effectiveness of various education efforts. In the present investigation, KEBSQ data gathered at baseline suggested that the state of Hawaii DOE practitioners were less knowledgeable about EBPs for youth psychopathology than the graduate students in clinical psychology. In addition, practitioner knowledge of EBPs for youth psychopathology improved following a half-day training in EBPs. Specifically, DOE practitioners demonstrated the most improvement with regard to practice elements that have not been identified as evidence based. Together, these results may be an indication that the state of Hawaii DOE practitioners may benefit from similar trainings in EBPs for youth psychopathology. Furthermore, it may be particularly useful to focus education efforts on treatment practices that are not evidence based, as opposed to solely addressing those that are.

Several directions for future research can be envisioned for the KEBSQ. To begin with, the data obtained in the current investigation were collected from a relatively unique population working within the school system under a state agency. It is possible that the results obtained from this sample do not generalize to different populations. Therefore, it would be informative to gather KEBSQ data from individuals employed in a variety of settings, such as community centers and university clinics. It would also be useful to gather enough KEBSQ data to establish norms for the measure. This would provide a valuable context for evaluating baseline scores.

Another potentially useful direction for research stems from the challenge of assessing a dynamic construct, such as knowledge of EBPs. The evidence base for the treatment of youth psychopathology is constantly evolving as new...
research is conducted and published in the literature. As such, it is possible that the KEBSQ items and/or scoring may require amendment. Although the evolution of the literature base is inherently gradual and the method with which the KEBSQ was developed leaves the measure relatively resistant to change, there are a couple of areas that may require further attention. To begin with, it is possible that new practice elements may be identified that are not included in the original KEBSQ, thus diminishing the measure’s ability to represent the contemporary evidence base. In addition, it is possible that practice elements that are not currently identified as included in efficacious treatment protocols may gather enough evidence to warrant being classified as such. Therefore, ongoing investigation and monitoring of the literature may be warranted to ensure stability of the KEBSQ’s content validity.

A final potentially useful direction for research may address assessing practitioner knowledge of EBPs in other ways. According to Rogers (2004), knowledge can be separated into three types: (a) awareness knowledge refers to information gained regarding an innovations’ existence, (b) how-to knowledge represents information necessary to use an innovation, and (c) principles knowledge addresses how an innovation works. The KEBSQ was developed specifically to assess awareness knowledge of EBPs for youth. As such, developing methods for assessing the other types of knowledge may provide additional insight toward identifying barriers to dissemination. In fact, multiple researchers have suggested that the development of how-to and principles knowledge may also pose significant challenges to dissemination (Connor-Smith & Weisz, 2003; Higa & Chorpita, 2007).

In summary, the KEBSQ appears to be a psychometrically supported assessment tool that has the potential to be useful in a variety of ways. Through applications such as those discussed previously, it may be possible to include assessment of clinician knowledge of EBPs in dissemination research and guide education efforts in real-world settings. Movement in this direction could help to increase the yield of scientific information garnered from dissemination research and, ultimately, improve the quality of mental health care delivered to children.

References


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