A Psychometric Evaluation of the Intention Scale for Providers-Direct Items

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Abstract

This study examined the psychometric properties of the Intention Scale for Providers-Direct Items (ISP-D; 16 items), a questionnaire for assessing therapists' evidence-based practice attitudes, subjective norms, perceived behavioral control, and behavioral intentions. Participants were community mental health providers from the State of Hawaii. A confirmatory factor analysis provided support for a revised 14-item ISP-D measure that fits the data reasonably well. Subscales of this revised ISP-D demonstrated acceptable to good internal consistency, with the exception of the Perceived Behavioral Control subscale. The majority of convergent validity correlation patterns between the ISP-D and related constructs were significant and in predicted directions.

Keywords: Implementation, Evidence-based practice, Therapist survey, Theory of planned behavior, Factor analysis

Introduction

Research suggests that there are a number of multi-level barriers to evidence-based practice (EBP) implementation in community settings. At the individual level, therapists have stated challenges related to attitudes and knowledge as reasons for not adopting EBPs.[1, 2] Organizational level barriers include a lack of institutional support, insufficient time and funding for trainings, and misaligned reimbursement priorities, all of which can affect therapists' ability to utilize EBPs with their clients.[2–5] Another issue complicating EBP implementation is the lack of standardized assessment tools for measuring constructs central to this type of work. Although great strides

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Journal of Behavioral Health Services & Research, 2019. 1–18. © 2019 National Council for Behavioral Health. DOI 10.1007/s11414-019-09675-3

Published online: 25 November 2019

continue to be made in this area,[6] the continued proliferation of implementation efforts have generally outpaced the careful and scientific instrumentation work in this area. In general, researchers in the field have traditionally relied on creating their own idiographic, study-specific questionnaires or measures[7–10] to evaluate therapists' characteristics in relation to training and other provider-focused investigations. These study-specific measures are typically characterized by a small set of items that are used to assess constructs related to the adoption of an innovation, without subjecting the items to validation processes.[11] Furthermore, Beidas and Kendall[7] concluded that as a result of this type of idiographic measurement activities, diverse across study measurement strategies have become another barrier for synthesizing research findings and have called for the construction of psychometrically supported measures to help implementation efforts.

Theory of planned behavior

One model that may be particularly helpful in implementation measurement efforts for describing the adoption of novel practices is the theory of planned behavior (TPB).[12] Although the TPB was initially developed and examined within the context of social psychology, it has become one of the most extensively studied behavior change theories in health-related activities.[13–15] Ajzen's TPB model[12] describes three determinants of behavioral intentions: (a) *attitudes*—an individual's overall evaluation or appraisal of the outcomes associated with the behavior in question; (b) *subjective norms*—an individual's evaluation of the social pressure to perform or not perform the behavior in question; and (c) *perceived behavioral control*—an individual's perception of his or her capability and opportunity to perform the behavior in question. The TPB suggests that an individual's intention to perform a behavior serves as the most immediate determinant of behavior and that, *behavioral intentions*, therefore, may serve as a proximal measure of behavior because it involves motivational factors that influence behavior. The TPB also indicates that attitudes, subjective norms, and perceived behavioral control are affected by their corresponding beliefs and outcome evaluations of the behavior.

In 2011, Ajzen[16] estimated that the TPB had been utilized in thousands of empirical studies relating to behavioral predictions, and the overall work in this area supports the validity of behavioral intentions for predicting actual behaviors.[13, 14] For example, Armitage and Conner's[17] and Sheeran and Orbell's[18] meta-analyses of the TPB reported correlations between behavioral intentions and behavior at .47 and .44, respectively. Furthermore, meta-analyses of the empirical literature have shown that behavioral intentions can be predicted using measures of attitudes toward the behavior (correlations ranging from .45 to .60), subjective norms (correlations between .34 and .42), and perceived behavioral control (correlations ranging from .35 to .46).[19]

While a majority of the existing TPB studies explore patient physical health-related behaviors,[13] there are only a few studies that explore the application of TPB with mental health therapists' behaviors.[20–22] For instance, Klaybor's[22] study of social workers' intention to use the Diagnostic Statistical Manual, Fourth Edition (DSM-IV), for assessment and treatment purposes found that attitudes, subjective norms, and perceived behavioral control were significant predictors of behavioral intentions. Similarly, Casper's[20] study showed that mental health clinicians enrolled in a continuing education class guided by the principles of the TPB had stronger behavioral intentions for implementing a self-report assessment tool in their practice in comparison with the clinicians who were enrolled in a standard continuing education class. A review by Kelly and colleagues[21] also demonstrated that the principles of the TPB were used to predict substance abuse workers' intentions to use EBPs and that 41% of the variance in their behavioral intentions was accounted for by their attitudes, subjective norms, and perceived behavioral control. The results of these studies, along with the extensive TPB evidence base across various domains, suggest that further research applying the TPB to youth mental health providers may be a potential next step for implementation instrumentation and research efforts.

Measurement

Research investigating mental health therapists' behavioral intentions of EBP use within the context of the TPB is limited, but measurement development efforts have emerged. For example, an existing TPB questionnaire that has been utilized in the area of substance use prevention is the Evidence-Based Practice Theory of Planned Behavior Survey (EBP TPB Survey).[21] The EBP TPB Survey is a 15-item self-report measure that was created and uniquely used in a study to examine substance abuse workers' EBP intentions. This instrument assesses therapists' intentions, attitudes, subjective norms, and perceived behavioral control for using EBPs in their treatment practice with adult substance abuse clients. Although Kelly and colleagues'[21] study found evidence for the internal consistencies of the EBP TPB Survey subscales, other aspects of reliability, validity, and model fit of this measure have not yet been investigated. Within the domain of attitudes, there is the Evidence-Based Practice Attitude Scale (EBPAS),[23] which is a measure of therapists' attitudes toward EBPs. Its most recent version was published in 2010, where Aarons et al.[24] expanded upon Aaron's initial[23] work by adding a variety of subscales and creating national norms. Although the EBPAS is the most well tested and psychometrically supported therapist attitudinal measure in our field, it does not assess for perceived behavioral control, subjective norms, or behavioral intentions for using EBPs.

An instrumentation effort specifically designed to examine youth mental health therapists' behavioral intentions toward implementing EBPs has begun recently with the development of the Intention Scale for Providers (ISP).[25] The ISP is a self-report measure that assesses therapists' views of EBP implementation through their self-report of attitudes, subjective norms, perceived behavioral control, and behavioral intentions. Burgess and colleagues[25] developed the ISP through a comprehensive content validation procedure, which involved four key phases: (a) defining the constructs of interest, (b) utilizing informant interviews to generate the item content, (c) modifying the items based on input from an expert panel, and (d) evaluating each of the items based on quantitative and qualitative reviews by an expert panel, key stakeholders, and the target population. Haynes and colleagues[26] cogently argue that content validation is an extension of construct validity by which the elements of an instrument are evaluated in relation to the target constructs, population, and purpose. Content validation procedures are meant to increase the likelihood that questionnaire items are relevant to their intended constructs and not relevant to irrelevant constructs. Building upon the ISP's strengths of having undergone a multiphase content validation process, a psychometric evaluation of the ISP's factor structure, reliability, and validity seems to be the next logical step for studying this measure. A psychometrically reliable and valid TPB youth therapist-report measure on EBP utilization may represent a valuable next step for implementation instrumentation and research efforts. For example, such an instrument could be used to evaluate the effects of implementation strategies that are intended to increase EBP implementation rates and if found useful would ultimately allow for cross-study comparisons with the context of a robust theory of behavior. Additionally, such a multi-dimensional measure might be of particular use during implementation situations in which assessment burden may be an issue.

Each of the TPB constructs of the ISP may be measured either directly—asking the participants plainly and candidly for their attitudes, subjective norms, perceived behavioral control, and behavioral intentions about the behavior, or indirectly—asking the participants about their corresponding beliefs and outcome evaluations of the behavior. The ISP consists of 16 direct measurement items, which includes five items for the attitudes scale, four items each for the perceived behavior control and behavioral intentions scales, and three items for the subjective norms scale, in addition to 54 indirect measurement items. Decisions about using only direct measurement items or both direct and indirect measurement items should consider a variety of factors such as the administration feasibility and the potential utility of belief-based indirect measurement items. In circumstances where administration time may be an issue, Ajzen[27] suggests

Table 1
Therapist background information

	n	Percentage
Most advanced educational degree		
Associate's or Bachelor's Degrees	3	1.4
Masters-level degrees (e.g., M.A., M.S., M.F.T., M.S.W.)	187	89.9
Doctoral Student, Intern, Psy.D., Ph.D., M.D.	20	9.5
Professional specialty (primary)		
Counseling (psychology)	63	29.9
Social work	46	21.8
Marriage and family therapy	43	20.4
Clinical psychology	20	9.5
Counseling (education)	12	5.7
School psychology	6	2.8
Other	6	2.8
Education or special education	2	0.9
Substance abuse counseling	2	0.9
More than one professional specialty	11	5.2
Theoretical orientation		
Cognitive or cognitive behavioral	180	86.5
Behavioral	141	67.8
Humanistic or client centered	109	51.7
Systems or family systems	100	48.1
Eclectic or integral	65	31.3
Existential or gestalt	37	17.8
Psychoanalytic or psychodynamic	35	16.8
Other	15	7.2
Primary clinical setting		
School based	126	59.7
Home based	42	19.9
Hospital or residential	18	8.5
Therapeutic foster care	9	4.3
Outpatient clinic	5	2.4
Other	3	1.4
Missing	7	3.3

Therapists were asked to endorse all theoretical orientations, not just one

a brief measure with the direct measurement items of the TPB is sufficient when the goal of the study is to predict intentions and behavior.

Present investigation

The overarching purpose of the current study was to examine the psychometric properties of the Intention Scale for Providers-Direct Items (ISP-D), which is an abbreviated version of the ISP, limited to its 16 direct measurement items. Four aims were subsumed under the larger goal of examining the ISP-D's psychometric properties. First, a confirmatory factor analysis (CFA) was conducted to examine the item-to-factor relations of the ISP-D. It was hypothesized that the ISP-D

would demonstrate a four-factor structure along the lines of the TPB domains of attitudes, subjective norms, perceived behavioral control, and behavioral intentions. Second, the reliability of the ISP-D was examined via internal consistency of the subscales. It was hypothesized that the four ISP-D subscales would demonstrate good internal consistency. Third, the ISP-D's construct validity was examined through convergence with related measures of attitudes, subjective norms, perceived behavioral control, and behavioral intentions. It was hypothesized that the ISP-D subscales would positively and significantly correlate with convergent indices of attitudes, subjective norms, perceived behavioral control, and behavioral intentions. Fourth, the relationship between therapist demographic variables and therapists' EBP attitudes, subjective norms, perceived behavioral control, and behavioral intentions was explored with regard to their relationships to the ISP-D's factors. The analyses for this final aim were exploratory in nature with no a priori hypotheses.

Method

Participants

Participants were public sector youth mental health therapists contracted with the State of Hawaii's Department of Health (DOH), Child and Adolescent Mental Health Division (CAMHD), and Department of Education (DOE) School-Based Behavioral Health (SBBH) program. CAMHD therapists provide mental health services to children and their families across a variety of settings including those that are home, community, and residential based, while SBBH therapists mainly provide outpatient services to children in the school setting. These therapists were surveyed because they provide the majority of direct services to youth in the public mental health sector in Hawaii. Concerning CAMHD therapists, all (K = 15) Hawaii direct service provider agencies contracted with CAMHD were contacted to participate. Of those, 11 (73%) leaders of different mental health agencies across the four major Hawaiian Islands agreed to participate. DOE participants were represented from all four districts on Oahu, Hawaii, with participation across 19 out of the 22 (86%) area complexes within these districts. Across these two major organizations, a total of 235 therapists (92 CAMHD and 143 DOE therapists) were approached to complete the survey battery. Response rates for CAMHD and DOE therapists were 88.0% and 90.9%, respectively, with a total response rate of 89.8% for all participants. A total of 211 therapists (81 CAMHD and 130 DOE therapists) completed one or more of the questionnaires from the survey battery. Participants ranged in age from 24 to 76 (M = 39.6, SD = 10.1), 75.4% were female (n = 159), and major primary ethnicities reported were the following: Asian (n = 63; 40.6%), White (n = 54; 34.8%), multi-ethnic (n = 56; 26.5%), and Hawaiian or Pacific Islander (n = 20; 12.9%). Participants reported an average of 5.3 years (SD = 5.3) of clinical training and an average of 8.5 years (SD = 7.6) of full-time clinical experience since earning their terminal degree. Approximately 45.5% (n = 85) of participants reported holding a state license to practice. As indicated in Table 1, participants had varying levels of education, professional specialties, theoretical orientations, and primary clinical work settings.* Participants reported attending an average of 26.2 h (SD = 22.1) of continuing education workshops, trainings, or conferences per year. On average, participants reported having an active caseload of 11.6 (SD = 8.1) clients and received approximately 3.2 h (SD = 3.8) and 2.3 h (SD = 1.6) of group and individual supervision per month, respectively.

* Note that if participants marked more than one primary clinical setting, it was indicated that they did not report a primary clinical setting.

Measures

Evidence-Based Practice Attitude Scale[23] The EBPAS is a 15-item therapist-report measure of attitudes toward EBPs that utilize a five-point scale to measure the amount with which participants agree with a statement, ranging from 0 ("not at all") to 4 ("to a very great extent"). The EBPAS has four subscales: (a) appeal—appeal of EBPs; (b) requirements—the extent to which a therapist would adopt an EBP if required by their agency, supervisor, or state; (c) openness—the therapists' openness to try EBPs; and (d) divergence—unfavorable attitudes toward EBPs (scored in reverse before used to compute the total score). Only the EBPAS total scale was utilized for the current study. Cronbach's alpha for the EBPAS total scale was acceptable at .78.

Evidence-Based Practice Theory of Planned Behavior Survey[21] The EBP TPB Survey is a 15-item questionnaire created to examine the predictors of EBP intentions by substance abuse therapists. This measure utilizes a seven-point Likert scale to measure the amount with which participants agree with a statement, ranging from 1 ("strongly disagree") to 7 ("strongly agree") and a seven-point bipolar adjective scale (e.g., extremely difficult…extremely easy) that assesses therapists' intentions, attitudes, subjective norms, and perceived behavioral control for using EBPs in their treatment practice with adult clients for substance abuse. While this measure was developed within the context of substance abuse therapists, its original wording was retained given that there was no reference specifically to substance abuse problems. Similar to the ISP-D, the EBP TPB Survey has four subscales: (a) attitudes—attitude toward the use of EBPs; (b) subjective norms—the extent to which therapists identify subjective pressure to employ EBPs into treatment practice; (c) perceived behavioral control—therapists' perceived capability of employing EBPs; and (d) intentions—therapists' intentions to employ EBPs into their current work practices. It should be noted that although the ISP-D and the EBP TPB Survey share the same scale score names, the respective scale score items between these two measures are completely different. In the current study, the Cronbach alphas (see Table 2) for the Intentions, Subjective Norms, Attitudes, and Perceived Behavioral Control subscales were .93, .78, .76, and .40, respectively, which are similar to the values that Kelly et al.[21] obtained, with the exception of the Perceived Behavioral Control subscale, which fell in the unacceptable range.

Intention Scale for Providers-Direct Items[25] The ISP-D is a 16-item measure designed to measure the TPB constructs of behavioral intentions (4 items), attitudes (5 items), subjective norms (3 items), and perceived behavioral control (4 items), as they relate to therapists' adoption of youth EBPs. The scoring scheme of the ISP-D varies by TPB-related factor and ranges from seven- to ten-point scales. The five items in the Attitudes subscale are scored on a seven-point semantic differential scale with distinct adjectives. For example, "Using EBPs with my clients feels: (*challenging-easy*)." The remaining items of the ISP-D are scored on a seven-point Likert scale indicating the extent to which the participant agrees or disagrees with a particular statement, from 1 ("strongly disagree") to 7 ("strongly agree"). One of the behavioral intentions item is scored on a ten-point scale asking participants to indicate the number of clients (1–10) with whom they intend on using EBPs with, out of the next ten clients that they see, whereas the other three behavioral intentions items are scored on a seven-point Likert scale. In the current study, given that the response format for the items in the ISP-D Behavioral Intentions subscale were not uniform, the question "Out of the next 10 clients you see, for how many of them will you use EBPs?" was rescaled to a 7-point scale using a linear transformation technique. Negative items are reverse scored and overall scores for each subscale are calculated through the mean of the item scores.

Table 2

Convergent validity bivariate correlations and internal consistency coefficients

	ISP-D ATT	ISP-D SN	ISP-D PBC	ISP-D BI	EBPTPB ATT	EBPTPB SN	EBPTPB PBC	EBPTPB BI	EBPAS Total
ISP-D ATT	-								
ISP-D SN	.13	-							
ISP-D PBC	.10	− .14*	-						
ISP-D BI	.41**	.59**	.07	-					
EBPTPB ATT	.55**	.33**	.19**	.51**	-				
EBPTPB SN	.38**	.51**	− .19**	.43**	.39**	-			
EBPTPB PBC	.27**	.10	.35**	.20**	.40**	.13	-		
EBPTPB BI	.46**	.31**	− .04	.60**	.52**	.57**	.38**	-	
EBPAS Total	.38**	.19**	.01	.39**	.37**	.39**	.11	.53**	-
Coefficient alphas	.75	.72	.63	.84	.76	.78	.40	.93	.78

ISP-D, Intention Scale for Providers-Direct Items (model 2); *ATT*, Attitudes; *SN*, Subjective Norms; *PBC*, Perceived Behavioral Control; *BI*, Behavioral Intentions

*$p < .05$

**$p < .01$

Therapist Background Questionnaire (TBQ) The TBQ assesses basic demographic information (i.e., age, gender, ethnicity), training and experience information (i.e., degrees earned, state license, professional specialty, theoretical orientation, years of clinical training, years of clinical experience, continuing education workshops, or trainings attended), and work setting information (i.e., clinical setting, current caseload, hours of supervision per month). The TBQ and variations of it have been utilized in numerous research investigations centered on examining therapist-reported attributes and behaviors.[28–31]

Procedure

Data collection took place as part of a larger investigation on therapists' intentions (i.e., a separate vignette study focused on therapist behaviors as opposed to a psychometric study). The questionnaires for all participants were pre-organized into sealable envelopes, with either the ISP-D or a questionnaire for a related study appearing first in each packet and the TBQ appearing last. The order of the EBPAS and the EBP TPB Survey were then randomized before the TBQ. Participants received cash or gift card incentives for their participation. All procedures and consent forms were approved by the University of Hawai'i at Mānoa Committee on Human Studies and the DOE Data Governance and Analysis Branch prior to recruitment and data collection.

Data analytic strategy

Data integrity Distributional properties of the data (i.e., normality, standard deviations, skewness, kurtosis) were examined at all subscale levels of the ISP-D and EBP TPB Survey, as well as the EBPAS Total scale in order to obtain a preliminary understanding of the data. The distribution of the data was tested using Shapiro-Wilk's *W* statistic, skewness, and kurtosis. Extreme values were also examined across all subscales of the ISP-D and EBP TPB Survey and the EBPAS Total scale using the stem-and-leaf plot and box plot functions on the Statistical Package for the Social Sciences (SPSS) software. Participants' data for each subscale were included for analyses in a pairwise fashion and required 100% of the subscale items to be included in analyses. Across all 211 ISP-D measures, 211 participants' Attitudes subscales, 209 participants' Perceived Behavioral Control subscales, 203 participants' Subjective Norms subscales, and 201 participants' Behavioral Intentions subscales were included for analyses. Across all 211 EBP TPB Survey measures, 211 participants' Attitudes and Behavioral Intentions subscales, 209 participants' Subjective Norms subscales, and 204 participants' Perceived Behavioral Control subscales were included for analyses. Across all 211 EBPAS measures, 210 participants' EBPAS Total scales were included for analyses. In addition to the strategies mentioned above, Cronbach's alpha coefficients were calculated to determine internal consistency values for all subscales within each measure in the current study.

Power Sample size requirements were estimated by counting the number of parameters included in the potential CFA model.[32, 33] When using just the direct measurement items, there are a total of 16 factor loadings, plus six factor correlations and 16 error terms, which yields a total of 38 parameters to estimate. Bentler and Chou[34] recommend using five subjects per model parameter when running a CFA. This suggests that a minimum of 190 participants (38 parameters × 5) would be needed for the factor analysis. A power analysis was conducted using G*Power[35] using a one-way ANOVA for four groups (the maximum number of groups scheduled for planned comparisons). The results indicated that to detect a medium effect size ($\eta^2 = 0.06$; cf. attitudinal

differences between therapists of varying backgrounds[31])[36] at the 95% confidence level (α = .05), a total sample size of 175 therapists would be necessary. In summary, across the CFA and the planned ANOVAs, a total sample of 175–190 therapists would be required to run all the proposed analyses.

Aim 1: Construct validity: confirmatory factor analysis to examine factor structure A CFA with Mplus 8[37] was used to examine the item-to-factor relations of the ISP-D in order to confirm the hypothesis that the ISP-D would demonstrate a four-factor TPB structure. Maximum likelihood parameter estimates with robust standard errors (MLR) were used because they yield standard errors that are robust to non-normal data. Rhemtulla et al.[38] recommend treating data sets with five or more categories as continuous, which supports the use of MLR. Factor loadings were examined to investigate the extent to which items adequately and significantly loaded on their respective factors. Items were considered to load adequately and significantly on their respective factors if their *z*-score was not between − 1.96 and 1.96 as calculated by (estimate/standard error) at the 95% confidence level (α = .05). Items with poor factor loadings were removed from the model before rerunning the CFA. Model fit was evaluated via the comparative fit index (CFI),[39] root mean square error of approximation (RMSEA),[40] standardized root mean square residual (SRMR), and Tucker-Lewis index (TLI).[41] CFI values greater than .90[42] and greater than .95[43] represent "acceptable" and "good" model fit, respectively. RMSEA values lower than .08 and lower than .05 were used as cutoffs for "adequate" and "good" fit, respectively.[44] SRMR values less than .08 were used as a cutoff for "good" fit.[43] TLI values greater than .95 were used as a cutoff for "good" fit.[45] The correlations between factors were also examined to ensure that the factors have acceptable discriminant validity. Given that the χ^2 test is sensitive to model complexity and dependent on sample size,[46] the χ^2 values are reported but not formally considered for evaluation within the context of model fit.

Aim 2: Reliability Cronbach's alpha coefficients were calculated for all ISP-D subscales in order to examine the internal consistencies for this instrument, with coefficients of < .50, .50, .60, .70, .80, and .90 considered unacceptable, poor, questionable, acceptable, good, and excellent, respectively.[47]

Aim 3: Construct validity: bivariate correlations to examine convergent validity Zero-order bivariate Pearson product correlations were computed between all subscales of the ISP-D and EBP TPB Survey, as well as the EBPAS Total subscale. Meta-analyses[19] indicate that behavioral intentions tend to be most highly correlated with attitudes, followed by perceived behavioral control and subjective norms. It was hypothesized that the ISP-D Attitudes, Subjective Norms, and Perceived Behavioral Control subscale scores would all correlate positively with the ISP-D Behavioral Intentions subscale score. In addition to the three independent correlations between behavioral intentions, it was also hypothesized that the three determinant constructs would be positively correlated with each other (i.e., ISP-D Attitudes with ISP-D Subjective Norms, ISP-D Attitudes with ISP-D Perceived Behavioral Control, and ISP-D Subjective Norms with ISP-D Perceived Behavioral Control). Additionally, it was hypothesized that the ISP-D subscale scores would correlate positively and significantly with their counterpart constructs of attitudes, subjective norms, perceived behavioral control, and behavior intentions in the EBP TPB Survey. Regarding ISP-D and EBPAS Total scale correlations, it was hypothesized that the EBPAS Total scale would be positively correlated with the ISP-D Attitudes and Behavioral Intentions subscales. The strengths of the bivariate correlations were evaluated using the conventions of .10, .30, and .50,

which can be interpreted as small, medium, and large coefficients, respectively.[36] The correlations were examined and considered significant against alpha levels of .01 and .05 (i.e., $p < .01$ and $p < .05$, respectively).

Aim 4: Other exploratory analyses Finally, exploratory analyses were conducted to evaluate the relationship between the TPB constructs and various demographic variables. The relationship between the ISP-D subscale scores and other continuous variables (e.g., years of clinical experience) was assessed through zero-order bivariate correlations. The relationship between ISP-D subscale scores and categorical variables (e.g., highest degree earned) was examined through analysis of variance (ANOVA) analyses, with subsequent follow-up pairwise comparisons completed as indicated. As mentioned above, the strengths of bivariate correlations were evaluated using the conventions of .10, .30, and .50. The strengths of the ANOVAs were evaluated by η^2 for small, medium, and large effect sizes with Green and Salkind's[36] respective guidelines of .01, .06, and .14. Analyses were performed against an alpha level of .05 (i.e., $p < .05$). When evaluating the pairwise mean differences for statistically significant ANOVAs with three or more groups, Tukey's HSD tests were used if equality of error variances could be assumed (i.e., $p > .05$ for Levene's test of equality of variance). Dunnett's *C* tests were used for post hoc comparisons when equal variances could not be assumed.

Results

Data integrity

Regarding skewness, all nine combined ISP-D14 and EBP TPB Survey subscales and the EBPAS Total scale met benchmark for "excellent" or "acceptable" skewness. Furthermore, concerning kurtosis, only one of the nine combined ISP-D14 and EBP TPB Survey subscales and EBPAS Total scale did not meet at least "acceptable" criteria (i.e., the ISP-D14 Subjective Norms subscale had a kurtosis of 2.08). However, Shapiro-Wilk's statistics suggested that all subscales were non-normally distributed ($p < .001$), with the exception of the EBPAS Total subscale ($p = .256$). A majority of the non-normally distributed subscales were still non-normally distributed even after performing logarithmic and square root transformations, both with and without the statistical outliers. Given that transformations remove original numerical values from the subscales and limit subsequent interpretability of the subscales, the decision was made to use the original values of these subscales.

Aim 1: Construct validity: confirmatory factor analysis to examine factor structure

The fit for the original four-factor model (model 1) of the ISP-D did not meet benchmark for adequate model fit on four out of four fit indices (i.e., χ^2 (98) = 277.75, RMSEA = .093, SRMR = .117, CFI = .812, TLI = .770). All of the factor loadings significantly loaded on their respective factors, with the exception of items two and nine, from the Attitudes and Perceived Behavioral Control subscales, respectively (see Table 3).[†] A four-factor model of the ISP-D, with the poor

[†] Since the item-level data were skewed and technically ordinal, the same analyses were run with the Mplus "categorical" option, which uses the weighted least square means and variance (WLSMV) adjusted estimator and a polychoric as opposed to Pearson correlation matrix. Notably, this approach does not assume the normality of the indicators. This model produced a negative residual variance (− .002) for one factor. Thus, the factor variance was set to 0, which again produced a non-positive definite covariance matrix. Setting the variance to .01 resulted in an appropriately converging model. This model had similar fit statistics to the continuous model (χ^2 (98) = 465.314, RMSEA = 0.133 (0.121–0.146), CFI = 0.907, TLI = 0.886, SRMR = 0.079). Model 2 also fit similarly with categorical indicators (χ^2 (71) = 215.443, RMSEA = 0.098 (0.083–0.113), CFI = 0.962, TLI = 0.951, SRMR = 0.061).

Table 3

Factor loadings for the confirmatory factor analysis for the ISP-D models by subscale

		Model 1		Model 2	
Item #		**Estimate (S.E.)**	*z*	**Estimate (S.E.)**	*z*
Attitudes					
5	Using EBPs with my clients feels genuine/insincere (for me).	0.76 (0.10)	7.86	0.75 (0.10)	7.33
1	Using EBPs with my clients feels useful/useless (for me).	0.76 (0.10)	7.84	0.77 (0.10)	7.75
3	Using EBPs with my clients feels harmful/beneficial (for me).	− 0.66 (0.09)	− 7.18	− 0.66 (0.09)	− 7.32
4	Using EBPs with my clients feels flexible/rigid (for me).	0.48 (0.12)	3.96	0.47 (0.13)	3.72
2	Using EBPs with my clients feels challenging/easy (for me).	− 0.18 (0.10)	− 1.92	N/A	N/A
Perceived behavioral control					
13	I have the power to decide whether or not to use EBPs with my clients.	− 0.66 (0.10)	− 6.51	− 0.67 (0.11)	− 6.09
15	I have the autonomy to choose the treatment practices I use.	− 0.65 (0.09)	− 6.97	− 0.62 (0.09)	− 6.78
7	The decision to use EBPs with my clients is out of my control.	0.50 (0.11)	4.54	0.53 (0.12)	4.50
9	I am confident in my ability to use EBPs with my clients.	− 0.20 (0.14)	− 1.42	N/A	N/A
Subjective norms					
10	I am expected to use EBPs with my clients.	0.89 (0.04)	22.87	0.89 (0.04)	23.04
6	People in my field who are important to me want me to use EBPs with my clients.	0.75 (0.08)	10.03	0.75 (0.07)	10.10
12	My profession pressures me to use EBPs with my clients.	0.48 (0.07)	7.11	0.48 (0.07)	7.14
Behavioral intentions					
14	I expect to use EBPs with my clients.	0.88 (0.03)	26.09	0.88 (0.03)	26.11
8	I want to use EBPs with my clients.	0.87 (0.03)	26.52	0.87 (0.03)	26.58
11	I intend to use EBPs with my clients.	0.87 (0.04)	21.86	0.87 (0.04)	21.75
16	Out of the next 10 clients you see, for how many of them will you use EBPs?	0.52 (0.09)	5.88	0.52 (0.09)	5.92

S.E., standard error; *N/A*, not applicable

The estimate and *z* scores for items 2 and 9 on model 2 are N/A because these two items were removed from the model

fitting items (i.e., two and nine) removed was also tested to see if this revised model (model 2) provided a better model fit than the original model. Model 2 showed an improved fit over model 1 and fit the data reasonably well (i.e., χ^2 (71) = 169.36, RMSEA = .081, SRMR = .075, CFI = .885, TLI = .852). All factor loadings in model 2 loaded significantly on their respective factors (see Table 3).

Aim 2: Reliability

Cronbach's alpha coefficients were calculated for the four subscales of the 14-item revised ISP-D (model 2), referred to as the ISP-D14 hereinafter. The ISP-D14 Behavioral Intentions subscale (α = .84) met benchmark for good reliability ($\alpha \geq .80$). Scores from the ISP-D14 Attitudes subscale (α = .75) and Subjective Norms subscale (α = .72) met benchmark for acceptable reliability ($\alpha \geq .70$). The Perceived Behavioral Control subscale fell in the questionable range for reliability (α = .63). ISP-D14 mean and standard deviation indices for the current sample were as follows: Behavioral Intentions (M = 5.90, SD = 1.09, range = 1.22–7.00); Attitudes (M = 5.25, SD = 0.99, range = 2.00–7.00); Subjective Norms (M = 5.55, SD = 1.25, range = 1.00–7.00), and Perceived Behavioral Control (M = 4.81, SD = 1.32, range = 1.67–7.00). Overall, these mean descriptive statistics suggest that the therapists in this sample had positive attitudes (e.g., positively value the behavior), high levels of subjective norms (e.g., have a great amount of perceived social pressure to perform the behavior), moderate levels of perceived behavioral control (e.g., hold a moderate perception of their ability to perform the behavior), and strong behavioral intentions (e.g., high readiness to perform the behavior) for implementing EBPs.

Aim 3: Construct validity: bivariate correlations to examine convergent validity

Regarding scale score correlations for factors within the ISP-D14, both the Attitudes and Subjective Norms subscales correlated significantly and positively with the Behavioral Intentions index at r = .41 ($p < .01$) and r = .59 ($p < .01$), respectively. Inconsistent with the TPB model, the relationship between the ISP-D14 Perceived Behavioral Control subscale and the ISP-D14 Behavioral Intentions subscale was not significant (r = .07, p = .29). Also inconsistent with the TPB model, the relationships between the ISP-D14 Attitudes subscale and ISP-D14 Subjective Norms subscale as well as the ISP-D14 Attitudes subscale and ISP-D14 Perceived Behavioral Control subscale were not significant at r = .13 (p = .06) and r = .10 (p = .13), respectively. Also, contrary to the TPB model, an unexpected small and negative correlation was found between the ISP-D14 Subjective Norms subscale and the ISP-D14 Perceived Behavioral Control subscale at r = .14 ($p < .05$).

Convergent validity of the ISP-D14 was examined through zero-order bivariate Pearson product correlations with the EBP TPB Survey subscales and the EBPAS Total scale. Convergent validity results appear in Table 2. As predicted, the correlations between the ISP-D14, EBP TPB Survey, and EBPAS scales for similar domains were positive and significant. The convergent validity of the ISP-D14 Attitudes subscale was supported by its large and positive correlation (r = .55, $p < .01$) with the EBP TPB Survey Attitudes subscale and its medium positive correlation (r = .38, $p < .01$) with the EBPAS Total scale. Similarly, the EBPAS Total scale and the EBP TPB Survey Attitudes subscale exhibited a medium and positive correlation (r = .37, $p < .01$), providing evidence of convergent validity for the three Attitudes scales. The ISP-D14 Subjective Norms subscale showed a large and positive correlation (r = .51, $p < .01$) with the EBP TPB Survey Subjective Norms subscale, which provides support for its convergence. The ISP-D14 Behavioral Intentions subscale also demonstrated convergence through a large positive correlation (r = .60, $p < .01$) with the EBP TPB Survey Behavioral Intentions subscale. Convergence between the ISP-D14 Perceived Behavioral Control subscale and the EBP TPB Survey Perceived Behavioral Control subscale

was also supported with a medium and positive correlation ($r = .35$, $p < .01$). Also, as predicted, there was a medium and positive correlation ($r = .39$, $p < .01$) between the EBPAS Total scale and the ISP-D14 Behavioral Intentions subscale.

Aim 4: Other exploratory analyses

Attitudes All ANOVAs for highest degree, professional specialty, theoretical orientation, state licensure, and age of population worked with for treatment emerged non-significant. Attitude scores on the ISP-D14 varied as a function of the primary clinical setting in which therapists delivered treatment $F(2,184) = 3.84$, $p = .02$, $\eta^2 = .04$; however, Dunnett's C post hoc comparisons did not indicate any significant differences between home-based, school-based, and hospital/residential-based therapists.

Subjective norms All ANOVAs for highest degree, professional specialty, theoretical orientation, state licensure, and age of population worked with for treatment emerged non-significant. ISP-D14 subjective norms scores varied as a function of the primary clinical setting in which the therapists delivered treatment services, $F(2,176) = 5.60$, $p = .004$, $\eta^2 = .06$. Tukey's HSD post hoc comparisons indicated that home-based therapists' and hospital- or residential-based therapists' subjective norms scores were both significantly higher than those of school-based therapists, but not significantly different from each other.

Perceived behavioral control All ANOVAs for theoretical orientation, state licensure, and age of population worked with for treatment emerged non-significant. Higher advanced degree was significantly associated with higher scores on the Perceived Behavioral Control subscale of the ISP-D14, $F(1,194) = 4.13$, $p = .043$, $\eta^2 = .02$. Doctorate-level therapists' perceived behavioral control scores were significantly higher than those of masters-level therapists. ISP-D14 perceived behavioral control scores also varied as a function of the primary clinical setting in which the therapists delivered treatment services, $F(2,184) = 3.70$, $p = .026$, $\eta^2 = .04$ (see Table 4). Tukey's HSD post hoc tests indicated that school-based therapists had significantly higher perceived behavioral control scores than home-based therapists. Scores on the ISP-D14 Perceived Behavioral Control subscale also varied significantly by therapists' professional specialties, $F(3,187) = 4.04$, $p = .008$, $\eta^2 = .06$. Tukey's HSD post hoc comparisons indicated that therapists who endorsed a professional specialty of Clinical Psychology, Psychiatry, or School Psychology had significantly greater scores on perceived behavioral control than Marriage and Family Therapists.

Behavioral intentions There were small and negative correlations ($r = -.20$, $p < .01$) between ISP-D14 Behavioral Intentions subscale scores and years of full-time clinical experience ($r = -.20$, $p < .01$) and therapists' age ($r = -.17$, $p < .05$). Additionally, all ANOVAs for highest degree, professional specialty, theoretical orientation, and age of population worked with for treatment emerged non-significant. ISP-D14 behavioral intentions scores varied as a function of the primary clinical setting in which the therapists delivered treatment services, $F(2,176) = 13.24$, $p < .001$, $\eta^2 = .13$ (see Table 4), with post hoc tests indicating that home-based therapists' and hospital- or residential-based therapists' behavioral intentions scores were the highest. State licensure was significantly associated with higher scores on the Behavioral Intentions subscale of the ISP-D14, $F(1,198) = 12.77$, $p < .001$, $\eta^2 = .06$. Therapists who were state licensed had higher behavioral intentions scores than therapists who were not state licensed.

Discussion

General summary

The ISP-D is a therapist self-report measure designed to measure the four TPB constructs as they relate to therapists' adoption of youth EBPs that was created through an intensive multiphase content validation process. This current study contributed to EBP instrumentation implementation efforts through the psychometric evaluation of the ISP-D in a large sample of youth public sector mental health therapists in the State of Hawaii. The study's first a priori hypothesis that the ISP-D would demonstrate a four-factor structure along the lines of the TPB domains of attitudes, subjective norms, perceived behavioral control, and behavioral intentions was supported through confirmatory factor analysis and scale refinement. Regarding the reliability of the ISP-D14, the Attitudes, Subjective Norms, and Behavioral Intentions subscales met benchmark for acceptable, acceptable, and good reliability, respectively, whereas the Perceived Behavioral Control subscale fell in the questionable range for reliability. Although the internal consistency reliability of the ISP-D14 Perceived Behavioral Control subscale was questionable, perceived behavioral control is considered an integral construct of the TPB. Therefore, the Perceived Behavioral Control subscale was retained but any results involving this subscale should be interpreted with caution.

Related to the TPB model, meta-analyses[19] indicate that behavioral intentions tend to be most highly correlated with attitudes, followed by perceived behavioral control and subjective norms. Conversely, the results of the current study with respect to the TPB constructs as measured by the ISP-D14 suggest that the correlation between subjective norms and behavioral intentions was larger than the correlation between attitudes and behavioral intentions. Although these results are inconsistent with the research literature, they are not surprising as Ajzen[12] claims that the degree to which attitudes, subjective norms, and perceived behavioral control contribute to the prediction of

Table 4
ISP-D scale scores by primary clinical setting

	n	Mean (SD)
ISP-D Attitudes		
School-based treatment	127	5.09 (1.07)[a]
Home-based treatment	42	5.49 (0.74)[a]
Hospital or residential treatment	18	5.58 (0.88)[a]
ISP-D Subjective Norms		
School-based treatment	120	5.32 (1.34)[a]
Home-based treatment	41	5.89 (1.16)[b]
Hospital or residential treatment	18	6.15 (0.73)[b]
ISP-D Perceived Behavioral Control		
School-based treatment	127	4.96 (1.27)[ab]
Home-based treatment	42	4.31 (1.47)[a]
Hospital or residential treatment	18	4.83 (1.47)[b]
ISP-D Behavioral Intentions		
School-based treatment	120	6.23 (1.21)[a]
Home-based treatment	41	7.02 (0.94)[b]
Hospital or residential treatment	18	7.32 (0.55)[b]

ISP-D, Intention Scale for Providers-Direct Items (model 2)
[ab]Differing letter superscripts indicate significant pairwise mean differences at 99% confidence interval

behavioral intentions will differ depending on the specific behavior and situation. Similarly, Kelly and colleagues'[21] TPB study on substance abuse workers' EBP intentions also found the correlation between behavioral intentions and subjective norms to be the strongest across all the TPB constructs. Ajzen's[12] statement that the relative strength or impact that attitudes, subjective norms, and perceived behavioral control each hold in the prediction of behavioral intentions will likely vary across different behaviors or situations and may hold true for the ISP-D14. Although the literature has yet to develop around the area of youth mental health therapists' behavioral intentions of EBP use within the context of the TPB, related research in the area of general health care providers (e.g., physicians, nurses, pharmacists) aligns with the current findings such that the strength of the correlations between behavioral intentions and the remaining TPB constructs varied across studies and behaviors.[48] Another possible explanation for the differences found in the current study may be related to Armitage and Conner's[17] findings from their meta-analyses study that TPB instruments with multiple-item measures of subjective norms (e.g., ISP-D14 Subjective Norms scale) have significantly stronger correlations with behavioral intentions than instruments with single-item subjective norms measures. In other words, the weaker correlations found between subjective norms and behavioral intentions in many of the previous TPB studies may be an artifact of a weaker measurement system.

Findings from the present study also indicated that the ISP-D14 was related to the counterpart subscales of the EBP TPB Survey and the EBPAS Total scale, providing initial support for the convergent validity of the ISP-D14. Notably, the ISP-D14 Attitude, Subjective Norms, Perceived Behavioral Control, and Behavioral Intentions subscales all correlated the strongest with their counterpart subscales on the EBP TPB Survey.

The current study also found that therapists in-home-based or hospital-based settings reported higher levels of behavioral intentions and stronger subjective norms for using EBPs than school-based therapists. One possible explanation for these differences may be related to the structure of Hawaii's public sector mental health service delivery system for children. In Hawaii, the majority of school-based mental health services are provided by the DOE's SBBH therapists, whereas a majority of the in-home, community, and out-of-home services are provided through agencies contracted by the DOH's CAMHD. It is possible that there are organizational and or cultural differences that may be responsible for these differences in therapists' reported levels of behavioral intentions and subjective norms.

Consistent with previous studies, no relationship between therapists' attitudes and years of full-time clinical experience,[31, 49] professional specialty, or theoretical orientation[23] was found. Consistent with Izmirian and Nakamura,[29] but inconsistent with Nakamura and colleagues,[31] attitudes did not differ based on therapists' state licensure status. Interestingly, however, therapists who were state licensed in the current study endorsed greater behavioral intentions for using EBPs than non-licensed therapists. Doctorate-level therapists' perceived behavioral control scores from the current study were significantly higher than those of masters-level therapists, suggesting that doctorate-level therapists hold a stronger perception of their ability to utilize EBPs with their clients than masters-level therapists. Altogether, these results may suggest that therapists who hold a doctorate degree or are state licensed may have been exposed to more research or EBPs during higher level graduate training and, therefore, feel more confident or comfortable with their use of EBPs.

Limitations

Although the results of the current study are promising with regard to initial psychometric support for the ISP-D14, a few caveats are in order. First, the use of public sector therapists within the State of Hawaii might limit the generalizability of the results and findings may not apply to other systems of care or the private sector. For example, participating therapists in the current

sample may be different from other service system providers on a variety of known and unknown parameters. Further, although there was an exceptionally high participation rate in the current study, it should also be noted that all therapists volunteered to participate in the study, and therefore, care should be taken when generalizing the findings of this study to a larger population of treatment providers who may not be interested in participating in research studies. Likewise, given the early phase of development of the ISP-D14, and the lack of available norms of the measure, any interpretation of the scores should be made with caution. A second potential limitation is that the test-retest reliability of the ISP-D14 was not investigated, and therefore, the degree to which the results of the ISP-D14 measure is consistent over time is unknown. A third potential limitation to this study concerns the recommended ratio of indicators (items) per latent construct. For CFA models, Kline[50] recommends an absolute minimum number of two indicators per factor because CFA models are prone to errors in analyses in smaller samples. Additionally, Kenny suggests a rule of thumb, which is that "Two might be fine, three is better, four is best, and anything more is gravy."[51(p. 143)] Taken together, it appears that the general consensus suggests two to four indicators per latent construct, but a limitation for having fewer indicators is that it becomes more difficult to empirically identify the model. Looking at the items of the ISP-D14, the Attitudes, Behavioral Intentions, Perceived Behavior Control, and Subjective Norms scales all fall within the suggested limits (four, four, three, and three items, respectively), but are on the lower end on acceptability with regard to recommended items per scale. Another potential limitation of the study is that self-report measures that use direct measurement items such as the ISP-D14 may be affected by reporter bias such as social desirability. In situations like this, using the full 70-item ISP measure may have an advantage because indirect measurement items may be less likely to produce socially desirable responses if the therapists are unable to guess what is being measured.

Future studies

Forthcoming research may expand upon this study by investigating whether the same four-factor TPB structure of the ISP-D14 holds true for private sector therapists and those from other systems of care. Likewise, future studies may also examine the norms of the ISP-D14 using a large nationwide sample of therapists to establish national norms for the measure. It may also be beneficial to explore if there are any similarities or differences between organization membership (e.g., school mental health therapists compared against community mental health therapists, private compared against public sector therapists) with regard to the therapists' responses to the ISP-D14, as this may help tailor future implementation strategies. Future studies may also investigate the relationship between the different ISP-D14 subscales' abilities to successfully predict therapists' actual EBP behaviors with their clients, and in turn, potentially provide informative assessment strategies that may help to guide future EBP implementation efforts.

Our field may also benefit from continued research in the form of examining the psychometric properties of the full 70-item ISP measure, which includes both the direct and indirect measurement items. Ajzen[52] claims that including the belief-based indirect measurement items may provide a practical utility above and beyond the direct measurement items such that these indirect items may be used to survey attitudinal considerations that guide individuals' decisions to engage in a given behavior as well as explore their beliefs and outcome evaluations of the behavior. Incorporating both direct and indirect measurement items in a TPB measure would provide a basis for conducting additional reliability analyses such that the indirect measurement items for each of the TPB constructs can be tested to see if they correlate with their respective counterpart direct measurement items, which would provide further evidence for the instrument's internal consistency and overall coherence. Moreover, in light of the questionable reliability of the ISP-D14 Perceived Behavioral Control subscale, any analyses conducted with the ISP-D14 Perceived Behavioral

Control subscale should be interpreted with caution until further evidence supporting its reliability can be found.

Implications for Behavioral Health

Despite the noted limitations, the current investigation provides preliminary support for the factor structure, internal consistency, and convergent validity of the ISP-D14 in a diverse sample of public sector youth mental health therapists. An important next step for the psychometric investigation of the ISP-D14 concerns its convergent validity with other indices of EBP behavior, such as actual therapeutic practice behaviors or even observations of those therapeutic sessions. Given the promising psychometric properties of the ISP-D14, this instrument may be considered for helping to examine the effectiveness of implementation strategies that are designed to increase youth mental health therapists' use of EBPs.[25] Furthermore, because this measure is brief (i.e., 14 items), the instrument has the potential to be used efficiently for research in real-world practice settings where the gold standard practice of providing direct observations of behavior change amongst therapists can be expensive and laborious. Furthermore, given the measure's firm rooting in TPB constructs that transcend typically assessed domains in this type of work, there exists the potential for new and penetrating lines of research with regard to therapist behavior change. For example, a training intervention might be shown to have a large impact on therapists' subjective norms but have no influence on their perceived behavioral control, thus limiting the overall effect on their behavioral intentions and ultimately their behavior. It is hoped that the regular use of carefully designed and validated instruments with psychometric support such as the ISP-D14 may help to improve the overall quality of services youth receive in the public mental health sector.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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