Received: 18 October 2023 | Revised: 8 February 2024 | Accepted: 9 February 2024

DOI: 10.1002/jaoc.12132

QUANTITATIVE RESEARCH

A pilot study of the behavioral addictions knowledge survey: Ensuring students' knowledge about process/behavioral addictions

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Abstract

Future counselors are likely to work with clients with process/behavioral addictions (PBA). The behavioral addiction knowledge survey (BAKS) was designed to determine counseling students' knowledge of PBAs. This article presents the instrument development procedures and results of a preliminary exploratory factor analysis (EFA) and a Rasch analysis of the BAKS. The sample size included 77 counseling students. The EFA suggested a three-factor, 18-item solution, with satisfactory internal consistency within each factor. Rasch analysis results also yielded excellent infit and outfit statistics. Detailed psychometric properties of the BAKS are provided. Implications for counselor educators, supervisors, and future researchers are included.

KEYWORDS

counselor education, exploratory factor analysis, instrument development, process/behavioral addictions, Rasch analysis

INTRODUCTION

In recent decades, the definition of addiction has grown to include individuals with an addiction to behaviors or other non-substances. These addictions are referred to as process or behavioral addictions (PBAs) and are defined as "a pathological involvement in a drug-free activity that exposes persons to mood-altering stimuli that produces pleasure or relieves pain" (Thombs & Osborn, 2019, p. 278). The continuously expanding body of research about PBAs led the American Psychiatric Association (APA) to include gambling disorder in the *Diagnosis and Statistical Manual* (DSM; 2013, 2022), which is the first and only diagnosable PBA for counselors. Non-diagnosable PBAs may include

internet gaming disorder (APA, 2022), addiction to exercise (Lodovico and Gorwood, 2020), sex (Derbyshire & Grant, 2015), pornography (Sallie et al., 2021), shopping, (Duroy et al., 2018), and smartphones (Allred & Atkin, 2020).

Recently published prevalence rates suggest that PBAs are present within society and may be a common treatment concern for clients (Daglis et al. 2021; Oka et al., 2021). However, evidence indicates that practicing counselors (Cartwright et al., 2021; Giordano & Cashwell, 2018; Ricciutti & Storlie, 2023; Wilson et al., 2019) and counseling students (Wilson et al., 2019) may be undertrained and underprepared to work with clients with PBAs. For this reason, the purpose of this study was to develop and test an instrument to determine counseling students' knowledge of PBAs prior to graduation and licensure. It is the goal of this instrument to provide clear data to help programs and counselor educators ensure that their students are knowledgeable about and prepared to treat clients with PBAs. Based on students' scores, it is the hope that this instrument will highlight areas for continued learning and growth within counseling programs.

Prevalence of process/behavioral addictions

Despite the lack of diagnostic criteria, recent research has determined that prevalence rates are higher than previously thought for many PBAs. At this time gambling disorder is the only PBA included in the DSM-5-TR (APA, 2022), with estimated prevalence rates of 0.2–0.3% of the population. However, Choliz et al. (2019) found that 68.5% of over 7,000 people surveyed had participated in a gambling-related activity, and 0.72% met criteria for pathological gambling behavior. Internet gaming disorder (APA, 2013, 2022) or addiction to video games is another type of PBA that was recently included in the DSM under conditions in need of further study. It has received recent attention in research to determine estimated prevalence rates and its impact on functioning. As many as 5.9% of adolescents in Europe, Asia, and Australia displayed addictive behaviors to video games, which led to impairments in sleep, academic achievement, and social relationships (Sugaya et al., 2019). Similarly, Kim et al. (2022) conducted a meta-analysis and found that 8.5% of males and 3.5% of females from 61 studies met criteria for Internet gaming disorder. Exercise addiction, which may be either a primary or secondary addiction (Cook & Luke 2017), has been found to affect anywhere from 2% to 43% of regular exercisers (Lodovico et al., 2019; Lukács et al., 2019; Marques et al., 2019) and 3% to 77% of competitive athletes (Godoy-Izquierdo et al., 2023; Marques et al., 2019; Nogueira et al., 2018). Estimated prevalence rates of shopping addiction were found to be as high as 16.1% (Duroy et al., 2018). Although these figures are estimates and should be viewed with appropriate caution, they illustrate that PBAs may be a common treatment concern for clients.

It is worth noting that some researchers have determined that prevalence rates of many PBAs have increased since the coronavirus (COVID-19) pandemic (Daglis et al., 2021; Dubey et al., 2020). Specifically, activities involving the Internet have increased in the years since the widespread COVID-19 lockdown (Ilslam et al., 2020; Király et al., 2020; Oka et al., 2021). Specific activities that include using social media (Luo et al., 2021; Zhan et al., 2021) are; online gambling (Brodeur et al., 2021; Hakansson et al., 2020), video games (King et al., 2020; Oka et al., 2021), viewing pornography (Király et al., 2020; Sallie et al., 2021), and retail shopping (Kovács et al., 2022; Niedermoser et al., 2021). Based on previous research, it may be concluded that the recent increase in potentially addictive behaviors may lead to increased prevalence rates of PBAs. This underscores the likelihood that many counseling students may work with clients seeking treatment for a PBA after becoming licensed.

Counselor education and preparation about process/behavioral addictions

At the time of writing this paper, there are few opportunities for counseling students to learn about PBAs. Out of the 18 CACREP-accredited addiction counseling programs, only one of them offers a

PBA-focused course (CACREP, 2024). This lack of education is reflected in research studies that have explored counselors' education, training, or preparation to work with clients with PBAs. Wilson and Johnson (2013) surveyed 37 practicing counselors and found that only 13% could provide an example of a PBA. Sixty-four percent of those counselors reported they had worked with clients with PBAs, but the majority of those participants reported feeling uncomfortable or very uncomfortable treating and diagnosing that population. Many participants also expressed being undertrained and underprepared to work with clients with PBAs.

Giordano and Cashwell (2018) surveyed college counselors about their knowledge of and experience with treating sex addiction. The researchers found that 65 out of 77 (84.4%) participants had treated college students presenting with sex addiction in the past year. However, only 33.8% of the 77 participants received training to do so in their counseling programs. Ricciutti (2023) explored the experiences of practicing counselors who have worked with clients with PBAs. All of the participants reported that they received minimal to no education about PBAs during their graduate training programs. Ricciutti and Storlie (2023) compared mental health counselors' stigma toward individuals with substance use disorders (SUDs) and PBAs. They determined that the participants held similar levels of stigma toward individuals with either type of addiction, which called into question existing academic and continuing education (CE) about both SUDs and PBAs. These studies highlight the contradiction between what counselors are taught during training programs and the populations they ultimately work with after graduation.

Recent research has stated the potential benefits of incorporating PBA content into counseling training programs (Falls Holman & Carlisle, 2019; Falls Holman et al., 2019; Giordano et al., 2019; Singh Balhara & Singh, 2019). Falls Holman et al. (2019) advised about ways to incorporate PBAs into existing courses and created student learning outcomes (SLOs) for PBA education. Giordano et al. (2019) designed and implemented a PBA course into a counseling program, then conducted a pre and post-test questionnaire to determine if the course impacted students' knowledge, preference, understanding, and competence toward working with clients with PBAs. Students reported they improved in each area at the end of the course. Written comments described their increased knowledge and excitement to work with clients with PBAs. However, the questionnaire was only four items and was not tested to determine reliability or validity. This indicates a need for an instrument that is psychometrically sound and able to determine students' knowledge about PBAs or justify the development of a PBA-focused course.

Other self-report instruments have been developed to determine counseling students' knowledge and competence in specific professional areas. One instrument is the multicultural counseling inventory (MCI; Sodowsky et al., 1994) which was developed to measure counselors' multicultural competencies. Although the MCI was developed in 1994, many researchers continue to use it today, and some researchers have used it to develop new self-report instruments to measure counselors' multicultural competencies (Killian et al., 2023; Harun et al., 2022). Another self-report instrument is the Confidence in Suicide Prevention Measure (Voss et al., 2013) which assesses counselors' knowledge of suicide risks and their confidence to address suicidality with clients. Regarding addiction and addiction counseling, the Addiction Counseling Self-Efficacy Scale (ACSES; Murdock et al., 2005) was developed to measure counseling students' knowledge and self-efficacy for working with clients in the area of addiction counseling. The ACSES has good psychometric properties and has been used in other studies since its development (Giannopoulos et al., 2021; Louie et al., 2021). These examples indicate that self-report instruments are valuable to researchers and counselor educators to determine counseling students' knowledge and competence in various clinical areas.

The combined evidence that counselors are likely to treat clients presenting with a PBA and the limited preparation about PBAs provided during and after counseling programs (Giordano & Cashwell, 2018; Ricciutti & Storlie, 2023; Wilson & Johnson, 2013), highlights a considerable gap in counselor education. For this reason, it is important to provide educators with a self-report tool to determine if counseling students are knowledgeable, prepared, and competent to work with clients with PBAs. Counselor educators can use this information to identify areas for future growth and

make programmatic changes. The purposes of this study were to: (a) develop an instrument to assess counseling students' knowledge about PBAs (b) conduct a preliminary (pilot) analysis to explore the psychometric properties of the BAKS, (c) determine if participants' scores on the BAKS are impacted by coursework, and (d) explore whether or not counseling students are accurately aware of their PBA. The following research questions guided us in our investigation:

1. What is the preliminary reliability of the BAKS with a sample of students enrolled in CACREP-accredited master's counseling programs?
2. What is the preliminary validity of the BAKS with the same sample?
3. What are the psychometric properties and fit statistics of the BAKS using Rasch analysis?
4. Are participants' BAKS scores impacted by whether they have taken a substance use/addiction course?
5. Are participants accurately aware of their knowledge about PBAs as evidenced by BAKS scores?

METHODOLOGY

Participants

The data for this study were collected from sources in two states. The first set of data was collected in January 2021 from master's students enrolled in a CACREP-accredited counseling program at a university in the Middle West. Forty-one students participated in the study. Three participants were removed after screening the data for missing values, yielding a final sample size of 38 participants for the first data set. The second set of data was collected in January 2023 from master's students enrolled in CACREP-accredited counseling programs throughout one state in the Southeast. Forty-three students began the study. Two were removed after screening the data for missing values, yielding a final sample size of 41 participants for the second data set.

A range of 25 to 150 participants is considered an excellent sample size for preliminary instrument development studies (Bujang, 2021; Hertzog, 2008; Stallard, 2012). For this reason, the authors decided to combine the two sets of data into one because both groups responded to the same version of the BAKS, and the procedures were similar in both data collection processes. SPSS (Version 28) was used to detect response outliers after combining both data sets to yield a sample size of 79 participants. Two respondents were removed from the pilot data set due to missing data, yielding a final sample of 77 participants, an adequate size for a preliminary analysis. An evaluation of skewness absolute values (less than two) and kurtosis absolute values (less than seven) in the preliminary combined data set suggested no extreme deviations from the normal distribution for all 23 BAKS items, as indicated by Dimitrov (2012). The absolute values for skewness did not exceed 0.77, and the absolute values of kurtosis did not exceed 1.49.

Demographic information about the 77 participants was analyzed after both data sets were combined. Participants were at any point in their counseling program. They ranged in age from 21 to 61 years ($M = 30.26$, $SD = 8.69$). Regarding gender, 72.7% ($n = 56$) of the participants identified as female, 22.1% ($n = 17$) identified as male, 1.3% ($n = 1$) identified as non-binary/third gender, 1.3% ($n = 1$) identified as transgender, and 2.6% ($n = 2$) did not disclose their gender identity. Regarding race, 79.2% ($n = 61$) of participants identified as White/Caucasian, 9.1% ($n = 7$) identified as Black/African American, 5.2% ($n = 4$) identified as Asian/Asian American, and 6.5% ($n = 5$) identified as "Other." Regarding ethnicity, 90.9% ($n = 70$) identified as not-Hispanic or not-Latino/a/x/e, 6.5% ($n = 5$) identified as Hispanic or Latino/a/x/e, and 2.6% ($n = 2$) did not report their ethnicity. Participants were also asked two binary questions (Y/N): (a) if they had ever taken a substance use/addiction course, and (b) if they believed they were knowledgeable about PBAs. For the first question, 49.35% ($n = 38$) of participants reported that they had completed a substance use/addiction course, while 50.65% ($n = 39$) had not. For the second question, 72.72% ($n = 56$) of participants

reported that they believed they were knowledgeable about PBAs, while 25.97% ($n = 20$) did not, and one participant did not respond.

Procedures

Prior to collecting data, we received institutional review board approval from each university the first author was affiliated with at the time of each round of data collection (i.e., one university in the Middle West and one in the Southeast). In both rounds, the initial recruitment invitation was emailed to potential participants through their program's email listserv. A follow-up recruitment invitation was emailed a week later, and a second follow-up was emailed a week after that. In the second round of data collection, the first author also sent the initial and follow-up recruitment invitations to program chairs or coordinators from other counseling programs in the Southeastern state with a request to forward the invitation to their students. The emails included a link to Qualtrics, where participants read and signed the informed consent.

We believed it was necessary for all participants to have a consistent definition and examples of PBAs in order to reduce individual opinions or beliefs that may have impacted the study's results. For this reason, we asked participants to attest to having read the following definition and examples of PBAs: "'A process/behavioral addiction is defined as a pathological involvement with a non-substance-related activity or stimuli that relieves pain or produces pleasure' (Thombs & Osborn, 2019, p. 278). Examples include gambling disorder, internet gaming disorder, binge eating disorder, sex addiction, shopping addiction, and exercise addiction." Afterwards, participants were invited to complete the BAKS and then the demographics form. Once participants had completed both surveys, they received the opportunity to be entered into a drawing to receive one of five $20 Amazon gift cards.

Instrument

The BAKS is a 4-point Likert-type scale that was developed by the first author to assess counseling master's students' knowledge about PBAs. The survey originally included 23 items, and all were scored ranging from 1 (strongly disagree) to 4 (strongly agree). Scoring on the instrument is simple; the sum of the responses is determined, and higher total scores reflect more knowledge of PBAs, while lower scores reflect less knowledge. Since the BAKS was developed for this study, the psychometric properties have not yet been investigated.

To create the BAKS, we used interview questions from the first author's recent consensual qualitative analysis study which explored the experiences of practicing counselors working with clients with PBAs (Ricciutti & Storlie, 2023). Interview questions were reworded to fit the quantitative nature of the BAKS. Examples of these items included "I have received appropriate education on behavioral addictions," "I feel comfortable working with clients with behavioral addictions," "I am knowledgeable about assessment techniques used to diagnose behavioral addictions," and "I feel prepared to work with clients with behavioral addictions."

To develop additional BAKS items we conducted a comprehensive literature review to locate recent research about counseling students' knowledge about PBAs or similar topics. Relevant research that was identified through the literature review included Giordano et al. (2019) and Falls Holman et al. (2019). Giordano et al. (2019) interviewed counseling students about their PBA knowledge and preparation before and after completing a PBA course. Falls Holman et al. (2019) created SLOs to help educators include PBA content in existing counseling coursework. Information from both studies were used to develop BAKS items, including "I feel competent (ability to succeed) in my ability to work with clients with behavioral addictions," (based on Giordano et al., 2019) and "I feel confident in my ability to plan treatment interventions for behavioral addictions," (based on Falls Holman et al., 2019)

Demographic questionnaire

A demographics questionnaire was created to collect information about participants' age, gender identity, race, and ethnicity. Two additional items were asked: (a) "have you taken a substance use/addictions course," and (b) "do you believe you are knowledgeable about process/behavioral addictions?" The results from the questionnaire were detailed previously.

Data analysis

The data analysis for this study consisted of four phases. First, participants' demographic characteristics of age, gender, race, ethnicity, and questions about their education and knowledge about PBAs were analyzed using descriptive statistics. Second, a preliminary EFA with Promax rotation was conducted because we anticipated that the latent factors generated from the EFA would be closely related to each other (Kolkbrenner, 2021). Cronbach's alpha (Cronbach, 1951) and McDonald's omega values (McDonald, 1999) for each latent factor were determined. An acceptable value for both internal consistency values is at least 0.7 (Field, 2017). Factor themes were decided based on statistical outputs and detailed feedback received from a panel of three experts in addiction and counselor education.

Third, we used a Rasch analysis to determine item-level fit statistics for each factor. A good-fitted Rasch model should expect average values of mean square error (MSE) to be about 1.00, values of standardized fit statistics to be within the −2 and +2 range (Engelhard & Wang, 2021), and infit and outfit mean square (MNSQ) values to fall between 0.5 and 1.5 to be adequate for analysis (Aryadoust et al., 2021; Linacre, 2002). Finally, a multivariate analysis of variance (MANOVA) was conducted to compare participants' scores on each BAKS latent factor with their responses to the two binary questions on the demographic questionnaire (i.e., if they had taken a substance use/addictions course and if they believed they were knowledgeable about PBAs). We chose to use a MANOVA because we anticipated the three latent factors would be closely related. Using MANOVA would reduce the error rate and increase statistical power.

RESULTS

Our primary goal in this study was to develop a psychometrically sound instrument to measure counseling students' knowledge about PBAs and determine the instrument's factor structure. After calculating the descriptive statistics for the 23 BAKS items, it was determined that the overall ratings indicated a moderate spread of the participants' confidence on different aspects related to the BAKS (Table 1). Higher ratings indicated higher levels of participant agreement with the statements. Across the BAKS, the standard deviations were all small, indicating that the participants exhibited a concentrated distribution of item ratings (Field, 2017).

Exploratory factor analysis

Preliminary exploratory factor analyses on all 23 BAKS items were completed by using IBM SPSS 28 with principal component analysis (PCA). It was hypothesized that all latent factors would be correlated. As a result, the oblique rotation was adopted. Initially, we used a PCA with eigenvalues greater than 1 to generate the number of latent factors to be extracted from the observed variables. For factor retention standard, we used guidelines from Kolkbrenner (2021) and Mvududu and Sink (2013) by suppressing factor loadings that were smaller than 0.4 and communalities that were smaller than

TABLE 1 Descriptive statistics for the original BAKS items.

	M	*SD*
1. I would like to work with clients with behavioral addictions.	2.94	0.63
2. As of this moment, I feel competent (able to succeed) in my ability to work with clients with behavioral addictions.	2.20	0.71
3. I think it is important for counselors to be trained to work with behavioral addictions.	3.67	0.47
4. As of this moment, I believe I can empathize with clients with behavioral addictions.	2.96	0.76
5. As of this moment, I feel comfortable working with clients with behavioral addictions.	2.57	0.78
6. As of this moment, I feel prepared to work with clients with behavioral addictions.	2.16	0.76
7. As of this moment, I feel knowledgeable about the historical influences of behavioral addictions in society.	2.24	0.92
8. As of this moment, I feel knowledgeable about the cultural influences of behavioral addictions in society.	2.59	0.84
9. I can correctly identify a behavioral addiction in a client.	2.52	0.68
10. I can correctly diagnose a client with a behavioral addiction.	2.29	0.72
11. I can create a treatment plan for a client with a behavioral addiction.	2.15	0.72
12. I am able to describe the impact of a behavioral addiction on a client's daily functioning.	2.81	0.72
13. I am able to describe the impact of a behavioral addiction on a client's well-being.	2.90	0.73
14. I can describe the nature of co-occurring behavioral addictions and substance use disorders.	2.43	0.75
15. I feel confident in my ability to plan treatment interventions for behavioral addictions.	2.14	0.69
16. I am confident in my ability to plan treatment interventions for co-occurring addictions (i.e., individuals addicted to both substance and behavior)?	2.00	0.68
17. I can help clients locate various services to treat behavioral addictions (e.g., 12-step groups, outpatient counseling, inpatient treatment, etc.).	2.81	0.88
18. I have an understanding of the contextual variables (such as culture, race, ethnicity, class, and gender) on behavioral addictions.	2.61	0.79
19. I am able to discuss the ethical challenges that may present when working with behavioral addictions.	2.62	0.72
20. I am able to discuss the legal challenges that may present when working with behavioral addictions.	2.30	0.74
21. I am knowledgeable about assessment techniques used to diagnose behavioral addictions.	2.14	0.67
22. I have received appropriate training on behavioral addictions.	2.00	0.70
23. I have received appropriate training on treating behavioral addictions.	2.08	0.69

Note: Items 1, 3, 13, 14, and 23 were removed from the final version of the BAKS.

0.3. For cross-loaded items, the item was deleted if the differences between the loadings were smaller than 0.15. If the loading differences were greater than 0.15, the largest loadings were retained.

The initial PCA based on Kaiser's (1970) criterion revealed a five-factor solution, which cumulatively accounted for 75.2% of the total model variance. The rotated component matrix suggested that item 14 ("I can describe the nature of co-occurring behavioral addictions and substance use disorders") was closely cross-loaded on the first and the second factors, with the loadings being 0.42 and 0.43. For this reason, item 14 was eliminated from the item pool. Item 12 ("I am able to describe the impact of a behavioral addition on a client's daily functioning") and item 13 ("I am able to describe the impact of a behavioral addition on a client's well-being") both loaded on the third factor, with loadings of 0.796

and 0.797, respectively. Also, considering that the wordings of both items were almost identical, the researchers decided to eliminate item 13 to reduce redundancy. When the eigenvalues were compared with a parallel analysis, a four-factor model was suggested. We repeated the PCA with Varimax rotation with the 23 original items, and the number of factors fixed to 4. With a fixed four-factor model, the factor loadings from the rotated component matrix indicated that items 14 and 23 were closely cross-loaded. For these reasons, we ultimately chose to exclude items 13, 14, and 23 from the instrument.

Exploratory factor analysis with the reduced item pool

We repeated the EFA with the PCA and Promax rotation with the existing data and the 20 remaining BAKS items. We also suppressed any factor loadings with absolute values that were smaller than 0.4. This initially yielded satisfactory statistical results with a four-factor model. However, there were only two items loaded on the fourth factor, indicating unreliable psychometric properties for this factor. After a thorough discussion, we chose to delete the fourth latent factor, and a final three-factor model was retained. Details of the overall factor structure and the item-level factor loadings are provided in Table 2. For this three-factor model, all the factor loadings larger than the 0.4 threshold were retained. The revised factor structure was clearly laid out without any ambiguity or cross-loaded items, and the items were strongly loaded within each factor.

After reviewing the factor structure, the first author presented the list of items in each factor to counselor educators with expertise in addiction and counselor education. Each of the experts were faculty members in a CACREP-accredited counseling program and were familiar with counseling curricula. Two were professors and one was an associate professor. Two had expertise in addiction counseling and taught addiction-focused courses. A thorough discussion was held with each of the experts to obtain feedback about factor names. Then, we reviewed the feedback and made final decisions. The seven items that loaded strongly on Factor 1 ($F1$) were related to content knowledge and the respondents' experiences. $F1$ was named expertise of contextual factors. The seven items that loaded strongly on Factor 2 ($F2$) represented the respondents' level of confidence regarding how they treat clients with PBAs. $F2$ was named addiction treatment self-efficacy. The four items that loaded strongly on Factor 3 (F3) were related to the respondents' diagnostic perceptions. $F3$ was named diagnostic self-efficacy.

The three-factor model illustrated a precise and concise solution for the BAKS. With the existing factor structure, we also tested the internal consistency within each factor by using both Cronbach's alpha (Cronbach, 1951) and McDonald's omega values (McDonald, 1999) as the reliability estimates. Cronbach's alphas for both $F1$ and $F2$ were considered excellent with a reliability value of $\alpha = 0.90$ and $\alpha = 0.92$, respectively. The Cronbach's alpha for $F3$ was slightly lower, but still within the great range with a value of $\alpha = 0.88$. The McDonald's omega values for the 3 factors were 0.91, 0.92, and 0.88, respectively. Both Cronbach's alpha and McDonald's omega values indicated high levels of internal consistencies for the three factors.

Rasch analysis and fit statistics

For $F1$ (expertise of contextual factors), Table 3 displays the measures (item difficulties) and the infit and outfit statistics. All but item 17 showcased the infit and outfit statistics within the "productive" range (i.e., between 0.50 and 1.50). Items that fall outside of that range may be because the responses/observations were too predictable. Regarding item 17 ("I can help clients locate various services to treat behavioral addictions [e.g., 12-step groups, outpatient counseling, inpatient treatment, etc.]"), both infit and outfit MNSQ indicated underfit (1.69 and 1.67, respectively), suggesting that the respondents' rated this item differently than the model expected. We chose to keep this item for analysis because (a) the fit statistics were only slightly over the 1.50 threshold and (b) did not exceed the −2, +2 range that would have deemed the item as a distortion of the measurement/latent factor (Engelhard

TABLE 2 Exploratory factor analysis results of BAKS with a three-factor solution.

Item content	*F1*	*F2*	*F3*
18. I have an understanding of the contextual variables (such as culture, race, ethnicity, class, and gender) on behavioral addictions.	0.850		
19. I am able to discuss the ethical challenges that may present when working with behavioral addictions.	0.836		
8. As of this moment, I feel knowledgeable about the cultural influences of behavioral addictions in society.	0.758		
20. I am able to discuss the legal challenges that may present when working with behavioral addictions.	0.722		
7. As of this moment, I feel knowledgeable about the historical influences of behavioral addictions in society.	0.709		
17. I can help clients locate various services to treat behavioral addictions (e.g., 12-step groups, outpatient counseling, inpatient treatment, etc.).	0.550		
21. I am knowledgeable about assessment techniques used to diagnose behavioral addictions.	0.527		
4. As of this moment, I believe I can empathize with clients with behavioral addictions.		0.758	
16. I am confident in my ability to plan treatment interventions for co-occurring addictions (i.e., individuals addicted to both substance and behavior)?		0.704	
5. As of this moment, I feel comfortable working with clients with behavioral addictions.		0.677	
6. As of this moment, I feel prepared to work with clients with behavioral addictions.		0.659	
15. I feel confident in my ability to plan treatment interventions for behavioral addictions.		0.637	
2. As of this moment, I feel competent (able to succeed) in my ability to work with clients with behavioral addictions.		0.633	
22. I have received appropriate training on behavioral addictions.		0.612	
9. I can correctly identify a behavioral addiction in a client.			0.839
10. I can correctly diagnose a client with a behavioral addiction.			0.838
12. I am able to describe the impact of a behavioral addiction on a client's daily functioning.			0.694
11. I can create a treatment plan for a client with a behavioral addiction.			0.577

TABLE 3 Rasch item statistics for F1: Expertise of contextual factors.

	Measure	S.E.Measure	Infit	Outfit
Q18	−3.37	0.213	0.704	0.661
Q19	−3.41	0.214	0.814	0.797
Q8	−3.32	0.213	0.909	0.880
Q20	−2.30	0.209	0.782	0.751
Q7	−2.08	0.209	1.210	1.163
Q17	−4.11	0.218	1.686	1.671
Q21	−1.73	0.210	0.850	0.865

Note: Infit is defined as information-weighted mean square statistic; Outfit is defined as outlier-sensitive means square statistic.

TABLE 4 Rasch item statistics for F2: Addiction treatment self-efficacy.

	Measure	S.E. Measure	Infit	Outfit
Q4	−5.63	0.241	1.851	1.874
Q16	−4.01	0.255	0.684	0.587
Q5	−3.94	0.237	1.067	1.094
Q6	−2.09	0.243	0.718	0.664
Q15	−1.97	0.244	0.660	0.615
Q2	−2.27	0.243	0.754	0.706
Q22	−1.32	0.245	0.902	0.848

Note: Infit is defined as information-weighted mean square statistic; Outfit is defined as outlier-sensitive means square statistic.

TABLE 5 Rasch item statistics for F3: Diagnostic self-efficacy.

	Measure	S.E. Measure	Infit	Outfit
Q9	−3.37	0.248	0.783	0.740
Q10	−2.29	0.243	0.757	0.730
Q11	−4.54	0.248	1.012	1.026
Q12	−4.84	0.257	1.059	0.990

Note: Infit is defined as information-weighted mean square statistic; Outfit is defined as outlier-sensitive means square statistic.

& Wang, 2021; Linacre, 2002). The seven items that formed F2 (Addiction Treatment Self-Efficacy) also demonstrated adequate model-data fit (Table 4). Only item 4 ("As of this moment, I believe I can empathize with clients with behavioral addictions") indicated an underfit, with both Infit and Outfit MNSQ being approximately 1.80, exceeding the 1.50 upper bound. We again kept this item for further analysis because it did not exceed the −2, +2 range. Items 9–12 formed *F*3 (diagnostic self-efficacy). With fewer items, the item fit statistics were all within the 0.5–1.5 range (Table 5).

To provide an overall view of the latent factors, aggregated model-data fit statistics are provided in Table 6. The average values for all fit statistics demonstrated a good fit to the Rasch model. Chi-square values for all four factors were statistically significant at $p < 0.001$ level. The reliability of separation values were all close to 1.00. The higher the values of the reliability of separation, the more distinct locations there are within the facets. In this case, the item facets displayed the highest level of distinction among all four factors. Put simply, all the items nested within a factor formed a latent construct, yet each item is distinct from the others.

MANOVA for the three BAKS latent constructs

After the final 18 items were confirmed and retained, we conducted a MANOVA to address research questions four and five. We compared participants' overall responses to the two binary questions on the demographics questionnaire with their scores on the three latent factors. A significant difference was found between BAKS scores on each latent factor and if participants had taken a substance use/addictions course, $F(3, 73) = 8.640$, $p < 0.001$. Meaning, the participants who had completed a substance use/addiction course scored significantly higher on each BAKS factor than those who had not. For *F*1, participants who had taken a substance use/addictions course had a mean of 19.24 ($SD = 3.80$), while those who did not had a mean of 15.41 ($SD = 4.28$). For *F*2, participants who had taken a substance use/addictions course had a mean of 17.68 ($SD = 4.08$), while those who did not had

TABLE 6 Summary statistics of BAKS latent factors.

	F1	F2	F3
Calibrations			
Measure (Logits)			
M	0.00	0.00	0.00
SD	0.94	1.91	2.13
Standard Error			
M	0.25	0.29	0.33
SD	0.03	0.04	0.01
Model-Data Fit			
Infit *MSE*			
M	0.99	0.96	0.97
SD	0.38	0.52	0.17
Std. Infit			
M	−0.30	−0.60	−0.10
SD	2.10	2.90	0.90
Outfit *MSE*			
M	0.97	0.93	0.97
SD	0.38	0.55	0.23
Std. Outfit			
M	−0.40	−0.60	−0.10
SD	1.90	2.00	0.80
Separation Statistics			
Reliability of Separation	0.95	0.98	0.98
Chi-Square	110.5*	344.2*	156.9*

Note: *$p < 0.001$.

a mean of 14.54 ($SD = 3.75$). For $F3$, participants who had taken a substance use/addictions course had a mean of 10.95 ($SD = 2.00$), while those who did not had a mean of 8.59 ($SD = 2.28$).

A significant difference was also found between scores on each latent factor and if participants believed they were knowledgeable about PBAs, $F(3, 72) = 10.916$, $p < .001$. Meaning, the participants who believed they were knowledgeable about PBAs scored significantly higher on each BAKS factor than those who did not. For $F1$, participants who believed they were knowledgeable had a mean of 18.54 ($SD = 3.83$), while those were not had a mean of 13.50 ($SD = 3.90$). For $F2$, participants who believed they were knowledgeable had a mean of 17.00 ($SD = 4.15$), while those who were not had a mean of 13.50 ($SD = 3.33$). For $F3$, participants who believed they were knowledgeable had a mean of 10.46 ($SD = 2.07$), while those who were not had a mean of 7.75 ($SD = 2.38$).

DISCUSSION

The BAKS was developed to measure counseling students' knowledge of PBAs prior to graduation and licensure. The purpose of this study was to determine (a) the preliminary reliability and validity of the BAKS, (b) the psychometric properties and fit statistics of the BAKS using Rasch analysis, and (c) compare BAKS scores to whether or not participants had taken a substance use/addiction course and if participants believed they were knowledgeable about PBAs. To do this, we collected data

from students enrolled in CACREP-accredited master's counseling programs. We followed a robust validation process by (a) complying with the steps needed to conduct an EFA and Rasch analysis, and (b) using multiple validation methods. We applied a series of tool validation techniques, and the EFAs suggested a four-factor model. Upon review of the BAKS indicators (the initial version with 23 items) and the four-factor model, we noticed that items 12 and 13 loaded on the same factor and had almost identical factor loadings and wording. After a thorough discussion, we determined that the term "daily functioning" in item 12 better represented clinical terminology in the counseling profession than the term "wellbeing" in item 13. For this reason, item 13 was removed. We also chose to delete the fourth latent factor as there were only two items in the factor. The Cronbach's alpha and McDonald's omega values for the remaining three factors all passed the acceptable threshold.

Rasch analyses were conducted to provide additional support for refining the instrument. Results provided infit and outfit statistics for each indicator. Only items 14 and 23 were found to have unsatisfactory fit statistics. We chose to delete both items as keeping them may have caused the latent constructs to fit less well with the proposed model. All other BAKS items demonstrated satisfactory model-data fit statistics, suggesting these items were representative of the latent constructs. The same tool validation analyses were repeated on a reduced item pool, and the statistical results yielded a clear and concise three-factor model with 18 final items.

We conducted a MANOVA to determine if participants' responses to the binary questions on the demographics questionnaire impacted their scores on the BAKS. Those who took a substance use/addictions course received significantly higher scores on each of the BAKS latent factors than those who had not taken such a course, indicating greater knowledge of PBAs. This indicates that previous coursework about addictions, in general, may lead to greater knowledge about PBAs. We also found that those who believed they were knowledgeable about PBAs received significantly higher scores on each of the BAKS latent factors compared to those who did not believe they were knowledgeable. These results indicate that the participants may have an accurate awareness of their knowledge about PBAs. Overall, the pilot validation results, and comparison testing indicate that the final version of the BAKS is a promising instrument to measure counseling students' knowledge of PBAs in three latent aspects.

Implications for counselor education and supervision

The results in the present study offer a number of implications for counselor educators and supervisors who want to assess their counseling students' and supervisees' knowledge about PBAs and relevant contextual factors (i.e., co-occurring PBAs and SUDs, assessments, outside treatment resources, etc.). This information is relevant because PBAs are being identified and diagnosed more frequently, especially as technology becomes more prevalent (Ilslam et al., 2020; Király et al., 2020; Oka et al., 2021). Yet, at the time of this writing, many counseling programs do not include a PBA-focused course within their curriculum. Meaning, students' objective knowledge about PBAs may otherwise not be explored and assessed in a reliable manner at any point throughout their program.

Counselor educators can work to fill the educational gap by incorporating the BAKS into SUD and general addictions coursework. This is supported by the results of the present study which found that counseling students scored higher on the BAKS if they had taken a substance use/addiction course. Counselors and addiction educators can use the BAKS to learn about the students' existing knowledge of PBAs and determine if they are prepared to work with that population of clients. Educators can choose whether or not to add more information about PBAs into existing courses based on students' BAKS scores. They may even choose to advocate for more addiction or PBA-specific education in their master's programs. Supervisors in clinical settings where clients with PBAs are frequent or increasing may also find the BAKS helpful to use with their supervisees during practicum and internship. The results of this study also found that students who reported that they believed they were knowledgeable

about PBAs scored higher on all three BAKS latent factors. This indicates that counseling students may be accurately aware of their knowledge of PBAs.

The BAKS can also be used to help design and measure the effectiveness of a new PBA-focused course or CE program. The BAKS was developed based on previous literature which stressed the importance of future counselors being informed and knowledgeable about PBAs (Giordano et al., 2019; Ricciutti & Storlie, 2023). This included one article with recommended SLOs for a PBA-focused course (Falls Holman et al., 2019). Counselor and addiction educators can use the BAKS to guide their development and implementation of a course or CE about PBAs. This can be accomplished by using the BAKS as a pre and post-test measurement on the first and last days of the course or at the beginning and end of a CE workshop. Doing so can help educators identify what they may be teaching effectively and what may be missing in the course curriculum. Finally, program or cohort-wide BAKS scores can be used to determine patterns of knowledge about PBAs or lack thereof based on a number of educational qualities. These may include (a) the counseling program track or focus area, (b) whether or not students have completed an addictions course prior, (c) the number of total courses completed, and (d) the type of internship placement site. This information can be helpful by highlighting strengths and areas of growth throughout an entire program. For these reasons and the statistical results described previously, counselor educators may feel confident using the BAKS to determine students' knowledge and areas for growth prior to entering the counseling profession.

Limitations and implications for future research

This study was not without limitations. First, although our sample size was acceptable for a preliminary (pilot) analysis (Bujang, 2021; Hertzog, 2008; Stallard, 2012), a larger sample size may have been ideal to ensure the robustness of the results. Second, the primary purpose of this research was to investigate the psychometric properties of the BAKS. For this reason, we did not test how participants of diverse backgrounds may have responded to the instrument or if their understanding of BAKS items were statistically different. We encourage future researchers to explore the impact of demographic characteristics on participants' responses to items.

Future researchers may choose to conduct analyses on the BAKS to further its development and test its psychometric properties. We invite researchers to consider test–retest analyses to determine if the BAKS is sensitive to interventions overtime, such as additional coursework or training. We also encourage future researchers to consider novel ways to achieve a large sample size. This may include exploring the knowledge of PBAs in other helping professions (i.e., social work students, psychology students, etc.). Researchers may also consider designing mixed-methods studies that combines the BAKS with qualitative practices to collect well-rounded and meaningful data, ensuring that diverse perspectives are heard. Further, we urge future researchers to explore the convergent validity of the BAKS by testing it alongside other instruments that explore counseling students' knowledge (e.g., ACSES; Murdock et al., 2005). This may also include using a social desirability survey to ensure that students are not responding to any of the BAKS items in a socially desirable manner.

Finally, future researchers may also consider the results in this study to justify additional research about PBAs and the education of PBAs in general. As previously discussed, researchers may explore differences in BAKS scores based on how close students were to graduating, courses completed, or counseling students' program track (i.e., clinical mental health, school, or addictions counseling). Researchers can also collect data about the programs the participants are being recruited from, such as how many substance use/addictions courses the program offers and if they are mandated or electives. PBAs have become identified and diagnosed frequently (Daglis et al. 2021; Oka et al., 2021), and counseling students will be on the forefront of PBA treatment. For this reason, we believe it is important for counselors, counselor educators, and members of all helping professions to be informed about PBAs.

CONCLUSION

The purpose of this study was to investigate the psychometric properties of the BAKS. The researchers followed a robust validation process by complying with the general steps of instrument development and by using multiple validation methods. The EFAs suggested a three-factor model, and all three factors demonstrated satisfactory internal consistency. The results highlight implications for counselor educators and supervisors. We encourage future researchers to continue analyses of the BAKS to confirm these preliminary findings. Finally, we urge the use of the BAKS with diverse populations and additional research of PBAs.

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How to cite this article: Ricciutti, N. M., & Zhang, S. (2024). A pilot study of the behavioral addictions knowledge survey: Ensuring students' knowledge about process/behavioral addictions. *The Journal of Addictions & Offender Counseling*, *45*, 205–220. https://doi.org/10.1002/jaoc.12132