



Validation of the Mandarin version of the Bergen Shopping Addiction Scale for assessing online and offline problematic shopping behaviors

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ABSTRACT

Background: The present study examined and compared the psychometric properties of the Mandarin version of the Bergen Shopping Addiction Scale (BSAS) for assessing online and offline problematic shopping (PS) behaviors. In addition, the validity of the BSAS cutoff for differentiating between PS and non-PS behaviors was evaluated. Moreover, the correlation between PS severity determined using the BSAS and that determined on the basis of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR)* criteria for internet gaming disorder (IGD), adapted for PS was investigated.

Methods: A total of 992 individuals participated in an online survey. Factor structures of the online BSAS and offline BSAS were analyzed through confirmatory factor analysis. For both versions of the instrument, criterion-related validity was examined by investigating the correlation of the BSAS score with the *DSM-5-TR* criteria for IGD, adapted for PS. Concurrent validity was examined by investigating the correlations of the BSAS score with depression, anxiety, and impulsivity. The validity of the BSAS cutoff for PS behavior diagnosis was examined using an independent *t*-test.

Results: Both the online BSAS and the offline BSAS had a one-factor structure and exhibited adequate internal consistency. Both online and offline BSAS scores were significantly correlated with online and offline shopping addiction symptoms adapted from the *DSM-5-TR* criteria for IGD, impulsivity, depression, and anxiety. The BSAS cutoff effectively differentiated between online and offline PS or non-PS behaviors.

Conclusion: The present study indicates that the BSAS can efficiently assess online and offline PS and exhibits adequate psychometric properties.

1. Introduction

Shopping is an essential behavior in modern life. It is a leisure activity and can be a rewarding experience for some individuals

(Mukhopadhyay & Johar, 2009). However, a minority of individuals engage in problematic shopping (PS), which has negative consequences. A meta-analysis reported that the cumulative prevalence of PS behaviors among adults was 4.9 % (Maraz et al., 2016). Younger and female adults

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were more likely than older and male adults to exhibit PS behaviors (Maraz et al., 2016). PS has severe consequences, such as large debts, difficult-to-pay bills, social criticism, legal and financial disputes, and feelings of guilt (Christenson et al., 1994; Lejoyeux & Weinstein, 2010).

Traditionally, PS was viewed as a manifestation of compulsion and poor impulse control. For example, Faber (2004) characterized PS as “inappropriate, excessive, and significantly disruptive consumer behavior driven by coercion in one's life” (page 170). The 11th revision of the *International Classification of Diseases* includes compulsive buying–shopping disorder under “other specified impulse control disorders” (World Health Organization, 2019). Although the fifth *Diagnostic and Statistical Manual of Mental Disorders – Text Revision (DSM-5-TR)* does not include PS as a psychiatric condition (American Psychiatric Association, 2022), studies have identified similarities between PS and substance use disorders diagnosed on the basis of symptomatology, neurological and cognitive impairments, and psychosocial risk factors (Müller et al., 2019, 2021).

Individuals with PS behaviors often experience physiological cravings to shop when exposed to cues (Lawrence et al., 2014; Starcke et al., 2018; Trotzke et al., 2017). Although shopping initially evokes positive emotions, individuals experiencing PS subsequently engage in compulsive shopping to alleviate negative emotions, a pattern that mirrors substance use disorder (Müller et al., 2019; Nicolai et al., 2016). Moreover, individuals with PS may think about shopping all the time (preoccupation and salience), engage in shopping to feel better and/or to escape other things in their life (mood modification), have to buy more and more things to obtain the same satisfaction and as before (tolerance), try to shop less or stop buying non-essential things but are unable to do so (relapse), and feel bad if being prevented from shopping (withdrawal) (Andreassen et al., 2015; Griffiths, 2023). PS may also negatively affect and compromise an individuals' everyday obligations (occupation, education and/or relationships) and health (conflict) (Andreassen et al., 2015; Griffiths, 2023). Therefore, PS has the core features of behavioral addiction (Griffiths, 2005; Müller et al., 2019; Nicolai et al., 2016).

The Bergen Shopping Addiction Scale (BSAS) was the first instrument developed for determining the severity of PS on the basis of addiction components model (Andreassen et al., 2015). The BSAS comprises seven core items based on the addiction components model (Griffiths, 2005): the salience of shopping in daily life, the role of shopping in mood modification, conflicts arising from shopping, tolerance for shopping, withdrawal symptoms when shopping is restricted, relapse after attempting to quit shopping, and problems caused by shopping. This instrument exhibits good psychometric properties, including a well-established structure, content validity, convergent validity, and discriminative validity (Andreassen et al., 2015).

Although the BSAS is useful in assessing PS behaviors, several issues related to the scale warrant further investigation. First, the BSAS has been deemed suitable for assessing both online and offline PS behaviors because it can assess a wide range of shopping behaviors across contexts (Andreassen et al., 2015). For example, Augsburger et al. (2020) used the BSAS to assess online and offline shopping addiction. However, the BSAS for assessing online and offline PS behaviors have not been directly compared in terms of their psychometric properties. Second, Andreassen et al. (2015) proposed a BSAS cutoff of 3 (agree) or 4 (completely agree) on more than four of the seven items for differentiating between PS and non-PS behaviors. However, further investigation is required to validate this cutoff. Finally, although the BSAS was developed on the basis of the addiction components model, the correlation of problematic shopping assessed on the BSAS with shopping disorder symptoms based on the adapted *DSM-5-TR* criteria remains unclear.

In the present study, the Mandarin version of the BSAS for assessing both online and offline PS behaviors were compared in terms of their psychometric properties, including their factor structures through factor analysis and concurrent validity by investigating its correlations with depression, anxiety, and impulsivity. More specifically, the *DSM-5-TR*

criteria for internet gaming disorder (IGD), adapted for PS, were used to examine criterion-related validity. Their correlations with the BSAS score were expected to be significant ($r > 0.5$; Cohen, 1988). Depression, anxiety, and impulsivity were used to examine concurrent validity, and their correlations with the BSAS score were expected to be significant. In addition, the validity of the BSAS cutoff for differentiating between PS and non-PS behaviors was evaluated. Moreover, the correlation between PS severity determined using the BSAS and that determined on the basis of the *DSM* concepts for shopping disorder was investigated. The present study was guided by three hypotheses (H_3). More specifically, it was hypothesized that the (i) BSAS would exhibit adequate psychometric properties for assessing both online and offline PS (H_1), (ii) BSAS cutoff (scoring 3 or 4 on more than four of the seven items) would effectively differentiate between individuals exhibiting PS behaviors and those not exhibiting such behaviors (H_2), and (iii) BSAS score would be significantly correlated with PS assessed on the basis of adapted *DSM-5-TR* criteria for shopping disorder (H_3).

2. Method

2.1. Study cohort and procedure

Between November 20 and December 10, 2024, eligible individuals were recruited through advertisements posted on Facebook, LINE, and Professional Technology Temple (PTT). Given the high use of these platforms, the advertisements were considered to have reached a broad cross-section of Taiwan's population. The Facebook advertisements targeted users on the basis of location (Taiwan) and language (Chinese). Facebook's algorithm determined the users to whom the advertisements were shown. The present study included Taiwanese individuals aged ≥ 18 years. Individuals willing to participate in the present study could click the “agree to participate” button in the advertisement, provide informed consent, and complete the survey. Individuals unwilling to participate could click the “refuse to participate” button and exit the webpage. A total of 1000 individuals initially completed the online survey. However, eight individuals were excluded because they were aged under 18 years. Therefore, the final sample comprised 992 individuals. The study protocol was approved by the first author's institutional review board (approval number: 202401645B0).

2.2. Measures

2.2.1. Mandarin version of the BSAS

PS severity over the previous year was determined using the seven-item BSAS (Andreassen et al., 2015). The original English version of this instrument was translated into Mandarin through a standardized forward–backward translation process (Souza & Rojjanasrirat, 2011). The contents of the BSAS are applicable to individuals from diverse cultural and social backgrounds; therefore, no cultural adaptation was made during the translation process. Each item (e.g., “I think about shopping/buying things all the time”) is rated on a five-point scale from 0 (completely disagree) to 4 (completely agree). The participants were asked to complete the scale twice – once in relation to offline shopping and the second in relation to online shopping. The psychometric properties of the BSAS are reported in the ‘Results’ section. The Mandarin Version of the BSAS is presented in Supplementary material S1.

2.2.2. *DSM-5-TR* criteria for internet gaming disorder adapted for problematic shopping

In the present study, the nine criteria outlined in *DSM-5-TR* for the diagnosis of internet gaming disorder were modified for assessing shopping disorder symptoms over the past year (i.e., the word ‘gaming’ was replaced by the word ‘shopping’). The response to each item (e.g., “Have you ever tried to control how often, when and how much you shop, but failed?”) was either yes or no. A higher total number of “yes” responses indicates a higher severity of shopping disorder. The participants were

asked to complete the scale twice – once in relation to offline shopping and the second in relation to online shopping. The instrument's Cronbach's α was 0.80 for online shopping and 0.81 for offline shopping.

2.2.3. Center for Epidemiological Studies Depression Scale

Depressive symptoms over the past month were assessed using the 10-item Mandarin version (Cheng et al., 2006) of the Center for Epidemiological Studies Depression Scale (Björgravinsson et al., 2013; Radloff, 1977). Each item (e.g., “I was bothered by things that usually don't bother me”) was scored on a four-point scale from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). A higher total score indicates a higher severity of depression. The instrument's Cronbach's α in the present study was 0.81.

2.2.4. State-Trait Anxiety Inventory-State Version

Current anxiety symptoms were assessed using the six-item Mandarin version (Du et al., 2022) of the State-Trait Anxiety Inventory-State version (Spielberger et al., 1970). Each item (e.g., “I am worried”) was rated on a four-point scale from 1 (*not at all*) to 4 (*very much so*). A higher total score indicates a higher severity of anxiety. The instrument's Cronbach's α in the present study was 0.78.

2.2.5. Abbreviated Barratt Impulsiveness Scale Version 11

Impulsivity was assessed using the Mandarin version (Li & Chen, 2007) of the 13-item Abbreviated Barratt Impulsiveness Scale, version 11 (Coutlee et al., 2014). Each item (e.g., “I do things without thinking”) was rated on a four-point scale from 1 (*never or rarely*) to 4 (*almost always or always*). A higher total score indicates a higher level of impulsivity. The instrument's Cronbach's α in the present study was 0.81.

2.3. Statistical analysis

The participants' demographic characteristics and their scores for each measure were summarized using descriptive statistics, such as mean $\pm$ standard deviation and frequency (percentage) values. On the basis of the original BSAS (Andreassen et al., 2015), a one-factor structure (i.e., all seven items loaded on one latent construct of online or offline PS) was expected. Factor structures were separately evaluated for the online and offline versions of the BSAS through confirmatory factor analysis (CFA). CFA was performed using a diagonally weighted least squares estimator, which is suitable for data obtained using a Likert-type scale (Li, 2021).

Several fit indices were used to determine whether the data aligned well with the one-factor structure. The indices and corresponding cutoffs were as follows: comparative fit index (CFI) > 0.9 , Tucker–Lewis index (TLI) > 0.9 , standardized root mean square residual (SRMR) < 0.08 , and root mean square error of approximation (RMSEA) < 0.08 (Kline, 2023). Although nonsignificant χ^2 can be used as a fit index to examine data-model fit, the present study only reported the χ^2 (rather than using it to determine data-model fit) because of the large sample size. Internal consistency was evaluated for both the online and offline versions of the BSAS; a Cronbach's α value of > 0.7 indicates acceptable reliability (Nunnally, 1978).

The one-factor structure was evaluated through multigroup CFA for male and female participants to determine whether both sexes interpreted the BSAS (both the online and offline version) similarly. In the multigroup CFA, three nested models were generated: M0 (configural model), M1 (metric invariance model), and M2 (scalar invariance model). M0 assumed that both males and females interpreted the BSAS in a one-factor structure without any constraints. M1 assumed that both males and females interpreted the BSAS in a one-factor structure, with factor loadings constrained to be equal between the two sexes. M2 assumed that both males and females interpreted the BSAS in a one-factor structure, with factor loadings and item intercepts constrained to be equal between the two sexes (Brown et al., 2015). M0 was compared with M1 to determine between-model differences in factor

loadings for any BSAS items (online or offline shopping). M2 was compared with M1 to determine between-model differences in item intercepts. The models were compared following two steps. First, the models were compared (e.g., M0 vs. M1) in terms of three fit indices (cutoffs: $\Delta\text{CFI} > -0.01$, $\Delta\text{RMSEA} < 0.01$, and $\Delta\text{SRMR} < 0.01$; Siaw et al., 2025). Second, the χ^2 difference tests was performed to detect significant between-model differences in specific items.

After the evaluation of the factor structure for the BSAS, criterion-related validity and concurrent validity were examined by investigating the Pearson correlations of the BSAS with several external measures. More specifically, the DSM-5-TR criteria for IGD, adapted for PS, were used to examine criterion-related validity. Their correlations with the BSAS score were expected to be significant ($r > 0.5$; Cohen, 1988). Depression, anxiety, and impulsivity were used to examine concurrent validity, and their correlations with the BSAS score were expected to be significant.

Finally, the validity of the BSAS cutoff (Andreassen et al., 2015) in differentiating among individuals with different conditions was examined using several independent *t*-tests with effect sizes. The conditions explored were as follows: online and offline shopping addiction symptoms adapted from the DSM-5-TR IGD criteria, depression, anxiety, and impulsivity. Effect size was calculated in terms of Cohen's *d*, with values of > 0.5 and > 0.8 indicating moderate and large effect sizes, respectively (Cohen, 1988). All analyses were performed using jamovi (The jamovi project, 2024).

3. Results

Approximately 76.4 % of the participants ($n = 758$) were females. The mean age of the participants was 40.8 years ($SD \pm 11.0$). Over four-fifths (83.0 %; $n = 823$) had an undergraduate or postgraduate degree. Table 1 presents the participants' scores for BSAS online and offline shopping, online and offline shopping addiction symptoms adapted from the DSM-5-TR IGD criteria, depression, anxiety, and impulsivity.

The CFA results supported the one-factor structure for BSAS online shopping (CFI = 0.987; TLI = 0.981; SRMR = 0.051; RMSEA = 0.028) and BSAS offline shopping (CFI = 0.977; TLI = 0.966; SRMR = 0.084; RMSEA = 0.030). However, the SRMR value was slightly higher than the suggested cutoff (< 0.08) for BSAS offline shopping. All factor loadings exceeded 0.3 for both BSAS online and offline shopping (Table 2). The internal consistency was adequate for both BSAS online shopping ($\alpha = 0.719$) and offline shopping ($\alpha = 0.706$).

Multigroup CFA (Table 3) showed that both males and females interpreted the BSAS online and offline shopping items within a one-factor structure (all fit indices for M0 were satisfactory). However, the

Table 1
Participant characteristics ($N = 992$).

Variables	Mean (SD) or n (%)
Age (in years)	40.8 (11.0)
Gender	
Male	234 (23.6)
Female	758 (76.4)
Educational level	
Junior high or below	8 (0.8)
Senior high	161 (16.2)
College	589 (59.4)
Postgraduate	234 (23.6)
Problematic online shopping (BSAS) score	8.02 (5.35)
Problematic offline shopping (BSAS) score	6.38 (5.07)
DSM-5-TR online shopping addiction score	1.12 (1.83)
DSM-5-TR offline shopping addiction score	1.00 (1.79)
Depression score	7.69 (4.87)
Anxiety score	12.50 (3.75)
Impulsivity score	28.05 (5.82)

BSAS, Bergen Shopping Addiction Scale; DSM-5-TR, Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition, Text Revision).

Table 2
Model fit for the one-factor structure of the BSAS for assessing online and offline problematic shopping behaviors.

	Online shopping (Cronbach's $\alpha = 0.719$)	Offline shopping (Cronbach's $\alpha = 0.706$)
Factor loading for each item		
BSAS1	0.619	0.635
BSAS2	0.550	0.467
BSAS3	0.467	0.403
BSAS4	0.598	0.573
BSAS5	0.556	0.576
BSAS6	0.519	0.688
BSAS7	0.358	0.312
Fit indices for entire scale		
Comparative fit index	0.987	0.977
Tucker–Lewis index	0.981	0.966
SRMR	0.051	0.084
RMSEA	0.028	0.030
95 % CI of RMSEA	0.007, 0.045	0.011, 0.047
χ^2 (df)/ p-value	24.7 (14)/ 0.038	26.5 (14)/ 0.022

BSAS, Bergen Shopping Addiction Scale; df, degrees of freedom; SRMR, standardized root mean square of residual; RMSEA, root mean square error of approximation.

Table 3
Between-sex consistency in interpreting the online and offline shopping items of the Bergen Shopping Addiction Scale.

	M0	M1	M2	M1 vs. M0	M2 vs. M1
Online shopping					
χ^2 (df)	23.3 (28)	40.1 (34)	62.6 (40)	–	–
p-value for χ^2	0.717	0.218	0.013	–	–
$\Delta\chi^2$ (Δ df)	–	–	–	16.8 (6)	22.5 (6)
p-value for $\Delta\chi^2$	–	–	–	0.010	<0.001
CFI	1.000	0.993	0.972	–	–
Δ CFI	–	–	–	0.007	0.021
RMSEA	0.000	0.019	0.034	–	–
Δ RMSEA	–	–	–	0.019	0.015
SRMR	0.049	0.056	0.061	–	–
Δ SRMR	–	–	–	0.007	0.005
Offline shopping					
χ^2 (df)	21.5 (28)	54.3 (34)	79.0 (40)	–	–
p-value	0.802	0.015	<0.001	–	–
$\Delta\chi^2$ (Δ df)	–	–	–	32.8 (6)	24.7 (6)
p-value for $\Delta\chi^2$	–	–	–	<0.001	<0.001
CFI	1.000	0.962	0.927	–	–
Δ CFI	–	–	–	0.038	0.035
RMSEA	0.000	0.035	0.044	–	–
Δ RMSEA	–	–	–	0.035	0.009
SRMR	0.072	0.092	0.096	–	–
Δ SRMR	–	–	–	0.020	0.004

M0, configural model; M1, metric invariant model; M2, scalar invariant model; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

nested models indicated that the males and females interpreted some BSAS items (online or offline shopping) differently. Between-sex differences in factor loadings were significant for Item 3 (*affecting daily obligations*) for both online and offline shopping. For both online and offline shopping, factor loadings for Item 3 were significantly higher for males than for females. Significant between-sex differences in item intercepts were observed for the following items: Item 2 (*changing mood*) for both online and offline shopping, Item 3 (*affecting daily obligations*) for both online and offline shopping, and Item 4 (*shopping more than before*) for offline shopping (Table 4). Males had significantly higher item intercepts for Item 3 but significantly lower intercepts for Item 2 and Item 4 than females.

Fig. 1 presents the criterion-related validity and concurrent validity

Table 4
Between-sex differences in factor loadings and item intercepts.

Item number (Description)	χ^2 (p-value)	χ^2 (p-value)
	Online shopping	Offline shopping
Factor loading		
BSAS1 (Always thinking)	– ^a	0.247 (0.619)
BSAS2 (Changing mood)	1.304 (0.254)	0.766 (0.382)
BSAS3 (Affecting daily obligations)	8.725 (0.003)^b	7.748 (0.005)^b
BSAS4 (Shopping more than before)	0.022 (0.881)	1.007 (0.316)
BSAS5 (Unable to shop less)	0.414 (0.520)	0.186 (0.666)
BSAS6 (Feeling bad)	0.024 (0.877)	0.152 (0.696)
BSAS7 (Impaired wellbeing)	1.035 (0.309)	– ^a
Item intercept		
BSAS1 (Always thinking)	2.015 (0.156)	0.006 (0.938)
BSAS2 (Changing mood)	8.987 (0.003)^c	13.718 (<0.001)^c
BSAS3 (Affecting daily obligations)	7.722 (0.005)^b	5.578 (0.018)^b
BSAS4 (Shopping more than before)	3.498 (0.061)	4.677 (0.031)^c
BSAS5 (Unable to shop less)	1.110 (0.292)	0.152 (0.697)
BSAS6 (Feeling bad)	1.134 (0.287)	0.556 (0.456)
BSAS7 (Impaired wellbeing)	1.526 (0.217)	2.774 (0.096)

BSAS, Bergen Shopping Addiction Scale. The degree of freedom was 1 for all χ^2 values. Boldfaced values indicate significant between-sex differences.

- ^a Anchored item not subjected to invariance testing.
- ^b Male participants had stronger factor loadings or higher item intercepts than did female participants.
- ^c Female participants had stronger factor loadings or higher item intercepts than did male participants.

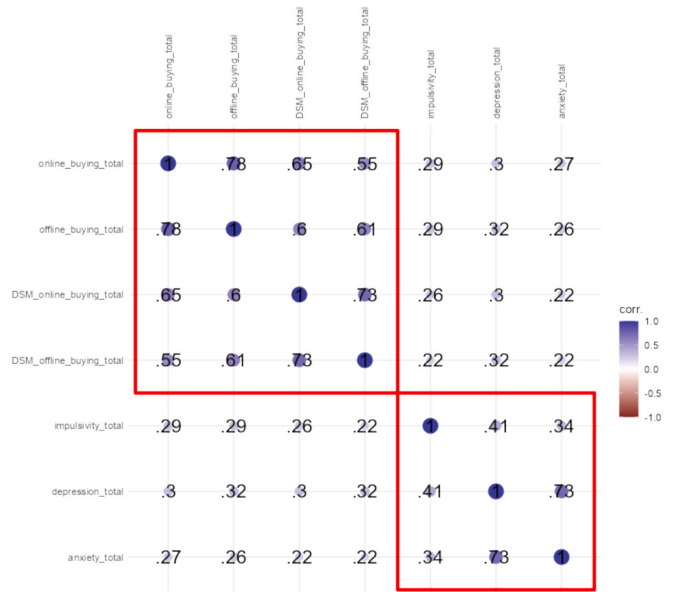


Fig. 1. Heatmap depicting the criterion-related validity and concurrent validity of the BSAS.

Criterion-related validity was examined by investigating the correlation of the BSAS score with the *DSM-5-TR* online and offline shopping addiction symptoms. Concurrent validity was examined by investigating the correlations of the BSAS score with impulsivity, depression, and anxiety. BSAS, Bergen Shopping Addiction Scale; online_buying_total, BSAS online shopping score; offline_buying_total, BSAS offline shopping score; *DSM-5-TR*, *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition, Text Revision); DSM_online_buying_total, *DSM-5-TR* behavioral addiction diagnostic criteria for online shopping; DSM_offline_buying_total, *DSM-5-TR* behavioral addiction diagnostic criteria for offline shopping.

of the BSAS for online and offline shopping. The criterion-related validity was supported because the BSAS online and offline shopping scores were significantly correlated with online and offline shopping addiction symptoms adapted from the *DSM-5-TR* IGD criteria (correlation strength: moderate to high; $r = 0.55–0.78$; $p < .001$). Concurrent validity

was also supported because the BSAS online shopping and offline shopping scores were significantly ($p < .001$) correlated with score for impulsivity ($r = 0.29$ and 0.29 , respectively), depression ($r = 0.30$ and 0.32 , respectively), and anxiety ($r = 0.27$ and 0.26 , respectively).

The BSAS cutoff effectively differentiated between PS and non-PS behaviors (Table 5). Participants exhibiting online PS behaviors ($n = 72$ [7.3 %]) had significantly higher scores for the following symptoms than did those not exhibiting such behaviors ($n = 920$ [92.7 %]): *DSM-5-TR* online shopping disorder (4.56 ± 2.83 vs. 0.85 ± 1.41 ; $p < .001$; Cohen's $d = 1.66$), *DSM-5-TR* offline shopping disorder (4.18 ± 3.32 vs. 0.75 ± 1.32 ; $p < .001$; Cohen's $d = 1.36$), depression (10.56 ± 5.70 vs. 7.47 ± 4.73 ; $p < .001$; Cohen's $d = 0.59$), anxiety (14.47 ± 3.95 vs. 12.35 ± 3.69 ; $p < .001$; Cohen's $d = 0.56$), and impulsivity (30.56 ± 6.92 vs. 27.85 ± 5.68 ; $p = .002$; Cohen's $d = 0.43$).

Participants exhibiting offline PS behaviors ($n = 41$ [4.1 %]) had significantly higher scores for the following symptoms than did those not exhibiting such behaviors ($n = 951$ [95.9 %]): online shopping addiction symptoms adapted from the *DSM-5-TR* IGD criteria (4.76 ± 3.40 vs. 0.97 ± 1.55 ; $p < .001$; Cohen's $d = 1.44$), offline shopping addiction symptoms adapted from the *DSM-5-TR* IGD criteria (5.76 ± 3.18 vs. 0.79 ± 1.38 ; $p < .001$; Cohen's $d = 2.03$), depression (13.12 ± 6.23 vs. 7.46 ± 4.67 ; $p < .001$; Cohen's $d = 1.03$), anxiety (15.68 ± 4.10 vs. 12.36 ± 3.67 ; $p < .001$; Cohen's $d = 0.85$), and impulsivity (32.41 ± 6.12 vs. 27.86 ± 6.12 ; $p < .001$; Cohen's $d = 0.77$).

4. Discussion

The present study showed that both the online BSAS and offline BSAS had a one-factor structure and adequate internal consistency. Both the online and the offline BSAS scores were significantly correlated with online and offline shopping addiction symptoms adapted from the *DSM-5-TR* IGD criteria, impulsivity, depression, and anxiety, which confirmed the criterion-related validity and concurrent validity of the BSAS. These results supported H_1 , indicating that the BSAS is suitable for assessing online and offline PS behaviors. Developed for assessing a broad range of shopping behaviors rather than those in a particular context (Andreassen et al., 2015), the BSAS can evaluate both online and offline PS behaviors.

In the present study, the validity of the proposed BSAS cutoff for differentiating between PS and non-PS behaviors (a score of 3 or 4 on more than four of the seven items) was evaluated. The results supported H_2 , suggesting that the BSAS cutoff effectively differentiated between participants exhibiting PS behaviors and those not exhibiting such behaviors, as evident from significant differences in their scores for online and offline shopping addiction symptoms adapted from the *DSM-5-TR*

IGD criteria, depression, anxiety, and impulsivity. The BSAS cutoff can be used for large-scale screening of individuals with potential online and offline PS behaviors. On the basis of the BSAS cutoff, 7.3 % and 4.1 % of the participants were identified to exhibit online and offline PS behaviors, respectively. Zarate et al. (2023) proposed a raw BSAS score of >23 (2 SD based on participants' responses to all seven BSAS items) as an indicator of an elevated risk of shopping addiction. In their study, 8 % of all participants were at a risk of having shopping addiction. However, in the present study, only 0.6 % and 0.2 % of the participants had online and offline BSAS scores of >23 , respectively. Zarate et al. (2023) did not explain why they did not use the cutoff proposed by Andreassen et al. (2015) and therefore used a different way to estimate the prevalence of PS which may partly explain the discrepancy in prevalence between the two studies. Given that the prevalence of PS in the present study using the BSAS cutoff proposed by Andreassen et al. (i.e., 7.3 % for online PS and 4.1 % for offline PS) was close to that of 4.9 % in a meta-analysis of PS (Maraz et al., 2016), the cutoff proposed by Andreassen et al. appears to be credible. However, in using the BSAS cutoff for PS screening, other reasons for the discrepancy in prevalence estimates are likely including interpersonal variations in sociocultural background among the different samples.

In the present study, the online and offline BSAS scores were significantly correlated with *DSM-5-TR* shopping disorder symptoms (adapted from the *DSM-5-TR* criteria for internet gaming disorder). The BSAS was developed on the basis of the addiction components model (Andreassen et al., 2015). Notably, the present study appears to be the first to investigate the correlations of the BSAS score with the core symptoms of *DSM-5-TR* behavioral addiction. The present study supports the notion that PS is a type of behavioral addiction. Researchers should consider the nature of addiction when developing interventions for individuals exhibiting PS behaviors. Meta-analyses of psychotherapeutic and behavioral treatment approaches for behavioral addiction such as disordered gambling suggest that they can result in significant improvements (Yau & Potenza, 2015). The effect of cognitive behavioral therapy (CBT) for behavioral addiction has gained empirical support from randomized control trials (Brand et al., 2025). CBT focuses on challenging the irrational thought processes and beliefs that are thought to maintain problematic behaviors (Petry et al., 2006). However, although systematic reviews indicate that CBT is the most researched form of psychotherapy and presents a helpful intervention for reducing the symptom severity of PS, studies to date are limited by methodological shortcomings, which reduce their validity and generalizability (Müller et al., 2025).

The present study indicated that males and females interpreted some BSAS items differently. For both online and offline shopping, males had significantly lower intercepts for Item 2 (*changing mood*) than females. Similarly, Zarate et al. (2023) found that males needed to have a higher risk of shopping addiction to endorse Item 2 (*changing mood*) than females. Therefore, males are less likely than females to become addicted to shopping for mood modification purposes. Moreover, for both online and offline shopping, males had significantly greater factor loadings and higher item intercepts for Item 3 (*affecting daily obligations*) than females. For offline shopping, males had significantly lower item intercepts for Item 4 (*shopping more than before*) than females. A meta-analysis reported that females were more likely than males are to exhibit PS behaviors (Maraz et al., 2016). Sex-based differences should be considered when PS behaviors are assessed and interventions for mitigating such behaviors are developed.

The present study has several limitations. First, the participants were recruited through online advertisements. Although Facebook, LINE, and PTT have a wide user base in Taiwan, the users may not be fully representative of the country's general population. Second, the study sample included more females than males (76.4 % vs. 23.6 %). A review of studies that recruited participants through social media, such as Facebook, reported a sex-based bias favoring females (Whitaker et al., 2017). Further research is required to determine why males are less

Table 5

Results of independent *t*-tests comparing problematic shopping and non-problematic shopping behaviors using the Bergen Shopping Addiction Scale.

	Mean (SD)		<i>t</i> (<i>p</i> -value)	Cohen's <i>d</i>
	PS	Non-PS		
Online shopping	<i>n</i> = 72	<i>n</i> = 920		
<i>DSM-5-TR</i> online	4.56 (2.83)	0.85 (1.41)	11.00 (<.001)	1.66
<i>DSM-5-TR</i> offline	4.18 (3.32)	0.75 (1.32)	8.71 (<.001)	1.36
Depression	10.56 (5.70)	7.47 (4.73)	4.48 (<.001)	0.59
Anxiety	14.47 (3.95)	12.35 (3.69)	4.42 (<.001)	0.56
Impulsivity	30.56 (6.92)	27.85 (5.68)	3.24 (0.002)	0.43
Offline shopping	<i>n</i> = 41	<i>n</i> = 951		
<i>DSM-5-TR</i> online	4.76 (3.40)	0.97 (1.55)	7.11 (<.001)	1.44
<i>DSM-5-TR</i> offline	5.76 (3.18)	0.79 (1.38)	9.97 (<.001)	2.03
Depression	13.12 (6.23)	7.46 (4.67)	5.75 (<.001)	1.03
Anxiety	15.68 (4.10)	12.36 (3.67)	5.10 (<.001)	0.85
Impulsivity	32.41 (6.12)	27.86 (6.12)	4.68 (<.001)	0.77

PS, problematic shopping; *DSM-5-TR*, *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition, Text Revision).

likely than women are to participate in online surveys on PS behaviors. Third, all data were self-reported by the participants. Therefore, the risk of single-rater or recall biases could not be eliminated. Fourth, the test–retest reliability of the Mandarin version of the BSAS was not examined. Finally, although the present study demonstrated factor loadings of the BSAS (both online and offline PS behaviors) were adequate using the criteria of >0.3 (Tabachnick & Fidell, 2007), factor loadings reported in the present study were lower than those reported in the previous research (Andreassen et al., 2015; Zarate et al., 2023). More specifically, factor loadings reported in studies authored by Andreassen et al. (2015) and Zarate et al. (2023) were all above 0.6, while in the present study, most items had factor loadings of <0.6 (range = 0.358 to 0.619 for online PS; 0.312 to 0.688 for offline PS). The lower factor loadings may be due to the data quality or the translation accuracy, especially on the cultural adaptation. Therefore, future studies are needed to further delineate the exact reasons for the differences in factor loadings between the present and prior studies. Moreover, healthcare providers and researchers who want to use the Mandarin version of BSAS need to be aware of the lower factor loadings.

5. Conclusion

The present study indicates that the BSAS can effectively assess online and offline PS behaviors and that it exhibits good psychometric properties. The cutoff recommended by Andreassen et al. (2015) can differentiate between online and offline PS and non-PS behaviors. The addictive characteristics of online and offline PS were also supported by the findings. In modern society, online and offline PS behaviors are prevalent among adults and can compromise individuals' quality of life. The BSAS can be used for the assessment of PS behaviors, which can facilitate timely interventions. Further study is needed to examine the effects of CBT on reducing the symptoms of PS.

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CRedit authorship contribution statement

Wei-Po Chou: Writing – original draft, Validation, Methodology, Investigation. **Chifa Hung:** Writing – original draft, Methodology. **Mark D. Griffiths:** Writing – review & editing, Methodology. **Wen-Jiun Chou:** Writing – review & editing, Methodology, Data curation. **Guo-Jia Hsieh:** Writing – review & editing, Methodology, Data curation. **Chao-Ying Chen:** Writing – review & editing, Methodology, Data curation. **Cheng-Fang Yen:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation. **Chung-Ying Lin:** Writing – review & editing, Writing – original draft, Formal analysis.

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Declaration of competing interest

The authors declare no competing interests.

Data availability

Data supporting the findings of this study are available from the corresponding author on request.

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