

## Original Article

# The Persian Version of The Beliefs about Losing Control Inventory (P-BALCI): A Validating and Factor Analysis in The Iranian Population

Mostafa Toobaei<sup>1\*</sup>, Mehdireza Sarafraza<sup>1</sup> & Mohammad Aminae<sup>1</sup>

1. Department of clinical psychology, Faculty of Education and Psychology, Shiraz University, Eram square, Shiraz, Fars, Iran.

### Abstract

The Beliefs About Losing Control Inventory (BALCI) is a self-report measure of negative beliefs about losing control, including three-factor dimensions. In this study, we assessed the factor structure, reliability, and validity of the Persian version of the BALCI (P-BALCI) among the Iranian population. A total of 336 individuals completed the Persian version of Beliefs about Losing Control (P-BALCI), the Obsessive Beliefs Questionnaire-44 (OBQ-44), the Obsessive-Compulsive Inventory-Revised (OCI-R), the Anxiety Sensitivity Index (ASI), Anxiety Control Scale-Revised (ACS-R), and the Desirability of Control Scale (DCS). Similar to the original version of BALCI, the results showed that the P-BALCI had a three-factor structure. The P-BALCI showed good reliability through Cronbach's alpha coefficients ( $\alpha=.91$ ) and test-retest coefficients. Also, the P-BALCI had good convergent and divergent validity. The P-BALCI was also associated with elevated OCD symptoms above and beyond identified obsessive beliefs by the OBQ-44. The findings indicated that the P-BALCI is a reliable measurement scale for assessing beliefs about losing control in an Iranian sample.

### Keywords

Control  
Losing control  
Beliefs  
OCD  
Factor Structure

Received: 2024/08/05

Accepted: 2024/11/29

Available Online: 2025/02/20

### Introduction

Obsessive-compulsive disorder (OCD) is the fourth most common psychiatric disorder with an estimated lifetime prevalence of 2 to 3 percent in the general population (Sadock & Sadock, 2022). OCD is also the third most common mental disorder in Iran, with a prevalence of 1.8%-4.7% (Shirzadi et al., 2019), and has been linked to corona anxiety (Shokri et al., 2024). According to DSM-V-TR, OCD is characterized by the presence of obsessions and/or compulsions. *Obsessions* are recurrent and persistent thoughts, urges, or images that are experienced as intrusive and unwanted, whereas *compulsions* are repetitive behaviors or mental acts that an individual feels driven to perform in response to an obsession or according to rules that must be applied rigidly (American Psychiatric Association, 2022).

Cognitive theories of OCD posit that intrusive thoughts are universal (Rachman & de Silva, 1978; Radomsky et al., 2014) and OCD patients, due to their dysfunctional beliefs, misinterpret their normal intrusive thoughts as catastrophic, personally significant, and overly meaningful (Rachman & de Silva, 1978; Rachman & Hodgson, 1980; Salkovskis, 1985, Rachman, 1998;

Salkovskis, 1999; Rachman, 2002). Consequently, they experience negative emotions and often perform compulsions to reduce distress and prevent negative consequences (Radomsky & Gagne, 2019; Gagné & Radomsky, 2020). They may also have trouble naming their inner experiences (Abedi et al, 2023). The Obsessive-Compulsive Cognitions Working Group (OCCWG) identified three maladaptive belief domains, which play a role in the development and maintenance of OCD: beliefs about responsibility and threat overestimation, perfectionism and intolerance of uncertainty, and beliefs about the importance of and need to control one's thoughts, which are assessed by the Obsessive Belief Questionnaire (OBQ-44; Obsessive Compulsive Cognitions Working Group, 1997, 2005). Previous studies (Taylor et al., 2006; Miegel et al., 2019) showed that these beliefs are not exclusively relevant to OCD. Also, Radomsky and Gagne (2019) suggested that these belief domains need to be expanded or other belief domains should be identified.

Radomsky and Gagne (2019) argued that *control* and *loss of control* would benefit from more investigation. Clark (2004) emphasized the importance of the misinterpretation of unsuccessful thought control by

**Corresponding author:** Department of clinical psychology, Faculty of Education and Psychology, Shiraz University, Eram square, Shiraz, Fars, Iran. E-mail: [Mtoobaei@shirazu.ac.ir](mailto:Mtoobaei@shirazu.ac.ir)



OCD patients. Additionally, the OBQ-44 assesses this belief—the belief that having complete control over one’s thoughts is necessary to avoid negative outcomes (Obsessive Compulsive Cognitions Working Group, 1997). Therefore, more focus on the *negative consequences* related to failed attempts at thought control may be particularly informative (Radomsky & Gagne, 2019).

Clinical research findings indicated that the fear of losing control and beliefs about losing control are important in individuals with OCD (Radomsky & Gagne, 2019). Perceived control over upsetting intrusions is best predicted by the belief that the thought might be acted upon (Clark and Purdon, 1993). Therefore, negative beliefs about the variety of components of losing control (such as likelihood, meaning, consequences, and severity) may be the principal elements of control-related cognitions in OCD.

Also, several lines of research have supported the importance of beliefs about losing control. A correlational study found a positive relation between fear of losing self-control and OCD symptoms (Froreich et al., 2016). Experimental investigations have also provided evidence in favor of the causal role of negative beliefs about losing control in the development and maintenance of OCD symptoms. (see Myers and Wells, 2013; Gagné and Radomsky, 2017) Therefore, Radomsky and Gagne (2019) concluded that emphasis on losing control while assessing beliefs about control in OCD may thus be important, yet existing measures may not capture this aspect.

However, various instruments that measure sense of control (e.g., the Desirability for Control Scale, Burger, & Cooper, 1979; and the Anxiety Control Questionnaire-Revised, Browne et al., 2004), but none specifically examine beliefs about the negative consequences of failure in controlling thoughts or loss of control (Radomsky & Gagne, 2019). Radomsky and Gagne (2019) criticize the existing instruments that measure control-related cognitions (such as OBQ-44, MCQ-30, and Agoraphobic Cognitions Questionnaire) and argue that “These tools mainly focus on the content of intrusive thoughts as opposed to assessing beliefs about a potential loss of control (e. g., the meaning and/or consequences of losing control) and do not capture the full range of domains over which individuals with OCD may believe they can lose control.”

The Beliefs About Losing Control Inventory (BALCI; Radomsky & Gagne, 2019) is a 21-item inventory that aims to assess the extent to which one fears losing control, the meaning and perceived negative consequences of a loss of control, and beliefs about the importance of staying in control. The BALCI also aims to capture multiple domains over which individuals with OCD may believe they can lose control (Radomsky & Gagne, 2019). Radomsky and Gagne (2019) found a 3-factor structure for BALCI: (1) Thoughts/Behaviors/Emotions (TBE), (2) Importance of Staying in Control and 3) Body/Bodily Functions. They showed this scale had good reliability and good

convergent and discriminant validity (Radomsky & Gagne, 2019).

Regarding the role of the BALCI in psychopathological studies (Radomsky & Gagne, 2019) and the effect of cultural and indigenous aspects of each society on the psychometric properties of psychological instruments (Kaplan & Saccuzzo, 2017), it seems that the psychometric properties of this scale need to be investigated in clinical and non-clinical samples before applied to the Iranian population. Therefore, the goal of this study was to validate the Persian Version of Beliefs about Losing Control Inventory (P-BALCI) in an Iranian sample. It was thus hypothesized that the items would load onto three factors of beliefs about losing control over one’s: 1) Thoughts, Behaviors, and Emotions, 2) Staying in Control, and 3) Body/Bodily Functions. We also hypothesized that the BALCI would show good reliability and good convergent and discriminant validity. Finally, we hypothesized that the BALCI would predict elevated OCD symptoms.

## Method

### Participants

Initially, 350 individuals participated in this study. They were recruited from social network websites. The inclusion criteria were: a) being at least 18 years of age, b) being able to read/understand the items in Persian and c) not on psychiatric medications. The five cases who were under 18 years of age were excluded from the sample. To identify multivariate outliers, Mahalanobis distance was calculated, and nine cases were excluded for having a  $p < .001$  (Tabachnick & Fidell, 2014). There was no univariate outliers based on having Z-Score greater than 3.29 (Tabachnick & Fidell, 2014). The final sample consisted of 336 individuals of whom 75% were female with an average age of 33.62 ( $SD=9.48$ ; Range=18-60). The skewness and kurtosis values were within the acceptable range (George, 2011). This study was approved by Medical Ethics Committee of Shiraz University of Medical Sciences (Code of Medical Ethics: IR.SUMS.REC.1399.1296).

### Instrument

#### *Beliefs About Losing Control Inventory (BALCI):*

BALCI is a self-report measure of beliefs about losing control. The BALCI contains 21 items rated from 0 (*not at all*) to 4 (*very much*). The measure consists of three subscales: Thoughts/Behaviors/Emotions (TBE; questions 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18), Importance of Staying in Control (ISC; questions 14, 15, 19), and Body/Bodily Functions (BBF; questions 6, 7, 20, 21). Radomsky and Gagne (2019) reported good convergent and divergent validity. The measure had excellent internal consistency ( $\alpha=.93$ ) as well as adequate test-retest reliability ( $r's=.68$ ; Radomsky & Gagne, 2019). In this study, the BALCI had good internal consistency as well ( $\alpha=.92$ ).

#### *The Obsessive Beliefs Questionnaire-44 (OBQ-44;*

The OBQ-44 is a 44-item measure assessing maladaptive beliefs relevant to the development and maintenance of OCD, comprising three subscales: Responsibility and Threat Overestimation, Perfectionism and Intolerance for Uncertainty, and Importance of/ and Control Over Thoughts. The items are rated on a 7-point scale ranging from 1 (*disagree very much*) to 7 (*agree very much*). The OBQ-44 has good internal consistency across the three subscales ( $\alpha$ 's = .89-.93). The criterion, convergent, and divergent validity were good as well (Obsessive Compulsive Cognitions Working Group, 2005). In this study, we used the Persian version of OBQ-44, validated by Shams et al., (2004). In Iran, Shams et al. (2004) reported excellent concurrent reliability: internal consistency using Cronbach's alpha ( $\alpha=.92$ ), split-half coefficient ( $r=.94$ ), and good test-retest reliability ( $r=.82$ ). We also found excellent internal consistency for the OBQ-44 ( $\alpha=.94$ ).

#### **The Obsessive-Compulsive Inventory-Revised (OCI-R):**

The OCI-R evaluates six OC symptoms: washing, checking/doubting, obsessing, mental neutralizing, ordering, and hoarding. The OCI-R contains 18 items on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). Previous research has shown excellent internal consistency ( $\alpha=.90$ ) and good test-retest reliability for the total score across the OCD group ( $r$ 's = .82) and the control group ( $r$ 's = .84). The convergent and divergent validity has also been shown to be good (Foa et al., 2002). In this study, we used the Persian version of this scale, which has good internal consistency ( $\alpha=.85$ ; Ghassemzadeh et al., 2011). We also found excellent internal consistency for the OCI-R ( $\alpha=.90$ ).

#### **The Anxiety Sensitivity Index (ASI):**

The ASI is a 16-item measure of beliefs about anxiety-related symptoms (physical, cognitive, and social concerns). The ASI's items are rated from 0 (*very little*) to 4 (*very much*). Reiss et al. (1986) reported good test-retest reliability ( $r=.75$ ). In this study, we used the Persian version of ASI (Ghaseminejad et al., 2013). It has good to excellent internal consistency in various studies ( $\alpha=.85-.94$ ; Moradimanesh et al., 2007; Ghaseminejad et al., 2013). We also found excellent internal consistency for the ASI ( $\alpha=.90$ ).

#### **The Anxiety Control Questionnaire-Revised (ACQ-R):**

The ACQ-R is a 15-item self-report measure adapted from the original version of ACQ, developed by Rapee et al. (1996). It assesses the perceived sense of control over anxiety-provoking situations. The measure consists of three subscales: Emotion Control, Threat Control, and Stress Control (Brown et al., 2004). The ACQ-R items are rated from 0 (*Strongly disagree*) to 5 (*Strongly agree*). The scale has good convergent and divergent

validity and good test-retest reliability ( $r$ 's = .82-.88) (Rapee et al., 1996). In this study, we used the Persian version of this scale, developed by Salari-Moghaddam et al. (2018). The ASQ has good internal consistency ( $\alpha=.89$ ), split-half reliability ( $r$ 's = .89), and good convergent and divergent validity (Salari-Moghaddam et al., 2018). We also found good internal consistency for the ACQ-R ( $\alpha=.86$ ).

#### **The Desirability of Control Scale (DCS):**

The DCS is a 20-item self-report measure of desire for control over general life events. The DCS is a 7-point scale with responses ranging from 1 (*never*) to 7 (*always*). It has good test-retest reliability ( $r=.75$ ; Burger & Cooper, 1979).

The scale items were translated into Persian using the forward and backward translation procedure proposed by Brislin (1986). First, the researcher translated the questionnaire into Persian. Then, the items of the scale were back-translated into English by two experts in English, who had lived in Canada and the UK; and finally, the translations were compared to the original English version. The two back-translations were highly similar to the original scale. The final Persian version demonstrated acceptable internal consistency ( $\alpha=.71$ ) and divergent validity ( $r=-.18^*$ ).

#### **Procedure**

We sent an online survey link to the participants via social media messaging applications including WhatsApp, Telegram, and Instagram. The online survey comprised the informed consent form, the instruments mentioned above, and a question asking each participant whether they had received an OCD diagnosis from a psychiatrist or a clinical psychologist. The survey software presented the questionnaires in a random order (to control for potential order effects) and prevented participants from leaving items unanswered (i.e., no missing data). Data were analyzed using Exploratory factor analysis, Pearson's correlations, independent t-tests, and hierarchical regression analysis. Data were analyzed using SPSS-27 software.

#### **Results**

An exploratory factor analysis (EFA) was conducted to evaluate the factor structure of the scale. Since we expected the factors to correlate with each other, an oblique (Promax) rotation was used. The subject-to-item ratio was approximately 16, which is above the recommended ratio (Costello & Osborne, 2005). Bartlett's test of sphericity indicated that the items correlated significantly with each other, so the data were appropriate for an EFA ( $\chi^2_{(171)} = 3228.338$ ,  $p < .001$ ). The Kaiser-Meyer-Olkin (KMO) index of sampling adequacy was .91 (i.e., in the superb range), which indicated that an EFA would produce reliable factors (Tabachnick & Fidell, 2014).

In the initial factor analysis, four factors were extracted based on the eigenvalues greater than one criterion (after extraction and before rotation). Examination of the scree plot suggested that not only should three factors be retained,

but also that the principal factor analysis of the original scale revealed a three-factor structure (Radomsky & Gagne, 2019). Therefore, another EFA with a Promax rotation was conducted with a fixed number of three factors. A cut-off value of .30 was used as a criterion to suppress small coefficients (Costello & Osborne, 2005). The three-factor solution of the P-BALCI explained 57.34% of the variance

after extraction. An item was retained if the loading difference between the primary factors and the alternative factors was .20 (Hinkin, 1998; Howard, 2016). Two items were loaded on two factors and the loading difference was less than .20 (items 8 and 10). These items were removed and the EFA was conducted again.

**Table 1.** The Factor Structure and Loading of The P-BALCI

Items	Factor 1 (TBE)	Factor 2 (ISC)	Factor 3 (BBF)
Item 16	.820	.422	.467
Item 12	.811		.375
Item 9	.802		.394
Item 17	.796	.354	.382
Item 2	.778		.459
Item 11	.766		.432
Item 1	.761		
Item 4	.753	.451	.596
Item 3	.723		
Item 5	.664		.426
Item 18	.654		.316
Item 13	.603		.432
Item 15		.892	
Item 14		.868	.325
Item 19	.313	.811	
Item 21	.493	.429	.787
Item 6			.784
Item 7	.303		.564
Item 20			.314

*Note.* Principal axis factoring with Promax rotation was used for extracting factors. P-BALCI= Persian version of Beliefs About Losing Control Inventory. TBE= Thought/ Behavior/Emotion. ISC= Importance of Staying in Control. BBF= Body/Bodily Functions. The final three-factor structure explained 57.65% of the variance. The first factor comprised 12 items and explained 40.73% of the variance, the second factor comprised of three items, which explained 10.73% of the variance, and the third factor comprised of four items, which explained 6.18% of the variance. Based on the oblique rotation, we realized that factors moderately correlated with each other: Factors 1 and 2 ( $r=.35$ ), factors 1 and 3 ( $r=.50$ ), and factors 2 and 3 ( $r=.33$ ). The factor loadings of all items are presented in Table 1. Internal consistency was evaluated using Cronbach's alpha. The total P-BALCI ( $\alpha=.91$ ) and TBE ( $\alpha=.92$ ) exhibited strong internal consistency. The internal

consistencies of the ISC ( $\alpha=.83$ ) and the BBF ( $\alpha=.54$ ) subscales were good and adequate, respectively. Sixty-four persons of the participants completed the measures for the second time after a 30-day follow-up of their first P-BALCI assessment. Pearson's correlation was conducted between scores of the first and second completion to determine the test-retest reliability. The total P-BALCI, TBE and BBF subscales demonstrated good test-retest reliability ( $r=.82$ ,  $.80$ ,  $.80$ , respectively); The ISC subscale demonstrated adequate test-retest reliability ( $r=.67$ , all  $p$ -values $<.001$ ). These findings provided support for good test-retest reliability. The convergent and divergent validity were assessed by conducting Pearson's correlation between the P-BALCI and the relevant measures. To assess convergent validity, the correlations between the P-BALCI scores with the OBQ-44, the ASI, and the ACQ-R scores were examined.

**Table 2.** Pearson's Correlations between the P-BALCI (Total and Subscales) and Convergent and Divergent Scales

Measures	OBQ-44	ASI	ACQ-R	DCS	OCI-R						
					Total	Washing	Obsession	Hoarding	Ordering	Checking	Neutralizing
PBALCI-Total	.625**	.614**	-.693**	.021	.606**	.395**	.615**	.381**	.430**	.432**	.407**
P-BALCI-TBE	.546**	.591**	-.710**	-.013	.574**	.345**	.616**	.375**	.378**	.429**	.376**
P-BALCI-ISC	.496**	.302**	-.209**	.134*	.310**	.239**	.235**	.171**	.305**	.183**	.228**
P-BALCI-BBF	.448**	.445**	-.493**	-.001	.461**	.365**	.432**	.263**	.345**	.301**	.321**

*Note.* P-BALCI= the Persian version of Beliefs About Losing Control Inventory. TBE=the Thought/ Behaviour/Emotion subscale. ISC= the Importance of

Staying in Control subscale. BBF=the Body/Bodily Functions subscale. OBQ-44=the Obsessive Beliefs questionnaire. ASI= the Anxiety Sensitivity Index.

ACQ-R= the Anxiety Control Questionnaire-Revised. DCS=the Desirability of Control Scale.\* $P<.05$ ,\*\*  $P<.01$ . Divergent validity was evaluated by examining the association between the P-BALCI and the DCS, which measures the desire for control over general life events. Correlations between the P-BALCI and these measures are shown in Table 2. These findings provided support for good convergent and divergent validity.

To confirm that P-BALCI was more strongly associated with convergent measures than with divergent measures, a t-test for dependent correlation was conducted (Steiger, 1980). The results revealed that the correlation between the P-BALCI and the OBQ-44, the ASI, and the ACQ-R were significantly stronger than the correlation between the P-BALCI and the DCS (OBQ-44,  $z = 9.323$ ,  $p<.001$ , ASI,  $z=9.268$ ,  $p<.001$ , ACQ-R,  $z=11.473$ ,  $p<.001$ ).

**Table 3.** Comparison between the P-BALCI Scores (Total and Subscales) in OCD and the Control Group

	OCD (N= 49)	Controls (N= 287)	t	Sig.
	Mean (S.D)	Mean (S.D)	(df= 334)	
P-BALCI-Total	34.77 (13.32)	23.75 (11.89)	5.887	.000
P-BALCI-TBE	21.77 (10.21)	13.19 (9.02)	6.028	.000
P-BALCI-ISC	8.48 (2.39)	7.65 (2.98)	2.163	.034
P-BALCI-BBF	4.51 (3.03)	2.89 (2.54)	3.977	.000

*Note.* P-BALCI =The Persian version of Beliefs about Losing Control Inventory. TBE=Thought/Behavior/Emotion. ISC=Importance of Staying in Control. BBF=Body/Bodily Functions.

Diagnosis of OCD was considered as the criterion to evaluate the criterion validity. Therefore, the means of the P-BALCI in OCD patients (based on a self-report question asking whether or not the participants have received an OCD diagnosis by a psychiatrist/clinical psychologist) were compared to non-clinical individuals. An independent sample t-test was conducted to compare the means of the P-BALCI scores (total and subscales) in OCD patients to non-clinical individuals. The results are presented in **Error! Reference source not found.**

A hierarchical regression analysis was conducted to examine whether beliefs about losing control contribute to the OCD symptoms above and beyond previously identified obsessive beliefs. The OBQ-44 total scores were entered in step 1, and the P-BALCI total scores were entered in step 2. The findings revealed that the OBQ-44 total scores predicted OCI-R total scores, and explained a significant amount of its variance ( $R^2_{adjusted}=.469$ ,  $p<.000$ ). When the P-BALCI total score

entered in step 2, the amount of the variance significantly increased ( $R^2_{change}=.05$ ,  $p<.0001$ ). The final model accounted for 52.20% of the variance ( $F_{(2,333)}=181.90$ ,  $p<.0001$ ). Both the OBQ-44 ( $\beta =.68$ ,  $t_{(334)}=17.23$ ,  $p<.001$ ) and the P-BALCI ( $\beta =.29$ ,  $t_{(334)}=5.98$ ,  $p<.001$ ) were significant predictors of the OCI-R total scores.

Finally, while controlling for beliefs about the importance of and control over thoughts (the ICT subscale of OBQ-44), which is theoretically related to beliefs about losing control, the predictive power of the P-BALCI subscales was examined. The hierarchical regression analyses were conducted and the results can be found in **Error! Reference source not found.**

Overall, negative beliefs about losing control over one’s thoughts, behaviors, and emotions (the TBE subscale) uniquely predicted elevated symptoms of OCD in general (total OCI-R) and of washing, obsessions, hoarding, ordering, and neutralizing (all the OCI-R subscales). The BBF subscale also predicted symptoms of OCD in general, washing and ordering. However, the ISC subscale only predicted the symptoms of obsession and ordering subscales (all  $p$ ’s<.05).

**Table 4.** Hierarchical Regressions Predicting the OCI-R (Total and Subscales) from the OBQ-44-ICT and the P-BALCI Subscales

	Model 1						Model 2					
	R2	B	SE B	$\beta$	t	p	R2	B	SE B	B	t	p
Total	.319					<.001	.468					<.001
OBQ-ICT		.500	.040	.565	12.504	<.001		.321	.042	.362	7.724	<.001
P-BALCI-TBE								.432	.063	.343	6.884	<.001
P-BALCI-ISC								.016	.188	.004	.088	.930
P-BALCI- BBF								.640	.221	.141	2.888	.004
Washing	.12					<.001	.19					<.001
OBQ-ICT		.070	.010	.355	6.947	<.001		.040	.011	.202	3.518	<.001
P-BALCI-TBE								.038	.017	.136	2.233	.026
P-BALCI-ISC								.044	.051	.047	.859	.391
P-BALCI- BBF								.205	.061	.201	3.380	<.001
Obsession	.30					<.001	.48					<.001
OBQ-ICT		.128	.010	.556	12.221	<.001		.085	.011	.367	8.033	<.001
P-BALCI-TBE								.146	.016	.444	9.142	<.001
P-BALCI-ISC								-.098	.048	-.090	-2.049	.041
P-BALCI- BBF								.103	.056	.087	1.837	.067
Hoarding	.13					<.001	.18					<.001

OBQ-ICT	.067	.009	.364	7.137	<.001	.046	.011	.249	4.308	<.001
P-BALCI-TBE						.067	.016	.256	4.175	<.001
P-BALCI-ISC						-.025	.048	-.028	-.513	.608
P-BALCI- BBF						.040	.056	.042	.706	.481
Ordering	.15				<.001	.22				<.001
OBQ-ICT	.092	.012	.398	7.939	<.001	.054	.013	.232	4.125	<.001
P-BALCI-TBE						.057	.020	.172	2.874	.004
P-BALCI-ISC						.123	.059	.113	2.091	.037
P-BALCI- BBF						.153	.070	.129	2.205	.028
Checking	.159				<.001	.23				<.001
OBQ-ICT	.078	.010	.402	8.018	<.001	.052	.011	.269	4.823	<.001
P-BALCI-TBE						.082	.016	.299	5.044	<.001
P-BALCI-ISC						-.040	.049	-.043	-.812	.418
P-BALCI- BBF						.055	.058	.055	.947	.344
Neutralizing	.17				<.001	.22				<.001
OBQ-ICT	.064	.008	.417	8.375	<.001	.045	.009	.288	5.109	<.001
P-BALCI-TBE						.042	.013	.192	3.200	.002
P-BALCI-ISC						.011	.039	.015	.280	.779
P-BALCI- BBF						.083	.047	.105	1.792	.074

*Note.* OCI-R = Obsessional Compulsive Inventory-Revised. OBQ-44 = Obsessive Beliefs Questionnaire. ICT = Importance of Control over Thoughts. BALCI = Beliefs about Losing Control Inventory. TBE = Thoughts/Behaviors/Emotions. ISC = Importance of Staying in Control. BBF = Body/Bodily Functions. R2 = R2adjusted.

## Discussion

In this study, we aimed to validate the Persian version of the BALCI to assess losing control beliefs as a specific aspect of control-related cognition in the Iranian population.

The result of the EFA supported a three-factor structure consistent with the original scale (Radomsky & Gagne, 2019) and Turkish version (Oğuz & Fedai, 2023), indicating cross-national applicability. Items 8 (*I am afraid of losing control of my thoughts*) and 10 (*I'm afraid I might do something inappropriate or embarrassing*) were removed due to low loading differences on two factors (TBE and ISC). Exploring the items' content shows that although the contents were explicitly related to TBE (primary factor), it implies that you should be in control, so staying in control becomes important (ISC) which reflects cultural beliefs emphasizing having control over one's mind and behavior. Therefore, the 19 remaining items captured beliefs about losing control over one's Thoughts/Behaviors/ Emotions (TBE subscale), beliefs about the Importance of Staying in Control (ISC subscale), and one's Body/Bodily Function (BBF subscale). According to Radomsky and Gagne (2019), individuals may fear losing control over multiple psychological functions simultaneously (i.e., thoughts, behaviors, emotions). These findings suggest that the P-BALCI effectively assesses beliefs about losing control in a culturally relevant manner.

The findings indicated that the validity of P-BALCI, in terms of convergent and divergent validity, was consistent with the previous study (Radomsky & Gagne, 2019). The P-BALCI was found to have a strong

relationship with measures of the Obsessive Beliefs Questionnaire (OBQ-44), the Anxiety Sensitivity Index (ASI), perceived control over anxiety-provoking situations, and the Anxiety Control Questionnaire-Revised (ACQ-R); and it had a weak correlation with the Desirability of Control Scale (DCS). The relationship between the P-BALCI and the convergent measures was significantly stronger than the association between the P-BALCI and the DCS, a measure of the general desire for control. Examining criterion-related validity, demonstrated that P-BALCI differentiated OCD patients from non-clinical individuals. Therefore, the validity of P-BALCI was confirmed in the Iranian population.

In the present study, the total internal consistency of the P-BALCI and the subscales internal consistency using Cronbach's alpha was excellent; and the test-retest reliability of the scale over a four-week interval was also good. These findings suggest that P-BALCI is a reliable and valid measure of beliefs about losing control to apply to the Iranian population. Notably, the P-BALCI's subscales provide relevant information above and beyond a single total score. These results were consistent with previous validation studies of BALCI (Radomsky & Gagne, 2019; Oğuz & Fedai, 2023), showing that BALCI has good reliability and validity in a non-clinical sample.

The P-BALCI explained a significant amount of variance in the OCD symptoms over and above other domains of obsessive beliefs. These findings were also consistent with the original scale study (Radomsky & Gagne, 2019), demonstrating good predictive power for OCD symptoms. As Radomsky and Gagne (2019) suggested, these findings provide more evidence for expanding control-related beliefs to include aspects of losing control in the cognitive formulation of OCD. Radomsky and Gagne (2019) noted that although there are two items related to losing control in the OBQ-44's ICT subscale, these items principally measure the beliefs about intrusive thoughts rather than the meaning and consequences of a loss of control. Therefore, this

inventory is the first instrument to assess beliefs about losing control as an important facet of control-related beliefs.

Similar to the original scale study (Radomsky & Gagne, 2019), the TBE subscale uniquely predicted elevated OCD symptoms when controlling for the ICT subscale. Unlike the previous study the BBF was able to predict all the OCD symptoms based on the Vancouver Obsessional Compulsive Inventory-VOCI scale (Radomsky & Gagne, 2019), in the present study, the BBF subscale could only predict symptoms of OCD (i.e., in general, washing and ordering) based on the OCI-R scale. It seems the inherent relation between the washing symptoms and the body can explain the predictive power of the BBF with washing symptoms while controlling for the ICT subscale of the OBQ-44. Given the strong cultural emphasis on cleanliness in Iranian society and the corresponding washing and contamination are strongly related to the body, the BBF subscale can predict the washing and contamination symptoms in our population. Contrary to the original scale study (Radomsky & Gagne, 2019), the ISC subscale predicted obsession and ordering symptoms of OCD over and beyond the ICT subscale, whereas the original study found no significant predictive power of the ISC with all other OCD symptoms over and beyond the ICT subscale. This finding suggested that the beliefs about the importance of staying in control explain the increased amount of variance in predicting obsession and ordering more than the ICT subscale. While the ICT subscale measures the importance of thoughts and the necessity of controlling one's thoughts (Radomsky & Gagne, 2019), the ISC subscale measures the importance of staying in control. Examining the item content of the ICT subscale of the OBQ-44 and the ISC subscale of the P-BALCI, revealed that the ICT subscale items mostly deal with the means of having specific thoughts (e.g., aggressive or sexual thoughts) and fusion beliefs such as thought-action fusion, while the content of the ISC subscale items deal with the importance of staying in control of the thoughts and feelings (e.g., "It's important for me to stay in control of my thoughts"). Therefore, it seems that the more specific aspect of control-related beliefs has more predictive power for obsession and ordering. It can be said that individuals with OCD use ordering as a strategy to prevent loss of control, as the ordering symptoms are well predicted by all three subscales of the P-BALCI. Besides, the differences between the findings of this study and the original scale study could be a result of different assessment tools of the OCD symptoms (the VOCI in the original scale study and the OCI-R in the current study) and may also reflect cultural differences.

This study also had some limitations: Firstly, although the sample size was adequate for the statistical analysis, increasing the sample size in future studies can increase the generalization power of the findings. Secondly, the clinical sample was distinguished solely on the basis of a self-report question, due to the limitations of the

coronavirus pandemic, which reduces the diagnostic validity of the clinical group. We suggest that future studies, accordingly, select the clinical group with structured interviews and objective tools. Thirdly, since the sampling method was convenience sampling, the results should be carefully generalized; hence, using probability sampling methods is recommended for future research. Fourthly, the clinical sample size was smaller than the non-clinical sample size. Therefore, we suggest that future studies either select a bigger sample size for the clinical group or the instrument would be only validated in clinical samples.

Despite the limitations, the BALCI is the first self-report questionnaire available to measure the beliefs about losing control (Radomsky & Gagne, 2019). Besides, this study is the first, to our knowledge, to investigate the psychometric properties of the Persian version of BALCI in an Iranian sample. This research provides objective psychometric evidence showing that the beliefs about losing control are an important aspect of the control-related cognitions, which are not captured by the ICT subscale of the OBQ-44 (Radomsky & Gagne, 2019).

## Conclusion

This research demonstrated that the P-BALCI had a three-factor structure similar to its original structure in another culture as well. Also, the P-BALCI had good reliability based on Cronbach's alpha (internal consistency) and test-retest coefficients. The scale's validity was confirmed in terms of convergent and divergent validity, as well as criterion-related validity. Overall, the Persian version of the BALCI has good psychometric properties and is a reliable and valid scale to apply to the Iranian samples.

## Acknowledgment

We would like to thank all individuals who participated in the study.

## Disclosure Statement

No potential conflict of interest was reported by the authors.

## ORCID

Mostafa Toobaei: <https://orcid.org/0000-0003-3567-6660>

## References

- Abdi, R., Naseri, M., & Mirmohamadi, F. (2023). The relationship between alexithymia, cognitive avoidance, and distress tolerance with the dimensions of obsessive-compulsive disorder symptoms. *Journal of Research in Psychopathology*, 4(11), 1-9. doi: 10.22098/jrp.2022.10442.1073
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders-Text Revised (DSM-5-TR)*: American Psychiatric Pub.

- Brislin, Richard W. (1986). The Wording and Translation of Research Instruments. In Walter J. Lonner & John W. Berry (Eds.), *Field methods in crosscultural research*: Sage Publications.
- Brown, Timothy A, White, Kamila S, Forsyth, John P, & Barlow, David H. (2004). The structure of perceived emotional control: Psychometric properties of a revised Anxiety Control Questionnaire. *Behavior Therapy*, 35, 75-99. doi:10.1016/S0005-7894(04)80005-4
- Burger, J. M., & Cooper, Harris M. (1979). The desirability of control. *Motivation and emotion*, 3, 381-393. doi:10.1007/BF00994052
- Clark, David A. (2004). *Cognitive-behavioral therapy for OCD*: Guilford Press.
- Clark, David A, & Purdon, Christine. (1993). New perspectives for a cognitive theory of obsessions. *Australian Psychologist*, 28, 161-167. doi:10.1080/00050069308258896
- Costello, Anna B, & Osborne, Jason. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical assessment, research, and evaluation*, 10, 7. doi:10.7275/jyj1-4868
- Foa, Edna B, Huppert, Jonathan D, Leiberg, Susanne, Langner, Robert, Kichic, Rafael, Hajcak, Greg, & Salkovskis, Paul M. (2002). The Obsessive-Compulsive Inventory: development and validation of a short version. *Psychological assessment*, 14, 485. doi:10.1037/1040-3590.14.4.485
- Froneich, Franzisca V, Vartanian, Lenny R, Grisham, Jessica R, & Touyz, Stephen W. (2016). Dimensions of control and their relation to disordered eating behaviours and obsessive-compulsive symptoms. *Journal of eating disorders*, 4, 14. doi:10.1186/s40337-016-0104-4
- Gagné, Jean-Philippe, & Radosky, Adam S. (2017). Manipulating beliefs about losing control causes checking behaviour. *Journal of Obsessive-Compulsive and Related Disorders*, 15, 34-42. doi:10.1016/j.jocrd.2017.08.013
- Gagné, Jean-Philippe, & Radosky, Adam S. (2020). Beliefs about losing control, obsessions, and caution: An experimental investigation. *Behav Res Ther*, 126, 103574. doi:10.1016/j.brat.2020.103574
- George, Darren. (2011). *SPSS for windows step by step: A simple study guide and reference, 17.0 update, 10/e*: Pearson Education India.
- Ghaseminejad, Mohamad Ali, Zargar, Yadollah, & Mehrabizade Honarmand, Mahnaz. (2013). The study of anxiety sensitivity, alexithymia, positive and negative affectivity and mental health as predictors asthma disease. *Studies in Medical Sciences*, 24, 719-729. <http://umj.umsu.ac.ir/article-1-1928-en.html>
- Ghassemzadeh, H., Shams, G., Abedi, J., Karamghadiri, N., Ebrahimkhani, N., & Rajabloo, M. (2011). Psychometric properties of a Persian-language version of the obsessive-compulsive inventory-revised: OCI-R-Persian. *Psychology*, 2, 210-215. doi:10.4236/psych.2011.23032.
- Hinkin, Timothy R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational research methods*, 1, 104-121. doi:10.1177/109442819800100106
- Howard, Matt C. (2016). A Review of Exploratory Factor Analysis Decisions and Overview of Current Practices: What We Are Doing and How Can We Improve? *International Journal of Human-Computer Interaction*, 32, 51-62. doi:10.1080/10447318.2015.1087664
- Kaplan, Robert M, & Saccuzzo, Dennis P. (2017). *Psychological testing: Principles, applications, and issues*: Nelson Education.
- Miegel, F., Jelinek, L., & Moritz, S. (2019). Dysfunctional beliefs in patients with obsessive-compulsive disorder and depression as assessed with the Beliefs Questionnaire (BQ). *Psychiatry Research*, 272, 265-274. doi:10.1016/j.psychres.2018.12.070
- Moradimanesh, Fardin, Mirjafari, S Ahmad, Goodarzi, Mohammad Ali, & Mohammadi, Noorollah. (2007). Examining psychometric properties of Anxiety Sensitivity Index revised. *Journal of Psychology*, 11(4), 426-446.
- Myers, Samuel G, & Wells, Adrian. (2013). An experimental manipulation of metacognition: A test of the metacognitive model of obsessive-compulsive symptoms. *Behaviour Research and Therapy*, 51, 177-184. doi:10.1016/j.brat.2013.01.007.
- Obsessive Compulsive Cognitions Working Group. (1997). Cognitive assessment of obsessive-compulsive disorder. *Behaviour Research and Therapy*, 35, 667-681. doi:10.1016/S0005-7967(97)00017-X
- Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory--Part 2: Factor analyses and testing of a brief version. *Behav Res Ther*, 43, 1527-1542. doi:10.1016/j.brat.2004.07.010
- Oğuz, Mercan., Fedai, Kabadayi. (2023). Psychometric properties of the BALCI Turkish version. *Psicologia-reflexao E Critica*, 36. doi: 10.1186/s41155-023-00248-0
- Rachman, S. (2002). A cognitive theory of compulsive checking. *Behaviour Research and Therapy*, 40(6), 625-639. doi:10.1016/S0005-7967(01)00028-6
- Rachman, Stanley. (1998). A cognitive theory of obsessions: Elaborations. *Behaviour Research and Therapy*, 36(4), 385-401. doi:10.1016/S0005-7967(97)10041-9
- Rachman, Stanley, & de Silva, Padmal. (1978). Abnormal and normal obsessions. *Behaviour Research and Therapy*, 16, 233-248. doi:10.1016/0005-7967(78)90022-0
- Rachman, Stanley J, & Hodgson, Ray J. (1980). *Obsessions and compulsions*: Prentice Hall.
- Radosky, A. S., & Gagne, J. P. (2019). The development and validation of the Beliefs About Losing Control Inventory (BALCI). *Cogn Behav*



- Ther*, 49, 97-112. doi:10.1080/16506073.2019.1614978
- Radomsky, Adam S, Alcolado, Gillian M, Abramowitz, Jonathan S, Alonso, Pino, Belloch, Amparo, Bouvard, Martine, . . . Fernández-Álvarez, Hector. (2014). Part 1—You can run but you can't hide: Intrusive thoughts on six continents. *Journal of Obsessive-Compulsive and Related Disorders*, 3, 269-279. doi:10.1016/j.jocrd.2013.09.002
- Rapee, Ronald M, Craske, Michelle G, Brown, Timothy A, & Barlow, David H. (1996). Measurement of perceived control over anxiety-related events. *Behavior Therapy*, 27, 279-293. doi:10.1016/S0005-7894(96)80018-9
- Reiss, Steven, Peterson, Rolf A, Gursky, David M, & McNally, Richard J. (1986). Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behaviour Research and Therapy*, 24(1), 1-8. doi:10.1016/0005-7967(86)90143-9
- Sadock, Benjamin J, & Sadock, Virginia A. (2022). *Kaplan and Sadock's synopsis of psychiatry: Behavioral sciences/clinical psychiatry*: Lippincott Williams & Wilkins.
- Salari-Moghaddam, S, Ranjbar, A.R, & Fathi-Ashtiani, Ali. (2018). Validity and Reliability measurement of the Persian version of anxiety Control Questionnaire. *Journal of Clinical Psychology*, 9, 33-43. doi:10.22075/jcp.2018.11010.1073
- Salkovskis, Paul M. (1985). Obsessional-compulsive problems: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, 23, 571-583. doi:10.1016/0005-7967(85)90105-6
- Salkovskis, Paul M. (1999). Understanding and treating obsessive-compulsive disorder. *Behaviour Research and Therapy*, 37, S29-S52. doi:10.1016/S0005-7967(99)00049-2.
- Shams, G., Karam Ghadiri, N., Esmaeli Torkanbori, Y., & Ebrahimkhani, N. (2004). Validation and reliability assessment of the Persian version of Obsessive Beliefs Questionnaire-44. *Advances in Cognitive Sciences*, 6, 23-36. <http://icssjournal.ir/article-1-29-en.html>
- Shirzadi, M., Jozanifard, Y., Eskandari, S., Farhang, S., & Khazaei, H. (2019). An epidemiological survey of psychiatric disorders in Iran: Kermanshah. *Asian J Psychiatr*, 43, 67-69. doi:10.1016/j.ajp.2019.04.004
- Shokri, A., Didehban, R., Asghari Ganji, A., Mosalman, M., Ahmadian, S. M., Mehrabanaski, H., & Mahdavi, A. (2024). Predicting corona anxiety based on obsessive compulsive disorder and health literacy. *Journal of Research in Psychopathology*, 5(17), 50-57. doi:10.22098/jrp.2023.10290.1061
- Steiger, James H. (1980). Tests for comparing elements of a correlation matrix. *Psychological bulletin*, 87, 245. doi:10.1037/0033-2909.87.2.245
- Tabachnick, Barbara G, & Fidell, Linda S. (2014). *Using multivariate statistics* (Vol. 6): Pearson Boston, MA.
- Taylor, Steven, Abramowitz, Jonathan S, McKay, Dean, Calamari, John E, Sookman, Debbie, Kyrios, Michael, . . . Carmin, Cheryl. (2006). Do dysfunctional beliefs play a role in all types of obsessive-compulsive disorder? *Journal of Anxiety Disorders*, 20, 85-97. doi:10.1016/j.janxdis.2004.11.005