Personal Stigma, Determinants of Intention to Use Technology, and Acceptance of Internet-based Psychological Interventions for Depression

Short title: Acceptance of Internet Psychological Interventions

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Abstract

Objective: Despite showing comparable levels of efficacy, internet-based psychological interventions (IPI) exhibited lower acceptance and intention of use as compared to psychological treatment delivered by face-to-face methods. Surprisingly, no research has inspected whether IPI acceptance is associated with variables linked with intentions of technology use and with barriers to seeking professional psychological help, such as personal depression stigma. Informed by the Unified Theory of Acceptance and Use of Technology, the current study tested the role of technology and mental health-related determinants as predictors of acceptance of IPI for depression.

Methods: Participants were 417 community Portuguese adults, who completed a pencil-and-paper survey.

Results: Our results indicated that performance expectancy, social influence, and personal stigma against depression were significantly associated with the acceptance of IPI for depression.

Conclusions: These results suggest that barriers to seeking professional psychological help should be considered in the understanding of IPI acceptance.

Keywords: Internet-based intervention; internet-delivered intervention; depression; personal stigma; acceptance; e-mental health

1. Introduction

Substantial advances in clinical sciences were achieved in the development and validation of internet-based psychological interventions for depression [1] (IPI). Globally, the clinical studies designed to evaluate the efficacy and effectiveness of IPI for depression suggested the efficacy of IPI in reducing depressive symptoms, when compared with no-treatment and/or face-to-face intervention conditions in both post-test and follow-up assessments [2–5].

Despite the empirical evidence of the efficacy of online-delivered psychological interventions in reducing symptoms' severity, past empirical work has suggested that not only IPI might not work for all people [5] but also that IPI exhibited lower levels of acceptance as compared to psychological treatment delivered face to face [6–8]. Thus, some scholars have proposed that the technology acceptance may operate as a key dimension in the understanding of the adherence and preference for IPI designed to treat depression [8,9]. The construct of technology *acceptance* is defined by the degree of preparation and willingness of an individual to use a technological tool as a method to achieve a particular goal [10,11].

Different theoretical models have been proposed to explain the acceptance of the use of technology. Of these models, the Unified Theory of Acceptance and Use of Technology (UTAUT) [12] has shown greater empirical validation [13]. The UTAUT has two core assumptions. First, it assumes the user's acceptance of a technological tool is primarily determined by the perceived usefulness of that tool (i.e., the way it will increase performance in a task) and how easily its use is perceived (i.e., the degree of effort inherent to the use of a specific technology) [12]. Second, the UTAUT postulated that technology acceptance (the behavioral intention of technology use) is directly influenced by individual's performance expectancy, effort expectancy, and social influence, whereas sex,

age, experience, and voluntariness to use are regarded as moderating factors for the behavioral intention of technology usage [12].

Prior research has already applied the UTAUT for the examination of technology-related determinants of IPI acceptance [9,14]. However, other studies have also suggested that the acceptance and adherence to IPI for depression may vary in function of other psychological factors, including the level of literacy and familiarity with the use of technology, and attitudes toward IPI [15,16]. Despite the clinical utility of the UTAUT to understand how overall technology acceptance is associated with greater levels of acceptance of IPI as a reliable treatment delivery method for depression, some questions remain unanswered regarding other nontechnology-related determinants of use of IPI for depression. Surprisingly, no study to date has tested simultaneously in the same model determinants of technology use along with specific psychological variables associated with the intention of seeking psychological interventions, such as depression personal stigma. This is a critical conceptual flaw since prior research has identified heightened depression personal stigma as a major barrier for seeking professional help among patients diagnosed with a depressive disorder [17].

The stigma towards depression is defined by the degree of negative attitudes/behaviors of an individual towards mental illness, which can involve labeling processes, separation, stereotyping, and social, political, and economic discrimination of individuals diagnosed with mental illness[18]. In particular, individuals who reported higher levels of self-stigma towards depression were those who presented more negative attitudes and beliefs, such as shame, personal failure, lack of self-control, and the perception of depression as character vulnerability[19]. As a result, research has suggested high levels of depressive symptoms coupled with high personal stigma was associated with lower acceptance of traditional psychological intervention and greater resistance to seeking

professional psychological help[20]. Furthermore, high levels of self-stigma towards depression was also associated with the most unfavorable attitudes towards the usefulness, acceptance, and effectiveness of the psychological intervention, higher levels of fear and shame towards the need of professional help, and with beliefs that depressive symptoms will be addressed on their own [21]. Albeit informative, it remained unclear whether this pattern of associations between depression personal stigma and lower acceptance of face-to-face psychological intervention would be replicated in acceptance of internet-based psychological interventions.

In order to address this limitation, the present study sought to test a model of acceptance of online psychological intervention for depression in a sample of Portuguese community adults. In that model, we tested performance expectancy, the effort expectancy, and social influence as technology-related determinants of acceptance of technology use proposed by the UTAUT[12]. In addition to these variables, the predictive value of depressive symptoms and the personal stigma towards depression in the explanation of the variance of IPI acceptance was also examined.

2. Material and methods

2.1 Participants

Participants were 417 community adults (269 women and 148 men). The mean age was 27.09 years (SD = 11.58). With respect to marital status, 51.1% of the sample were single, 45.1% were married or in cohabitation, and 1.5% were divorced/separated. In terms of education level, 72 participants (17.3%) completed the compulsory education level (9th grade), 233 (55.9%) had completed high school education, and 100 (24.0%) had a college degree. Approximately 29% of the sample (n = 121) indicated that sought professional mental health services in the past.

2.2 Measures

Acceptance of internet-based psychological intervention. A questionnaire developed to measure information technology acceptance [9,14] was administered to assess the online intervention acceptance. Based on the UTAUT[12], acceptance was defined by the authors as the behavioral intention to use information technology. It has been shown that acceptance is the most proximal predictor of effective use of information technology. The questionnaire comprises four items. Each item was answered on a five-point *Likert* scale (from '1' totally disagree to '5' totally agree). For the present study, the adapted version by Ebert et al.[9] was used to assess the acceptance of online psychological intervention for depressive symptoms. The total score ranged from 4 to 20, in which higher scores reflect greater acceptance of online psychological intervention in depressive symptoms. The Portuguese version of the preliminary questionnaire presented preliminary satisfactory values of validity in terms of construct and reliability (AUTHORS' BLINDED REFERENCE). In the current study, the internal consistency (Cronbach's alpha) of the questionnaire was .91.

Perceived competence in the use of information technologies. The expertise of the participants was assessed by the question 'How would you rate your knowledge and expertise in computer usage?'. The participants answered the question on a five-point *Likert* scale (from '1' *little or no knowledge and expertise* to '5' *I have more knowledge and expertise than most people*). A higher score reflected a higher perceived expertise.

Determinants of intention of technology use (performance expectancy, effort expectancy, and social influence). Given the absence in the literature of empirically validated instruments, these three determinants of the acceptance of information technology usage advocated by the UTAUT[12] were assessed by items developed and preliminarily validated by Ebert and colleagues [9]. The items were constructed based on

the UTAUT and on the review of the methods found in the literature for the measurement

of these variables. For the current study, items were slightly adapted to specifically refer to

internet-based interventions for depression. All items were answered on a five-point *Likert*

scale (from '1' *totally disagree* to '5' *totally agree*). To each dimension, higher scores

reflect greater levels of the construct assessed. The performance expectancy, defined as the

perceived benefit for their own mental health, was measured by four items (e.g., 'Using an

Internet-based intervention for depression would improve my personal well-being'). The

effort expectancy, defined as the perceived ease of use of an online intervention, was

assessed by three items (e.g., 'Using an Internet-based depression intervention would be an

easy task for me'). Finally, social influence, defined as the degree to which an individual

that significant other consider that he/she should use an online intervention, was measured

by four items (e.g., 'People close to me would recommend me to use an Internet-based

training'). In the present research, the Cronbach's alphas for performance expectancy,

effort expectancy, and social influence composites were .87, .89, .76, respectively.

Personal stigma about depression. The personal stigma of depression was

assessed by the subscale of personal stigma of depression of the Depression Stigma

Scale[22]. This 9-item subscale assesses the personal attitudes of the respondents towards

depression (e.g., 'Depression is a sign of personal weakness'). The items are answered on a

five-point *Likert* scale (from '1' *totally disagree* to '5' *totally agree*), in which higher the

score, the higher the personal stigma (negative attitudes) about depression. The Portuguese

version of this scale showed good psychometric properties[23]. The internal consistency in

the present sample was .85.

Depressive symptoms. Depressive symptoms were assessed by the Patient Health

Questionnaire-9[24] (PHQ-9). The PHQ-9 assesses the frequency/severity of depressive

symptoms based on the nine criteria of DSM-IV for major depressive disorder (e.g., "I felt

despair, dismayed or a lack of hope"). In each item, the participant rated the degree of how affected they were during the last 14 days, using a four-point *Likert* scale (from '0' *never* to '3' *almost every day*). The total score of the scale may vary between 0 and 27, in which higher scores reflect higher the frequency/severity of depressive symptoms. The Portuguese version of the measure presented fairly satisfactory initial psychometric qualities (Soreira, 2017). In this present research, the Cronbach's alpha coefficient was .89.

Sociodemographic data. The assessment protocol comprised sociodemographic items, including sex, age, marital status, and education level. Participants were also asked whether they used in the past professional mental health services for any mental health or interpersonal problem (i.e., psychologists, psychiatrists or psychotherapists) (yes/no).

2.3 Procedure

In order to participate in this study, two inclusion criteria were established: residing in Portugal and having an age greater than or equal to 18 years old. Participants were recruited in a Portuguese university or via a snowball procedure. First, instructors were contacted asking their permission for the administration of the assessment protocol at the end of their lecture. Participants were informed about the aim of the current research and the voluntary basis of their participation by the researchers in the lectures whose instructors agreed to allow time for data collection. No extra course credits were assigned. Protocols were group administered. The participation rate was 87%.

After the protocols' completion, the students were asked if they wanted to participate in the delivery of the assessment protocols to people of their interpersonal relations, whom they could foresee as participants in the research. This *snowball sampling* technique had the intent to increase the variability of the sample's sociodemographic characteristics. Assessment protocols were delivered inside envelopes to students who consented to hand them to people in their personal relationships. The

completed protocols would have to be handed in the sealed envelope to students who would subsequently give them back to researchers a week later in the same class. No financial compensation was provided. The participation rate was 56%. Among the returned assessment protocols, 15 participants were excluded of the analyses: two participants did not sign the informed consent and thirteen answered less than 75% of the main variables of the study in the protocol. The assessment protocol also included an informed consent and the completion time ranged from 15 to 20 minutes. The research procedures were approved by the institutional review board at the research site prior to conducting the study.

2.4 Statistical Analysis

First, a bivariate correlation analysis was conducted to preliminarily examine the significance, strength, and directionality of the correlations among the main variables studied. Then, a hierarchical multiple regression analysis was conducted to test the hypothesis that technology-related determinants and personal stigma would predict acceptance of IPI. Participants' age, sex (coded as 0 = women vs. 1 = men), and prior use of professional mental health services (coded as 0 = no prior use vs. 1. prior use) were entered as covariate variables in Step 1. We included these covariates in the model because previous research has found interindividual differences in patterns of internet usage, perceived competence in computer usage, and acceptance of internet-based psychological interventions in function of these variables [9,25]. Subsequently, participants' perceived expertise in computer usage and UTAUT's technology-related determinants (performance expectancy, effort expectancy, and social influence) were added in Step 2. Finally, Step 3 included depression personal stigma and depressive symptoms. The statistical analyses were performed using IBM SPSS 23.

3. Results

Table 1 presents the means and standard deviations of the study's main

variables. Preliminary bivariate correlations were conducted to determine the association between the variables. Globally, the associations between the study's variables presented significant associations in the expected directions, with the exception of depressive symptoms, which showed no significant correlations with most of the remaining variables.

INSERT TABLE 1 ABOUT HERE

As presented in Table 2, the final model of hierarchical regression for the prediction of acceptance of IPI for depression was significant, $F(9, 408) = 49.40$, $p < .001$. The final model explained 56% of the variance of the IPI acceptance. Step 1 contributed to the variance in acceptance, $F(3, 414) = 3.55$, $p < .01$, in which age was a significant predictor of IPI acceptance. Sex and prior use of professional mental health services were not significant predictors of IPI acceptance. The explained variance in IPI acceptance significantly increased with the addition of the technology-related variables entered in Step 2 ($\Delta R^2 = .52$, $p < .001$), with performance expectancy and social influence as significant predictors, $\beta = .73$, $p < .001$ and $\beta = -.11$, $p < .01$, respectively. Finally, personal stigma entered in Step 3 was significantly associated with IPI acceptance, $\beta = -.12$, $p < .01$. Variables entered in Step 3 contributed for additional variance to IPI acceptance, $R^2 = .56$, $\Delta R^2 = .02$, $p < .01$.

INSERT TABLE 2 ABOUT HERE

4. Discussion

The present study sought to examine a preliminary model of IPI acceptance for depression among a community sample of Portuguese adults. Our model hypothesized that IPI acceptance would be predicted by the determinants of technology use postulated by the UTAUT as well as by depression personal stigma, moreover, conceptualized in literature as one of the major barriers to not seeking professional psychological help. Globally, the results showed that age, performance expectancy, social influence, and personal stigma of

depression were significantly associated with the acceptance of IPI for depression. These findings were partially in line with the assumptions of UTAUT[12] since sex and effort expectancy were not associated with IPI acceptance when other variables besides those postulated by the model are taken into account. In particular, our results might indicate that IPI's perceived ease of use does not lead directly to its acceptance. On the other hand, the performance expectancy and the social influence emerged as predictors of IPI acceptance for depression. This raises the possibility that the expectancy of achieving success in the task and the perception that would recommend or support the participation in an IPI for depression increases the intention and motivation to use this delivery method of psychological intervention. In sum, these preliminary results suggest the utility of the UTAUT in the understanding of the acceptance of internet-based psychological intervention, corroborating the findings reported in previous research [9,12,14].

An intriguing result of the current study was the negative association between personal stigma of depression and acceptance of IPI (i.e., higher levels of depression personal stigma were associated with lower IPI acceptance). Although the association between depression personal stigma and IPI acceptance was not yet examined empirically, some authors have proposed that IPIs could mitigate the impact of personal stigma in the resistance of seeking psychological professional help. Under this hypothesis, IPI would be perceived as a more attractive and less threatening intervention setting for individuals with high/moderate personal stigma by reducing self-embarrassment associated with the in-person physical contact between therapist-client [21]. As a result, IPI could increase the preparedness to engage in psychological treatment in high-stigma individuals. Unexpectedly, our results did not point in this direction. Nonetheless, our results seem to be in line with previous findings that identified personal stigma of depression as a major barrier for seeking professional help and engaging in psychological treatments[18,26]. For

instance, Vogel and colleagues[27] showed that the perceived stigma and the personal stigma were significantly related between them, as well as with the attitudes towards professional psychological help and the intention of seeking counseling.

Surprisingly, depressive symptoms did not account for IPI acceptance in our model. This finding contrasts with previous research with community samples that suggested a positive and significant relationship between the severity of depressive symptoms and seeking psychological help[28,29], and intention of use of an IPI[30,31]. However, these previous studies did not test simultaneously depressive symptoms and personal stigma in the prediction of IPI acceptance. Although caution in interpreting this finding is warranted due to the preliminary nature of the current research, we speculate that the inclusion of personal stigma in the model might contribute to the absence of association between the severity of depressive symptoms and IPI acceptance. Similar findings were reported in past empirical studies that tested both depressive symptoms and personal stigma in the prediction of seeking traditional forms of treatment for depression[28,32]. Prior conceptual models have highlight personal stigma as a more proximal factor of the behavioral intention of seeking professional psychological help than depressive symptoms[18], suggesting potential mediating effect of personal stigma on the relationship between depressive symptoms and IPI acceptance. Future research should replicate this finding and also apply a longitudinal approach to test the mediation role of personal stigma.

Since this study was conducted with a sample of Portuguese adults, it is plausible to hypothesize whether specific Portuguese cultural circumstances might partially explain the current pattern of findings. Although speculative at this time, some indicators point in direction of no substantial effect of Portuguese cultural specificities on the results. First, the mean total scores of IPI acceptance found in our research was similar to those reported

in studies with German participants using the same measure [9,14]. In addition to these comparable levels of IPI acceptance, previous cross-national surveys have also shown that the patterns of internet access/usage and use of the internet for seeking health information reported by the middle/high educated Portuguese adults were similar to those showed by adults of other developed countries [33]. Finally, past cross-cultural and cross-sectional studies revealed that Portuguese adult participants presented comparable levels of mental health literacy, personal stigma about depression, and attitudes towards seeking face-to-face treatment for depression to those reported by participants of other Western countries [34–36]. Future research should, however, examine our model in international samples in order to fully understand whether cultural specificities could account for IPI acceptance for depression.

4.1 Limitations

Some limitations must be considered when interpreting the results of this research. First, our theoretically-based hypotheses were tested using correlational data and no strong causal effects could be concluded. In particular, changes in the severity of depressive symptoms over time might be expected. However, due to the cross-sectional design of the current study, the potential differential impact of these changes over time on IPI acceptance was not tested. In addition, future research should longitudinally test the presented model, focusing specifically on participants diagnosed with depression who effectively engaged an IPI.

Second, similarly to previous studies that addressed the public acceptance of e-mental health treatment services for psychological problems [26,37,38], our research was conducted using a convenience sample. Although the only study conducted with a representative sample revealed similar findings to those with convenience samples [8,39], future research should consider examining the tested model in larger and representative

samples. In particular, as patterns of internet access and usage might vary according to sociodemographic and socioeconomic variables [25,40], studies with representative samples could contribute to a more comprehensive inspection of how these individual differences are associated with the acceptance of IPI for depression. Subsequently, this detailed knowledge might support the design of tailored and responsive acceptance-facilitating interventions intended to positively influence individuals' acceptance of this treatment delivery method [9,41]. Third, albeit the preliminary validity indicators, some of the study's variables were measured using instruments with limited psychometric evaluation. Even though this is a limitation transversal to all international studies in this field, future research should focus on the design and validation of assessment of IPI acceptance and related constructs. Fourth, individuals' acceptance of IPI for depression was not compared to the acceptance of face-to-face interventions. The comparison of acceptance between both delivery methods could allow controlling whether the levels of IPI acceptance for depression reported by the participants were primarily associated with this delivery method itself or due to general attitudes towards seeking professional help.

Finally, prior participation in IPIs was not controlled, in part, which could explain participants' levels of IPI acceptance. Participants who potentially enrolled in prior IPI might present higher levels of literacy regarding this delivery method, including information about the IPIs' effectiveness, confidentiality, data security, and technical procedures. In addition, the levels of technology-related determinants of acceptance of technology (i.e., performance expectancy, the effort expectancy, and social influence) and IPI acceptance could also differ across participants with past experience of using an IPI. For example, when compared with participants with a perceived negative IPI experience, participants who had a beneficial experience in previous IPI might show not only more positive perceptions regarding IPI as a valid method to ameliorate mental health problems

(performance expectancy), but also lower perceived effort in using IPI (e.g., ease and comfort of use). Tough, as no IPI is, to our knowledge, validated in Portugal, the probability of participation in a prior IPI is residual. Further research should account for this variable in order to obtain results with greater statistical and conceptual strength.

4.2 Conclusion

In summary, our findings may have some implications for the development of psychoeducation interventions to improve IPI clinical readiness. Previous studies had already demonstrated the efficacy of interventions designed to facilitate the acceptance of IPI for depression[9]. The content of these interventions was conceived based on theoretical assumptions of the UTAUT and the currently available evidence on barriers of acceptance of internet-based interventions. By showing that the acceptance of IPI for depression was associated with both technology-related determinants and depression personal stigma, our findings might suggest that future IPI acceptance facilitating interventions would benefit from the inclusion in their curricula of modules designed to address the barriers of seeking professional psychological help, such as personal stigma. This integrative approach would improve the clinical utility of such interventions in the individuals' preparedness to engage in IPI for depression and also their levels of IPI acceptance as a reliable and valid delivery method of psychological help.

Summary table

What was already known on the topic

* Internet-based psychological interventions demonstrated efficacy in reducing depressive symptoms.

* Low rates of adherence to internet-based psychological interventions for depression when compared with face-to-face interventions.

What this study added to our knowledge

* Personal stigma against depression predicts acceptance of Internet-based psychological interventions for depression.

* Acceptance of Internet-based psychological interventions for depression is better explained by variables linked with intentions of technology use and by barriers to seeking professional psychological help.

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Table 1.

Means, SD, and Bivariate Correlations Among Main Variables

Variable	Mean	SD	1.	2.	3.	4.	5.	6.
1. IPI acceptance	9.77	3.25	-					
2. Perceived tech expertise	3.09	1.01	.14**	-				
3. Performance expectancy	11.01	3.96	.54**	.11*	-			
4. Effort expectancy	8.17	2.30	.48**	.12*	.65**	-		
5. Social influence	4.16	1.85	.24**	.25*	.08	.11*	-	
6. Depressive symptoms	5.78	4.51	-.02	-.03	.02	.08	.20**	-
7. Personal stigma	21.71	5.52	-.25**	.02	-.20**	-.03	.14*	.03

* $p < .05$. ** $p < .01$.

Table 2. *Hierarchical Regression Predicting Acceptance of Internet-based Psychological Intervention for Depression*

Variable	*B (SE)*		β	R^2	ΔR^2
Step 1					
Sex	-0.59 (0.37)		-.09		
Age	-0.05 (0.18)		-.14**		
Prior use of mental health services	0.09 (0.37)		.01		
F (3, 414)		3.55**		.02	
Step 2					
Perceived competence	0.10 (0.14)		.03		
Performance expectancy	0.60 (0.04)		.73***		
Effort expectancy	0.01 (0.06)		.007		
Social influence	-0.19 (0.07)		-.11**		
Δ*F* (7, 410)		100.48***		.54	.52***
Step 3					
Depressive symptoms	-0.01 (0.03)		-.02		
Personal stigma	-0.07 (0.02)		-.12**		
Δ*F* (9, 408)		5.08**		.56	.02**

** *p* < .01. *** *p* < .001.