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Validation of the French version of the Acceptability E-scale (AES) for mental E-health systems

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ABSTRACT

Despite the increasing use of E-health systems for mental-health organizations, there is a lack of psychometric tools to evaluate their acceptability by patients with mental disorders. Thus, this study aimed to translate and validate a French version of the Acceptability E-scale (AES), a 6-item self-reported questionnaire that evaluates the extent to which patients find E-health systems acceptable. A forward–backward translation of the AES was performed. The psychometric properties of the French AES version, with construct validity, internal structural validity and external validity (Pearson's coefficient between AES scores and depression symptoms on the Beck Depression Inventory II) were analyzed. In a sample of 178 patients (mean age=46.51 years, SD=12.91 years), the validation process revealed satisfactory psychometric properties: factor analysis revealed two factors: "Satisfaction" (3 items) and "Usability" (3 items) and Cronbach's alpha was 0.7. No significant relation was found between AES scores and depression symptoms. The French version of the AES revealed a two-factor scale that differs from the original version. In line with the importance of acceptability in mental health and with a view to E-health systems for patients with mental disorders, the use of the AES in psychiatry may provide important information on acceptability (i.e., satisfaction and usability).

1. Introduction

Patient-reported outcomes (PROs), including measures of satisfaction, have gained increasing attention in the mental-health services (Boyer et al., 2009; Crow et al., 2002; Fitzpatrick, 1991). Indeed, patient satisfaction has become one of the important PROs and a contributing outcome in the assessment of health care quality (Zendjidjian et al., 2014b). Patient satisfaction with caregiving is a strong predictor of future behaviors, in particular treatment adherence (Ware and Davies, 1983; Zendjidjian et al., 2014a; 2014b), and provides important information for improving the quality of health care organizations (Cleary and McNeil, 1988).

Given the increased prevalence of chronic disease, in particular of mental and brain disorders (Wykes et al., 2015), health care organizations now have to deal with the increased use of E-health systems (Chouvarda et al., 2015). Such systems facilitate: i) communication and coordination between patient and healthcare professionals (in primary care and hospital), and ii) medical decisions for diagnosis, prognosis and therapeutic follow-up (Chouvarda et al., 2015). While the extent to which patients are satisfied with E-health systems and find them acceptable should be evaluated, there is a lack of psychometric tools to evaluate it.

The Acceptability E-scale (AES) presents some advantages in the field of patient-reported outcomes in E-health systems (Tariman et al., 2011). It is a generic and validated questionnaire that can accurately evaluate satisfaction with a broad range of E-health systems (Carlson et al., 2001; Mullen et al., 2004; Taenzer et al., 2000), a point that differentiates it from other questionnaires that may have no clear validation process and which focus only on satisfaction with one precise E-health solution. It is also based on 6 items (with a 5-point Likert scale for each item), which is time-efficient and increases its usability in clinical practice. Furthermore, it is a self-reported questionnaire, which is recognized as the most reliable method to measure satisfaction (Crow et al., 2002).

Despite French being the 6th most widely spoken world language with 220 million speakers (Organization International de la francophonie, 2009), the AES has not previously been translated and validated in French. Thus, in order to better evaluate satisfaction with E-health solution in native French speakers, this study sought to design and validate a French version. Translating

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questionnaires may be dependent on cultural background (Brislin, 1970) so before using any translated questionnaire, a transcultural validation should be undertaken according to specific rules and methods. In the present study we analyzed the psychometric properties of the French AES version in a sample of French patients that was interviewed with a virtual agent, which are the most innovative E-health solution to sustain a clinical evaluation (Philip et al., 2014). In this study, the virtual agents made a clinical evaluation of depressive symptoms.

2. Methods and materials

2.1. Participants

Outpatients were recruited by psychiatrists in Bordeaux University Hospital from November 2014 to June 2015 in a consecutive sample design. Inclusion criteria were: native French-speaking adult patients (> 18 years) with any type of psychiatric or sleep complaints. Exclusion criteria were: insufficient capacity to consent to and understand and answer the self-report questionnaires.

Gender, age, year of education and antidepressant treatment were noted. Patients were given a clinical interview with a virtual agent to evaluate Major Depressive Disorder (MDD) according to DSM-5 criteria, which was the E-health solution that they had to evaluate with the AES. This virtual agent was adapted from previously developed software able to self-conduct interactive face-to-face clinical interviews (Philip et al., 2014). This software was based on four modules (Philip et al., 2014): i) an interview manager module that conducts the whole interview and manage the other modules, ii) a 3D rendering module that display the virtual agent and play animations, iii) a speech synthesizer module that create speech of the virtual agent and iv) a speech recognizer module that recognize the responses of the patients. The software suite was installed on a computer (Windows 8-i7 3770@3.4 GHz–8 GB-NVidia 670 GTX) connected to a 40-in. display and to a Microsoft Kinect sensor. In the present study the virtual agent was able to self-conduct interactive face-to-face clinical interviews to investigate each MDD DSM-5 criteria (American Psychiatric Association, 2013).

Patients were invited to participate in the study during their routine clinical evaluation. After receiving a detailed description of the study, participants gave their informed consent. The study was conducted in accordance with the Declaration of Helsinki and French Good Clinical Practices. The study was classified as a clinical trial by the US National Institutes of Health (ClinicalTrials.gov identifier: NCT02544295). The present article of validation of the AES is part of a more general study on the validation of based-virtual reality diagnosis for neuropsychiatric disorders and sleep/wake disorders (PHENOVIRTPSY).

2.2. Procedure

2.2.1. Translation of the AES

A forward–backward translation was performed through a multistep method (Brislin, 1970; Epstein et al., 2015). The original version was translated into French by a French native psychiatrist (AS). The back-translation into English was undertaken by a professional native English translator (KR) blind to the original version. This back-translated version was submitted to a second professional native English translator (HK) who noted the differences with the original version. The differences were notified to the French psychiatrist (AS) for a second round of translation and back-translation (KR). After this second round, the back-translated version and the original version was declared equivalent. The translated version of the AES was administered to 7 patients and showed good clarity and cultural acceptability. No further adaptations were required. The final version of the French AES is shown in Table 1.

2.2.2. Assessments

2.2.2.1. Self-rated assessment. The Acceptability E-scale (AES) (Tariman et al., 2011) and the Beck Depression Inventory II (BDI-II) (Beck et al., 1996) were completed as part of the self-rated psychiatric assessment. The AES consists of 6 items rated by the patients on a balanced five-point Likert scale ranging from 1 to 5. The rating was determined according to patients' experience concerning the evaluation with the virtual agent. The score was obtained by computing the sum of the scores obtained by items associated with it, from 1 to 5. The scale ranges from 6 to 30. The BDI-II consists of 21 items rated by the patients according to their experience in the preceding month. The BDI-II has previously been translated and validated in French (Beck, 1996; Bourque and Beaudette, 1982). The scale ranges from 0 to 63.

2.2.2.2. Psychiatric assessment. Patients were medically examined by an experienced psychiatrist, who judged whether MDD was present according to DSM-5 criteria. However, no standardized interview was applied. The consulting psychiatrist judged whether MDD was present and treatment was required. Therefore, the diagnostic standard for the present study was expert opinion. Only MDD was evaluated in the present study. The psychiatrists were blind to the results of the virtual agent.

2.3. Statistical analyses and hypotheses

Descriptive statistics of the obtained data included frequencies and percentages of categorical variables together with means and standard deviations of continuous variables. For the validation process, we analyzed the psychometric properties of the French AES version including construct validity, internal structural validity and external validity. Data analysis was performed using SPSS software (Version 18 for Mac, PASW Statistics), LISREL software (Scientific Software International, Inc.) and WINSTEP Software (Wright et al., 2001). For all the tests, the accepted significance level was 5%.

2.3.1. Construct validity

A confirmatory factor analysis (CFA) was performed using the LISREL model to analyze the construct validity and to test the one factor structure of the original scale (Tariman et al., 2011). If the Root Mean Square Error of Approximation (RMSEA) was not satisfactory (> 0.05), a principal component factor analysis (PCA) with Varimax rotation was performed to explore the structure of the French version of the AES (Kaiser, 1958). This analysis determined the final structure and the number of independent factor of the French version of the AES. Items were included in a factor if they revealed a loading greater than 0.4. The undimensionality of each factor was assessed using Rasch analyses by computing the pattern of item goodness-of-fit statistics (INFIT) for each factor (Wright et al., 2001). A value of INFIT between 0.5 and 1.5 ensures that all items of the scale tend to measure the same concept (Wright et al., 2001).

2.3.2. Internal structural validity

Item-internal consistency (IIC) was assessed by correlating each item with its related factor; correlations of at least 0.4 are recommended for supporting IIC

Table 1
English version/French version and factor analysis of the French version of the AES.

No.	*Factor*	*Items*	*French version*	*Mean*	*SD*[a]	*Floor* (%)	*Ceiling* (%)	*Alpha*[b]	*INFIT*[c]
1	Usability	How easy was this computer program for you to use?	À quel point avez-vous trouvé ce programme informatique facile d'utilization?	4.62	1.06	6.2	85.4	0.762	1.64
2	Usability	How understandable were the questions?	À quel point les questions étaient-elles compréhensibles?	4.77	0.52	15.7	80.9	0.713	0.95
3	Satisfaction	How much did you enjoy using this computer program?	À quel point avez-vous apprécié l'utilization de ce programme informatique?	4.07	0.91	34.8	38.8	0.595	0.47
4	Satisfaction	How helpful was this computer program in describing your symptoms and quality of life?	A quel point ce programme informatique vous a-t-il été utile pour décrire vos symptômes et votre qualité de vie?	3.7	1.07	31.5	27.5	0.626	0.64
5	Usability	Was the amount of time it took to complete this computer program acceptable?	Le temps consacré à répondre à ce programme informatique était-il acceptable?	4.57	0.89	14	75.3	0.644	0.80
6	Satisfaction	How would you rate your overall satisfaction with this computer program?	Comment évaluer-vous votre satisfaction générale de cet outil informatique?	4.07	0.93	38.8	38.2	0.577	0.69

[a] Standard deviation.
[b] Cronbach's alpha if item is deleted.
[c] Rasch statistics.