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Original article

Psychometric validation of the French version of the Connor-Davidson Resilience Scale

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ABSTRACT

Objectives. – Resilience defines the ability to face adversity with positive outcomes. Different scales, including the 25-item Connor-Davidson Resilience Scale (CDRISC), have been elaborated in order to evaluate resilience among various populations. The evaluation of resilience in French populations was impossible until CDRISC was translated into French. In the present work, we aim to validate a French version of CDRISC (f-CDRISC).
Methods. – The survey was conducted at Nantes University. Both dental and medical students were eligible. The factor structure of f-CDRISC was determined and its replicability was tested on two sub-samples by exploratory factor analysis (EFA) and parallel analysis (PA). A third student sample was used for confirmatory factorial analysis (CFA).
Results. – We collected 1210 responses. Four items did not reach acceptance thresholds for reliability and were discarded from the f-CDRISC. EFA and PA of the remaining 21 items highlighted a replicable 3-factor structure that was further confirmed by CFA. Resilience factors included "tolerance to negative affects", "tenacity" and "self-confidence". All factors displayed acceptable to good internal consistency. They were characterized by positive medium to strong correlations with the overall f-CDRISC Scale. Significant positive correlations were also observed between the resilience factors.
Conclusion. – The present work constitutes the first study devoted to a French adaptation of the CDRISC questionnaire. We present evidence showing that the f-CDRISC is a reliable tool for resilience evaluation in French speaking populations.

1. Introduction

Resilience defines the ability to have good psychological outcomes and quality of life despite experiencing stressful environment or more generally serious adversities [1,2]. It is heterogeneously expressed in humans but is considered to be a dynamic process elaborated throughout life [3,4]. It has been proposed that exposure to risk factors may strengthen people's resilience to a future exposure to similar risks [5].

Resilience is perceived as a construct based on several protection factors related to a person's personality and biology and to their environment [1,6]. It can be explored in populations by using different psychometric scales. Among these, the Brief Resilient Coping Scale (BRCS) [7], the Connor Davidson Resilience Scale (CDRISC) [8], the Resilience Scale for Adults (RSA) [9] and the Wagnild & Young Resilience Scale (RS) [10] are well-accepted tools for resilience evaluation [11]. The CDRISC consists of a 25-item questionnaire, the overall score of which being proportionally representative of resilience propensity [8]. The original version is reported to have good reliability and validity [8]. It is structured as a 5-factor construct, which includes:

- personal competences, high standards and tenacity;
- trust in one's instincts, tolerance of negative affect, and strengthening effects of stress;
- positive acceptance of change, and secure relationships;
- control;
- spirituality [8].

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The CDRISC has been translated and psychometrically validated for different countries including Austria [12], Brazil [13], China [14], Iran [15], Korea [16], the Netherlands [17], the Russian Federation [18], Spain [19] and Turkey [20]. To date, the CDRISC has not been adapted and validated for French speaking populations, although a report mentions the use of a short form of CDRISC in a sample of French women [21]. The factorial structure of CDRISC described initially for US general population [8] has been replicated for Australian [22] and Korean [16,23] populations. However, the item composition of the resilience factors identified in these studies was not in good agreement with that of Connor and Davidson [8]. Furthermore, the 5-factor structure has been highly contested [24], and alternative factorial structures have been demonstrated since then including 1- [25], 2- [26], 3- [19,20,27] and 4-factor [13] models.

Health professionals have to cope with difficult situations in their practice and in their interpersonal relationships. Resilience contributes to their mental health and well-being [28,29]. During their studies health students acquire academic skills. They are also required to face adverse situations and stressful conditions regarding patient care and interpersonal relationships. At the end of their first year at Nantes University, the students are selected through a competitive exam after which they can choose either a medical, dental, pharmaceutical, physiotherapy or mid-wifery career according to their academic rank [30]. Very little is known concerning the resilience of our students despite the fact that they are largely submitted to a stressful learning environment. In this work, we aimed to validate a French translation of the CDRISC questionnaire (f-CDRISC) as a preliminary research devoted to resilience evaluation in French speaking populations.

2. Material and methods

2.1. Recruitment of the participants and questionnaire administration

The present work has received an ethical accreditation from the Ethics committee of Nantes University (reference number ST/BB 14–772). The students registered in 2013–2014 at Nantes dental and medical schools were eligible for this study. We contacted the students by e-mail and invited them to answer the electronic version of the questionnaire. The access (between March and May 2014) was made possible after the electronic validation of an informed consent in which means and goals of the study were described. Data were only accessible to researchers. For anonymity ensuring and for test-retest analysis, we asked each respondent to encode his/her response by using the first two letters of his/her first name, a number corresponding to his/her day of birth (between 01 to 31), a number corresponding to his/her year of birth (between 00 and 99), a number corresponding to his/her birth place (between 00 and 101) and the first two letters of his/her mother's given name.

A French version of the CDRISC was elaborated according to the procedure described earlier [31]. The original version of the questionnaire was translated and back-translated by an English speaking team composed by two scientists, two dentists and a French/English translator. The students were asked to answer the following question for each item: "to which extent do you agree with the following proposal"? Item scoring was based on a 5-point Likert Scale with 0 corresponding to "not at all" and 4 corresponding to "full agreement".

2.2. Characteristics of the respondents

French dental and medical studies correspond to a 6-year curriculum including a common first year of health studies. In 2013–2014, 1387 health students were registered at Nantes University in first year of study. A total of 387 and 1176 students were respectively registered in dental and medical (year 2 to 6) studies. One thousand and ten responses were obtained from contacted students (rate of return = 41.0%). Five hundred and twenty-four respondents were from medical ($n = 203$; mean age $\pm$ sd = 21.8 ± 2.2, 129 females/74 males) and dental ($n = 321$; mean age $\pm$ sd = 22.7 ± 2.3, 175 females/146 males) curriculums. 686 respondents corresponded to first year students (583 females and 203 males; mean ag $\pm$ sd = 19.2 ± 1.5).

2.3. Data analysis

Data were collected at the end of the open session and were further analyzed with SPSS 20 (IBM, Inc.), Sigma Plot (Jandel Scientific) and R software (version 3.2.5 downloaded from www.r-project.org). The reliability was deduced from the calculation of Cronbach's α, omega (Ω) [32], greatest lower bound coefficient (GLB) [33], mean item-score correlation and mean inter-item correlation coefficients. The intra-class correlation coefficient (ICC) was determined in test-retest conditions involving 203 medical students who completed the questionnaire three months later. The appropriateness of the questionnaire was deduced from the Kaiser-Meyer-Olkin (KMO) coefficient and from the Bartlett's test. The items sampling adequacy was estimated from the anti-image correlation coefficient (AIC) calculated for each item, considering a threshold > 0.5 for acceptance.

We applied the method recommended earlier [34] for exploratory factor analysis (EFA, see below). After the removal of incomplete responses and outliers (Dixon's test), the data corresponding to dental and medical respondents were randomly allocated in two groups (i.e. A: $n = 262$ and B: $n = 262$) through an Excel (Microsoft Inc.) procedure. Group A (153 females; 109 males) consisted of 168 dental students and 94 medical students. Group B (158 females; 104 males) was composed of 154 dental students and 108 medical students. The homogeneity of the two groups was verified by χ^2 test (medical vs. dental $\chi^2 = 0.12$, $P = 0.728$; female vs. male $\chi^2 = 1.51$, $P = 0.219$). EFA (maximum likelihood method with Varimax rotation and Kaiser normalization) and parallel analysis were conducted on the data sets obtained from groups A and B. The number of factors tested by EFA in the different models varied from 2 to 6. Communalities (h^2) above 0.2, Eigen values above 1.0 and loading values above 0.3 were considered for item allocation.

In order to evaluate the goodness-of-fit of a proposed factor structure, we ran confirmatory factorial analyses (CFA, maximum likelihood method). We used recommended threshold values to assess the goodness-of-fit of the different factorial solutions [35]. We calculated absolute indices:

- the normed χ^2 (χ^2/df, optimally below 2.0);
- the standardized root mean square residual (sRMR, optimally below 0.05);
- the goodness-of-fit index (GFI) and the adjusted goodness-of-fit (AGFI, both being optimally above 0.9);
- the root mean square error of approximation (RMSEA, optimally below 0.08) and its relative P (close) for which a value above 0.05 indicates a good fit.

Since several models could be compared, we also used comparative indices:

- the comparative fit index (CFI) (optimally above 0.9);
- the corrected Akaike information criterion (cAKIC), the value of which is required to be lower than that of a saturated model [36]. In the case of model comparison, the preferred one corresponds to that showing the lowest cAKIC value.

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