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DecidHealth : Psychometric validation of the IUS-12 and IUS-12-H scales on French healthcare professionals

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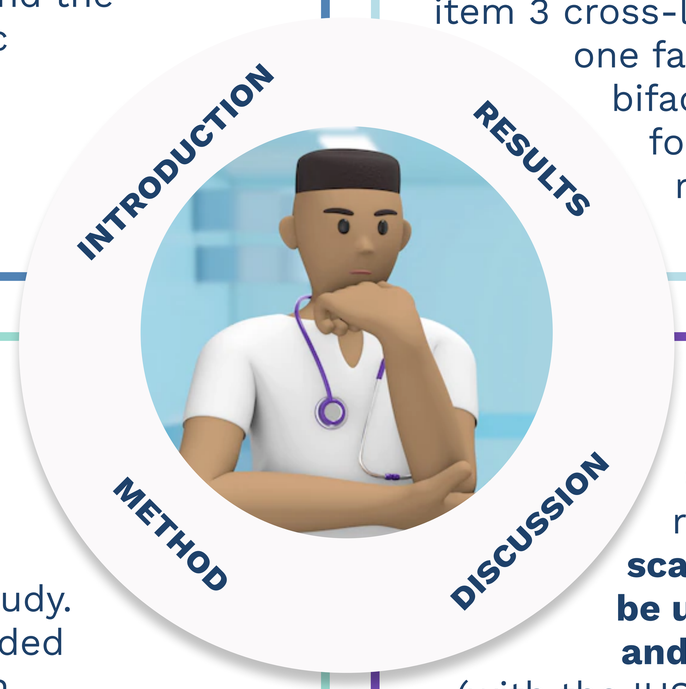
Intolerance of uncertainty (IU) is of primary interest in the health field, as it can have negative consequences on the health decision making process. Given the importance of this factor, research into the relationship between **clinical reasoning** and intolerance of uncertainty, including its **impact on medical decisions**, is essential.

However, the implementation and evaluation of the relevance of action plans to modify this parameter **requires reliable and valid tools**.

Researchers commonly use the Intolerance of Uncertainty Scale (Carleton et al., 2007). A 27-item version (IUS-27) and a shorter 12-item version exist (IUS-12). However, no reliable and valid version of this scale exists for measuring this parameter in HCPs in France. **We wished to conduct a French psychometric validation study of the IUS-12 scale as well as a validation of a version adapted to HCPs (called IUS-12-H).**

As the IUS-12 has shown good psychometric qualities in English and that the IUS-12-H is partly based on the IUS-12 (Carleton et al., 2007), we hypothesized that both our French versions of the IUS-12 and the IUS-12-H would show good psychometric qualities and would correlate with each other.



933 healthcare professionals (recruited using emails and social networks as LinkedIn) completed the study. Among the respondents, 417 were excluded because they did not meet our inclusion criterias (*i.e.*, they were underaged and/or notHCPs according to our definition and/or did not fully complete more than two scales).
The final sample was composed of **516 participants** (*M*age = 36.72, *ET*age = 12.22, 197 women, 120 men, 2 others and 197 who did not specify their gender).

Participants completed the **IUS-12** and **IUS-12-H**, as well as **additional scales** intended to allow for convergent and divergent validity analyses (*i.e.*, Physicians' Reactions to Uncertainty (PRU), Distress Tolerance Scale (DTS), Discomfort Intolerance Scale (DIS), Perceived Stress Scale (PSS10), Difficulties in Emotion Regulation Scale (DERS-16), Work Uncertainty Questionnaire (WQ), Need for Cognition Scale (NFCO), Need For Closure Scale (NFC), and the Tolerance of Ambiguity in Medical Students and Doctors (TAMSAD)).

The survey ended with socio-demographic questions (*i.e.*, age, gender, discipline practiced and for how many years).

Results of the external validity factorial analyses of the IUS-12 and IUS-12-H :

	PRU	DTS	DIS	PSS10	DERS-16	QIT	NFCO	NFC	IUS-12	TAMSAD
IUS-12	Distinct	Distinct	Distinct	Distinct	Distinct	Partial cross loading	Distinct	Distinct	-	Distinct
IUS-12-H	Distinct	Distinct	Distinct	Distinct	Distinct	Distinct	Distinct	Distinct	Partial cross loading	Distinct

Note: Distinct = Both scales have very distinct factor structures, Partial cross loading = Both scales have factor structures that cross load on some items

We followed a three-stage analysis for all the scales in our study: 1) We ascertained the construct validity of all the scales by **checking that the factorial structure observed corresponded to that described in the literature**, 2) Then we **tested the external validity of our scales by conducting correlational analyses**, 3) And then we conducted **new factor analyses with our scales and the additional scales in pairs in order to check the external validity** (*i.e.*, did the factor analyses show that the scales had different factor structures when taken in pairs).
The seminal paper by Carleton et al (2007) describes a two-factor structure. We found this structure to explain 53% of the variance for the IUS-12 (factor loadings ranging from 0.46 to 0.95). This bifactorial model explained 50% of the variance for the IUS-12-H (factor loadings ranging from 0.43 to 0.87). However, item 3 cross-loaded and did not seem to fall more into one factor than another. A new test of this bifactorial model without item 3 accounted for 51% of the variance (factor loadings ranging from 0.42 to 0.88).

Our psychometric analyses on the responses of 516 HCPs suggest that **both scales are psychometrically valid and can be used to measure IU** (with the IUS-12) **and IU in the medical context among HCPs** (with the IUS-12-H).

This study is also encouraging for many practical implications. **IUS-12-H can be used in training courses involving HCPs with very different backgrounds and occupations**. Beyond the prospects of comparison between professions, this scale offers the possibility of identifying HCPs with a high level of IU requiring remediation. This will also be an opportunity to develop and propose to HCPs pedagogical models adapted to their level of IU, without mixing in training individuals with very different levels of IU.
Insofar as uncertainty can lead to inadequate care, we are pleased to know that with IU scales it is now possible to better understand how HCPs deal with uncertainty, and thus to **be able to identify individuals at greater risk of sub-optimal treatment issues due to poor uncertainty management.**
We are aware that a framework for interpreting the score is needed and future studies will have to determine at what threshold of "score change" one can consider that there has been a change in the IU of HCPs.

References :
- Carleton, R. N., Norton, M. A. P. J., & Asmundson, G. J. G. (2007). Fearing the unknown: a short version of the Intolerance of Uncertainty Scale. Journal of Anxiety Disorders, 21(1), 105–117. https://doi.org/10.1016/j.janxdis.2006.03.014

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