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Validity and reliability of the Hyperacusis Impact Questionnaire (HIQ) translated to Dutch

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BACKGROUND

Hyperacusis can be defined as a decreased sound tolerance for everyday sounds, causing distress and reduced quality of life (Tyler, 2014). The most commonly used self-report questionnaire in Dutch for the assessment of hyperacusis is the Hyperacusis Questionnaire (HQ) developed by Khalfa et al (2002). However, the validity of this questionnaire, as well as its sensitivity to treatment effects has been questioned in past research (Fackrell et al. 2015; Schecklmann et al. 2015). Therefore, a new Hyperacusis Impact Questionnaire (HIQ) was developed and validated in English by Aazh et al (2021). The objective of the current study was to translate the HIQ in Dutch, and to evaluate reliability and validity of the Dutch version of the HIQ.

METHODS

TRANSLATION

- Using the forward-back translation procedure.
- Pretested to evaluate clarity and readability with six subjects with hyperacusis differing in age, gender and severity of hyperacusis.
- Finalizing the Dutch version of the HIQ after clarifying some terms more in detail (Table 1).

Table 1: the English and Dutch version of the HIQ.

1.	Feeling anxious when hearing loud noises Angstig voelen bij het horen van luide geluiden	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen
2.	Avoiding certain places because it is too noisy Vermijden van bepaalde plaatsen omdat ze te lawaaierig zijn	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen
3.	Lack of concentration in noisy places Gebrek aan concentratie in lawaaierige omgevingen	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen
4.	Unable to relax in noisy places Niet in staat zijn om te ontspannen in lawaaierige omgevingen	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen
5.	Difficulty in carrying out certain day-to-day activities/ tasks in noisy places Moeite hebben bij het uitvoeren van bepaalde dagelijkse activiteiten/taken in lawaaierige omgevingen	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen
6.	Lack of enjoyment from leisure activities in noisy places Gebrek aan plezier tijdens vrijetijdsactiviteiten in lawaaierige omgevingen	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen
7.	Experiencing low mood because of your intolerance to sound Humeurig zijn door uw overgevoeligheid voor geluid	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen
8.	Getting tired quickly in noisy places Snel vermoeid raken in lawaaierige omgevingen	0-1 day 0-1 dag	2-6 days 2-6 dagen	7-10 days 7-10 dagen	11-14 days 11-14 dagen

RELIABILITY AND VALIDITY

- Participants: twenty-five subjects (9 male, 16 female) with subjective complaints of hyperacusis with a mean age of 42.8 years (standard deviation (SD) 14.33, range 22-67 years) and 25 subjects without hyperacusis matched in gender and age were tested.
- Study design: the Dutch version of the HQ, and new HIQ in Dutch were filled in by all participants twice with approximately two weeks interval.

RESULTS

INTERNAL CONSISTENCY

After removing the first item regarding anxiousness, factor analysis yielded a single factor model, representing 68.05% of the total variance (Table 2). Cronbach's α was 0.92, indicating excellent internal consistency.

Table 2: Factor loading and mean (SD) per item.

Item No.	Factor loading	Mean (SD)
4	0.95	1.98 (1.00)
5	0.87	1.76 (0.94)
6	0.85	1.58 (0.91)
8	0.84	1.78 (0.98)
3	0.72	1.82 (0.80)
7	0.69	1.61 (0.84)
2	0.61	1.58 (0.86)

TEST-RETEST RELIABILITY

Total HIQ score was on average 11.96 (SD 5.14, range 7-25) and 10.94 (SD 4.13, range 7-25) on test and retest, respectively. Using paired samples t-test, there was no significant difference in total HIQ score between test and retest ($t(45)=1.91$, $p=0.06$).

Two-way mixed, single measures intraclass correlation coefficient was 0.64, which is acceptable.

DISCRIMINABILITY

Using Mann-Whitney U test, there was a significant difference in total HIQ score between the groups with hyperacusis and without hyperacusis, with mean rank 33.10 and 17.22, respectively ($U=105.5$, $p<0.001$). This indicates good discriminability.

CONVERGENT VALIDITY

A strong, significant correlation was seen between the total HIQ score and total HQ score ($r_s=0.699$, $p<0.001$), implying convergent validity.

DISCUSSION

This first evaluation of reliability and validity of the HIQ translated in Dutch, indicates excellent internal consistency and acceptable test-retest reliability, as well as discriminant and convergent validity. Hence, the Dutch version of the HIQ is suggested to be useful as a measure of the impact of hyperacusis.

Future research is needed to evaluate the new translated questionnaire in a larger sample of subjects with subjective complaints of hyperacusis, varying in hyperacusis severity, and combining the results with measurements of hearing thresholds and uncomfortable loudness levels. A reliable and valid self-report questionnaire regarding hyperacusis could be used in the assessment of hyperacusis, as well as to evaluate treatment outcomes, in clinical and research practice.

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