**To cite this article:**
Pauline Degrave & Jonathan Dedonder (2018): A French translation of the Goldsmiths Musical Sophistication Index, an instrument to assess self-reported musical skills, abilities and behaviours, Journal of New Music Research, DOI: 10.1080/09298215.2018.1499779

# A French translation of the Goldsmiths Musical Sophistication Index, an instrument to assess self-reported musical skills, abilities and behaviours

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The aim of this study was to translate into French the Goldsmiths Musical Sophistication Index (Gold-MSI) (Müllensiefen, D., Gingras, B., Musil, J., & Stewart, L. (2014). The musicality of non-musicians: An index for assessing musical sophistication in the general population. *PLOS One*, *9*(2), e89642) – an inventory to assess self-reported musical skills, abilities and behaviours -, to examine the internal consistency and to confirm the factor structure of this new French translation. The Gold-MSI has been translated into French in different steps and completed online by 795 persons, out of which data from 750 persons have been analysed. Measures of internal consistency reveal that the French version of the Gold-MSI has high levels of internal consistency ($\alpha$ = .80–.95; $\omega$ = .86–.96; Guttman $\lambda$6 = .80–.97). Additionally, confirmatory factor analysis shows a good structure index (RMSEA = .063; SRMR = .066; CFI = .884) and confirms the underlying factor structure. These findings support the use of the French version of the Gold-MSI as a reliable instrument to measure the level of different musical facets. The French translation, which is freely available in supplementary material, can contribute to research about musical skills and behaviours in French-speaking regions.

**KEYWORDS** : Music questionnaire; Gold-MSI; French; translation; traduction; français

## The Goldsmiths Musical Sophistication Index

The Goldsmiths Musical Sophistication Index (GoldMSI) (Müllensiefen, Gingras, Musil, & Stewart, 2014) is a 38-item self-report inventory measuring a range of musical skills, abilities and behaviours. Compared to other tests and questionnaires assessing musical abilities (e.g. Chin and Rickard, 2012; Gordon, 1989; Law & Zentner, 2012; Seashore, Lewis, & Saetveit, 1960; Werner, Swope, & Heide, 2006 – for a discussion, see Müllensiefen et al., 2014, p. 2), the Gold-MSI specifically attempts to take into account the wide range of musical abilities and to measure expertise not only through instrumental training, but also through a variety of musical activities. The authors therefore adopted the term 'musical sophistication', which is less loaded with biases and preconceptions than terms such as 'ability', 'aptitude' or 'musical potential', and which 'can refer to musical skills, expertise, achievements and related behaviours across a range of facets that are measured on different subscales' (Müllensiefen et al., 2014, p. 2). The GoldMSI assesses the General Musical Sophistication and five subscales:

(1) Active Engagement, e.g. how much time and how much money is spent on music;
(2) Perceptual Abilities, e.g. accuracy of musical listening skills;
(3) Musical Training, e.g. amount of formal musical training received;
(4) Singing Abilities, e.g. accuracy of one's own singing;
(5) Emotions, e.g. ability to talk about emotions expressed by music.

As broadly described in Müllensiefen et al. (2014), the Gold-MSI has been developed and refined in five main steps. First, the authors developed the new self-report inventory after a systematic review of the existing literature, tests, questionnaires and inventories. The items have been submitted several times to different participants, which made it possible to produce a final questionnaire of 38 items. Second, the authors carried out analyses, which confirmed the adequacy of the items and the factor structure of the self-report questionnaire. Third, the authors validated the inventory through the examination of the correlations between the Gold-MSI inventory and the Musical Engagement Questionnaire (Werner et al., 2006) as well as Gordon's Advanced

Measures of Audiation (Gordon, 1989). Correlations between the questionnaire with two personality inventories have also been examined. The scores from the Gold-MSI were then linked to the results of two listening tests, one about melody memory and one about musical beat perception. This showed that the general musical sophistication scale indexes both listening tasks positively and confirmed that the selfreported musical behaviour was related to objectively measurable listening abilities. Finally, the authors examined the relation between the self-reported and listening scores and the socio-economic conditions.

The Gold-MSI, like many other musical tests and questionnaires, is in English. French versions of these tests are rather scarce (e.g. the Brams' test (https://www.brams.org/test-en-ligne/), the brief PROMS (https://webapp.uibk.ac.at/psychologie/musiquote/index.php/229167/lang-fr). This paper therefore aims at developing a French translation of the Gold-MSI and confirming the factor structure of this new French version. The original English version of the Gold-MSI has already been translated into German (Schaal, Bauer, & Müllensiefen, 2014) and into Danish. For their German translation, Schaal et al. (2014) confirmed the underlying factor structure using confirmative factor analysis and observed high reliabilities of the five sub-factors as well as the general factor (see results below). In this paper, we will examine whether we find similar results to the original (English) and German versions for the French translation of the self-report inventory.

## Translation of the English Gold-MSI into French

The Gold-MSI was translated from English to French in five steps, using a translation procedure in several stages (see Thanh, Nguyen, & Chan, 2016). First, two French speakers – one male and one female – who are fluent in English and familiar with music terminology performed independently forward translations. The emphasis was placed on conceptual rather than literal translations, as well as on natural and acceptable language for the broadest audience (i.e. simple, clear and comprehensible formulations). A unique forward translation was then established after the two translators discussed the discrepancies between their two versions. Second, the translation was submitted to a bilingual English/French expert in English linguistics to read the unique forward translation and to comment on it. Third, the translated sentences which remained under discussion after the previous two steps were given to a native English speaker, a music researcher who is fluent in French, to translate them back into English. The words and expressions that did not match the original items were then discussed by one of the original translators and one linguistic expert. Based on these steps, a questionnaire was established for a pre-testing and cognitive interviewing: during an in-depth interview, four native speakers of French (two women and two men, mean age = 42.25) were given the translated questionnaire and gave their comments about the research instrument and explained how they interpreted the items and understood the questionnaire. Discussion concerned mainly some matters of vocabulary and formulation (e.g. 'susciter des émotions' or 'provoquer des émotions'). Finally, on the basis of the different comments of the pre-test respondents, the final version of the questionnaire was established. This French questionnaire formed the basis of the current study. The complete version of this questionnaire is available in supplementary material.

## Analysis of the French version of the Gold-MSI

### *Procedure*

The questionnaire was set up online, via the online survey LimeSurvey (Limesurvey GmbH). The survey started with an introductory text explaining that the survey evaluates the musical profile of the participants. Participants first received general questions about them (gender/ nationality/ age/ place of residence/ professional status/ highest degree). Afterwards, they answered the 38 questions of the Gold-MSI. Participants also had to mention either an anonymous identifier or their e-mail if they wanted to be informed of other similar research projects. At the end of the questionnaire, participants received feedback about their musical profile (the five subscales and the general factor given by the Gold-MSI) in the form of the percentiles of their scores associated with a short interpretation of it.

Each question appeared separately and was obligatory. The presentation of the questionnaire, the order of the different parts and questions as well as the feedback which was provided were made to look as much as possible like the online English version of the Gold-MSI that was then available.

The participation in the survey was voluntary. The survey was freely accessible online from 6 January 2016 until 16 February 2016. The address was shared mainly through email and social networks. In order to reach specific groups (i.e. retired people and musicians), the address was also sent to mailing lists of non-profit associations where many retired people work and to orchestras. Without pauses, the procedure took about 10

minutes. If needed, the participants could take a break and continue later where they had stopped.

### Participants

795 participants completed the whole questionnaire. From this sample, we excluded people who were not Belgian or French and who had never lived in Belgium or in France ($N$ = 29), in order to guarantee homogeneity in the knowledge of this variety of French. Moreover, outliers who mainly chose the same response category acrossthe38itemswereremovedfromthesamplefollowing the technique applied by Müllensiefen et al. (2014), viz. variance <2 *SDs* below mean variance ($N$ = 5). Furthermore, for ethical reasons, data from participants who were less than 18 years old were discarded from the analysis ($N$ = 11). Since the questionnaire was online, it was possible to re-take the test. This was controlled via the e-mail addresses and anonymous identifiers. Through these different criteria, 45 participants were discarded, leaving 750 participants.

In this sample, 28.9% were men and 71.1% were women. Participants were between 18 and 87 years old; the mean age was 47.88 years ($SD$ = 17.092). The participants were Belgian (90.5%), French (4.8%), had dual nationality Belgian-French (1.6%) or dual nationality Belgian or French with another nationality (3.1%). As to the occupational status, 7.1% were still studying, 55.1% were working, 6.9% did not work and 30.9% were retired.

### Survey instrument and calculation of individual scores

The Gold-MSI contains 38 questions. Thirty-one questions are statements for which participants have to indicate their level of agreement on a seven-point Likert scale. The different levels have been translated as: *1. Pas du tout d'accord (EN: Completely disagree); 2. Fortement pas d'accord (EN: Strongly disagree); 3. Pas d'accord (EN: Disagree); 4. Ni pas d'accord, ni d'accord (EN: Neither agree nor disagree); 5. D'accord (EN: Agree); 6. Fortement d'accord (EN: Strongly agree); 7. Tout à fait d'accord (EN: Completely agree).* Seven questions are ordinal scale items, each with seven answer possibilities. For these questions, participants mention their level of investment in different musical activities. For example, 'I engaged in regular, daily practice of a musical instrument (including voice) for 0 / 1 / 2 / 3 / 4-5 / 6-9 / 10 or more years'.

The individual score of the participants is calculated as follows: for the questions of the Likert scale, participants receive the point related to the level of the Likert scale, except for the nine negative statements where the response scale is reversed; for the ordinal scale questions, each answer is recoded from 1 to 7.

As mentioned above, the Gold-MSI calculates a level of general musical sophistication as well as levels of five subscales (active engagement, perceptual abilities, musical training, singing abilities, and emotions). The *general musical sophistication* score is based on 18 questions; the subscales scores *active engagement* and *perceptual abilities* on nine questions; the subscales scores *musical training* and *singing abilities* on seven questions and the subscale score *emotions* on six questions. The different questions per (sub)scale are given in supplementary material.

**Table 1.** Summary of the statistics and indicators of internal consistency for the French translation of the Gold-MSI subscales and general musical sophistication factor, compared to the original (English) and German versions.

| | Active engagement | Perceptual abilities | Musical training | Singing abilities | Emotions | General musical sophistication |
|---|---|---|---|---|---|---|
| Mean (SD) | 35.48 | 46.69 | 22.61 | 28.26 | 32.58 | 72.08 |
| | (10.23) | (8.83) | (11.29) | (9.15) | (5.33) | (18.11) |
| Original | 41.52 | 50.20 | 26.52 | 31.67 | 34.66 | 81.58 |
| version | (10.36) | (7.86) | (11.44) | (8.72) | (5.04) | (20.62) |
| German version | 32.99 | 45.84 | 22.85 | 27.55 | 30.67 | 70.41 |
| | (9.45) | (8.62) | (10.62) | (8.87) | (5.55) | (19.94) |
| Scale maximum | 63 | 63 | 49 | 49 | 42 | 119 |
| Original version | 63 | 63 | 49 | 49 | 42 | 126 |
| German version | 58 | 63 | 49 | 49 | 42 | 121 |
| Scale minimum | 9 | 18 | 7 | 7 | 8 | 24 |
| Original version | 9 | 9 | 7 | 7 | 6 | 18 |
| German version | 10 | 12 | 7 | 7 | 12 | 23 |
| Alpha | 0.87 | 0.88 | 0.92 | 0.87 | 0.80 | 0.95 |
| Original version | 0.87 | 0.87 | 0.90 | 0.87 | 0.79 | 0.93 |

| | | | | | | |
|---|---|---|---|---|---|---|
| German version | 0.80 | 0.83 | 0.88 | 0.84 | 0.71 | 0.91 |
| Omega | 0.90 | 0.89 | 0.94 | 0.91 | 0.86 | 0.96 |
| Original version | 0.87 | 0.87 | 0.90 | 0.87 | 0.79 | 0.93 |
| German version | 0.80 | 0.84 | 0.88 | 0.84 | 0.72 | 0.91 |
| Guttman6 | 0.87 | 0.88 | 0.92 | 0.87 | 0.80 | 0.97 |
| Original version | 0.86 | 0.87 | 0.91 | 0.87 | 0.77 | 0.94 |
| German version | 0.79 | 0.84 | 0.88 | 0.84 | 0.69 | 0.92 |

### *Data analysis*

As in the analysis of the original (English) and of the German versions of the questionnaire, three different measures of internal consistency were used in order to evaluate the internal consistency of the French version of the Gold-MSI: Cronbach's alpha, McDonald's omega total (Zinbarg, Revelle, Yovel, & Li, 2005) and Guttman's lambda 6 (Guttman, 1945) (for the purpose of each coefficient, see chapter 1 in (Irwing, 2018). These tests were used for each subscales of the questionnaire, as well as for the general musical sophistication scale. The postulated five factors plus a general factor of the French Gold-MSI version were analysed trough a confirmatory factor analysis (CFA). Internal consistency analyses were carried out using the R software environment and the R package psych (Revelle, 2017). CFA was carried out using STAT 14 (StataCorp, 2015).

## Results

Table 1 provides the means, standard deviations and the three measures of internal consistency for the five subscales and for the general musical sophistication scale, compared to the original (English (Müllensiefen et al., 2014) and German (Schaal et al., 2014) versions. The three measures of internal consistency are high (from .80 to .97). The observed scores are close to the original (English) and German versions and indicate a strong internal consistency. In addition to these internal consistency scores, a confirmatory analysis of the five factors of the Gold-MSI shows a good structure index (Figure 1). The root-mean-square error of approximation (RMSEA) value is .063 and the standardised root-mean-square residual (SRMR) value is .066. The comparative fit indices (CFI) is .884.These values are close to those obtained for the original (English) and the German versions (see Table 2). Moreover, we analysed the correlations between the Gold-MSI subscales. The inter-factor correlation is from moderate to strong. Table 3 gives the results, compared to the German version. A graphical representation of the distributions of the individual sub-scales and the global scale is given in Figure 2. As for the German translation (Schaal et al.,2014), the distribution is close to normal, except for the distribution of the subscale 'music training' that tends to a bimodal distribution. This could probably be interpreted as a general normal distribution to which a large number of people without any music training is added.

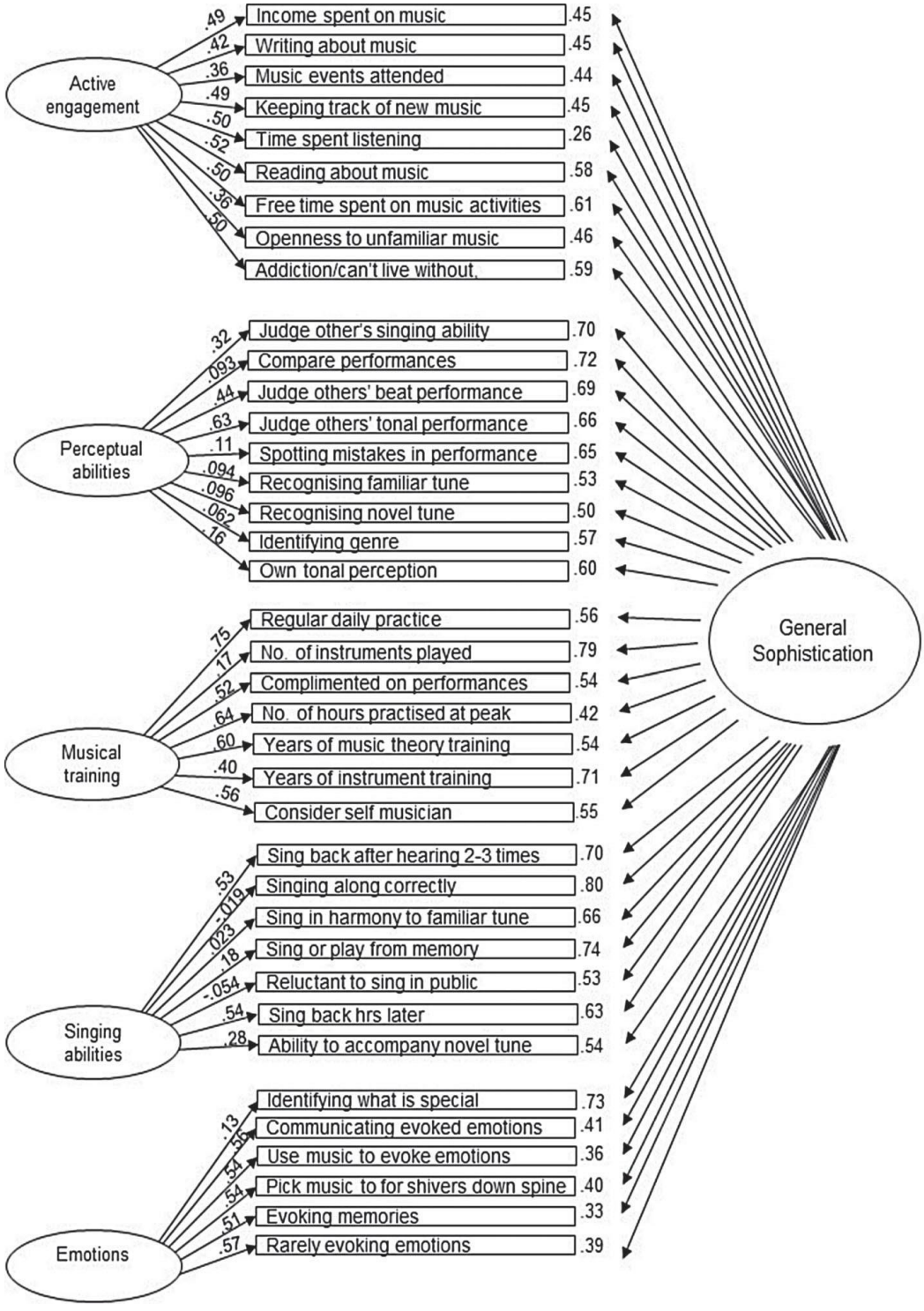



**Figure 1.** Factor structure with standardised parameters of the French version of the self-report inventory Gold-MSI as formalised by Müllensiefen et al. (2014).

**Table 2.** CFA values (RMSEA, SRMR and CFI) for the French, original (English) and German versions of the Gold-MSI.

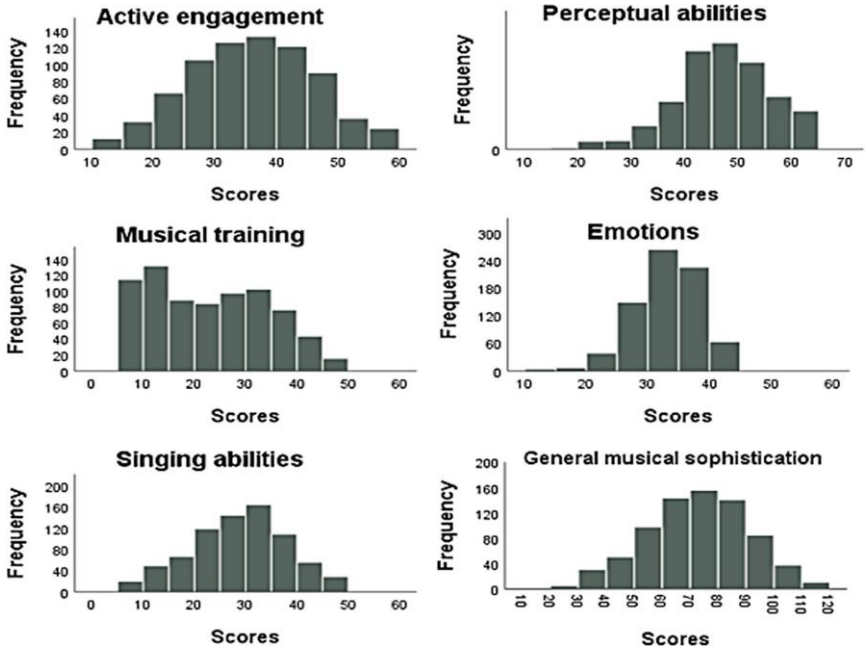
| | French version | Original version | German version |
|---|---|---|---|
| RMSEA | .063 | .060 | .060 |
| SRMR | .066 | .064 | .066 |
| CFI | .884 | .884 | .861 |

**Table 3.** Inter-factor correlations between the Gold-MSI subscales (Pearson).

| | F1 | F2 | F3 | F4 | F5 |
|---|---|---|---|---|---|
| F1 (Active engagement) | / | / | / | / | / |
| German version | / | / | / | / | / |
| F2 (Perceptual abilities) | 0.608*** | / | / | / | / |
| German version | 0.516*** | / | / | / | / |
| F3 (Musical training) | 0.458*** | 0.625*** | / | / | / |
| German version | 0.423*** | 0.634*** | | | |
| F4 (Emotions) | 0.674*** | 0.617*** | 0.339*** | / | / |
| German version | 0.612*** | 0.567*** | 0.371*** | | |
| F5 (Singing abilities) | 0.555*** | 0.756*** | 0.636*** | 0.492*** | / |
| German version | 0.472*** | 0.703*** | 0.608*** | 0.461*** | |

Note: French version: $N = 750$; German version: $N = 641$; ***$p < .001$.

**Figure 2.** Distribution of each subscale and of general musical sophistication scale.



## Application

The Gold-MSI can be used in different music-related studies, which require a quick way to test different facets of musicality of the participants. In this way, the original English version and the translated German version have already been used in different research domains, for example, in musicology (Floridou, Williamson, & Müllensiefen, 2012), in neurology (Farrugia, Jakubowski, Cusack, & Stewart, 2015) or in linguistics (Dawson, Tervaniemi, & Aalto, 2018; Kang & Williamson, 2013).

A validated French translation of the Gold-MSI was also needed, since several studies aim to test the musical facets of French speakers through a short questionnaire, such as the Gold-MSI. This has already been the case in a medical study evaluating the beneficial effects of rhythmic auditory cueing in Parkinson's disease: Cochen De Cock et al. (2018) tested the musicality of patients with Parkinson's disease using the Gold-MSI. Besides, Degrave (2017) used the Gold-MSI to test the musical facets of French speakers learning Dutch: based on literature about the link between musical abilities and foreign languages performance (Slevc & Miyake, 2006), Degrave (2017) observed a correlation between some musical facets of the learners (viz. music training and musical engagement) and word stress perception.

In the future, our translation, whose factor structure has been controlled, will offer a homogeneous and validated inventory for research in French-speaking regions. The questionnaire is adapted for French speakers of Belgium and in France. Use in regions of other varieties of French, such as Canada or Switzerland, is perfectly possible, perhaps after some vocabulary adaptations.

## Conclusion

The purpose of this study was to present the development of a French translation of the English version of the GoldMSI, to examine the internal consistency and to confirm the factor structure of the Gold-MSI in this French translation. First, a reliable translation procedure was followed to provide a proper translated version. Then, this version was submitted online ($N$ = 750). The results were analysed by different measures of internal consistency: Cronbach's alpha, McDonald's omega total (Zinbarg et al., 2005), Guttman's lambda 6 (Guttman, 1945) and with a CFA. Results reveal high levels of internal consistency for the individual subscales and the global scale of general musical sophistication. In addition, the data confirmed the underlying factor of the model based on the original (English) version and the German version of the Gold-MSI.

Therefore, the very good psychometric properties and internal consistency of the French version allow new perspectives for future research: the inventory, which is freely available in supplementary material, can contribute to research about musical skills and behaviour analyses in French speaking regions.

## Acknowledgments

The authors thank Prof. Dr Ph. Hiligsmann, Dr T. Fontenelle, Prof. Dr M.A. Lefer, Ruben Tibi, Samantha Laporte, Blair Kenneth Ellis, Françoise Persoons, Gaetano Termine and Géraldine De Baets for their contributions to the translation of the questionnaire. The authors are also immensely grateful to Dr Daniel Müllensiefen for his constructive comments on this research project. The authors would also like to thank the two anonymous reviewers for their valuable comments and suggestions to improve the quality of the paper.

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