Evidence of cross-cultural consistency in a multidimensional model for the severity of misophonia and trigger burden: psychometric conclusions emerging from the Mandarin version of the Selective Sound Sensitivity Syndrome Scale (S-Five).

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Keywords: misophonia, S-five, China, Mandarin

Abstract

This study investigates whether the S-Five multidimensional model for the misophonic experience identified in samples of English-speaking individuals, were valid in participants from an Asian population. The five dimensions (internalising appraisals, *externalising* appraisals, perceived *threat* and avoidance behaviour, outbursts, and impact on functioning) were replicated in the responses of 256 Chinese individuals, indicating the cross-cultural uniformity of the experience of misophonia as captured by the S-Five. That is, current results point to the stability of the manifestation of misophonia across cultures, seen here for the first time in the literature.

By design, the S-Five items were developed to reflect sound sensitivities in a manner that is not specific or matching to individuals of a certain age, gender, ethnicity, nationality, socio-economic status, and educational level. Testimonial to this fact is not only the replication of the five factors, but also the replication of the evidence towards satisfactory psychometric properties (reliability and validity) of the scale. The S-Five is a psychometrically robust tool to be used to Mandarin speaking samples.

1 Introduction

Misophonia is characterised by disproportionate emotional responses to everyday sounds (Jastreboff and Jastreboff, 2001) and, by consensus, is recognised as a disorder (Swedo et al., 2021). Trigger sounds have been identified to broadly cluster into the three groups of eating sounds, nose/throat sounds and environmental sounds (Vitoratou et al., 2021a), with decreased sound tolerance to eating sounds appearing to be at the centre of the disorder (Vitoratou et al., 2021a; Jager et al., 2020; Swedo et al., 2021). Trigger sounds have been identified to broadly cluster into the three groups of eating sounds, nose/throat sounds and environmental sounds (Vitoratou et al., 2021a), with decreased sound tolerance to eating sounds appearing to be at the centre of the disorder (Vitoratou et al., 2021a; Jager et al., 2020), Reactions and responses to sounds experienced in misophonia are varied and include emotional, physiological, and behavioural responses. It has been commonly reported that primary feelings such as anger and disgust are experienced (Edelstein et al., 2013; Jager et al., 2020; Kumar et al., 2017; Schröder et al., 2013), alongside unpleasant physiological changes, including an increased heart rate, muscle tension, pain and sweating (Edelstein et al., 2013; Johnson et al., 2013). Misophonia can have a significant impact on a person's social and occupational functioning (Rouw and Erfanian, 2018; Schröder et al., 2013). Avoidance behaviours, social withdrawal (Alekri and Al Saif, 2019; Hocaoglu, 2018; Johnson et al., 2013; Muller et al., 2018; Schneider and Arch, 2015; Singer, 2018) and, for some, aggression (Alekri and Al Saif, 2019; Hocaoglu, 2018; Reid et al., 2016; Jager et al., 2020) are also frequently reported.

There is currently limited literature available on misophonia outside of western cultures. Two studies have evaluated the symptoms and clinical correlates of misophonia within Asia. One study investigated the disorder within Chinese undergraduate students (Zhou et al., 2017) and another within Singaporean psychiatric patients (Quek et al., 2018). They found that 6% of respondents reported clinically significant levels of misophonia, as rated by the Misophonia Questionnaire (MQ; Wu et al., 2014)One study investigated the disorder within Chinese undergraduate students (Zhou et al., 2017) and another within Singaporean psychiatric patients (Quek et al., 2018). They found that 6% of respondents reported clinically significant levels of misophonia, as rated by the Misophonia Questionnaire (MQ; Wu et al., 2014), with 17% endorsing a sensitivity (selecting “often” or “always” on the rating scale) to eating sounds, 18% to nasal sounds and 13% to environmental sounds (Zhou et al., 2017). However, these studies did not report on a full psychometric analysis of the MQ, and the tool does not capture the complexities of the disorder identified by the S-Five's multidimensional severity scale and the symptom checklist.

A large study initiated in English-speaking individuals who identify with the condition led to the development of the S-Five (Vitoratou et al., 2021b). Four waves of sampling, more than 80 initial items and several thousand of responses, concluded with a 25-item scale which reflects five dimensions of the misophonic experience: emotional *threat*, *internalising* and *externalising* appraisals, *outbursts* and *impact*, with excellent psychometric properties. The factor structure was subsequently replicated in a large sample, representative of the UK population (Vitoratou et al., 2022). The S-Five has a supplementary trigger checklist, capturing the nature and intensity of the emotional response to sounds (Vitoratou et al., 2022; Vitoratou et al., 2021b), in a flexible format which allows modifications of the trigger sounds list and the response types, to accommodate advances made in the literature of misophonia research.

The current study aimed to evaluate the five-factor model of the experience of misophonia in an Asian sample. For that purpose, we used the adaptation into Mandarin of the S-Five, using the responses of Chinese individuals. Along with the cross-cultural robustness of the five dimensions, we evaluated the measurement invariance of the tool. A thorough examination of the reliability (consistency and stability) is presented as well as evidence towards the concurrent validity of the measurement and the correlates of misophonia. The trigger burden, as measured by the supplementary checklist, is also thoroughly investigated.

2 Materials and Methods

2.1 Recruitment

Inclusion criteria included being aged 18 years and over and fluent in Mandarin. Exclusion criteria were the presence of a severe learning or intellectual disability. A participants' information sheet was available at the beginning of the survey and consent was granted before completing the questionnaires online (ethics approval reference RESCM-19/20-11826).

Recruitment was done using a snowball sampling technique via social media in China (Wechat Moment, Weibo & Douban), as well as via Twitter, Reddit, and the Fortnightly Recruitment Circular at King's College London. Data collection took part between January and September 2021, including the retest study. Retest data were collected between two and four weeks of an individual's first assessment. Participants who finished the S-Five 25-item measurement scale were offered a chance to win an e-voucher.

2.2 Measures

The online survey included demographic questions, such as age, gender, ethnicity, education level, occupation, country of birth, and countries of residence in both past and present). The survey also asked whether the individual had any formal diagnoses on mental health conditions (including mood, anxiety, psychotic, personality, trauma, eating and substance abuse disorders), audiological conditions (e.g., tinnitus) and neurodevelopmental conditions (e.g. autism). They were asked whether they were aware of the term misophonia and whether they identified as having misophonia. The following self-report questionnaires were also included.

2.2.1 Selective Sound Sensitivity Syndrome Scale (S-Five; Vitoratou et al., 2021b)

The S-Five is a 25-item measurement scale which assess the severity of misophonia. Each item is rated on an 11-point scale from 0 (not at all true) to 10 (completely true). The items are presented in the Appendix in both English and Mandarin.

The S-Five trigger checklist (S-Five-T; see Appendix for the English and Mandarin versions) was designed to capture the nature and intensity of a range of trigger sounds. The S-Five-T is flexible by design, in that it allows for adjustment of the number of triggers used. The current study used the 37 trigger sounds presented in the original validation study for the S-Five (Vitoratou et al., 2021b). The original options for emotional reactions were also used (no feeling, irritation, distress, disgust, anger, panic, other feeling: negative, and other feeling: positive). Respondents select their main emotional reaction to each trigger item and then rate the intensity (henceforth trigger intensity) of that reaction, from 0 (doesn't bother me at all) to 10 (unbearable/causes suffering). Four indices can be computed: 1) the trigger count (TC), which is the total number of triggers endorsed (i.e. where a negative reaction is selected) by a respondent, 2) the reaction count (RC), the number of times each particular reaction type is

endorsed, counted across triggers in a single respondent, 3) the frequency/intensity of reactions score (FIRS) is the total value of the intensity items of all endorsed triggers, and 4) the relative intensity of reactions score (RIRS) which gives an estimate of the intensity of reactions to triggers, relative to the number of triggers reported. It is computed by dividing the FIRS index by the TC index.

2.2.2 Amsterdam Misophonia Scale (A-MISO-S; Schröder et al., 2013)

The A-MISO-S is a 6-item measure of misophonia adapted from a clinician-rated tool, the Yale-Brown Obsessive-Compulsive Scale (YBOCS; Goodman et al., 1989). While it was designed as a clinician-rated tool, for the purposes of this study we administered it as a self-report measurement tool. The questions ask about misophonia in relation time occupied, impact on functioning, level of distress, resistance of sounds, perceived control, and avoidance behaviour.

2.2.3 Misophonia Questionnaire (MQ; Wu et al., 2014)

The MQ is a three-part self-report measure for misophonia. The misophonia symptoms scale (MSYS) ask respondents to compare their sensitivity to specific triggers with others' responses and the misophonia emotions and behaviours scale (MEBS) measures an individual's responses to trigger sounds. The two subscales are combined to create the MQ total score. The misophonia severity scale is a single item question, adapted from the NIMH Global Obsessive-Compulsive Scale (NIMH GOCS; Murphy et al., 1982), asking individuals to rate the severity of their sound sensitivity on a scale from 1 (minimal) to 15 (very severe), with a score greater than or equal to 7 said to indicate clinically significant symptoms.

2.2.4 Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001)

The PHQ-9 was used to measure symptoms of depression. Items are rated on a 4-point ordinal scale, with a total score range of 0 to 27. We used a Mandarin version that has been validated in Chinese populations (Yeung et al., 2008).

2.2.5 General Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006)

The GAD-7 measures severity of anxiety symptoms. Each item is rated on a 4-point ordinal scale, with a total score ranging from 0 to 21. We used a Mandarin version that has been validated within Chinese populations (He et al., 2010).

2.3 Translation

The S-Five, developed in English, was translated into Mandarin for use in the Chinese population and then back-translated into English. Two authors (JW and QW), fluent in Mandarin, separately translated the S-Five, and the two versions were compared and revised accordingly. The co-adjusted version was translated back to English by a native Mandarin speaker, fluent in English. The back-translated version of the S-Five was compared to the original English version of the S-Five and a second co-adjusted version was produced. This version was again translated to English by the native Mandarin speaker. There were no significant differences between the final version of the translated S-Five and the original S-Five. Using the same method, the A-MISO-S and the MQ were translated to Mandarin for use in this study (please contact first author for the translated versions).

2.4 Statistical Analysis

The latent structure of the S-Five was evaluated using exploratory factor analysis. The suitability of the data for use in factor analysis was first assessed using the anti-image correlations and the corresponding Kaiser-Meyer-Olkin (KMO) test for sampling adequacy (Kaiser, 1960; Kaiser and Rice, 1974) and Barlett's (1951) test of sphericity.

The factor extraction method implemented was maximum likelihood with robust standard errors in Mplus (MLR; Muthen and Muthén, 1998-2017) due to skewness in the data, and the factors were allowed to correlate using the Oblimin rotation. Two criteria, based upon eigenvalues, were followed for identifying the number of factors to retain. First, the Guttman-Kaiser criterion (Guttman, 1954; Kaiser, 1960) which suggests retaining about as many factors as the number of eigenvalues above 1 (factor variances) in the sample covariance matrix. Second, the parallel analysis criterion (Horn, 1965) which suggests that the number of eigenvalues that are larger in current data than in simulated data generated from 50 sets of random data with the same number of observations and number of factors, identifies the number of factors to retain. The eigenvalues computed using the sample correlation matrix and the parallel analysis simulated data are presented graphically using Cattell's (1966) scree plot.

Absolute and relative goodness of fit indices were used to evaluate the fit of the EFA suggested models. The indices reported and the criteria followed were the relative chi-square (relative $\chi 2$: values close to 2 suggest a close fit; Hoelter, 1983), the Root Mean Square Error of Approximation (RMSEA: values <.06 are required for close fit; Hu and Bentler, 1999), the Tucker-Lewis Index (TLI: values >.95 suggest close fit; Bentler and Bonett, 1980), the Comparative Fit Index (CFI: values >.95 are required for a close fit; Hu and Bentler, 1999) and the Standardized Root Mean Residual (SRMR: values <.08 are needed for a good fit; Hooper et al., 2008). Model selection criteria were also considered, namely Akaike's Information Criteria (AIC; Akaike, 1974) and Bayesian Information Criteria (BIC; Schwarz, 1978) were reported, for which a lower value indicates a better model.

The multiple indicator multiple causes model (MIMIC; Joreskog and Goldberger, 1975; Muthén, 1979) was used to assess measurement invariance in relation to gender and age. An item was considered measurement non-invariant when the effect of the exogenous variable (age or gender) on the item directly (hereafter direct effect or de) was statistically significant.

The internal consistency of S-Five factors was evaluated by Cronbach's (1951) alpha and McDonald's (1999) Omega, for which values of α and ω >0.7 suggest satisfactory internal consistency, the alpha if item deleted and the item-total correlations (ITC), for which values between 0.3 and 0.8 were considered acceptable (Nunnally and Bernstein, 1994).

The test re-test reliability was evaluated, at item and factor level, by the intraclass correlations coefficient (ICC; Shrout and Fleiss, 1979) and the Psi Non-Parametric Concordance Coefficient (Psi; Kuiper and Hoogenboezem, 2019). For test-retest reliability, values above 0.75 for both coefficients are expected, according to Koo and Li (2016).

Convergent, concurrent validity was established through correlating the S-Five with the two other measurements scales for misophonia. Hypothesis testing was carried out, with respect to linear relationships between the S-Five and age, and gender differences in S-Five scores.

The statistical software of Stata 16 (StataCorp, 2019), Mplus 8 (Muthen and Muthén, 1998-2017) and R (R Core Team, 2017) were used to carry out the analysis.

3 Results

3.1 Descriptive indices

The sample (n=256) consisted of 186 females (71%) and 66 males (25%), with a mean age of 25 years (sd = 6.5) which did not differ across genders ($p>0.05$). The majority of the sample, 154 people (60%), had completed an undergraduate degree and 161 (63%) were students at the time of completing the study. 88% of participants were Han, the rest were from minority ethnic groups, including Uygur, Yi, Manchu, Tujia, Zhuang, Bai and Mongolian.

With respect to reported mental health and audiological conditions, the most often reported were depression (5%), social anxiety (4%) and tinnitus (4%). In terms of misophonia, 85 participants (33%) stated they were aware of the term misophonia and 41 (16%) identified as having misophonia. Autonomous sensory meridian response (ASMR) was experienced by 42% of the sample and synaesthesia by 25% (28% were unsure).

3.2 S-Five statements

3.2.1 Statement responses

The descriptive indices of the 25 S-Five statements are presented in Table 1. The items more widely endorsed (higher mean/median) were those related to the *externalising* and *threat* factors. None of the items correlated significantly with age but there were score differences with respect to gender (Table 1). Interestingly, none of the items referring to the *externalising* and *threat* items factors differed across genders, while males scored significantly higher than females in almost all other items.

3.2.2 Dimensionality and measurement invariance

First, we established that the sample correlation matrix suggested the existence of latent vectors. The anti-image correlations were above 0.88 for all statements, the KMO was 0.94, and Bartlett's test was significant (χ^2=13773,1, df=300, $p<0.001$). We therefore proceeded with exploratory factor analysis.

The sample correlation matrix emerged five eigenvalues above 1 (12.1, 3.2, 1.5, 1.3, and 1.1) and hence the Kaiser-Guttman criterion points towards a five-factor structure, explaining 73% of the total variance. Parallel analysis, on the other hand, indicated that three factors should be extracted, as is depicted in the scree plot in Figure 1. The goodness of fit examination suggested that the three-factor model however did not fit the data adequately (rel χ^2=4.3; RMSEA=0.1 with 90% (0.107,0.122), TLI=0.81, CFI=0.86, SRMR=0.051, AIC: 27491.6, BIC: 27923.6). The goodness of fit was improved for the four-factor model (rel χ^2=3.02; RMSEA=0.09 with 90% (0.081,0.197), TLI=0.89, CFI=0.92, SRMR=0.036, AIC: 27169.3, BIC: 27679.3), but close fit was only achieved in the 5 factor models (rel χ^2=2.01; RMSEA=0.063 with 90% (0.054,0.072), TLI=0.94, CFI=0.97, SRMR=0.020, AIC: 26960.8, BIC: 27545.1). Increasing the factors to six led to a sixth factor with no loading larger than 0.3 (overfitting). Therefore, the five-factor solution was accepted in our data. The five factor solution loadings are presented in Table 2 and the assignment of the items to factors coincides completely with the original model found by Vitoratou et al. (2021b).

We proceeded with the evaluation of the measurement invariance of the tool with respect to gender and age using the MIMIC model. Adjusted for gender and the five latent dimensions, only one item was found to be non-invariant with respect to age, namely item I02 ('If I can't get away from certain noises, I am afraid I might panic or feel like I'll explode'), being less endorsed on average as age increases (de=-0.04, p=0.027). The direct effect was however

very small and can be considered negligible. With respect to gender, men tend to endorse more often the same item (I02) compared to women of the same age and latent positions (de=-0.65, p-value=0.015). Finally, women tend to endorse more the item I08 ('the way I react to certain noises makes me feel like I must be an unlikable person deep down') compared to men of the same aga and latent positions (de= 0.55, p-value=0.0190.) In all cases the effects were less than half a unit on an 11-unit rating scale, and as only two effects were identified in the case of gender and one in the case of age, it is reasonable to conclude that the S-Five scores are effectively measurement invariant with respect to those factors and therefore the assessment of structural invariance (factor score differences) is justified.

Figure 1: Scree plot (including parallel analysis data)

3.3 S-Five scores: reliability and validity

None of the S-Five factor scores were correlated with age in our sample (Table 2). While there were no gender differences in the scores of the *externalising* and *threat* factors, in all other factors men scored significantly higher than women.

With respect to internal consistency, alpha and omega were satisfactory within all factors (0.88 or higher; Table 2), while test-retest reliability was also satisfactory with ICC being larger than 0.86 for all S-Five scores.

Table 3 presents the correlations of the S-Five factor scores and total score with several measurement scales, namely, two misophonia scales (MQ and A-MISO-S), PHQ-9 and GAD-7. Evidence of convergent validity is demonstrated by moderately strong correlations between the S-Five total score and the MQ and A-MISO-R. With respect to the PHQ-9 and GAD-7, low to moderate positive correlations with the S-Five factors and total score were found. Intercorrelations between the S-Five factors ranged from 0.3 to 0.7, as expected moderate to strong correlations were identified (Table 3).

3.3.1 S-Five-T scores: reliability and validity

The S-Five-T items and the scoring instructions are presented in the Appendix (English and Mandarin). The norms of the S-Five-T are presented in Table 4.

3.3.2 Reaction counts

On average, participants reported 20 out of 37 trigger sounds caused "no feeling" (Table 4). Irritation was the next highest reported reaction, with an average of 5 trigger sounds reported as causing this reaction. Irritation and disgust had small, significant positive correlations with age. In terms of gender, women scored significantly higher on the RC for irritation, while men scored higher on anger.

With respect to the RC scores, the intercorrelations varied between 0.2 and 0.7 (Table 5). All correlations were positive except for the 'no feeling' count, for which all correlations with other variables were negative. Interestingly, *disgust* correlated only with *no feeling* and *irritation*. *Distress* had low correlations with all other RCs. The highest correlations emerged between *no feeling*, *anger* and *panic*. The total number of triggers reported was highly

correlated with disgust and emerged similar coefficients with FIRS. RIRS on the contrary did not correlate with *disgust*, *anger* or *panic*.

The RC for *no feeling*, *irritation, distress* and *anger*, and total count had moderate correlations with the A-MISO-S and MQ total score. The PHQ-9 and the GAD-7 were significantly correlated with the RC *distress* and *panic* and TC, while both were negatively correlated with the reaction count of *no feeling*.

3.3.3 Intensity

Table 6 presents the norms for the 37 intensity items. The sounds which cause reactions with the higher intensity were lip smacking, baby crying, and repetitive sounds of barking or engine. The sounds with the least intensity in the reaction were certain words and accents, yawning, and normal eating. Three items had low positive correlations with age (repetitive barking, loud chewing and teeth sucking), while normal breathing had a low negative correlation with age. For one item, coughing, men scored higher than woman.

4 Discussion

The purpose of this study was to evaluate the psychometric properties of the Mandarin version of the S-Five questionnaire. This was, to our knowledge, the first study to validate a self-reported multidimensional questionnaire for misophonia within this population. The psychometric analysis conducted concluded that the original five factor structure found in the general UK population (Vitoratou et al., 2022) and a large sample of English-speaking individuals who identify with the condition (Vitoratou et al., 2021b) was replicated for Mandarin version. The scale was also found to be reliable (both in terms of internal consistency of each factor and stability in time), measurement invariant with respect to age and gender, and evidence of its validity emerged.

The original five dimensions (internalising appraisals, externalising appraisals, perceived emotional threat, outbursts, and impact on functioning) were fully and accurately reproduced in a sample derived from a population that not only speaks a different language but also belongs to an Asian culture. This highlights the consistency of the multidimensional experience of misophonia as captured by the S-Five. The S-Five items were designed to reflect sound sensitivities in a manner that is not specific or more matching to individuals of a certain age, gender, ethnicity, nationality socio-economic status and educational level. In this study, we see evidence that indeed the S-Five is robust cross culturally. Most importantly, the reproduction of the five factors in a Chinese sample in Mandarin, points to the stability of the manifestation of misophonia across cultures, seen here for the first time in the literature.

The convergent validity of the S-Five was established through correlating the factors of the scale and total score with previously development measures of misophonia. The MQ and the A-MISO-S were significantly, positively and moderative correlated with the five factors of the S-Five and with the total score. Spearman's rho coefficients were comparable to those found in previous S-Five validation studies (Vitoratou et al., 2021b; Vitoratou et al., 2022).

This study reported that the sounds of repetitive barking, a baby crying, snoring, repetitive coughing, repetitive engine noises and lip-smacking were highly rated among Chinese participants. While eating and nasal sounds have been more frequently rated as trigger sources in both Western and Eastern populations (Zhou et al., 2017; Jager et al., 2020). This may be explainable due to the specific and inclusive nature of the S-Five-T.

The S-Five also importantly highlights that the reactions to such sounds may be influenced by gender. Female participants scored significantly higher on the RC irritation, while men scored higher on the RC anger. With regards to the S-Five, male respondents scored significantly higher on the internalising appraisals, impact on functioning and outburst factors, as well as the total score. These differences reflect previous findings that gender impacts upon the misophonic experience (Vitoratou et al., 2021a).

Further support for previous findings comes from the correlated relationship between the S-Five and co-occurring diagnoses. Misophonic symptoms and severity of symptoms of misophonia were found to significantly correlated with severity of anxiety and depression. Zhou et al. (2017) found that in a sample of Chinese college students, misophonic symptoms and severity of misophonic symptoms were correlated with anxiety. Similarly, Quek et al. (2018) found a positive association between the severity of anxiety and the severity of misophonic symptoms in Singaporean psychiatric patients.

There were several limitations that arose in this study. First, the sample collected cannot be considered a representative sample of the Chinese population. This limits the use of the findings in being unable to compute and evaluate populations norms for misophonia. A further limitation of the study was the self-reporting of co-occurring diagnoses, which may not be clinically accurate. Future studies, should, therefore, aim to sample a representative population with clinical information collected via formal means, such as clinical interviews.

The present study evaluated a translated self-report measure for misophonia, namely the S-Five, within a Chinese sample. This is the first study, to our knowledge, to assess a self-report scale for misophonia, with respect to its psychometric properties. The S-Five was found to have comparable reliability and validity with the replication of a five-factor structure of meaningful content. The study suggests that the S-Five is a reliable and valid tool for measuring misophonic and should be expanded to the Chinese general population.

5 Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

6 Author Contributions

SV provided supervision to the project, completed the analysis and contributed to the manuscript. JW carried out data collection and translation of the scales and contributed to the introduction and discussion sections of the manuscript. CH contributed to the data analysis and the manuscript. QW carried out data collection and translation of the scales. SP contributed to the data analysis. JG provided supervision to the project and contributed to the manuscript.

7 Acknowledgements

SV and CH were funded or partially funded by the Biomedical Research Centre for Mental Health at South London and Maudsley NHS Foundation Trust and King's College London. This research was funded in whole, or in part, by the Wellcome Trust [JG; Grant number 102176/B/13/Z]. The views expressed are those of the author(s) and not necessarily those of the NHS, The Wellcome Trust, the NIHR or the Department of Health and Social Care.

We thank Ziyu Zhang for their assistance with translating the S-Five to Mandarin.

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9 Appendix

499 **Appendix A1**. The S-Five in English, with scoring information

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A. The S-Five: Experience scale (S-Five -E)
Please read each statement carefully and base your answer on how true they feel to you based on your current thoughts, experiences, and reactions*: 0-not at all true to 10-completely true*
Externalising
People should not make certain sounds, even if they do not know about others' sensitivities
I get angry at other people because of how disrespectful they are with the noises they make
People should do everything they can to avoid making noises that might bother others
I react strongly to certain sounds because I cannot stand how selfish, thoughtless or bad-mannered people can be
Certain sounds are just bad manners, and it is not strange to feel intense anger about that
Internalising
The way I react to certain sounds makes me wonder whether deep inside I am just a bad person
The way I react to certain noises makes me feel like I must be an unlikable person deep down
I respect myself less because of my responses to certain sounds
I feel like I must be a very angry person inside because of the way I react to certain sounds
I dislike myself in the moments of my reactions to sounds
Impact
My job opportunities are limited because of my reaction to certain noises
I do not meet friends as often as I would like to because of the noises they make
There are places I would like to go but do not, because I am too worried about how the noises will impact me
I can see future where I cannot do everyday things because of my reactions to noises
The way I feel/react to certain sounds will eventually isolate me and prevent me from doing everyday things

Outburst
I can get so angry at certain noises that I get physically aggressive towards people to make them stop
Sometimes I get so distressed by noises that I use violence to try and make it stop
Some sounds are so unbearable that I will shout at people to make them stop
If people make certain sounds that I cannot bear, I become verbally aggressive
I am afraid I will do something aggressive or violent because I cannot stand the noise someone is making
Threat
I feel trapped if I cannot get away from certain noises
I feel anxious if I cannot avoid listening to certain sounds
If I cannot get away from certain noises, I am afraid I might panic or feel like I will explode
If I cannot avoid certain sounds, I feel helpless
I can experience distress as the result of some noises
All items are rated in a 0-10 ordinal scale. Please randomise items before administering

Scoring:

In the S-Five-E, each item is rated in a 0-10 ordinal scale. Please add the responses of the corresponding items for each factor to compute the factor score /and all items for the total S-Five score. The factor scores range between 0 and 50, total score is between 0 and 250.

B. The S-Five-T trigger checklist
Trigger reaction items: Thinking about the past few weeks, what is the main feeling this sound* has caused you? *no feeling, irritation, distress, disgust, anger, panic, other feeling: negative, other feeling: positive, other: physiological reaction*
Trigger intensity items: Thinking about the past few weeks, please rate the intensity of your reaction to this sound* when made by another person or object *(from 0: doesn't bother me at all to 10: unbearable/causes suffering)*

*List of triggers currently included in the S-Five-t: Normal eating sounds, Certain letter sounds, Mushy foods being eaten, Sound of clipping nails, Swallowing, Keyboard tapping, Lip smacking, Normal breathing, Repetitive engine noises, Loud/unusual breathing, Mobile phone sounds, Repetitive coughing, Humming noise, Repetitive sniffing, Snoring, Certain accents, Whistling sound, Sound of tapping, Rustling, Chewing gum, Footsteps, Hiccups, Slurping, Cutlery noises, Sneezing, Certain words, Kissing, Joint cracking, Muffled sounds, Throat clearing, Baby crying, Repetitive barking, Loud chewing, Clock ticking, Crunching eating sounds, Teeth sucking, Yawning.

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506 The S-Five-t is made in a flexible format to allow researchers and treatment providers to
507 customise the checklist according to the needs of their study/client. That is, its format
508 facilitates adding or removing triggers as research findings progress or when treatment plans
509 are being customised. More importantly, the format of the items allows to add or remove
510 reactions.

511 Here we use 37 triggers and 9 reactions (no feeling to psychological reaction). We derive four
512 useful summary indices from the S-Five-t checklist, according to the definitions and scoring
513 guidelines described in Vitoratou et al. (2021b).

514 **Scoring:**

515 a) Trigger Count (TC) for each participant over all triggers: the index is computed by
516 counting the number of non-zero responses in the trigger intensity items.

517 b) Reaction Count (RC) for each trigger over all participants: the index is computed for each
518 reaction type separately, by counting over all participants the times a certain reaction was
519 selected.

520 c) Frequency/Intensity of Reactions Score (FIRS): the index is computed by counting the
521 trigger intensity items.

522 d) Relative Intensity of Reactions Score (RIRS): the index is computed by dividing the FIRS
523 index by the trigger count TC, to derive an estimation of the intensity of the responses to
524 triggers, relative to the number of triggers reported.

525 The scoring guide and the programming codes (SPSS, R project, Stata) to obtain all factors
526 and indices are freely available upon request made to Silia Vitoratou
527 (silia.vitoratou@kcl.ac.uk).

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Appendix A2. The S-Five in Mandarin, with scoring information

Translated by: Jingxin Wang, Qiaochu Wang

A. S-5：经历量表（S-5-E）
请仔细阅读以下陈述，并根据您目前的想法，经历和反应，来判断这些陈述在多大程度上符合您的状况（0:一点也不符合；10:非常符合）
外在反应
人们不应该弄出某些声音，即使他们不知道别人对这些声音的敏感程度
我会对那些弄出噪音的人生气，因为他们这种做法很不尊重他人
人们应该尽全力去避免制造出打扰他人的声音
对于一些声音我反应会很强烈, **因**为我无法忍受制造这些声音的人有多么自私,**不**顾及他人以及没有礼貌
有的人弄出一些特定的声音是无理的行为，我对此感到强烈愤怒并不奇怪
内在反应
我对某些特定声音的反应让我怀疑我内心深处是不是个坏人
我对某些特定噪音的反应放我觉得我一定是一个不讨人喜欢的人
我的自尊会因为自己对某些声音的反应而减少
我对某些声音的反应让我觉得我本身一定是一个十分易怒的人
我在对某些声音反应的瞬间讨厌自己
日常影响

我对某些噪音反应限制了我的工作机会
我想经常和我的朋友们见面，但是我做不到，因为他们总是制造噪音
由于担心某些噪音对我的影响，我没办法去我去想去的地方
由于我对噪音的反应，我将无法做日常的事情
总有一天，我对某些声音的反应会让我**孤立，使我无法做日常的事情**
情绪爆发
我会对某些特定的噪音非常生气，以至于我会对制造这些声音的人进行身体攻击，让他们停下来
有的时候噪音会让我十分痛苦，所以我会尝试用暴力来使它停下
为了阻止有些让我忍无可忍的声音，我会向他人大吼
如果人们制造出一些让我无法忍受的声音，我会在语言上变得有攻击性
我害怕我会因为受不了其他人发出的噪音而做出有攻击性或者暴力的事情
受到威胁
如果我不能摆脱某些噪音，我会觉得我被困住了
如果我不能避免听到某些声音，我会觉得焦虑
如果我不能逃避某些声音，我怕我会感到恐慌或者要爆发
如果我不能避免某种声音，我会觉得无助
某些噪音会让我觉得痛苦
所有陈述都按照 0-10 的顺序计分。请在使用前随机打乱陈述。

计分：

每一个单项记分 0-10 分

因素得分和总分：请将每个因素对应的单项的得分相加以计算每个因素的得分；将所有单项相加来计算 S-5 的总分。每个因素有五个对应单项，所以这些得分可以直接比较。

得分范围：每个因素的得分范围是 0-50，总分范围是 0-250。

B.S-5: **触**发音与反应量表（S-Five-t）
想一想在过去的几周里，这个声音主要带给您怎样**的感**觉? ***没有感****觉, 恼火, **痛苦**, 恶心, 愤怒, **恐慌**, **其他消极的感**觉, **其他良好的感**觉*
请您评估一下在过去的几周里，当别人或者某些物体发出这种声音时，您的反应程度 （0:**并不感到困**扰；10:**无法忍受/感到痛苦**
S-5-T **目前包括的敏感声音：吃东西的声音，某些拼音字母的读音，吃糊状的食物的声音（例如布丁，慕斯或者是粥），剪指甲的声音，吞咽的声音，打字的声音，咂吧嘴的声音，平时呼吸的声音，重复的引擎噪音，大声的/**不正常的呼吸声（鼻塞的声音，喘粗气），手机打字的声音或提示音，重复的咳嗽声，机器**发出的嗡嗡声，重复用力吸鼻子的声音，打鼾的声音，某些特定的口音，吹口哨的声音，敲打东西的声音，塑料或纸的沙沙声，大声嚼口香糖的声音，脚步声，打嗝，吃东西或喝东西发出的呼哧声，使用餐具产生的噪音，打喷嚏的声音，某些字的读音，亲吻的声音，关节发**出的响声，透**过墙壁，天花板，耳机传来的含糊的声音，清嗓子的声音，婴儿啼哭的声音，重复的犬吠声，大声咀嚼食物的声音，表走针的声音，吃松脆食物的声音 (**吃苹果，胡**萝卜，薯片或其他脆的食物的声音)，**吸牙**缝的声音，打哈欠的声音*

S-Five-t (敏感声音与反应量表)

S-Five-t 采用了灵活的格式，允许研究人员和治疗机构根据他们的研究/客户的需要定制检查表。也就是说，它的格式便于在研究结果进展时或在定制治疗计划时增加或删除触发因素。更重要的是，项目的格式允许添加或删除反应。

在这里，我们使用 37 个诱因（敏感声音）和 9 个反应（对心理反应没有感觉）。根据 Vitoratou 等人（2021b）中描述的定义和评分准则，我们从 S-Five-t 检查表中得出四个有用的总结指数

a) 敏感声音数量（TC）：该指数是通过计算触发敏感声音中的非零响应数量来计算的。

b) 每一个情绪的情绪反应得分（RC）：通过计算所有参与者选择某种反应的次数，对每种反应类型分别计算指数。

c)反应频率/强度得分（FIRS 指数）：该指数是通过计算对敏感声音的反应强度来计算的。

d)敏感声音相对强度 （RIRS 指数）：该指数的计算方法是用 FIRS 指数除以 TC，以得出相对于报告的敏感声音数量而言，对敏感声音反应强度的估计

评分指南和获得所有因素和指数的编程代码（SPSS、R 项目、Stata）可向 Silia Vitoratou 免费索取 (silia.vitoratou@kcl.ac.uk)。

Table 1

Descriptive indices, associations with age and gender, factor analysis loadings to factors, and reliability indices of the 25 S-Five items (N=225)

S-Five-E statements per factor	mean (sd)	median (Q1-Q3)	mode (min-max)	Age rho (p)	Gender difference mean (se)‡	loadings EFA	Psi (95% CI)	ICC
Externalising								
I06 Others avoid noises	7.0 (2.9)	8 (6-10)	10 (0-10)	-0.06 (0.369)	0.35 (0.40)	0.71	0.77 (0.70,1)	0.85
I13 Others not make sounds	5.7 (3.1)	6 (3-8)	6 (0-10)	-0.04 (0.547)	0.54 (0.44)	0.69	0.80 (0.72,1)	0.86
I16 Others selfish	5.5 (3.0)	6 (3-8)	7 (0-10)	0.06 (0.373)	0.81 (0.44)	0.81	0.83 (0.76,1)	0.87
I21 Others bad manners	5.4 (3.0)	6 (3-8)	6 (0-10)	-0.01 (0.912)	0.77 (0.42)	0.79	0.72 (0.65,1)	0.83
I25 Others disrespectful	6.0 (3.0)	7 (4-8)	7 (0-10)	-0.10 (0.132)	0.84 (0.42)	0.79	0.79 (0.71,1)	0.85
Internalising								
I05 Respect myself less	2.7 (2.9)	1 (0-5)	0 (0-10)	0.03 (0.659)	**1.33 (0.41)	0.78	0.81 (0.75,1)	0.86
I08 Unlikeable person	2.9 (3.0)	2 (0-5)	0 (0-10)	0.1 (0.113)	**1.70 (0.42)	0.78	0.84 (0.79,1)	0.87
I12 Angry person inside	3.5 (3.0)	3 (1-6)	0 (0-10)	0.02 (0.719)	0.63 (0.43)	+0.58	0.85 (0.79,1)	0.88
I18 Bad person inside	2.7 (2.8)	2 (0-5)	0 (0-10)	0.05 (0.465)	**1.31 (0.40)	0.80	0.78 (0.70,1)	0.85
I19 Dislike self	2.9 (3.0)	2 (0-5)	0 (0-10)	0.00 (0.979)	*0.92 (0.43)	0.85	0.81 (0.74,1)	0.86
Impact								
I01 Do not meet friends	2.1 (2.6)	1 (0-3)	0 (0-10)	0.06 (0.360)	*0.81 (0.37)	0.78	0.81 (0.75,1)	0.86
I09 Eventually isolated	2.7 (2.9)	1 (0-5)	0 (0-10)	0.08 (0.217)	**0.96 (0.41)	0.63	0.79 (0.72,1)	0.85
I14 Avoid places	2.7 (2.8)	2 (0-5)	0 (0-10)	0.03 (0.679)	*0.78 (0.40)	0.75	0.81 (0.75,1)	0.86
I15 Cannot do things	2.8 (2.8)	2 (0-5)	0 (0-10)	0.05 (0.433)	*0.84 (0.40)	0.81	0.77 (0.70,1)	0.85
I20 Limited job opportunities	2.6 (2.7)	2 (0-4)	0 (0-10)	0.02 (0.718)	*0.63 (0.39)	0.80	0.81 (0.73,1)	0.86
Outburst								
I04 Verbally aggressive	4.6 (3.0)	5 (2-7)	6 (0-10)	-0.01 (0.822)	*0.94 (0.43)	0.59	0.84 (0.78,1)	0.87
I17 Physically aggressive	2.7 (2.7)	2 (0-5)	0 (0-10)	0.01 (0.852)	**1.04 (0.39)	0.62	0.80 (0.73,1)	0.86
I22 Violence	2.9 (2.8)	2 (0-5)	0 (0-10)	0.00 (0.999)	**1.06 (0.40)	0.61	0.79 (0.73,1)	0.85
I23 Shout at people	3.6 (2.9)	3 (1-6)	0 (0-10)	0.02 (0.716)	**1.20 (0.41)	0.71	0.88 (0.82,1)	0.89
I24 Afraid of outburst	3.1 (3.0)	2 (0-5)	0 (0-10)	0.04 (0.569)	*0.95 (0.43)	0.62	0.86 (0.80,1)	0.88
Threat								
I02 Panic or explode	4.5 (3.2)	4 (2-7)	0 (0-10)	-0.08 (0.186)	0.34 (0.47)	0.81	0.85 (0.79,1)	0.88
I03 Feel helpless	4.4 (3.2)	5 (2-7)	0 (0-10)	-0.03 (0.592)	0.38 (0.46)	0.77	0.83 (0.76,1)	0.87
I07 Feel anxious	5.0 (3.2)	5 (2-7)	6 (0-10)	-0.11 (0.080)	-0.13 (0.45)	0.89	0.81 (0.73,1)	0.86
I10 Experience distress	5.6 (3.2)	6 (3-8)	10 (0-10)	-0.06 (0.382)	0.29 (0.45)	0.74	0.79 (0.71,1)	0.85
I11 Feel trapped	4.5 (3.1)	5 (2-7)	0 (0-10)	-0.06 (0.329)	0.27 (0.45)	0.83	0.81 (0.73,1)	0.86

*Q1 Q3 first and third quartile. ICC intraclass correlation coefficient; Psi coefficient and 95% confidence interval; rho: Spearman's correlation coefficient; *p<0.05; **p<0.01; ‡ mean difference (se) male vs female comparison, p-value via Mann Whitney test; +The item had a salient crossloading (o.31) on the Outburst factor.*

Table 2:

Norms and reliability of the S-Five 5 factors and total scores (N=255)

Factor	descriptive indices					internal consistency		stability	
	mean (sd)	median (Q1-Q3)	mode (min-max)	Gender difference mean (sd)‡	Age rho	α / ω	ITC	Psi (95% CI)	ICC
Externalising	29.7 (12.4)	32	30 (0-50)	3.3 (1.747)	-0.03	0.88 / 0.88	0.68 - 0.75	0.81 (0.74,1)	0.86
Internalising	14.7 (12.9)	11	0 (0-46)	**5.88 (1.814)	0.04	0.92 / 0.92	0.72 - 0.84	0.85 (0.79,1)	0.88
Impact	12.9 (12.2)	7	0 (0-50)	*4.01 (1.745)	0.06	0.93 / 0.93	0.81 - 0.84	0.81 (0.74,1)	0.86
Outburst	16.8 (12.3)	15	0 (0-50)	**5.19 (1.731)	0.00	0.93 / 0.93	0.87 - 0.84	0.87 (0.81,1)	0.89
Threat	24.1 (14.1)	25	0 (0-50)	1.14 (2.016)	-0.09	0.90 / 0.90	0.67 - 0.81	0.82 (0.75,1)	0.87
S-Five total	98.1 (50.9)	96	70 (0-232)	**19.54 (7.173)	-0.01	0.95 / 0.95	0.36 – 0.77	0.88 (0.82,1)	0.89

‡ mean difference (standard error) male vs female comparison, p-value via Mann Whitney test; sd: standard deviation; Q1 and Q3 first and third quartile respectively; α: Cronbach's alpha; ω: McDonald's omega; ITC: item-total correlations; ICC: intraclass correlation coefficient (two-way mixed effects, absolute agreement).

Table 3:

Intercorrelations of the S-Five scores, and correlations with other measures (validity assessment)

	Externalising	Internalising	Impact	Outburst	*Threat*	Total S-Five
S-Five (N=255)						
Internalising	0.30					
Impact	0.27	0.71				
Outburst	0.40	0.70	0.68			
Threat	0.50	0.60	0.54	0.64		
Total	0.61	0.84	0.78	0.87	0.84	
A-MISO-S (N=125)						
Total	0.41	0.42	0.46	0.40	0.52	0.57
MQ (N=118)						
MSYS (N=114)	0.41	0.42	0.33	0.31	0.43	0.47
MEBS (N=105)	0.33	0.46	0.35	0.50	0.58	0.58
MSES (N=118)	0.46	0.49	0.37	0.42	0.48	0.57
Total (N=118)	0.48	0.43	0.33	0.41	0.50	0.54
PHQ9 (N=130)						
Total	0.31	0.35	0.22	0.24	0.30	0.35
GAD7 (N=128)						
Total	0.27	0.38	0.24	0.30	0.33	0.37

Correlations are Spearman's rho and p-value<0.01 in all cases; A-MISO-S: Amsterdam Misophonia Scale MQ: Misophonia Questionnaire; MSYS: Misophonia Symptoms Scale; MEBS: Misophonia Emotions and Behaviours Scale; MSES: Misophonia Severity Scale; PHQ-9: Physical Health Questionnaire; GAD-7: Generalised Anxiety Disorder Assessment.

Table 4:

Norms and reliability of the S-Five-T scores (N=78)

S-Five RC (N=255)	**mean (sd)**	**median (Q1-Q3)**	**mode (min-max)**	**gender difference mean (se)‡**	**age rho**
No feeling	19.7 (7.7)	18 (15-25)	16 (0-37)	0.59 (2.9)	-0.11
Irritation	4.9 (3.4)	4 (3-7)	3 (0-15)	*-2.3 (1.2)	*0.25
Distress	1.2 (1.8)	1 (0-2)	0 (0-11)	0.3 (0.7)	-0.165
Disgust	2.7 (2.7)	2 (1-4)	0 (0-11)	-0.7 (1.0)	*0.24
Anger	1.0 (1.7)	0 (0-1)	0 (0-10)	*0.3 (0.7)	0.08
Panic	1.9 (2.0)	1 (1-3)	1 (0-12)	0.8 (0.8)	-0.05
TC	15.0 (7.0)	15 (11-21)	12 (0-30)	-0.6 (2.6)	0.14
FIRS	79.2 (45.2)	75 (44-115))	75 (0-184)	-7.9 (11.1)	0. 11
RIRS	4.1 (1.6)	5 (4-6)	6 (1-8)	0.3 (0.6)	0.07

*RC: response count;TC total count; FIRS frequency and intensity reaction count; RIRS relative intensity of reactions score; sd standard deviation; Q1 Q3 first and third quartile; rho: Spearman's correlation coefficient; ICC intraclass correlation coefficient; Psi coefficient and 95% confidence intervals; *p<0.05 **p<0.01; ‡ mean difference (se) male vs female comparison, p-value via Mann Whitney test.*

Table 5:

Intercorrelations of the S-Five, S-Five-T scores, and correlations with other measures (Spearman's rho)

	No feeling	Irritation	Distress	Disgust	Anger	Panic	TC	FIRS	RIRS
S-Five RC (N=81)									
No feeling		**-0.62	**-0.36	**-0.41	**-0.38	**-0.44	**-0.87	**-0.82	**-0.44
Irritation			*0.25	**0.36	*0.19	*0.26	**0.63	**0.59	**0.33
Distress				0.15	*0.23	*0.26	**0.41	**0.39	*0.28
Disgust					0.02	0.17	**0.53	**0.45	0.19
Anger						**0.35	**0.38	*0.27	0.11
Panic							*0.40	*0.33	0.12
TC								**0.89	**0.37
FIRS									**0.70
S-Five Factors (N=78)									
Externalising	**-0.39	**0.39	*0.27	0.14	*0.26	0.22	**0.46	**0.37	0.13
Internalising	**-0.40	**0.30	**0.33	0.06	**0.38	*0.25	**0.46	**0.46	**0.33
Impact	**-0.40	**0.36	*0.26	0.06	*0.27	0.12	**0.41	**0.46	**0.40
Outburst	**-0.43	**0.35	**0.5	0.09	**0.41	**0.31	**0.51	**0.45	*0.27
Threat	**-0.48	**0.38	**0.48	*0.24	**0.45	*0.26	**0.55	**0.52	**0.32
Total	**-0.49	**0.44	**0.47	0.16	**0.47	**0.3	**0.58	**0.56	**0.36
A-MISO-S (N=73)									
Total	**-0.44	**0.35	**0.33	0.16	**0.48	*0.27	**0.56	**0.51	**0.35
MQ (N=68)									
MSYS (N=68)	**-0.68	**0.45	**0.42	0.10	**0.36	**0.36	**0.68	**0.65	**0.43
MEBS (N=59)	**-0.34	0.21	**0.38	-0.02	**0.46	0.16	**0.41	**0.46	**0.42
MSES (N=59)	**-0.55	*0.32	**0.38	0.05	**0.54	*0.28	**0.58	**0.60	**0.43
Total (N=68)	**-0.52	**0.42	**0.37	0.08	**0.49	*0.29	**0.59	**0.61	**0.47
PHQ9 (N=73)									
Total	**-0.41	*0.26	*0.24	0.05	0.17	**0.31	**0.40	**0.37	0.22
GAD7 (N=72)									
Total	**-0.49	*0.24	*0.27	0.07	0.17	**0.34	**0.46	**0.41	*0.24

RC: response count; TC total count; FIRS frequency and intensity reaction count; RIRS relative intensity of reactions score; rho: Spearman's correlation coefficient; A-MISO-S: Amsterdam Misophonia Scale; MQ: Misophonia Questionnaire; MSYS: Misophonia Symptoms Scale; MEBS: Misophonia Emotions and Behaviours Scale; MSES: Misophonia Severity Scale; PHQ-9: Physical Health Questionnaire; GAD-7: Generalised Anxiety Disorder Assessment.

Table 6:

Norms and reliability of the intensity items for the 37 S-Five-T sounds

Trigger sounds	Mean (sd)	median (Q1-Q3)	mode (min-max)	Average Gender difference‡	age rho
Normal eating sounds	1.7 (3.0)	0 (0-2)	0 (0-10)	-0.91 (0.64)	-0.06 (0.468)
Certain letter sounds	0.5 (1.7)	0 (0-0)	0 (0-10)	-0.31 (0.53)	0.06 (0.537)
Mushy foods	1.2 (2.4)	0 (0-1)	0 (0-10)	-0.03 (0.78)	0.06 (0.542)
Sound of clipping nails	1.1 (2.1)	0 (0-1)	0 (0-8)	-0.44 (0.71)	0.02 (0.814)
Swallowing	0.8 (2.1)	0 (0-0)	0 (0-10)	-0.24 (0.72)	-0.02 (0.847)
Keyboard tapping	1.4 (2.2)	0 (0-3)	0 (0-8)	-0.34 (0.73)	0.1 (0.355)
Lip smacking	4.4 (3.6)	4 (0-7)	0 (0-10)	-1.59 (1.2)	0.06 (0.606)
Normal breathing	0.4 (1.5)	0 (0-0)	0 (0-8)	0.26 (0.5)	-0.29 (0.006)
Repetitive engine	3.8 (3.3)	4 (0-6)	0 (0-10)	-2.06 (1.09)	-0.08 (0.483)
Blocked nose	3.6 (2.9)	3 (0-6)	0 (0-9)	-0.49 (1.02)	0.04 (0.696)
Mobile phone	1.7 (2.6)	0 (0-3)	0 (0-10)	0.8 (0.92)	0.15 (0.175)
Repetitive coughing	3.5 (3.1)	3 (0-6)	0 (0-10)	*2.35 (1.06)	0.04 (0.702)
Humming	3.2 (2.8)	3 (0-6)	0 (0-10)	0.76 (0.99)	0.02 (0.865)
Repetitive sniffing	2.6 (3.0)	2 (0-5)	0 (0-10)	1.01 (1.12)	-0.06 (0.569)
Snoring	3.6 (3.4)	4 (0-7)	0 (0-10)	-0.05 (1.26)	0.11 (0.327)
Certain accents	1.5 (2.6)	0 (0-2)	0 (0-10)	-0.33 (0.97)	-0.05 (0.678)
Whistling sound	0.8 (2.0)	0 (0-0)	0 (0-10)	-0.17 (0.76)	0 (0.987)
Tapping	2.8 (3.0)	2 (0-6)	0 (0-10)	1.57 (1.09)	0.12 (0.263)
Rustling plastic or paper	1.5 (2.3)	0 (0-3)	0 (0-7)	-0.67 (0.88)	0.12 (0.263)
Chewing gum	3.1 (3.3)	2 (0-6)	0 (0-10)	-1.76 (1.22)	0.1 (0.349)
Footsteps	1.5 (2.6)	0 (0-3)	0 (0-10)	-0.7 (0.97)	-0.09 (0.409)
Hiccups	1.5 (2.5)	0 (0-3)	0 (0-10)	1.11 (0.94)	-0.08 (0.451)
Slurping	1.8 (2.9)	0 (0-3)	0 (0-10)	-1.22 (1.09)	0.11 (0.312)
Cutlery	2.3 (3.1)	0 (0-5)	0 (0-10)	-1.02 (1.17)	0.03 (0.797)
Sneezing	1.0 (2.1)	0 (0-0)	0 (0-7)	1.18 (0.78)	0.21 (0.065)
Certain words	0.5 (1.3)	0 (0-0)	0 (0-7)	0.46 (0.5)	-0.2 (0.071)
Kissing	1.1 (2.4)	0 (0-0)	0 (0-10)	-0.97 (0.91)	0.02 (0.858)
Joint cracking	0.9 (2.2)	0 (0-0)	0 (0-10)	-0.06 (0.81)	0.01 (0.921)
Muffled sounds	2.9 (3.0)	2 (0-5)	0 (0-10)	0.5 (1.14)	-0.04 (0.749)
Throat clearing	1.3 (2.6)	0 (0-2)	0 (0-10)	0.65 (0.96)	0.08 (0.497)
Baby crying	4.7 (3.4)	5 (1-7)	0 (0-10)	0.03 (1.25)	0.14 (0.221)
Repetitive barking	3.9 (3.1)	4 (1-6)	0 (0-10)	1.75 (1.14)	0.24 (0.036)
Loud chewing	3.3 (3.8)	2 (0-6)	0 (0-10)	-1.5 (1.41)	0.24 (0.038)
Clock ticking	2.1 (3.0)	0 (0-4)	0 (0-10)	-0.67 (1.12)	0.11 (0.322)
Crunching	0.7 (2.3)	0 (0-0)	0 (0-10)	-0.76 (0.85)	-0.27 (0.018)
Teeth sucking	2.8 (3.3)	1 (0-6)	0 (0-10)	-1.18 (1.22)	0.26 (0.021)
Yawning	0.4 (1.5)	0 (0-0)	0 (0-8)	-0.46 (0.57)	-0.18 (0.115)

*sd standard deviation; Q1 Q3 first and third quartile; rho: Spearman's correlation coefficient; ICC intraclass correlation coefficient; Psi coefficient and 95% confidence intervals; *p<0.05; **p<0.01; ‡ mean difference (se) male vs female comparison, p-value via Mann Whitney test.*