

## Empirical Article

## Preliminary validation of the Norwegian version of the Berlin Misophonia Questionnaire Revised (BMQ-R-NOR)

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*Objective*

To perform a psychometric evaluation of a Norwegian version of the Berlin Misophonia Questionnaire Revised (BMQ-R-NOR).

*Design*

Participants completed online versions of the self-report questionnaire BMQ-R-NOR on two occasions and MQ-NOR on one occasion. Convergent validity was assessed through Spearman's correlation between BMQ-R-NOR and MQ-NOR. Internal consistency was evaluated with McDonald's omega and Cronbach's alpha. Test-retest reliability was evaluated using Cohen's weighted kappa and intraclass correlation.

*Study sample*

82 participants with self-reported misophonia took part in the study at T1, and 53 of these participated at T2. However, only 41 of them were included in the test-retest analyses due to 12 participants being in treatment between T1 and T2.

*Results*

Subscales from the BMQ-R-NOR and MQ-NOR were significantly positively correlated, indicating evidence of convergent validity ( $r_s = 0.22^* - 0.74^{**}$ ). The BMQ-R-NOR showed overall good internal consistency (omega = 0.72–0.93; alpha = 0.70–0.93) and satisfactory test-retest reliability (ICC = 0.35–0.92).

*Conclusion*

The psychometric properties of the BMQ-R-NOR are considered satisfactory. However, it is advised to exercise caution when using it until further comprehensive validation studies are conducted to ensure robustness and reliability in clinical practice.

**Key words:** Misophonia questionnaire, decreased sound tolerance, test-retest validation, self-report, Norwegian.

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## INTRODUCTION

Misophonia is a term first coined by Jastreboff and Jastreboff (2001), and the disorder has been defined and characterized differently since then (Brout, Edelstein, Erfanian, *et al.*, 2018). However, a recent publication by Swedo, Baguley, Denys, *et al.* (2022) has aimed to establish a consensus definition to enhance the understanding of the disorder and facilitate the development of effective treatments. They described misophonia as a disorder of decreased tolerance to specific sounds, known as “triggers.” The triggers are often sounds made by other human beings and repetitive in nature (e.g., eating sounds or the clicking of a pen). When individuals with misophonia detect triggering stimuli, they often find it challenging to shift their attention away from them. This can lead to unpleasant and distressing experiences, eliciting negative emotional, physiological, and behavioral responses. These trigger stimuli can evoke a range of negative reactions, including anger, irritation, disgust, and anxiety, and induce increased muscular tension, heart rate, and sweating (Swedo, Baguley, Denys, *et al.*, 2022). Misophonia significantly disrupts the lives of those affected, as it often leads to maladaptive behaviors and avoidance patterns that interfere with their ability to perform tasks at work or in academics, and results in notable impairment in their interpersonal relationships (Brout,

Edelstein, Erfanian, *et al.*, 2018; Ferrer-Torres & Giménez-Llort, 2022).

While there is currently no universally agreed-on procedure for assessing the disorder, use of clinical interviews and other measures, such as self-report questionnaires, has been suggested (Wiese, Wojcik & Storch, 2021). There are multiple self-report questionnaires available for assessing misophonia. Each one captures specific aspects of the disorder, although they may not necessarily measure the same constructs or dimensions due to variations in the definition of misophonia (Swedo, Baguley, Denys, *et al.*, 2022). Questionnaires that have undergone psychometric analyses include the Misophonia Questionnaire (MQ; Wu, Lewin, Murphy & Storch, 2014), MisoQuest (Siepsiak, Śliwerski & Dragan, 2020), the Selective Sound Sensitivity Syndrome Scale (S-Five; Vitoratou, Uglik-Marucha, Hayes & Gregory, 2021), the Duke Misophonia Questionnaire (DMQ; Rosenthal, Anand, Cassiello-Robbins, *et al.*, 2021), the Duke-Vanderbilt Misophonia Screening Questionnaire (DVMSQ; Williams, Cascio & Woynaroski, 2022), the Misophonia Response Scale (MRS; Dibb, Golding & Dozier, 2021), the Misophonia Impact Questionnaire (MIQ; Aazh, Moore, Scaglione & Remmert, 2023), and the Berlin Misophonia Questionnaire Revised (BMQ-R; Remmert, Schmidt, Mussel, Hagel &

Eid, 2022; Remmert, Jebens, Gruzman, Gregory & Vitoratou, 2022). Utilizing psychometrically sound assessment instruments is imperative for comprehensively understanding the nature and severity of misophonia and for effectively evaluating treatment outcomes by assessing changes in symptom severity and degree of distress (Fackrell & Hoare, 2018).

In Norway, the MQ has undergone preliminary psychometric analyses (i.e., MQ-NOR by Larsen, Hovland, Nielsen & Larsen, 2022), providing valuable insights into its measurement properties, which were reported to be good. However, despite these positive findings, the MQ-NOR is limited in its brevity and insufficient coverage of key aspects of misophonia. Although demonstrating promising initial psychometric properties, uncertainties persist regarding the MQ's ability to accurately measure misophonia and its generalizability to the broader population of misophonia sufferers. These uncertainties stem from its validation against a questionnaire assessing general sound sensitivity and its usage of a university sample. Furthermore, the use of a single self-reported severity item limits sufficient psychometric evaluation. Given its development prior to the establishment of core definitions regarding misophonia, there is a potential need for refinement to better align with current understandings of the disorder (Rosenthal, Anand, Cassiello-Robbins, *et al.*, 2021; Siepsiak, Śliwerski & Dragan, 2020). The BMQ-R was validated against two misophonia questionnaires and additional measures to sufficiently validate all symptom-oriented subscales. Data collection involved both a university sample and participants recruited through online posts on social media. Additionally, the BMQ-R aligns with the scientific consensus on the definition of misophonia. Furthermore, it has undergone a revision, which ensures that the questionnaire has incorporated updated conceptualizations and improvements based on analyses of the previous version (Remmert, Jebens, *et al.*, 2022; Remmert, Schmidt, *et al.*, 2022). The BMQ-R was chosen for its symptom-oriented construction rationale and comprehensive coverage of misophonic symptoms. Additionally, its alignment with the consensus and the recent revision underscores its suitability. Our aim was to provide clinicians with an exhaustive and improved instrument for assessing misophonia that ensured both validity and reliability.

### *The present study*

The present study aimed to conduct an initial validation of a Norwegian version of the Berlin Misophonia Questionnaire Revised (i.e., BMQ-R-NOR), a multidimensional diagnostic instrument that measures a wide range of misophonic symptoms (Remmert, Jebens, *et al.*, 2022; Remmert, Schmidt, *et al.*, 2022).

To evaluate translation equivalence, it was hypothesized that the translated version of the BMQ-R-NOR would maintain the original meaning and intention of each item. This hypothesis was based on the importance of ensuring consistency in the interpretation of questionnaire items across languages and cultures. The forward and back translation procedure was employed as a widely accepted method for assessing translation equivalence. An expert panel, consisting of bilingual individuals with expertise in both the source and target languages, assessed the translation against the original to ensure semantic equivalence

in each subscale. Consensus among the experts was sought to confirm the accuracy of the translation process.

Similarly, a hypothesis regarding cultural equivalence posited that the translation would be culturally adapted to ensure understanding and relevance for the Norwegian population. This criterion was based on the recognition of the influence of cultural factors on the interpretation of questionnaire items. Pre-testing with potential participants was conducted to assess question comprehension and identify any cultural misunderstandings or sensitivities. This step aimed to ensure that the translated questionnaire resonated with the cultural context of the target population.

To assess convergent validity, both indirect and direct methods were employed. Indirectly, intercorrelations between the symptom-oriented subscales and the General Sound Intolerance Symptoms (GSIS) subscale were utilized, aligning with the indirect validation approach employed by Remmert, Schmidt, *et al.*, (2022) and Remmert, Jebens, *et al.* (2022). It was anticipated that all subscales within each content area would demonstrate high positive correlations. Additionally, it was expected that the GSIS would exhibit moderate to high correlations with misophonic symptoms. Directly, correlations were calculated between all subscales from the BMQ-R-NOR and the MQ-NOR Emotions and Behaviors Scale, as well as between the MQ-NOR Severity Scale and selected subscales from the BMQ-R-NOR. The MQ-NOR Symptom Scale, a trigger frequency scale, closely aligns with the sound classes outlined in the condition part of the BMQ-R-NOR. Consequently, no specific analyses were conducted on these sound classes, as their primary function is to provide an overview of the most disturbing sounds experienced by an individual. The MQ-NOR measures some aspects of misophonia, encompassing broad symptoms associated with the disorder. It was hypothesized that certain subscales from the BMQ-R-NOR would show moderate to high correlations with the MQ-NOR Emotions and Behaviors Scale, which can be categorized descriptively into avoidance items, emotional reactions items, one distress item, and dysregulation items. Specifically, it was anticipated that subscales aligning with the descriptive content of the MQ-NOR Emotions and Behaviors Scale (Anger Present, Irritation Present, Anxiety Present, Behavioral Dysregulation, Emotional Dysregulation, Reactive Avoidance, Anticipatory Avoidance, and Distress) would demonstrate higher correlations. Conversely, it was hypothesized that subscales not aligning with the MQ-NOR Emotions and Behaviors Scale on a descriptive content level would correlate moderately. The MQ-NOR Severity Scale was correlated with the subscales in the content areas of Dysregulation, Avoidance Behavior, and Clinical Significance (refer to the Measures section for an extensive list of content areas and subscales). It was hypothesized that these subscales would demonstrate moderate to high correlations with the MQ-NOR Severity Scale, which is in line with current literature (Guzick, Cervin, Smith, *et al.*, 2023; Jager, de Koning, Bost, Denys & Vulink, 2020; Möllmann, Heinrichs, Illies, Potthast & Kley, 2023).

Last, regarding reliability, it was hypothesized that the translated version of the BMQ-R-NOR would maintain the reliability of the measurements. This hypothesis was based on the assumption that the translation process did not introduce

significant measurement errors. To evaluate reliability, internal consistency (i.e., omega and alpha) were calculated for the translated version and compared with those of the original version to ensure comparable reliability. Test–retest reliability was also evaluated by assessing the consistency of responses between two testing points. The intraclass correlation coefficient (ICC) was calculated to quantify the degree of agreement between the test results from the two time points, providing an estimate of the stability of the measurements over time.

## MATERIALS AND METHODS

### *Procedure and participants*

Data were collected through Nettskjema, an online service provided by the University of Oslo for creating, storing, and managing surveys and data collection, which is connected to the secure IT platform TSD (Tjeneste for Sensitive Data) (Nettskjema, [n.d.](#)). Participants were recruited by experienced educational audio therapists through four audiology clinics, as well as through social media groups and posts. No financial or other support was provided. To meet the inclusion criteria for participation in the study, individuals had to be between the ages of 18 and 67 years and report a current or suspected complaint of misophonia. Participants received comprehensive information about the study, which included a thorough explanation of misophonia experience and symptoms, aiming to establish consistent comprehension of the term (i.e., “Do you experience anger or irritation when someone else eats, slurps or breathes loudly? Do you avoid meals with friends and family? Do you lose concentration when exposed to repetitive sounds?”). All participants were required to provide informed consent and answer all questions before submitting the questionnaire. The data were collected between February and April 2023. Participants were asked to respond to the survey on two occasions, approximately two weeks apart. These time points were labeled T1 and T2, respectively. The study was approved by Sikt—Norwegian Agency for Shared Services in Education and Research, which allowed us to handle personal data. Ethics approval from the Regional Committees for Medical and Health Research Ethics (REK) was not required, as the primary focus of this study was to adapt and validate the BMQ-R-NOR.

At T1, a total of 82 participants completed the survey (85.4% female). At T2, 53 participants completed the survey (79.2% female). The mean age was  $M = 37.7$  ( $SD = 12.33$ ). Of all participants, 74.7% obtained information about the study through social media, 21.7% acquired it from personal acquaintances, and 3.6% received it through educational audio therapists. To prevent any potential interference caused by treatment effects, 12 participants who were receiving treatment for misophonia at T1 and/or T2 were excluded from the test–retest analyses.

### *Translation*

The translation of the BMQ-R was based on the guidelines outlined in the “WHODAS 2.0 Translation package (version 1.0): Translation and Linguistic Evaluation Protocol and Supporting Material” (World Health Organization [WHO], [n.d.](#)). This process involved a forward- and back-translation procedure aimed at achieving cross-cultural and conceptual equivalence (WHO, [n.d.](#)). Although the guidelines are specifically tailored for the translation of WHODAS, they outline the standard WHO method, which we followed for the translation and adaptation of the BMQ-R. Initially, permission was granted from the developers of the BMQ-R to adapt the questionnaire into Norwegian. Next, a professional translator was engaged to create a forward-translation. An expert panel was assembled to review the translation, consisting of two Norwegian-German bilinguals, one educational audio therapist with clinical expertise in misophonia, and one psychologist with expertise in family conflicts. The two bilingual experts compared the forward-translation with the original version and provided suggestions for improvements in cases where the translation was unclear or inaccurate.

Afterward, two professionals from different backgrounds reviewed both the forward-translation and the suggestions provided by the bilingual experts. The professional experts provided feedback on the suggestions, often concurring with them, but occasionally proposing their modification based on their expertise in the field. Any discrepancies were discussed and resolved by the first and last author. A second translator was engaged to produce a back-translation of selected items from the final reviewed forward-translation. The Department of Special Needs Education at the University of Oslo was responsible for engaging the translators. One of the developers compared the back-translation with the original version and evaluated the selected items, providing comments on which items were equivalent in translation and which ones may have changed in meaning or item difficulty. Due to time constraints, the pre-testing of the questionnaire and the main data collection were conducted before a review of the back-translation in comparison with the original version could take place. The Norwegian instrument was pre-tested by four individuals who self-reported having misophonia. They offered feedback on items that were difficult to understand or unclear, and this resulted in minor adjustments to the wording of three items and the inclusion of examples for the sound classes.

### *Measures*

*Norwegian version of the Berlin Misophonia Questionnaire (BMQ-R-NOR).* The questionnaire comprises a condition part and a symptom part (Remmert, Jebens, *et al.*, 2022; Remmert, Schmidt, *et al.*, 2022). The condition part includes the General Sound Intolerance Symptoms (GSIS) subscale and 20 items that measure the extent of disturbances related to externally and internally produced sound classes. The GSIS consists of four items that are rated on a six-point scale ranging from 0 (*not at all agree*) to 5 (*completely agree*). The sound classes are rated on a six-point scale ranging from 0 (*not disturbing at all*) to 5 (*maximally disturbing*). The symptom part consists of 73 items organized into 20 subscales across six criteria-oriented content areas: (1) Aversive Reactions to the Presence of Sounds and (2) Anticipation of Sounds, encompassing the subscales Anger, Irritation, Disgust, Anxiety, and Physical Reactions, in response to both the presence and anticipation; (3) Dysregulation, encompassing General, Behavioral, Cognitive, and Emotional Dysregulation; (4) Clinical Insight, consisting of the subscales Recognition of Disproportionality and Excess; (5) Avoidance Behavior, including the two subscales Reactive and Anticipatory Avoidance; and (6) Clinical Significance, consisting of Distress and Functional Impairment (Remmert, Jebens, *et al.*, 2022; Remmert, Schmidt, *et al.*, 2022). Respondents rate each item on a six-point scale ranging from 0 (*not at all agree*) to 5 (*completely agree*).

*Norwegian version of the Misophonia Questionnaire (MQ-NOR; Larsen, Hovland, Nielsen & Larsen, 2022).* The MQ-NOR is a self-report questionnaire for assessing misophonia, consisting of three subscales. The Misophonia Symptom Scale (omega = 0.71) comprises seven items and is rated on a five-point scale ranging from 0 (*not at all true*) to 4 (*always true*). The Misophonia Emotions and Behaviors Scale (omega = 0.81) consists of 10 items and is rated on a five-point scale ranging from 0 (*never*) to 4 (*always*). The Total Score Scale is calculated by summing the scores from these two subscales. The Misophonia Severity Scale is a single-item 16-point rating scale ranging from 0 (*not sound sensitive*) to 15 (*very severe*).

### *Statistical analyses*

The internal consistency of the BMQ-R-NOR was assessed with McDonald’s omega and Cronbach’s alpha coefficients, which were classified based on established cutoff values: 0.70–0.79 reliable, 0.80–0.90 highly reliable, and >0.90 very highly reliable (Cohen, Manion & Morrison, 2018). Omega is the estimate utilized by the developers of the BMQ-R, and it is particularly advantageous for use with non-normally distributed data (Trizano-Hermosilla & Alvarado, 2016). Alpha estimates were included to facilitate comparability with results from studies, as



many older studies only provide estimates of alpha. Following Remmert, Schmidt, *et al* (2022) and Remmert, Jebens, *et al* (2022), confidence intervals for omega and alpha were computed using bias-corrected and accelerated bootstrapping with a bootstrapping sample size  $B = 1,000$  (Kelley, 2023; R Core Team, 2023). The interpretation of the correlation coefficients followed the rule of thumb proposed by Hinkle, Jurs, and Wiersma (2003). Convergent validity was indirectly evaluated by calculating correlations between the symptom-oriented subscales and the GSIS subscale. In addition, all subscales from the BMQ-R-NOR were correlated with the MQ-NOR Emotions and Behaviors Scale, and selected subscales from the BMQ-R-NOR were correlated with the MQ-NOR Severity Scale, to further examine convergent validity. Subscale scores of the BMQ-R-NOR were computed by calculating the mean score of all items within each subscale. The correlation analyses were performed using Spearman's rho correlation coefficients due to non-normality in the data, as determined by the Shapiro-Wilk test. Test-retest reliability was examined using four methods. Three methods were used for categorical variables (i.e., individual items), which included (1) exact agreement between items at T1 and T2, (2) difference of one point or less in response between T1 and T2, and (3) Cohen's weighted kappa (Landis & Koch, 1977). The fourth method was used for continuous variables (i.e., BMQ-R-NOR subscales), which involved intraclass correlations (ICCs). ICC estimates and their 95% confident intervals were based on a single rater/measurement, absolute-agreement, two-way mixed model (Koo & Li, 2016). The criteria for Cohen's weighted kappa ratings were as follows: 0.21–0.40 for fair agreement, 0.41–0.60 for moderate agreement, 0.61–0.80 for substantial agreement, and 0.81–1 for almost perfect agreement (Landis & Koch, 1977). ICC values were interpreted according to the following criteria: <0.50 were considered poor reliability, 0.50–0.75 were moderate reliability, 0.75–0.90 were good reliability, and >0.90 were excellent reliability (Koo & Li, 2016). The statistical analyses were conducted using IBM SPSS (Version 29), Jamovi (Version 2.2.5), and R Statistical Software (Version 4.9.3; R Core Team, 2023) with the package MBESS (Kelley, 2023).

## RESULTS

### *Descriptive statistics*

Of the participants, 67.1% had the highest GSIS sum score of 20. The mean GSIS sum score was  $M = 19.12$  ( $SD = 1.69$ ). Notably, when applying the same cutoff scores as utilized by Remmert, Schmidt, *et al* (2022) and Remmert, Jebens, *et al* (2022), where potentially affected individuals are identified by a sum score greater than 12, only one participant in this sample scored below this threshold. Based on these results, it can be inferred that the majority of the sample primarily consisted of individuals who may be affected by the disorder. The three sound classes that participants were most disturbed by were “people eating” ( $M = 4.32$ ,  $SD = 1.05$ ), “throat and mouth sounds” ( $M = 3.60$ ,  $SD = 1.32$ ), and “people drinking” ( $M = 3.41$ ,  $SD = 1.39$ ). The least disturbing sound class was “animal sounds” ( $M = 0.96$ ,  $SD = 1.19$ ).

The 20 symptom-oriented subscales had means and standard deviations ranging from  $M = 3.7$  ( $SD = 3.84$ ) to  $M = 18.4$  ( $SD = 2.88$ ). The Anticipation Anxiety Reactions subscale had the lowest mean, and the Present Irritation Reactions subscale had the highest. Please see Table 3 for an overview of the means and standard deviations of all subscales.

### *Convergent validity*

Intercorrelations between the symptom-oriented subscales and the GSIS subscale can be found in Table 1. The average correlation

among all subscales within Aversive Reactions to the Presence of Sounds is moderate and positive ( $r_s = 0.52$ ), and in Aversive Reactions to the Anticipation of Sounds, it is similar ( $r_s = 0.51$ ). Within the Dysregulation domain, the average correlation also leans toward a moderate and positive association ( $r_s = 0.41$ ). Regarding the Clinical Insight and Clinical Significance content areas, high positive correlations were observed with the subscales in each content area, as hypothesized, specifically, the subscales Disproportionality and Excess ( $r_s = 0.75$ ) and Distress and Functional Impairment ( $r_s = 0.78$ ). Additionally, within Avoidance Behavior, the subscales Reactive Avoidance and Anticipatory Avoidance displayed moderate positive correlations ( $r_s = 0.63$ ). In the Presence of Sounds content area, the highest correlation is found between the subscales Irritation and Anger, Irritation and Disgust, and Anxiety and Physical ( $r_s = 0.59$ ), whereas the lowest correlation is between Anxiety and Disgust ( $r_s = 0.38$ ). Within the Anticipation of Sounds domain, the highest correlation is observed between the subscales Disgust and Irritation ( $r_s = 0.67$ ), with the lowest observed between Anxiety and Anger ( $r_s = 0.26$ ). The GSIS displayed an average moderate positive correlation, with the highest correlation observed with the subscale Irritation Present ( $r_s = 0.55$ ), and the lowest correlation was found with Anxiety Present ( $r_s = 0.16$ ), indicating a non-significant correlation. These findings deviate from the initial hypotheses, as it was expected that all subscales within each content area would demonstrate high positive correlations, and that the GSIS would exhibit moderate to high correlations with misophonic symptoms, contrasting notably with the intercorrelations observed in the original BMQ-R dataset.

To assess convergent validity, all symptom-oriented subscales were correlated with the MQ-NOR Emotions and Behaviors Scale. Furthermore, specific subscales such as General, Behavioral, Cognitive and Emotional Dysregulation, Reactive and Anticipatory Avoidance, and Distress and Functional Impairment were correlated with the MQ-NOR Severity Scale (see Table 2). The correlations between the BMQ-R-NOR subscales and the MQ-NOR Emotions and Behaviors Scale ranged from descriptively low positive correlation ( $r_s = 0.36$ , Cognitive Dysregulation) to high positive correlation ( $r_s = 0.74$ , Anger Present). The correlations between the selected subscales from the BMQ-R-NOR and the MQ-NOR Severity Scale ranged from descriptively non-significant correlation ( $r_s = 0.17$ , Behavioral Dysregulation) to moderate positive correlation ( $r_s = 0.57$ , Anticipatory Avoidance). These results deviate from the initial hypotheses.

### *Internal consistency*

The internal consistency for the 21 subscales ranged from reliable (omega = 0.72) to very highly reliable (omega = 0.93). Notably, the subscale Behavioral Dysregulation exhibited the lowest reliability estimate, and the subscales Anticipation Anxiety Reactions and Functional Impairment demonstrated the highest reliability. Comparatively, the internal consistency of the subscales in the BMQ-R-NOR is slightly lower than that of the original BMQ-R. However, the BMQ-R-NOR shows higher values of omega in five subscales: Present Irritation Reactions (0.85), Anticipation Anxiety Reactions (0.93), Anticipation Physical Reactions (0.86), Reactive Avoidance (0.73), and Functional

Table 1. Intercorrelations for the BMO-R-NOR scales

| Measure                      | 1           | 2           | 3           | 4           | 5           | 6           | 7           | 8           | 9           | 10          | 11          | 12          | 13          | 14          | 15          | 16          | 17          | 18          | 19          | 20          | 21 |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----|
| 1. Anger Present             | –           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 2. Irritation Present        | <b>0.59</b> | –           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 3. Disgust Present           | <b>0.56</b> | <b>0.59</b> | –           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 4. Anxiety Present           | <b>0.49</b> | <b>0.46</b> | <b>0.38</b> | –           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 5. Physical Present          | <b>0.50</b> | <b>0.53</b> | <b>0.55</b> | <b>0.59</b> | –           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 6. Anger Anticipation        | <b>0.55</b> | <b>0.40</b> | <b>0.41</b> | <b>0.25</b> | <b>0.32</b> | –           |             |             |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 7. Irritation Anticipation   | <b>0.27</b> | <b>0.49</b> | <b>0.41</b> | <b>0.31</b> | <b>0.25</b> | <b>0.65</b> | –           |             |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 8. Disgust Anticipation      | <b>0.37</b> | <b>0.45</b> | <b>0.73</b> | <b>0.36</b> | <b>0.47</b> | <b>0.50</b> | <b>0.67</b> | –           |             |             |             |             |             |             |             |             |             |             |             |             |    |
| 9. Anxiety Anticipation      | <b>0.44</b> | <b>0.37</b> | <b>0.43</b> | <b>0.76</b> | <b>0.60</b> | <b>0.26</b> | <b>0.30</b> | <b>0.44</b> | –           |             |             |             |             |             |             |             |             |             |             |             |    |
| 10. Physical Anticipation    | <b>0.29</b> | <b>0.38</b> | <b>0.41</b> | <b>0.63</b> | <b>0.62</b> | <b>0.42</b> | <b>0.59</b> | <b>0.64</b> | <b>0.64</b> | –           |             |             |             |             |             |             |             |             |             |             |    |
| 11. General Dysregulation    | <b>0.49</b> | <b>0.43</b> | <b>0.43</b> | <b>0.38</b> | <b>0.47</b> | <b>0.44</b> | <b>0.22</b> | <b>0.32</b> | <b>0.40</b> | <b>0.38</b> | –           |             |             |             |             |             |             |             |             |             |    |
| 12. Behavioral Dysregulation | <b>0.57</b> | <b>0.34</b> | <b>0.38</b> | <b>0.32</b> | <b>0.21</b> | <b>0.45</b> | <b>0.26</b> | <b>0.35</b> | <b>0.28</b> | <b>0.21</b> | <b>0.43</b> | –           |             |             |             |             |             |             |             |             |    |
| 13. Cognitive Dysregulation  | <b>0.36</b> | <b>0.42</b> | <b>0.46</b> | <b>0.40</b> | <b>0.42</b> | <b>0.12</b> | <b>0.17</b> | <b>0.31</b> | <b>0.34</b> | <b>0.25</b> | <b>0.51</b> | <b>0.37</b> | –           |             |             |             |             |             |             |             |    |
| 14. Emotional Dysregulation  | <b>0.51</b> | <b>0.43</b> | <b>0.40</b> | <b>0.63</b> | <b>0.64</b> | <b>0.33</b> | <b>0.22</b> | <b>0.40</b> | <b>0.61</b> | <b>0.59</b> | <b>0.49</b> | <b>0.33</b> | <b>0.35</b> | –           |             |             |             |             |             |             |    |
| 15. Disproportionality       | <b>0.52</b> | <b>0.41</b> | <b>0.36</b> | <b>0.42</b> | <b>0.44</b> | <b>0.32</b> | <b>0.16</b> | <b>0.21</b> | <b>0.33</b> | <b>0.28</b> | <b>0.54</b> | <b>0.41</b> | <b>0.37</b> | <b>0.48</b> | –           |             |             |             |             |             |    |
| 16. Excess                   | <b>0.51</b> | <b>0.36</b> | <b>0.33</b> | <b>0.53</b> | <b>0.56</b> | <b>0.34</b> | <b>0.21</b> | <b>0.28</b> | <b>0.54</b> | <b>0.44</b> | <b>0.46</b> | <b>0.34</b> | <b>0.34</b> | <b>0.65</b> | <b>0.75</b> | –           |             |             |             |             |    |
| 17. Reactive Avoidance       | <b>0.42</b> | <b>0.42</b> | <b>0.46</b> | <b>0.40</b> | <b>0.45</b> | <b>0.22</b> | <b>0.22</b> | <b>0.38</b> | <b>0.38</b> | <b>0.39</b> | <b>0.48</b> | <b>0.35</b> | <b>0.41</b> | <b>0.54</b> | <b>0.42</b> | <b>0.35</b> | –           |             |             |             |    |
| 18. Anticipatory Avoidance   | <b>0.38</b> | <b>0.39</b> | <b>0.46</b> | <b>0.57</b> | <b>0.42</b> | <b>0.16</b> | <b>0.38</b> | <b>0.44</b> | <b>0.49</b> | <b>0.52</b> | <b>0.44</b> | <b>0.35</b> | <b>0.34</b> | <b>0.53</b> | <b>0.32</b> | <b>0.36</b> | <b>0.63</b> | –           |             |             |    |
| 19. Distress                 | <b>0.46</b> | <b>0.47</b> | <b>0.42</b> | <b>0.62</b> | <b>0.64</b> | <b>0.26</b> | <b>0.30</b> | <b>0.36</b> | <b>0.64</b> | <b>0.58</b> | <b>0.47</b> | <b>0.26</b> | <b>0.27</b> | <b>0.65</b> | <b>0.48</b> | <b>0.63</b> | <b>0.38</b> | <b>0.53</b> | –           |             |    |
| 20. Functional Impairment    | <b>0.46</b> | <b>0.44</b> | <b>0.37</b> | <b>0.64</b> | <b>0.61</b> | <b>0.18</b> | <b>0.23</b> | <b>0.31</b> | <b>0.67</b> | <b>0.57</b> | <b>0.42</b> | <b>0.32</b> | <b>0.17</b> | <b>0.60</b> | <b>0.50</b> | <b>0.55</b> | <b>0.48</b> | <b>0.60</b> | <b>0.78</b> | –           |    |
| 21. GSIS                     | <b>0.49</b> | <b>0.55</b> | <b>0.44</b> | <b>0.16</b> | <b>0.47</b> | <b>0.39</b> | <b>0.23</b> | <b>0.37</b> | <b>0.17</b> | <b>0.27</b> | <b>0.54</b> | <b>0.33</b> | <b>0.37</b> | <b>0.48</b> | <b>0.42</b> | <b>0.39</b> | <b>0.39</b> | <b>0.25</b> | <b>0.33</b> | <b>0.27</b> | –  |

N = 82. GSIS = General Sound Intolerance Symptoms. All correlations marked in bold are significant at  $p < 0.05$ .

Table 2. Relationship between subscales from the BMQ-R-NOR and the MQ-NOR

| Measure                                 | MQ-NOR: Emotions and Behaviors Scale | MQ-NOR: Severity Scale |
|-----------------------------------------|--------------------------------------|------------------------|
| 1. BMQ-R-NOR: Anger Present             | 0.74***                              |                        |
| 2. BMQ-R-NOR: Irritation Present        | 0.52***                              |                        |
| 3. BMQ-R-NOR: Disgust Present           | 0.54***                              |                        |
| 4. BMQ-R-NOR: Anxiety Present           | 0.62***                              |                        |
| 5. BMQ-R-NOR: Physical Present          | 0.53***                              |                        |
| 6. BMQ-R-NOR: Anger Anticipation        | 0.57***                              |                        |
| 7. BMQ-R-NOR: Irritation Anticipation   | 0.39***                              |                        |
| 8. BMQ-R-NOR: Disgust Anticipation      | 0.49***                              |                        |
| 9. BMQ-R-NOR: Anxiety Anticipation      | 0.54***                              |                        |
| 10. BMQ-R-NOR: Physical Anticipation    | 0.52***                              |                        |
| 11. BMQ-R-NOR: General Dysregulation    | 0.61***                              | 0.46***                |
| 12. BMQ-R-NOR: Behavioral Dysregulation | 0.59***                              | 0.17                   |
| 13. BMQ-R-NOR: Cognitive Dysregulation  | 0.36***                              | 0.33**                 |
| 14. BMQ-R-NOR: Emotional Dysregulation  | 0.64***                              | 0.42***                |
| 15. BMQ-R-NOR: Disproportionality       | 0.48***                              |                        |
| 16. BMQ-R-NOR: Excess                   | 0.51***                              |                        |
| 17. BMQ-R-NOR: Reactive Avoidance       | 0.65***                              | 0.41***                |
| 18. BMQ-R-NOR: Anticipatory Avoidance   | 0.59***                              | 0.57***                |
| 19. BMQ-R-NOR: Distress                 | 0.58***                              | 0.44***                |
| 20. BMQ-R-NOR: Functional Impairment    | 0.57***                              | 0.51***                |
| 21. BMQ-R-NOR: GSIS                     | 0.48***                              |                        |

Note:  $N = 82$ .

\*\*\* $p < 0.001$ ;

\*\* $p < 0.01$ ;

Impairment (0.93). The confidence intervals for omega overlap for most of the subscales between the original BMQ-R and its Norwegian adaptation, except for five subscales, namely Present Anger Reactions, Anticipation Disgust Reactions, Behavioral Dysregulation, Recognition of Excess, and Distress. For an overview of the reliability estimates for each subscale, please refer to Table 3.

#### Test-retest reliability

Examining both exact agreement and agreement with a difference of one grade or less, the agreement for individual items on the

BMQ-R-NOR ranged from poor to very good. Weighted kappas were in the fair to almost perfect agreement range with values ranging from 0.23 (G3) to 0.81 (BD03) (see Supplementary Appendix S1). The ICCs ranged from 0.53 (GSIS) to 0.92 (Functional Impairment), indicating moderate to excellent agreement, except for Present Irritation Reactions, which showed poor agreement ( $ICC = 0.35$ ) (see Table 4).

#### DISCUSSION

The aim of this study was to perform a preliminary evaluation of the BMQ-R-NOR, a Norwegian version of the BMQ-R (Remmert, Jebens, *et al.*, 2022; Remmert, Schmidt, *et al.*, 2022), by examining its psychometric properties. The main objective was to introduce a second, more comprehensive misophonia assessment tool specifically designed for the Norwegian context. This evaluation signifies notable progress in research and clinical practices in the field of misophonia within the Norwegian population.

It was hypothesized that the translated version would accurately preserve the original meaning and intent of each item while being culturally adapted to the Norwegian population. However, due to time constraints, the back-translated items were not reviewed prior to questionnaire testing, potentially resulting in changes in wording that could alter the intended measurement, reduce extremity, or deviate from the original meaning of certain items. Comments from the developer of the BMQ-R suggested that certain items may indeed have changed in terms of meaning during the translation process, particularly within the subscales Behavioral Dysregulation, Disproportionality, and Distress. In the Behavioral Dysregulation subscale, one item has been modified to have less extreme wording compared with the original version, using *get furious* (“bli rasende”) instead of *freak out* (“ausrasten”) in the Norwegian translation. This change potentially affects the item’s alignment with the intended construct of behavioral dysregulation, as it may now load onto the factor of anger reactions instead. Another item in the Behavioral Dysregulation subscale also has less extreme wording in the translated version, potentially altering the perception of control over unsolicited comments. These modifications were made to better align with the Norwegian language and culture. The item in the subscale Disproportionality was unintentionally modified by adding a moral component resulting in the statement *I shouldn’t react like that...* (“Egentlig bør jeg ikke reagere sånn...”) instead of the original, which stated *I should not have to react to...* (“Eigentlich müsste ich gar nicht so...”). This change was prompted by uncertainty regarding the correct interpretation of the original item, as one of the bilingual experts found it to be ambiguous. Ultimately, the modified version was chosen to ensure better alignment with the remaining items in the same subscale. Additionally, within the subscale Distress, the Norwegian version used less extreme wording compared with the original version, using terms such as *emotionally stressed* (“emosjonelt stresset”) and *stressed* (“stresset”) instead of *emotionally burdened* (“emotional belastet”) and *bothered* (“belasten”). The choice of terminology was based on feedback from the bilingual experts and the desire to maintain coherence throughout the questionnaire. Furthermore, in the Anxiety Present subscale, termed Fear Present

Table 3. Descriptive indices and reliability estimates for the BMQ-R-NOR subscales

| Subscale                                         | <i>M</i> ( <i>SD</i> ) | Min | Max | $\omega$ [95% CI] | $\alpha$ [95% CI] |
|--------------------------------------------------|------------------------|-----|-----|-------------------|-------------------|
| General Sound Intolerance Symptoms (GSIS)        | 19.1 (1.69)            | 10  | 20  | 0.74 [0.36–0.85]  | 0.71[0.50–0.86]   |
| Aversive Reactions to the Presence of Sounds     |                        |     |     |                   |                   |
| Anger Reactions                                  | 13.6 (4.81)            | 0   | 20  | 0.81 [0.72–0.86]  | 0.77 [0.68–0.85]  |
| Irritation Reactions                             | 18.4 (2.88)            | 0   | 20  | 0.83 [0.57–0.96]  | 0.83 [0.58–0.95]  |
| Disgust Reactions                                | 16.0 (4.30)            | 0   | 20  | 0.88 [0.81–0.92]  | 0.88 [0.81–0.93]  |
| Anxiety Reactions                                | 6.9 (6.62)             | 0   | 20  | 0.87 [0.79–0.91]  | 0.807 [0.79–0.91] |
| Physical Reactions                               | 10.6 (3.92)            | 0   | 15  | 0.82 [0.70–0.87]  | 0.80 [0.69–0.87]  |
| Aversive Reactions to the Anticipation of Sounds |                        |     |     |                   |                   |
| Anger Reactions                                  | 4.6 (3.55)             | 0   | 10  | 0.88 [0.80–0.93]  | 0.88 [0.78–0.93]  |
| Irritation Reactions                             | 6.9 (3.19)             | 0   | 10  | 0.84 [0.68–0.91]  | 0.84 [0.69–0.91]  |
| Disgust Reactions                                | 4.8 (3.24)             | 0   | 10  | 0.74 [0.55–0.82]  | 0.74 [0.49–0.82]  |
| Anxiety Reactions                                | 3.7 (3.84)             | 0   | 10  | 0.93 [0.88–0.96]  | 0.93 [0.87–0.96]  |
| Physical Reactions                               | 4.2 (3.24)             | 0   | 10  | 0.86 [0.79–0.91]  | 0.85 [0.77–0.90]  |
| Dysregulation                                    |                        |     |     |                   |                   |
| General Dysregulation                            | 9.4 (5.62)             | 0   | 20  | 0.90 [0.85–0.93]  | 0.89 [0.84–0.93]  |
| Behavioral Dysregulation                         | 8.6 (4.94)             | 0   | 20  | 0.73 [0.62–0.80]  | 0.70 [0.59–0.78]  |
| Cognitive Dysregulation                          | 12.9 (2.60)            | 5   | 19  | 0.83 [0.74–0.89]  | 0.83 [0.74–0.89]  |
| Emotional Dysregulation                          | 10.8 (5.34)            | 0   | 20  | 0.81 [0.72–0.86]  | 0.82 [0.74–0.87]  |
| Clinical Insight                                 |                        |     |     |                   |                   |
| Recognition of Disproportionality                | 13.1 (5.29)            | 0   | 20  | 0.85 [0.78–0.90]  | 0.84 [0.77–0.90]  |
| Recognition of Excess                            | 11.6 (5.50)            | 0   | 20  | 0.81 [0.72–0.86]  | 0.79 [0.71–0.86]  |
| Avoidance Behavior                               |                        |     |     |                   |                   |
| Reactive Avoidance                               | 13.9 (4.48)            | 3   | 20  | 0.72 [0.54–0.81]  | 0.70 [0.54–0.80]  |
| Anticipatory Avoidance                           | 11.3 (6.30)            | 0   | 20  | 0.90 [0.85–0.94]  | 0.90 [0.84–0.93]  |
| Clinical Significance                            |                        |     |     |                   |                   |
| Distress                                         | 13.8 (6.96)            | 0   | 25  | 0.89 [0.85–0.92]  | 0.89 [0.85–0.91]  |
| Functional Impairment                            | 13.2 (10.33)           | 0   | 35  | 0.93 [0.90–0.95]  | 0.93 [0.90–0.95]  |

Note: *N* = 82. *M* = mean; *SD* = standard deviation;  $\omega$  = McDonald's omega;  $\alpha$  = Cronbach's alpha (included to facilitate cross-study comparison).

in Norwegian to avoid confusion with the clinical diagnosis of anxiety, one item was adjusted accordingly. For instance, *Sometimes I experience intense anxiety or panic* ("Noen ganger føler jeg intens angst eller panikk...") was translated as *Sometimes I experience intense fear or panic* ("Noen ganger føler jeg intens frykt eller panikk...") to better reflect the intended construct in the Norwegian context.

The intercorrelations between the symptom-oriented subscales exhibit significant positive correlations within their respective content area, although consistency across different domains varies. While some correlations were indeed high and positive, it is noteworthy that not all correlations aligned descriptively with the hypothesis of high positive correlations. In comparison with the original BMQ-R (Remmert, Jebens, *et al.*, 2022; Remmert, Schmidt, *et al.*, 2022), the BMQ-R-NOR demonstrates lower overall correlations. The observed discrepancies may stem from sampling variations, wherein homogeneity of the participant group could influence the observed correlations, or the translation process, which could potentially lead to inaccurately translated items (Beaton, Bombardier, Guillemin & Ferraz, 2000; Cohen, Manion & Morrison, 2018). Additionally, the use of summed scores may have contributed to the overall lower correlations observed in our study. Notably, the GSIS displays moderate to low, and in two cases non-significant, correlations with the respective symptom-oriented subscales. This observation is particularly noteworthy and not in line with the initial hypothesis. However, it may be explained by the low variance of the GSIS. The relatively low and non-significant correlation between the

GSIS and the Anxiety subscales (Present and Anticipation) could be attributed to the possibility that the scale does not capture primary reactions but rather secondary emotions in response to sounds. Individuals with misophonia may not identify panic or fear as their primary reactions to sounds. Instead, they may initially respond with anger, followed by a sense of panic (Vitoratou, Uglik-Marucha, Hayes & Gregory, 2021).

The correlation analyses conducted between all BMQ-R-NOR subscales and the MQ-NOR Emotions and Behaviors Scale, as well as between selected BMQ-R-NOR subscales and the MQ-NOR Severity Scale, provide support for the hypothesis that the BMQ-R-NOR subscales measure conceptually related constructs. Notably, a descriptively higher correlation was observed between the MQ-NOR Emotions and Behaviors Scale and the BMQ-R-NOR's Anger Present subscale compared with Irritation Present, a pattern similarly observed in the Anticipation domain. This difference in correlation strengths may be attributed to the composition of the MQ-NOR subscale, which comprises composites of various symptoms. For instance, within the Emotions and Behaviors Scale, four out of ten items reflect anger symptoms, while only one item represents irritation. This discrepancy in item representation could potentially influence the strength of correlations observed between specific subscales. Contrary to our hypothesis, regarding the correlations with the MQ-NOR Severity Scale, the selected BMQ-R-NOR subscales did not exhibit descriptively high correlations with the MQ-NOR Severity Scale. However, all but one scale showed significant and descriptively low to moderate positive correlations. The absence

Table 4. Intraclass correlations (ICCs) assessing the test–retest reliability for the respective subscales of the BMQ-R-NOR

| Subscale                                         | Intraclass correlation | 95% confidence interval |             |
|--------------------------------------------------|------------------------|-------------------------|-------------|
|                                                  |                        | Lower bound             | Upper bound |
| GSIS                                             | 0.53                   | 0.28                    | 0.72        |
| Aversive Reactions to the Presence of Sounds     |                        |                         |             |
| Anger Reactions                                  | 0.78                   | 0.63                    | 0.88        |
| Irritation Reactions                             | 0.35                   | 0.05                    | 0.59        |
| Disgust Reactions                                | 0.70                   | 0.49                    | 0.83        |
| Anxiety Reactions                                | 0.88                   | 0.78                    | 0.93        |
| Physical Reactions                               | 0.82                   | 0.64                    | 0.91        |
| Aversive Reactions to the Anticipation of Sounds |                        |                         |             |
| Anger Reactions                                  | 0.69                   | 0.49                    | 0.82        |
| Irritation Reactions                             | 0.55                   | 0.29                    | 0.73        |
| Disgust Reactions                                | 0.80                   | 0.66                    | 0.89        |
| Anxiety Reactions                                | 0.84                   | 0.72                    | 0.91        |
| Physical Reactions                               | 0.78                   | 0.62                    | 0.87        |
| Dysregulation                                    |                        |                         |             |
| General Dysregulation                            | 0.74                   | 0.53                    | 0.86        |
| Behavioral Dysregulation                         | 0.87                   | 0.77                    | 0.93        |
| Cognitive Dysregulation                          | 0.65                   | 0.43                    | 0.79        |
| Emotional Dysregulation                          | 0.83                   | 0.69                    | 0.91        |
| Clinical Insight                                 |                        |                         |             |
| Recognition of Disproportionality                | 0.62                   | 0.39                    | 0.78        |
| Recognition of Excess                            | 0.71                   | 0.52                    | 0.83        |
| Avoidance Behavior                               |                        |                         |             |
| Reactive Avoidance                               | 0.80                   | 0.65                    | 0.89        |
| Anticipatory Avoidance                           | 0.76                   | 0.59                    | 0.86        |
| Clinical Significance                            |                        |                         |             |
| Distress                                         | 0.88                   | 0.79                    | 0.94        |
| Functional Impairment                            | 0.92                   | 0.85                    | 0.96        |

Note:  $N = 41$ . Participants who were in treatment at T1 and/or T2 ( $n = 12$ ) were excluded.

of a significant correlation between the Behavioral Dysregulation subscale and the Severity Scale raises concerns regarding convergent validity. While it is expected that behavioral dysregulation and symptom severity are closely related constructs, this observed discrepancy prompts further examination. These results provide preliminary empirical support for the validity of the BMQ-R-NOR as a measure for assessing misophonia. To establish construct validity, the original BMQ-R underwent comprehensive evaluations using various instruments that assessed constructs similar to the different symptom-oriented scales (Remmert, Jebens, *et al.*, 2022; Remmert, Schmidt, *et al.*, 2022).

The findings regarding internal consistency offer valuable insights into the measurement properties of the BMQ-R-NOR. The analyses indicate satisfactory internal consistency across all subscales, suggesting that items within each subscale are coherent and measure the same underlying concept. However, when examining the Dysregulation domain, all subscales showed high to very high reliability except the Behavioral Dysregulation subscale, which exhibited only reliable indices. This discrepancy could be attributed to some items loading onto the factor of anger, as previously stated. Moreover, upon comparing the confidence intervals of the reliability estimates between our sample and the

original sample, it is evident that most subscales exhibit overlapping confidence intervals, indicating statistically indifferent estimates. However, there were notable exceptions where the confidence intervals did not overlap, specifically in five subscales. These discrepancies suggest potential differences in reliability between our sample and the original sample. Nonetheless, these results tentatively suggest that the translation of the BMQ-R to the BMQ-R-NOR appears to be appropriate.

At the descriptive level, the test–retest analyses revealed that the mean exact agreement across all items was 49% (i.e., 77 items by 41 participants). Additionally, the mean difference of one grade or less across all items was 80.6%. These findings indicate that the majority of the changes in responses from T1 to T2 were minor, with only one grade or less difference. However, there were variations in responses, raising questions about the stability of the questionnaire. Based on the statistical test–retest analyses, the indices using Cohen's weighted kappa revealed moderate to almost perfect agreement for 65 items, while 12 items demonstrated fair agreement. This suggests that there is a certain level of agreement between the items, but there is still room for improvement, and the questionnaire should undergo further psychometric evaluations. The indices using ICCs indicated poor agreement for only one subscale, Irritation Present. The observed variations may be attributed to respondent fatigue as the length of the questionnaire could potentially impact participants' level of engagement and attention (Cohen, Manion & Morrison, 2018). Another factor that could contribute to the variations in responses is the potential differences in the experience of misophonia symptoms between T1 and T2. It is known that misophonia symptoms can change over time (Rouw & Erfanian, 2018) and may potentially be influenced by factors such as stress levels (Frank & McKay, 2019). These factors could have contributed to the observed discrepancies in participants' responses, which are also evident in the statistical analyses, including Cohen's weighted kappa and ICCs. This study is the first to examine the test–retest reliability of the BMQ-R. The results suggest that the BMQ-R-NOR demonstrates adequate test–retest reliability, indicating its potential for reliable use over time.

Based on our findings, the questionnaire has potential applications across various domains including clinical practice and research in the field of misophonia. Clinically, it can be utilized for diagnosing misophonia, assessing the severity of symptoms, tailoring treatment plans, and evaluating the effectiveness of interventions/treatment. In research, it can be a valuable instrument for investigating prevalence, risk factors, and outcomes related to misophonia.

### Limitations

When interpreting the study findings, it is important to consider several limitations. First, the sampling method, which involved recruiting participants from social media and clinics, may limit the generalizability of the results to the broader Norwegian population. Second, the study had a lower-than-expected number of participants, which hindered the execution of confirmatory factor analyses and limited the ability to compare the results with the original BMQ-R study by Remmert, Schmidt, *et al.* (2022) and Remmert, Jebens, *et al.* (2022). The small sample size resulted in



elevated standard errors and wider confidence intervals, which may increase the uncertainty of our findings and warrant careful consideration when interpreting the results. Third, the sample predominantly consisted of females, with only a small proportion of male participants (14.6%). While this gender imbalance may not have directly influenced the study's findings, it affects the comparability of results between genders. Last, the utilization of the MQ-NOR as the sole instrument for validation raises concerns about its appropriateness for assessing the BMQ-R-NOR. Although our findings provide initial evidence for valid conclusions regarding broader misophonic symptoms, it is important to acknowledge that the MQ-NOR may not be the optimal instrument for this purpose. Hence, future research should consider incorporating a broader range of convergent measures to further validate the BMQ-R-NOR and ensure its robustness across various contexts and populations. Particularly, efforts to recruit participants from clinical settings alongside those from social media platforms could enhance the representativeness of the sample and strengthen the generalizability of findings. Additionally, inclusion of a control group in future studies would provide valuable comparative data, allowing for more rigorous examination of the specificity and sensitivity of the BMQ-R-NOR in distinguishing misophonia from other disorders.

## CONCLUSION

The present study has demonstrated that the BMQ-R-NOR exhibits overall satisfactory psychometric properties, including adequate internal consistency and test-retest reliability. Additionally, most subscales of the BMQ-R-NOR have demonstrated moderate to high correlations with the MQ-NOR, indicating initial evidence of convergent validity. The non-significant correlation of the subscale Behavioral Dysregulation and the MQ-NOR Severity Scale questions the convergent validity. The BMQ-R-NOR serves as a valuable tool for assessing various aspects of misophonia in Norway, providing a more comprehensive questionnaire option. However, it is important to acknowledge the limitations of this study, and further extensive validation is recommended. Clinicians in Norway should therefore exercise caution when using the BMQ-R-NOR in their practice.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## AUTHOR CONTRIBUTIONS

EK designed the study, conducted the data collection, performed the data analysis, interpreted the results, and drafted the manuscript. AF and GEN provided feedback and revised the manuscript. All authors have read and approved the final manuscript.

## DATA AVAILABILITY STATEMENT

Research data are not shared.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

## Supplementary Appendix S1.

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