Tradução e validação da Versão Portuguesa do Questionário de Comportamento Auditivo (ABQ) para crianças com perturbações do espectro do autismo

Artigo Original

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Artigo recebido a 27 de Maio de 2025.
Aceite para publicação a 11 de Novembro de 2025.

Resumo

O *Auditory Behavior Questionnaire* é um instrumento validado para avaliar comportamentos auditivos atípicos em crianças com perturbação do espetro do autismo. O estudo teve como objetivo traduzir e validar este questionário para utilização em português europeu. A adaptação linguística e cultural incluiu tradução/tradução-reversa, revisão multidisciplinar e pré-teste. 24 pais, falantes nativos de português europeu, de crianças com perturbação do espectro do autismo completaram a versão portuguesa do questionário online, com reaplicação após dois a sete dias. A análise fatorial confirmou a validade da estrutura original de quatro fatores. Forte consistência interna foi revelada por valores de alfa de Cronbach para cada fator de 0,807, 0,914, 0,729 e 0,872. A reprodutibilidade foi demonstrada por coeficientes de correlação intra-classe para cada fator de 1,000, 0,927, 0,844 e 0,963. Estes resultados sustentam que esta versão portuguesa do *Auditory Behavior Questionnaire* apresenta validade e reprodutibilidade adequadas para utilização na população falante de português europeu.

Palavras-chave: Perturbação do espectro do autismo; Comportamentos auditivos; Questionário; Tradução

Introduction

Autism Spectrum Disorders (ASD) are a group of neurodevelopmental conditions characterized by early emerging deficits in social communication and social interaction, along with restricted and repetitive patterns of interests, behaviors and/or activities [1].

Children with ASD often present with difficulties in regulating the intensity of their response to sensory stimuli due to an inability to organize sensory information. Between 45% and 95% report sensory features

that significantly affect their functioning in everyday life[2–5]. Within the wider range of sensory processing deficits, abnormal auditory behavioral responses are frequently reported, although their presence and pattern appear to vary greatly from child to child [6–10].

Although auditory processing deficits are still not fully understood in ASD, different treatments and therapies have been used in clinical practice to reduce or eliminate these abnormal responses to sound. The ability to properly identify and categorize abnormal auditory behavioral responses is crucial for adequate tailoring and follow-up of effective interventions.

The Sensory Profile[11] provides a standard method for professionals to document different sensory processing patterns in children with ASD and is still widely used in research and clinical practice. However, whilst containing a number of auditory-specific items, it is not a dedicated measure of it.

In 2003, Dunning's master thesis[10] laid the foundation and item pool for the development of a questionnaire specific for the auditory domain. A survey of caregivers of children with ASD (n=175) provided ample information on different observed auditory behaviors. The content analysis of the responses obtained led to the development of a preliminary draft of the ABQ, containing 58 items, grouped in four behavioral domains: (1) Difficulty in background noise, (2) Hypersensitivity to sound (3) Unresponsiveness and (4) Auditory seeking.

In 2013, Egelhoff et al.[12] conducted a study aimed at examining the reliability, construct validity and standardization of the preliminary ABQ. A revised version of the ABQ was developed, containing 40 items, grouped in four renamed behavioral domains: (1) Difficulty in background noise, (2) Aversive reactions, (3) Unresponsiveness and (4) Stereotypic/Repetitive Behaviors. This version was validated for clinical use. Each item is to be rated on a 5-point Likert scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very Often).

To date, no validated Portuguese version of the ABQ has been made available, limiting its applicability within the Portuguese-speaking population. The aim of this study is to translate and validate the ABQ to Portuguese.

Methods

Study population

Children referred for audiological screening, as part of ongoing assessment for possible ASD, were recruited during Otorhinolaryngology evaluation.

Those who did not meet diagnostic criteria for ASD, according to the Diagnostic and Statistical Manual of Mental Disorders-5, were excluded. The ones with confirmed or suspected hearing deficits were also excluded. Further exclusion criteria comprised having primary caregivers who were not native speakers of European Portuguese, had a history of cognitive disorders or refused to participate in the study.

All participants were informed of the objective of the study and that their participation would be voluntary and, at any time, revocable.

A total of 24 children/primary caregivers met the inclusion criteria. Children were aged between 3 and 6 years, with a mean age of 5.2 years. 79% of the children were male (n=19). All primary caregivers were also parents to their respective child.

Material and procedures

Authorization was obtained from the authors for translation and validation of the ABQ to European Portuguese.

Linguistic and cultural adaptation was performed in 4 steps and is summarized in Figure 1. Two Portuguese doctors fluent in English independently translated the original English version of the ABQ and both translations were merged into a preliminary Portuguese version. This version was then sent for back-translation by a native English speaker fluent in European Portuguese who had no knowledge of the original English version. The results of both of these steps were later reviewed by an expert panel, consisting

Figure 1
Overview of the translation process

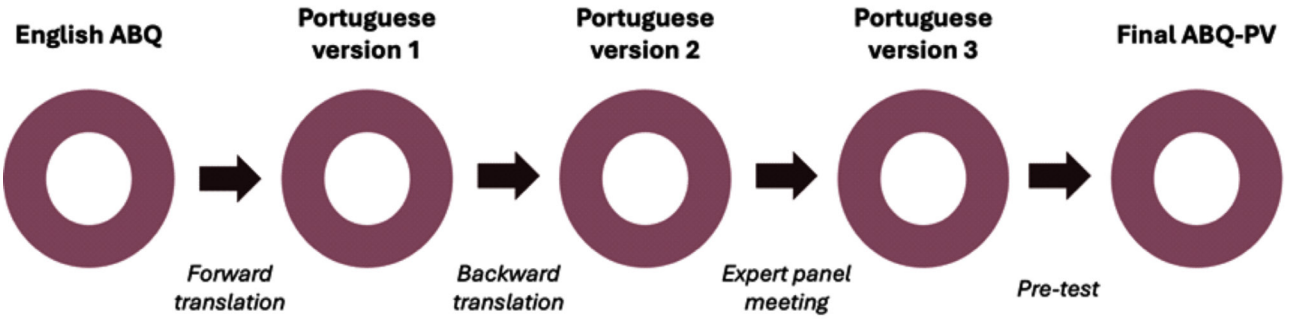

Table 1
Auditory Behavior Questionnaire – Portuguese Version (ABQ-PV)

	Com que frequência seu filho(a):	Nunca (1)	Raramente (2)	Às vezes (3)	Frequentemente (4)	Muito Frequentemente (5)
1	Tem dificuldades em responder quando está muito baralho em redor					
2	Esconde/tapa os ouvidos perante os sons					
3	Parece excessivamente sensível aos sons					
4	Costuma trautear ou repetir os sons que ouve					
5	Os sons que o(a) incomodam geram stress e ansiedade					
6	Fica perturbado e chora com os sons normais do dia a dia					
7	Fica concentrado(a) num som e ignora tudo em seu redor					
8	Reage a sons pouco intensos ou distantes					
9	Procura sons como forma de autoestimulação					
10	Tem dificuldades em concentrar-se numa tarefa quando as pessoas estão a falar em seu redor					
11	Não se assusta/não reage com sons inesperados					
12	Parece indiferente a outras pessoas quando falam					
13	Deteta sons que outras pessoas têm dificuldade em ouvir ou detetar					
14	Chora quando ouve um som alto					
15	Tem dificuldade em prestar atenção a si quando há ruído de fundo					
16	Evita fazer descargas na casa de banho devido ao barulho que gera					
17	Segura brinquedos ou objetos barulhentos junto ao ouvido por longos períodos de tempo					

	Com que frequência seu filho(a):	Nunca (1)	Raramente (2)	Às vezes (3)	Frequentemente (4)	Muito Frequentemente (5)
18	Fica incomodo ao ver um aspirador ou outros dispositivos que emitem sons altos					
19	Responde apenas quando o seu nome é chamado múltiplas vezes					
20	Parece focar a atenção nos sons em seu redor					
21	Gosta de sons que você acha excessivamente altos					
22	Evita brincar com outras crianças que estão a gritar					
23	Parece distraído(a) em ambientes barulhentos					
24	Tapa/esconde os seus ouvidos quando as pessoas estão a falar					
25	Fica incomodado com um som que para você não é muito alto ou incomodativo					
26	Direciona-se para ouvir uma pessoa ou conversa					
27	Repete verbalmente sons altos e incomodativos					
28	Evita situações/locais devido aos sons existentes naquele ambiente					
29	Tem dificuldades em concentrar-se no que alguém lhe está a dizer					
30	Tem uma reação adversa/descontrolada em uma sala barulhenta					
31	Fica incomodado/assutado após a ocorrência ou início de um som inesperado					
32	Parece angustiado(a) com os ruídos de fundo ou com pessoas a falar em seu redor					
33	Presta atenção a alguém a falar com ele/ela em um ambiente barulhento					
34	Age como uma criança com perda de audição					
35	Evita situações barulhentas em que terá dificuldades na concentração					
36	Emite sons verbais repetidamente e parece gostar					
37	Não reage a um som alto no ambiente em seu redor					
38	Distrai-se com o ruído de fundo (por exemplo com a televisão ou rádio) quando deveria estar focado					
39	Tem dificuldade em prestar atenção a alguém que está a falar com ele/ela na presença de ruído					
40	Parece que precisa de mais tempo para detetar um som					

of 5 ENT doctors and Neurodevelopment pediatricians. The consensus resulted in a revised Portuguese version. A pre-test was next conducted with three primary caregivers of children with ASD that reported no difficulties in the comprehension of the questions and the final Portuguese version of the Auditory Behavior Questionnaire (ABQ-PV) was created (Table 1). Questions pertaining to the child's demographic information and the items of the ABQ-PV were combined into a survey that was applied online to all participants. The ABQ-PV was later re-applied also online within two to seven days of initial survey response.

Data Analysis

Data analysis was performed using IBM SPSS statistical software version 29. Descriptive statistics were used to identify errors in the data and to characterize the sample. Factor analysis was used to examine construct validity. To determine homogeneity between different items in the questionnaire, internal consistency was calculated using the *Cronbach*'s α coefficient. Test-retest reliability, concerning the consistency between responses obtained from the same person on two or more separate occasions, was assessed trough the intraclass correlation coefficient.

Results

Validity and Reliability

Factor analysis was completed on the 40 items of the ABQ-PV. The eigenvalues and correspondent scree plot (Figure 2) generated were similar to those found on the original version's validation article and supported its four-factor structure: 1. Difficulty in Background Noise, 2. Aversive Reactions, 3. Unresponsiveness and 4. Stereotypic/ Repetitive Behaviors.

The *Cronbach*'s alpha values were 0.807 for factor, 0.914 for factor 2, 0.729 for factor 3 and 0.872 for factor 4 (Table 2). These results show significant internal consistency (>0.7), providing evidence of a common underlying construct. Test-retest reliability analysis revealed intraclass correlation coefficients indicative of excellent reproducibility (>0.8) – 1.000 for factor 1, 0.927 (95% confidence

Figure 2
Eigenvalues (amount of variance explained by each factor) graphed against the potential factor numbers

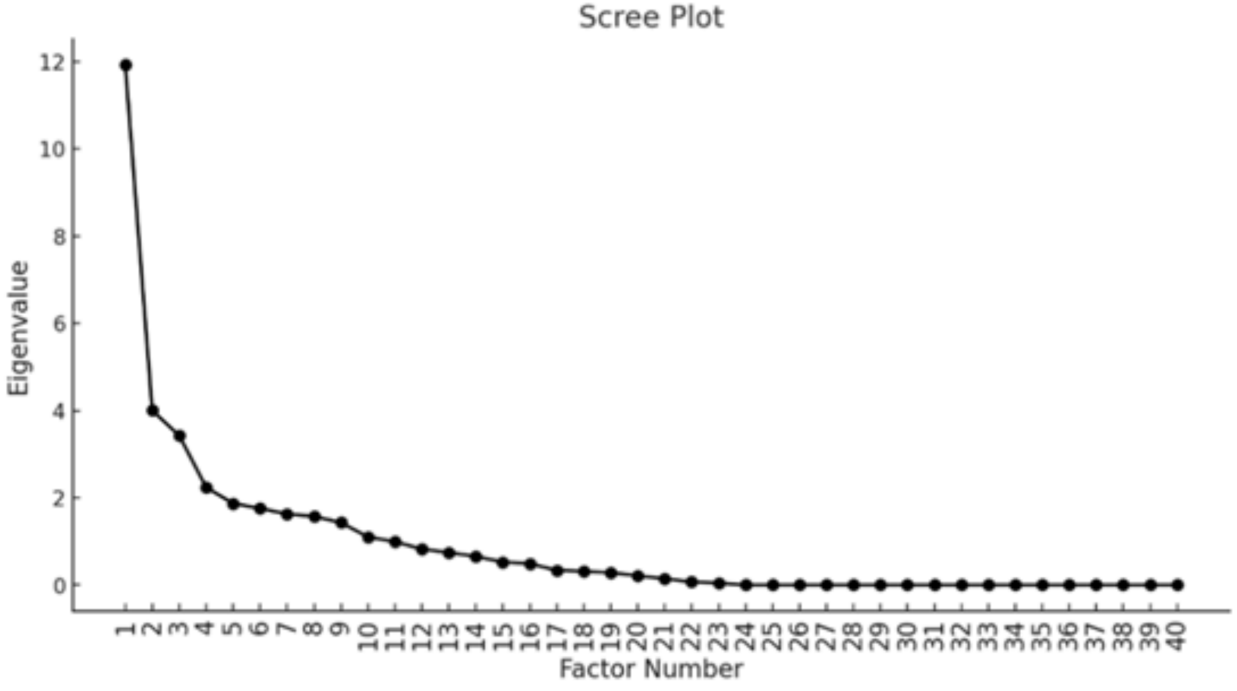

Table 2
Reliability coefficients by factor

	Cronbach's alpha	Intraclass correlation
Difficulty in Background Noise Items 1, 10, 15, 22, 23, 28, 32, 33, 35, 38, 39	0.807	1.000
Aversive Reactions Items 2, 3, 5, 6, 14, 16, 18, 24, 25, 30, 31	0.914	0.927
Unresponsiveness Items 11, 12, 19, 26, 29, 34, 37, 40	0.729	0.844
Stereotypic/Repetitive Behaviors Items 4, 7, 8, 9, 13, 17, 29, 21, 27, 36	0.872	0.963

interval [CI]: 0.832-0.969) for factor 2, 0.844 (95% CI: 0.640-0.933) for factor 3 and 0.963 (95% CI: 0.915-0.984) for factor 4 (Table 2).

Discussion

The present study successfully translated and validated the ABQ to European Portuguese, ensuring its applicability in the European Portuguese-speaking population. The findings indicate that the ABQ-PV maintains a robust four-factor structure, consistent with the original version [10,12], and retains high levels of reliability and reproducibility.

The results of the factor analysis closely mirrored those from the original validation study[12], reinforcing the stability of the questionnaire's structure. The validated four factors – Difficulty in Background Noise, Aversive Reactions, Unresponsiveness and Stereotypic/Repetitive Behaviors – align with previously well-documented auditory processing challenges observed in children with ASD[4,6,8,9]. These findings suggest that the ABQ-PV accurately captures the range of auditory behaviors experienced by this population.

Internal consistency, measured by *Cronbach*'s alpha, demonstrated strong reliability across all four factors (>0.7), supporting the internal homogeneity of the items. Additionally, test-retest reliability revealed high intraclass correlation coefficients (>0.8), confirming the questionnaire's temporal stability. These findings indicate that the ABQ-PV can be reliably used in clinical and research settings to assess and categorize abnormal behavioral responses to sound in children with ASD from European Portuguese-speaking populations.

The significance of this study lies in providing a linguistically and culturally adapted formal assessment tool of auditory behavior children with ASD, addressing a critical gap in the field. Previous research has emphasized the importance of linguistic and cultural adaptations in psychological and behavioral assessment tools to ensure validity across diverse populations [13]. By following a rigorous translation and back-translation process, with expert panel review and pre-testing, this study ensured the semantic and conceptual equivalence of the ABQ-PV.

Limitations

Despite the strengths of the study, certain limitations must be acknowledged. The fact that recruitment and questionnaire application were conducted close to the time of formal ASD diagnosis, resulted in a sample of predominantly young children. This fact, along with a relatively small sample size, might affect the generalizability of the findings. Future studies should aim to validate the ABQ-PV in larger and more diverse samples, including children of different ages, socioeconomic backgrounds and clinical settings.

Additionally, further research could also explore the questionnaire's applicability across different ASD presentations, as well as its potential sensitivity in distinguishing auditory processing difficulties across different ASD severity levels.

Conclusion

These results confirm that the Portuguese version of the ABQ provides the needed validity and reliability for application in the European Portuguese-speaking population. Not all children with ASD will exhibit deficits in auditory processing and abnormal auditory behaviors, but those that do may potentially benefit from more tailored intervention recommendations. The authors' hope is that the availability of this tool will help in better identifying and managing these children in the European Portuguese-speaking setting.

Agradecimentos

Os autores gostariam de agradecer aos autores do ABQ original por nos terem fornecido o questionário e permitido a sua tradução. Gostariam ainda de agradecer a todos os participantes que aceitaram contribuir para este trabalho, bem como a todos os profissionais que nos auxiliaram neste processo, em particular os colegas da Pediatria do Neurodesenvolvimento.

Conflito de interesses

Os autores declaram que não têm qualquer conflito de interesse relativo a este artigo.

Confidencialidade dos dados

Os autores declaram que seguiram os protocolos do seu trabalho na publicação dos dados de pacientes.

Proteção de pessoas e animais

Os autores declaram que os procedimentos seguidos estão de acordo com os regulamentos estabelecidos pelos diretores da Comissão para Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

Política de privacidade, consentimento informado e autorização do comité de ética

Os autores declaram que têm o consentimento por escrito para o uso dos dados dos pacientes neste artigo.

Financiamento

Este trabalho não recebeu qualquer contribuição, financiamento ou bolsa de estudos.

Disponibilidade dos dados científicos

Não existem conjuntos de dados disponíveis publicamente relacionados com este trabalho.

Declaração de IA generativa e tecnologias assistidas por IA no processo de redação

Não foram utilizadas ferramentas de IA na preparação deste artigo.

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