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Original article

The assessment of autistic traits with the Autism Spectrum Quotient: Contribution of the French version to its construct validity

Évaluation des traits autistiques par le Quotient du Spectre Autistique : contribution d'une version française à sa validation structurelle

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ABSTRACT

Introduction. – The Autism Spectrum Questionnaire (AQ, Baron-Cohen et al., 2001) is a self-report assessment tool aiming at screening autistic traits in normal intelligence adults. While numerous versions in other languages than English now exist, few factorial evidence do sustain the valid use of this instrument as it was conceived, based upon five distinct dimensions (Social skills, Communication, Attention to detail, Attention switching, Imagination); no such study exists with a French version of the AQ. The aim of our study is therefore to present the French version of the scale and to explore its factorial validity with confirmatory factorial analyses and, possibly, its invariance across men and women.
Method. – Several confirmatory factorial analyses, with the robust WLSMV estimator for categorical response format, were run on the questionnaire data from 788 French-speaking students (17–25 years old) at university faculties or schools for higher education in Belgium. The original five-factor measurement model of the AQ was assessed as well as alternative models. An exploratory factorial analysis was also applied to get more insight as to possible sources of misfit.
Results. – No measurement model – neither the original five-factor one nor any of the six other models tested – did produce statistics or fit indices close to significant values: there was no fit to the data. The internal consistency of the subscales was weak; the exploratory factorial analysis further confirmed that as much as ten factors were needed to explain 45% of the data variance.
Conclusion. – Our results, with a French version of the scale, add to many other ones which suggest that the AQ is a too heterogeneous questionnaire with somewhat ill-defined dimensions and non specific/ambiguous items. The questionnaire should probably be shortened and its content realigned to core features of the autism spectrum.

Mots clés :
Quotient de Spectre Autistique
Validité structurelle
Analyse factorielle confirmatoire
Version française

RÉSUMÉ

Introduction. – Le Questionnaire du Spectre Autistique (AQ, Baron-Cohen et al., 2001) est un outil d'auto-évaluation permettant de dépister des traits autistiques chez des adultes d'intelligence normale. Bien que de nombreuses versions de l'AQ existent en d'autres langues que l'anglais, il n'y a que peu de données factorielles soutenant la validité de l'instrument tel qu'il a été conçu, en cinq dimensions distinctes (Habilités sociales, Communication, Attention au détail, Partage de l'attention, Imagination) ; aucune étude de la sorte n'existe pour une version française de l'AQ. Le but de notre étude est donc de présenter une version française du questionnaire et d'explorer sa validité factorielle au moyen d'analyses factorielles confirmatoires, et, si possible, son invariance selon le sexe.

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Méthode. – Plusieurs analyses factorielles confirmatoires, utilisant l'estimateur WSLMV en raison du format de réponse catégoriel, ont été menées sur les données de questionnaire de 788 étudiants (17–25 ans) parlant français inscrits à l'université ou à de Hautes Écoles en Belgique. Le modèle original de mesure à cinq facteurs a été évalué, ainsi que plusieurs modèles alternatifs. Une analyse factorielle exploratoire a aussi été réalisée afin d'explorer les possibles sources de mauvais ajustement.
Résultats. – Aucun modèle de mesure – ni le modèle d'origine à cinq facteurs ni aucun des six autres modèles – n'a produit de statistiques ou d'indices d'ajustement s'approchant des valeurs-seuils : il n'y avait pas d'ajustement aux données. La consistance interne des sous-échelles était faible ; l'analyse factorielle exploratoire a aussi montré que pas moins de dix facteurs étaient nécessaires pour rendre compte d'environ 45 % de la variance des données.
Conclusion. – Nos résultats, obtenus avec une version française de l'échelle, s'ajoutent à ceux, nombreux, qui suggèrent que l'AQ est un questionnaire trop hétérogène composé de dimensions mal définies et d'items peu spécifiques/ambigus. Le questionnaire devrait sans doute être raccourci et son contenu réajusté pour correspondre mieux aux éléments centraux du spectre autistique.

1. Introduction

The interest for identifying and measuring autistic traits and differentiating them from other potentially disabling aspects of human psychological functioning has widely grown in the last 20 years (Volkmar, State, & Klin, 2009). One main progress in autism has probably been its nosographic evolution as illustrated in the revised DSM-5 diagnostic criteria (American Psychiatric Association, 2013; Lord & Jones, 2012; Lai, Lombardo, Chakrabarti, & Baron-Cohen, 2013); the impact of this recent theoretical shift is however by now largely unknown.

S. Baron-Cohen and his team in Cambridge developed the Autism-Spectrum Quotient based on the assumption of autistic behaviors being manifestations of an underlying continuous autism dimension (AQ; Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). This self-administered questionnaire aims to provide a quantified evaluation of the degree to which an adult with a normal intelligence quotient shows signs of the broad autism phenotype. The AQ was conceived to sample behaviors/preferences and cognitions most typical of this autistic functioning along five correlated dimensions (social skills, attention switching, attention to detail, communication and imagination). Importantly, special efforts were devoted to the development of the AQ to make items readily understandable, according to their authors.

Despite Baron-Cohen et al. studies originally supporting the validity of the AQ (2001, Woodbury-Smith, Robinson, & Baron-Cohen, 2005), several psychometrical aspects of the questionnaire have raised concern. In particular, questions about its factorial validity and the internal consistency of some of its dimensions emerged ten years ago already (Austin, 2005; Hurst, Mitchell, Kimbrel, Kwapil, & Nelson-Gray, 2007). Most studies using exploratory factor analyses on the English AQ obtain factorial solutions of modest to moderate explanatory value (% explained variance) with a reduced number of factors and items. Some core dimensions are repeatedly found, consistent with the basic dimensions in Baron-Cohen questionnaire, as "socialness", communication, and cognitive dysfunctions (restricted interests/behaviors) (Austin, 2005; Hurst et al., 2007, Stewart & Austin, 2009, Russel-Smith, Mayberry, & Bayliss, 2011). A few, more recent, studies with confirmatory factor analysis (CFA) on the total AQ clearly do not obtain the fit of the five-factor original model to their data in student samples (Hoekstra, Bartels, Cath, & Boomsma, 2008; Kloosterman, Keefer, Kelley, Summerfeldt, & Parker, 2011; Lau, Gau et al., 2013). When a fit can be obtained for a five-factor model, a series of the original items do not significantly participate to the variance (no significant loading) or are not discriminant enough (complex items) (Hoekstra et al., 2011; Lau, Gau et al., 2013; Lau, Kelly, & Peterson, 2013); consequently, the resulting item sets produce a somewhat different questionnaire content. In a very comprehensive study with their Dutch adaptation of the questionnaire, Hoekstra et al. (2008) suggested that the best fitting model for their data was that of a hierarchical factor structure with a higher-order "Social Interaction" factor made of four lower-order domains (social skill, communication, attention switching, imagination) and a second "Attention to detail" factor; a subset of 28 items resulted from their combined exploratory and confirmatory analyses. Among authors using CFA, Kloosterman et al. (2011) also conclude that shortening the AQ allows a better adjustment to the data; maybe, as sketched by Kuennsberg, Murray, Booth, and McKenzie (2012), "a large variability in the factor models across samples" is rather the main lesson of all these studies. For a review of factorial analyses on the original 50-items AQ, see Table 1[1].

Despite these psychometrical restrictions, many translated versions of the questionnaire were developed, i.e. in Japanese (Wakabayashi, Baron-Cohen, Wheelwright, & Tojo, 2006), Dutch (Hoekstra et al., 2008; Ketelaars et al., 2008), Italian (Ruta, Mazzone, Mazzone, Wheelwright, & Baron-Cohen, 2011), Persian (Mohammadi, Zarafshan, & Ghasempour, 2012), Chinese (Lau, Gau et al., 2013), Polish (Pisula et al., 2013), and Turkish (Kose et al., 2013). In France, Rousselot-Pailley, Fortin, Golse, Falissard, and Robel (2011) and Robel et al. (2014) studied an adapted and shortened version of the AQ rather than preserving and translating the questionnaire, which does not allow assessing the quality of the original AQ in French; Sonié et al. (2011, 2013) present AQ data in French on adolescents but without any factorial validity assessment. This is also the case with Lepage, Lortie, Taschereau-Dumouchel, and Théoret (2009) in Canada who published basic data on a French-Canadian version of the AQ, without any structural analysis of the instrument.

The aim of the present study is therefore to translate the AQ into French and test for its factorial validity with CFA. Aside the five-dimension Baron-Cohen original measurement model, alternative models – as suggested by the aforementioned research studies – will be considered and substantive analyses of the CFA and EFA outputs will provide further theoretical insight into the autism-spectrum assessment tool. In addition, because the AQ was designed with no specificity for gender, measurement invariance across men and women will be considered provided that an ade-

[1] In order to get all published scientific work on factorial studies of the AQ, we proceeded with a systematic search on the following databases, available at the library of the Université libre de Bruxelles: Proquest, ADB, CIBLE+, EBSCO. The search was constrained by the following criteria: the paper should be written in English or French, have been published in a Journal with a lecture committee, must report on a study of the AQ (keyword: "autism spectrum quotient"); the questionnaire data must have been submitted to a factor analysis (at least an exploratory one), with subjects being adults (adolescents excluded).

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