

A Preliminary Report of a Validity Study of the Autism-Spectrum Quotient Children's Version (AQ-Child) in Hong Kong

Patsy P S Wong, Ivy H Y Cheung, Patrick W L Leung

Department of Psychology, The Chinese University of Hong Kong

Raymond W S Chan, K K Chung

Child and Adolescent Team, Kwai Chung Hospital

Estella K F Woo, Annie C S Sheh

Child Assessment Service, Department of Health, Hong Kong SAR

Abstract

The Autistic Spectrum Quotient-Children's version (AQ-Child; Auyeung, Baron-Cohen, Wheelwright & Allison, 2008) is a 50-item parent-report questionnaire which aims at quantifying autistic features in children. In this preliminary study, we replicated the UK study in Hong Kong with a Chinese version of AQ-Child using a control group (n=226) comprised children from a mainstream primary school, and a clinical group (n=48) comprised children diagnosed as having autism spectrum conditions (ASC). Results showed that clinical group (mean=85.7) scored significantly higher than the control group (mean=62.4) ($p<0.01$). Among the controls, males scored (mean=64.0) higher than females (mean=61.2) with marginal significance ($p=0.06$) while there was no significant gender difference in the clinical group. The results were commensurate with that of the UK study. Ongoing recruitment of participants is in progress and thus with a larger sample size, the psychometric properties (including validity, internal consistency, underlying factor structure) of the AQ-Child Chinese version could then be explored further.

Keywords: Autism Spectrum Quotient-Children's Version, Autism, screening

Introduction

The Autism-Spectrum Quotient for adults (AQ-Adult) was developed as a self-administered, brief screening instrument for autism spectrum disorders in adults of normal intelligence (Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001). It is a 50-item questionnaire and has a range of score from 0 to 50. Results showed that adults with

Asperger syndrome (AS) or high-functioning autism (HFA) scored significantly higher than the control. With a cut-off of 32, 80% of the adults with AS/HFA scored at or above this cut-off while only 2% of controls did so. Besides, the AQ-Adult demonstrated high predictability of those who received a diagnosis of AS/HFA. Out of the 11 adults among the controls who scored 32+ and agreed for clinical interview, 7 met criteria for AS or HFA using DSM-IV,

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while the rest met at least 3 diagnostic criteria. Another study conducted in a clinic setting also found the AQ-Adult strongly predictive of who receives a diagnosis of AS (Woodbury-Smith, Robinson, Wheelwright & Baron-Cohen, 2005).

Considering the usefulness of the AQ-Adult, a revised version was adopted from the AQ-Adult and tested with adolescents of age from 9.8 to 15.4 (Baron-Cohen, Hoekstra, Knickmeyer & Wheelwright, 2006). The AQ-Adol retained the format and content of the AQ-Adult with minor modifications on item wordings to suit a parent-report style. Two clinical groups (AS/HFA and classic autism) and one control group were tested. The clinical groups as a whole scored significantly higher than the control, while there was no significant difference between the two clinical groups. A cut-off of 30 was set in which 90% of the two clinical groups combined scored at or above this cut-off, versus none from the controls.

In view of the success of the AQ-Adult and AQ-Adol in identifying autistic traits, a children's version of the AQ (AQ-Child) was designed and tested with children from 4 to 11 years (Auyeung, Baron-Cohen, Wheelwright & Allison, 2008). Similar to the AQ-Adol, the AQ-Child is a parent-report 50-item questionnaire, but with 12 items revised since they were not age-appropriate for children. Results showed a significant score difference existed between the clinical group (Autism and AS/HFA) and controls. The AQ-Child also demonstrated high sensitivity (95%) and specificity (95%). With a cut-off of 76 (total score: 150), 95% of the clinical group scored at or above the cut-off while only 4% of the controls did so. In addition, control males were found to be scored significantly higher than control females, a result which was consistent with all the AQ related studies mentioned above.

Similar findings were replicated in a

Japan study testing a group of children of normal IQ with a translated version of the AQ questionnaire (Wakabayashi et al., 2007). The two clinical groups, AS/HFA and pervasive developmental disorder not otherwise specified (PDD-NOS), scored significantly higher than controls. In this Japanese version, a lower cut-off (25) was set compared with the UK study. While 83% of the AS/HFA group and 73% of the PDD-NOS group scoring at or above this cut-off, only 4% of the controls did so.

Structure of AQ

The AQ-Adult, AQ-Adol and AQ-Child share the same structure, which is composed of five domains of autistic traits, namely social skill (items 1,11,13,15,22,36,44,45,47,48), attention switching (items 2,4,10,16,25,32,34,37,43,46); attention to detail (items 5,6,9,12,19,23,28,29,30,49); communication (items 7,17,18,26,27,31,33,35,38,39); and imagination (items 3,8,14,20,21,24,40,41,42,50). These items were selected in accordance with the demonstrated areas of cognitive abnormality in autism (Baron-Cohen et al., 2001) and the "triad" of autistic symptoms, which are significant qualitative impairment in social interaction and communication, in addition to restrictive repetitive and stereotyped patterns of behavior (APA, 2000). There are 10 items in each domain, which add up to a total of 50 items in the questionnaire. All items were randomized with respect to (a) expected response from a high-scorer, and (b) their related domain. Approximately half of the items were reversely worded to avoid response bias. In the AQ-Adult and AQ-Adol, items were scored as 1 for a response in the "autistic" direction (i.e. poor social and communication skills, poor imagination and attention-switching, and exceptional attention) and 0 otherwise. Hence the range of score was from 0 to 50. However, a four-point Likert scale (0=definitely disagree to 3=definitely agree) was adopted in the

Correspondence concerning this article should be addressed to Ms. Patsy P S Wong, Department of Psychology, The Chinese University of Hong Kong, Shatin, N.T.
Email: patsypswong@gmail.com

scoring system of AQ-Child because it was believed that additional information could be captured through a finer division of response. The range of scores thus became 0 to 150. The higher the score an individual got, the more prominent the presence of abnormal or autistic-like behavior.

Present Study

Previous research has already demonstrated that AQ-child could be used to quantify the degree of autistic features in children aged from 4-11 years old. Despite that the validity of the AQ-Child has been replicated in a Japanese study, no study has been done within the Chinese culture. Therefore the main objective of our present study was to investigate any possible cultural differences in AQ-child in terms of scoring pattern and distinction between the control and clinical groups.

Method

Participants

Two groups of samples of Chinese participants were recruited.

Group 1 comprised 226 children (79 males, 103 females, 44 undisclosed) were recruited by stratified sampling (random selection of 2 classes from each education level) from a mainstream primary school in Hong Kong. Their mean age was 9.31 (SD = 1.77, range = 6 to 13). The parent-report questionnaires, with consent form attached, were distributed by the class teachers to the students who were instructed to return within two days.

Group 2 comprised 48 children (46 males, 2 females) diagnosed with autism spectrum conditions (ASC) by psychiatrists and clinical psychologists using DSM-IV-TR criteria (APA, 2000). They were recruited from consecutive referrals presenting with ASC symptoms at a typical government-funded child psychiatric

clinic (Yaumatei Child Psychiatric Center) and a Child Assessment Center. Their mean age was 8.67 (SD = 1.93, range = 5 to 11). The parents of those children were invited to complete the questionnaire while they were waiting at the clinic or center.

The AQ-Child-C

The AQ-Child-C was a Chinese version of the AQ-Child (Auyeung, Baron-Cohen, Wheelwright & Allison, 2008). The AQ-Child was translated into Chinese and back-translated for cross-checking by two independent professional translators. It was pilot-tested and revised by a panel of Chinese-English bilingual clinical psychologists, clinical psychology trainees and a third professional translator. The final version was approved by the clinical psychologists.

Additionally, the following were appended at the end of the AQ-Child-C: eight questions on demographic information, including child's gender, date of birth, education, family composition; parent's occupation, education, age; and household income of the family. For the control group, four screening questions checking on the child's emotional and behavioral problems were also appended in addition to the demographic questions.

Scoring the AQ-Child-C

Following the AQ-Child (Auyeung, Baron-Cohen, Wheelwright & Allison, 2008) scoring method, a 4-point Likert scale was used as the response scale: 0 represented "definitely disagree", 1 represented "slightly disagree", 2 represented "slightly agree" and 3 represented "definitely agree" on the following items: 2, 4, 5, 6, 7, 9, 12, 13, 16, 18, 19, 20, 21, 22, 23, 26, 33, 35, 39, 41, 42, 43, 45, 46. The remaining items were reversely scored. That is, higher scores related to more "autistic-like" behavior. Questionnaires with more than five missing items were discarded for subsequent analyses

($n = 3$, all from controls). The total score of a questionnaire with five or fewer missing items was calculated as follows: total AQ-Child-C score + (mean item score X number of missing items) (Hoekstra et al., 2007). Besides, questionnaires with an affirmative answer made to any of the four screening questions on emotional or behavioral problems were also discarded for subsequent analyses ($n = 67$, all from controls).

Results

Group Differences

Mean AQ scores (total) for each group, broken down by sex and by sub-domain were shown in Table 1.

Comparing groups using an ANOVA of total AQ score by Group and Sex, a significant effect of Group was found ($F(1, 226) = 34.14$, $p < .001$). The clinical group (mean = 85.7, SD = 16.6) scored significantly higher than the control group (mean = 62.4, SD = 9.5). A further examination into the sub-domains confirmed that the clinical group scored significantly higher than the control group for all sub-domains ($t_s = 2.05$ to 13.23 , $p_s < .05$).

However, the main effect of Sex was not significant ($F(1, 226) = .008$, $p > .05$) and there was no significant interaction between Group and Sex ($F(1, 226) = .545$, $p > .05$). While no significant sex difference was found in the clinical group ($t = .08$, $p > .05$), T test revealed a marginal significant sex difference in the control group ($t = 1.9$, $p = .06$), with males (mean = 64.0, SD = 9.3) scored slightly higher than females (mean = 61.2, SD = 9.8).

Effect Size

The effect size between the clinical and control groups were compared and was found to be moderate ($r = .65$). The Chinese version of AQ-Child could fairly discriminate between

normal children and those with autism. However, this effect size was smaller than those of past UK and Japan studies (r ranged from .79 to .88).

Discussion

The present study reported the preliminary results of our AQ-Child Chinese version for quantifying the degree of autistic features of Chinese children in Hong Kong. Consistent with the UK studies, children with autistic spectrum conditions scored significantly higher than controls on the AQ-Child-C. However, different from the UK studies, there was no significant effect of sex on AQ-Child-C, though a marginal significance was found between control males and females, with control males scored higher than the control females. The effect size of the current study ($r = .65$) was moderate, but was smaller than that of the UK and Japan studies (r ranged from .79 to .88).

In order to further explore the generalizability and psychometric properties (including validity, internal consistency, underlying factor structure) of the AQ-Child-C to compare with those of the UK studies, ongoing recruitment for both control and clinical groups is in progress to expand the sample size to include children from age 4 to 11. For control, three kindergartens and two additional mainstream primary schools of different bandings and districts of Hong Kong have been recruited in this regard. With a larger sample size, it would be more feasible to determine a cut-off point for the AQ-Child-C which might aid clinicians in assessing the degree of caseness of autism or AS/HFA. Moreover, children with autism may exhibit inattentive features and autism was actually found to be 31% comorbid with ADHD (Leyfer, et al., 2006). In our study, we would also try to explore the discriminating ability of AQ-Child-C between children with autism spectrum conditions and children with ADHD.

Table 1
Mean scores for total and sub-domains by group

	AQ total	Communication	Attention to details	Social Skills	Imagination	Attention Switching
Control						
Mean	62.4	10.9	14.2	10.4	12.4	14.5
SD	9.5	4.0	3.9	3.8	3.6	3.1
ASC						
Mean	85.7	18.5	15.7	16.9	16.8	17.9
SD	16.6	4.6	5.9	5.4	4.8	3.6
Control Female						
Mean	61.2	10.4	13.6	10.3	11.2	14.4
SD	9.8	4.0	3.8	3.8	3.3	2.9
Control Male						
Mean	64.0	11.6	14.9	10.8	13.8	14.1
SD	9.3	3.9	3.9	3.9	3.3	3.4
Clinical Female						
Mean	89.0	22.5	11.5	19.5	17.5	18.0
SD	17.0	0.7	0.7	0.7	2.1	7.1
Clinical Male						
Mean	85.5	18.3	15.8	16.8	16.7	17.8
SD	4.2	4.6	6.0	5.4	4.9	3.5
Control vs ASC						
t-value	13.23**	11.74**	2.05*	9.89**	7.25**	6.66**
Control Female vs Control Male						
t-value	1.9	2.05*	2.22*	0.87	5.39**	0.66
	p-value=0.06					
Clinical Female vs Clinical Male						
t-value	0.28	1.25	1.01	0.71	0.22	0.06

*p<0.05, **p<0.01

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摘要

對自閉症類商數-兒童版(中文版)測量效度探究的初步研究報告

自閉症類商數-兒童版是一份旨在量化兒童自閉症症狀而由父母填寫的50題問卷。在本初步研究中，使用AQ-Child中文版，結果顯示臨床組分數 (mean = 85.7) 顯著高於對照組 (mean = 62.4)。在對照組中，男性分數 (mean = 64.0) 高於女性

(mean=61.2)，結果邊緣性顯著 ($p = .06$)，而在臨床組中沒有顯著的性別差異。此與英國研究的結果類似。研究仍在擴大樣本量，日後可以對AQ-Child中文版進行進一步的心理測量學探究。

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