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BRIEF REPORT

Brief Report: Development of the Adolescent Empathy and Systemizing Quotients

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Abstract Adolescent versions of the Empathy Quotient (EQ) and Systemizing Quotient (SQ) were developed and administered to $n = 1{,}030$ parents of typically developing adolescents, aged 12–16 years. Both measures showed good test–retest reliability and high internal consistency. Girls scored significantly higher on the EQ, and boys scored significantly higher on the SQ. A sample of adolescents with Autism Spectrum Conditions (ASC) ($n = 213$) scored significantly lower on the EQ, and significantly higher on the SQ, compared to typical boys. Similar patterns of sex differences and cognitive brain types are observed in children, adolescents and adults, suggesting from cross-sectional studies that the behaviours measured by age-appropriate versions of the EQ and SQ are stable across time. Longitudinal studies would be useful to test this stability in the future. Finally, relative to typical sex differences, individuals with ASC, regardless of age, on average exhibit a 'hyper-masculinized' profile.

Keywords Empathy · Systemizing · Autism · Sex differences · Adolescents

Introduction

The Empathizing–Systemizing (E–S) model of typical sex differences proposes that females on average have a stronger tendency to empathize (to identify another person's emotions and thoughts, and to respond to these with an appropriate emotion), while males on average tend to have a stronger tendency to systemize (to analyze or construct rule-based systems—whether mechanical, abstract or another type) (Baron-Cohen 2002). To measure these dimensions, the Empathy Quotient (EQ) and Systemizing Quotient (SQ) were developed (Baron-Cohen et al. 2003; Baron-Cohen and Wheelwright 2004).

The EQ and SQ are questionnaires with a Likert format and contain a list of statements about real life situations, experiences and interests where empathizing or systemizing abilities are required. Findings from the EQ in children and adults have shown that on average females score significantly higher than males (Auyeung et al. 2009; Baron-Cohen and Wheelwright 2004; Carroll and Chiew 2006; Wheelwright et al. 2006). Results from the SQ indicate that on average males score significantly higher than females (Auyeung et al. 2009; Baron-Cohen et al. 2003; Carroll and Chiew 2006; Wheelwright et al. 2006). Performance in individuals with Autism Spectrum Conditions (ASC) has shown an extreme of the typical male performance with adults and children scoring lower than typical males on the EQ and higher than typical males on the SQ (Auyeung et al. 2009; Baron-Cohen et al. 2003; Baron-Cohen and Wheelwright 2004; Lai et al. 2011; Wheelwright et al. 2006).

Using standardized scores on the EQ and SQ, a series of cognitive 'brain types' can be calculated, where individuals are described as being 'balanced' (Type B), better at Empathizing (Type E) or better at Systemizing (Type S). 'Extreme' Empathizing (Extreme E) or Systemizing (Extreme S) types are also assigned where an individual shows a significant discrepancy in different directions (Goldenfeld et al. 2005; Wheelwright et al. 2006). The Type S ($S > E$) is more common in males, whilst the Type

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E (E > S) is more common in females. Extreme types are also found, and a large proportion of children (47.2%) and adults (61.6%) with ASC fall in the Extreme S (S ≫ E), compared to approximately 5% of typical males and 1% of typical females (Auyeung et al. 2009; Wheelwright et al. 2006).

In this study, Adolescent versions of the Empathy (EQ) and Systemizing Quotients (SQ) were developed and tested. Using these new measures, sex differences and cognitive brain types are examined in adolescents with and without a diagnosis of ASC.

Method

Instruments

For both the Adolescent EQ and SQ, parents are asked to indicate how strongly they agree with each statement about their child by ticking one of four options: 'definitely agree', 'slightly agree', 'slightly disagree', or 'definitely disagree'. Each of the items scores 1 point if the respondent records the behavior mildly, or 2 points if the respondent records the behavior strongly. To avoid a response bias, approximately half the items were worded to produce a "disagree" response and half to produce an "agree" response. The questionnaires were adapted from the adult and child versions of the EQ and SQ. Items were revised to be age-appropriate but kept as close to the Adult and Child versions as possible, with most questions aimed at the same behaviors. See "Appendix 1" for the Adolescent EQ and "Appendix 2" for the Adolescent SQ. The scoring methods for each questionnaire are also shown in the appendices.

Participants

The Adolescent EQ and SQ were completed by mothers of adolescents between 12 and 16 years of age ($M = 14.08$, SD = 1.25), comprising 2 groups:

Group 1 consisted of typically developing adolescents (mean age = 14.12, SD = 1.26) who were recruited from two sources. The first source included $n = 741$ (422 girls, 319 boys) who were participating in a large epidemiological study of social and communication skills in primary schools in and around Cambridge, UK (Baron-Cohen et al. 2009; Scott et al. 2002; Williams et al. 2005). From this group, ($n = 9$) questionnaires were received with five or more blank or ambiguous items, and were considered incomplete. These data were discarded, with $n = 732$ (417 girls, 315 boys) participants remaining. The second source included $n = 298$ (154 girls, 144 boys) who were recruited via the Cambridge University Psychology website (http://www.cambridgepsychology.com).

Group 2 consisted of $n = 213$ (39 girls, 174 boys) adolescents with ASC, diagnosed by psychiatrists or an appropriate clinician (e.g. clinical psychologists) using established criteria (APA 1994; ICD-10 1994). Only children with a diagnosis of autism ($n = 43$, mean age = 13.71 (SD = 1.18)) or Asperger Syndrome/high functioning autism ($n = 170$, mean age = 13.95, (SD = 1.23)) were included in the study. Mothers of children with ASC were recruited via the Cambridge University Autism Research Centre website (http://www.autismresearchcentre.com) and completed the questionnaires online.

Results

Item Analysis

Using data from the typically developing group, an item analysis was conducted to examine if there were items that could be eliminated to reduce the length of the questionnaires. Items with corrected item-total correlation values below 0.3 were not included when calculating total scores. For the EQ, the excluded items were numbers 6, 10, 23, 25 and 37, with 35 remaining items. For the SQ, the excluded items were numbers 3, 5, 8, 18, 22, 25, 28, 31, 35, 38, 40, 44, 45, 48, 50 and 52, with 39 remaining items. All subsequent analyses are conducted using the retained items.

Internal Consistency

Cronbach's alpha coefficients were calculated using the retained items, and showed high coefficients for both the EQ ($\alpha = 0.94$) and SQ ($\alpha = 0.89$).

Descriptive Information

Table 1 shows means, standard deviations and ranges of the EQ and SQ scores by group.

See Table 2 for effect sizes found by comparing scoring patterns for typical boys, typical girls and adolescents with ASC.

Test–Retest Reliability

Six months after initial contact, $n = 375$ participants from the typically developing group were asked to complete a second copy of the EQ and SQ in order to examine test–retest reliability, resulting in 333 test–retest pairs (171 girls, 162 boys). Intra-class correlations for the EQ ($r = 0.84$, $p < 0.001$) and SQ ($r = 0.94$, $p < 0.001$) both show good test–retest reliability. These additional responses were not included in subsequent analyses.

Table 1 Mean scores for the Adolescent EQ and SQ by group

	EQ total			SQ total		
	M	SD	Range	*M*	SD	Range
Typical group ($n = 1{,}030$)	43.75	14.66	3–70	24.13	12.65	1–72
Typical girls ($n = 571$)	46.56	13.77	4–70	21.64	12.05	1–72
Typical boys ($n = 459$)	40.25	15.00	3–70	27.22	17.71	1–68
ASC group ($n = 213$)	10.38	9.20	0–60	33.65	15.63	0–76
ASC girls ($n = 40$)	13.93	12.61	2–60	29.17	15.82	6–76
ASC boys ($n = 173$)	9.55	8.04	0–55	34.69	15.45	0–73

Table 2 Group difference effect sizes for EQ, SQ and *D* (difference score between standardized EQ and SQ) scores

	EQ total	SQ total	*D*
Typical girls versus typical boys	0.50	0.28	0.52
ASC girls versus ASC boys	0.42	0.26	0.50
Typical boys versus ASC group	2.32	0.51	2.08
Typical girls versus ASC group	3.30	1.48	2.76

An effect size between 0.2 and 0.4 is considered to be small. A value between 0.5 and 0.7 is considered a medium effect size and a value >0.8 is considered a large effect size (Cohen 1988)

EQ and SQ Correlations

A correlation was performed for all groups together, yielding a significant negative correlation between EQ and SQ score ($r = -0.23$, $p < 0.001$). When the typically developing and ASC groups were examined separately, the correlations between EQ and SQ score were significant in the typical group ($r = -0.09$, $p < 0.001$) but not in the ASC group ($r = 0.10$, $p > 0.05$) respectively.

Group Comparisons

The Adolescent Empathy Quotient (EQ)

A wide range of scores was obtained for each group with no floor or ceiling effects. The Kolmogorov–Smirnov test of normality for all participants was significant ($D_{(1243)} = 0.09$, $p < 0.001$) which would be expected given the large sample size. Skewness (−0.48) and kurtosis (2.64) were acceptable, indicating that the scores for this measure have an approximately normal distribution.

A one-way between subjects analysis of variance (ANOVA) was conducted to examine if group (typical girls, typical boys, girls with ASC and boys with ASC) differences existed. There was a significant difference between groups ($F_{(3,1239)} = 374.86$, $p < 0.001$). Post hoc Tukey HSD tests showed significant differences ($p < 0.001$) with typical girls scoring the highest ($M = 46.56$, SD = 13.77), followed by typical boys ($M = 40.25$, SD = 15.00). In Group 2, girls ($M = 13.93$, SD = 12.61) and boys with ASC ($M = 9.55$, SD = 8.04) scored significantly lower than typically developing children ($p < 0.001$). However, no significant differences were found between boys and girls with ASC ($p > 0.05$). See Fig. 1 which shows the distribution of EQ scores for girls, boys and children with ASC.

The Adolescent Systemizing Quotient (SQ)

The Kolmogorov–Smirnov test of normality was significant ($D_{(2343)} = 0.08$, $p < 0.001$) for SQ scores. Skewness (0.78) and kurtosis (3.43) were acceptable, indicating that the scores were reasonably normally distributed. For each group, a wide range of scores was obtained and no floor or ceiling effects were observed.

The one-way ANOVA revealed a significant main effect for ASC diagnosis ($F_{(3,1239)} = 49.61$, $p < 0.001$). Tukey HSD pairwise comparisons revealed significant differences ($p < 0.001$), with typical boys ($M = 27.22$, SD = 12.71) scoring higher than typical girls ($M = 21.64$, SD = 12.05). Girls with ASC ($M = 29.18$, SD = 15.82) scored significantly higher than typically developing girls ($p < 0.01$). No difference between girls with ASC and typically developing boys ($p > 0.05$) was observed. Boys with ASC ($M = 34.69$, SD = 15.45) scored significantly higher than typical girls and boys ($p < 0.001$). No significant differences were found between boys and girls with ASC ($p > 0.05$). See Fig. 2 for the SQ score distribution.

Cognitive 'Brain Types'

Standardized scores were calculated for both the EQ and SQ according to the formulae suggested by Goldenfeld et al. (2005):

$$\text{E(standardized)} = [(\text{EQ observed} - <\text{EQ mean for typical population}>)/\text{maximum attainable score for EQ}]$$

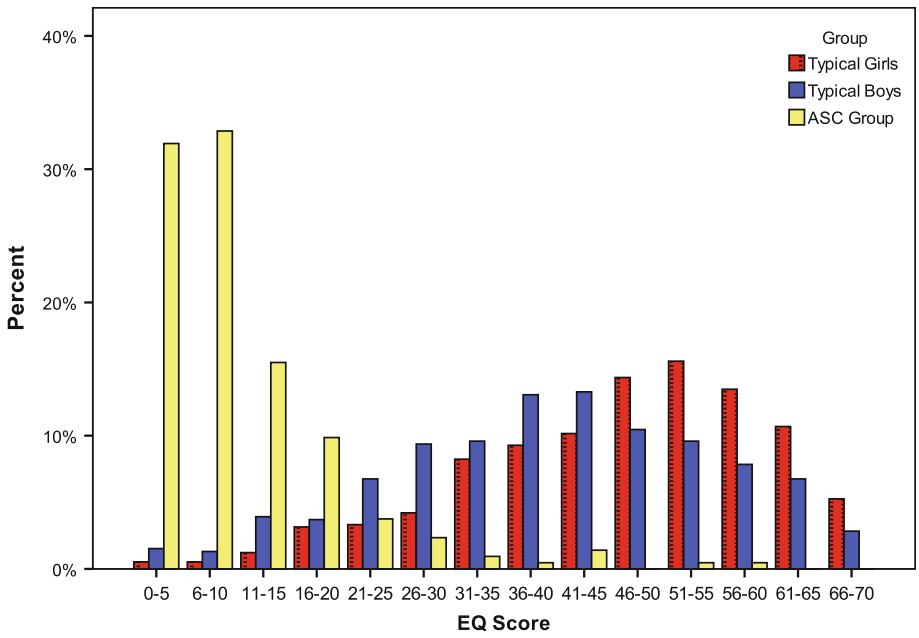

Fig. 1 EQ scoring patterns by group. *Note:* Girls with ASC did not score differently than boys with ASC on the EQ, therefore boys and girls with ASC have been combined

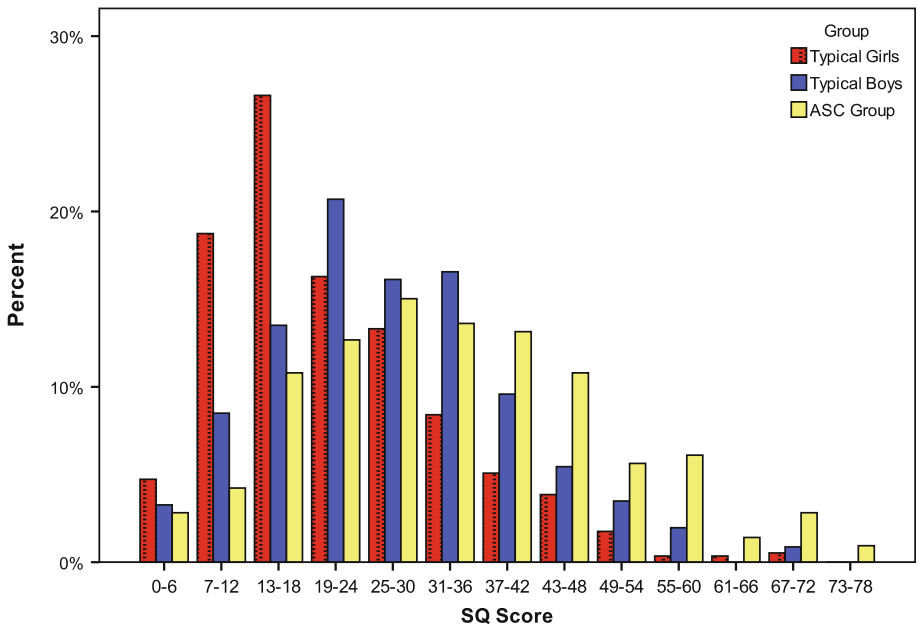

Fig. 2 SQ scoring patterns by group. *Note:* Girls with ASC did not score differently than boys with ASC on the SQ, therefore boys and girls with ASC have been combined

$$\begin{aligned}&\mathrm{S(standardized)}\\&\quad=[(\mathrm{SQ\,observed}-<\mathrm{SQ\,mean\,for\,typical\,population}gt)/\\&\qquad\mathrm{maximum\,attainable\,score\,for\,SQ}]\end{aligned}$$

The typically developing group means were used: EQ ($M = 43.75$; SD $= 14.66$) and SQ ($M = 24.13$; SD $= 12.65$). The standardized E and S variables were used to produce a difference score (D). This new variable was defined as follows:

$$\begin{aligned}&D(\text{difference between the normalized SQ and EQ scores})\\&\quad=(\mathrm{S}-\mathrm{E})/2\end{aligned}$$

Using the method suggested by Goldenfeld et al. (2005) for adult EQ and SQ data, cognitive 'brain types' were numerically assigned according to the percentiles of the typically developing group on the 'D' scale. The lowest scoring 2.5% were classified as Extreme Type E ($D < -0.243$). Participants who scored between the 2.5th and 35th percentiles were classified as Type E ($-0.243 \leq D < -0.061$). Those scoring between the 35th and 65th percentile were classified as Type B ($-0.061 \leq D < 0.047$). Type S was defined by scores between the 65th and 97.5th percentile ($0.047 \leq D < 0.286$), and the top 2.5% were classified as Extreme Type S ($D \geq 0.286$).

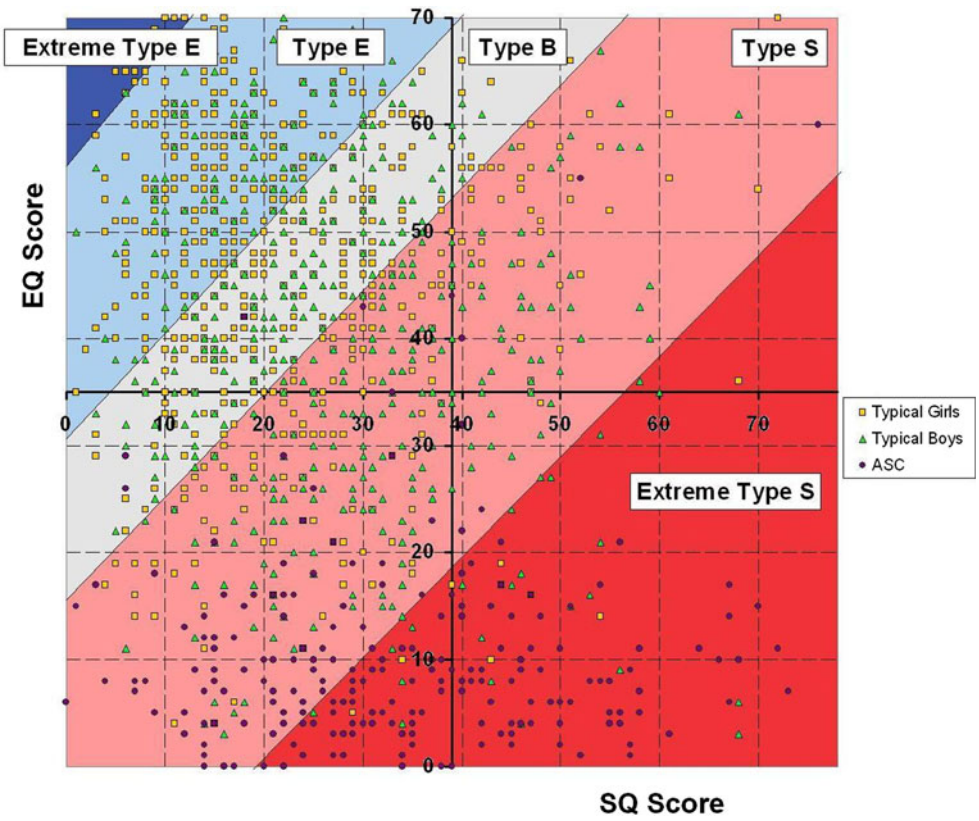

Fig. 3 Cognitive 'brain types' translated into raw scores on the Adolescent EQ and SQ

A one-way between subjects ANOVA was used to test for group differences in *D* scores. Results showed a significant effect of group ($F_{(3,1239)} = 351.20$, $p < 0.001$). Tukey HSD post hoc tests show that all groups differed significantly (all $p < 0.001$) from each other with typical girls ($M = -0.04$, SD = 0.13) tending towards the Extreme E or Type E 'brain types', followed by typical boys ($M = 0.00$, SD = 0.14), girls with ASC ($M = 0.25$, SD = 0.11) and boys with ASC ($M = 0.31$, SD = 0.11) showing a tendency to fall in the Type S or Extreme S 'brain types'. Figure 3 shows a visual representation of the cognitive 'brain types'. In this figure, from the top left hand corner and progressing towards the lower right corner (increasing *D* score), it can be clearly seen that the highest concentration of participants changes from typical girls to typical boys, and adolescents with ASC.

Table 3 shows cognitive brain type proportions for this sample. The Table also shows brain type proportions for observed school-aged children aged 4–11 years (reported in Auyeung et al. 2009), and adults (reported in Wheelwright et al. 2006).

Table 3 Percent of children, adolescents and adults with each 'brain type' measured in *D* (difference score between standardized EQ and SQ)

Brain type	*D* percentile (per)	Group								
		girls[a] $n = 675$	Boys[a] $n = 581$	ASC children[a] $n = 265$	Adolescent girls $n = 571$	Adolescent boys $n = 459$	Adolescent ASC $n = 213$	Typical women[b] $n = 1{,}038$	Typical men[b] $n = 723$	ASC adults[b] $n = 125$
Extreme E	Per < 2.5	4.0	0.5	0	3.5	1.1	0	4.3	0.1	0
Type E	$2.5 \leq$ per < 35	41.9	20.3	0	41.2	21.6	0	44.8	15.1	0
Type B	$35 \leq$ per < 65	31.7	29.5	1.9	30.1	29.8	4.0	29.3	30.3	6.4
Type S	$65 \leq$ per < 97.5	21.2	45.6	50.9	23.5	43.8	42.3	20.7	49.5	32
Extreme S	Per ≥ 97.5	1.2	4.1	47.2	1.8	3.7	55.9	0.9	5	61.6

[a] Data from Auyeung et al. (2009)

[b] Data from Wheelwright et al. (2006)

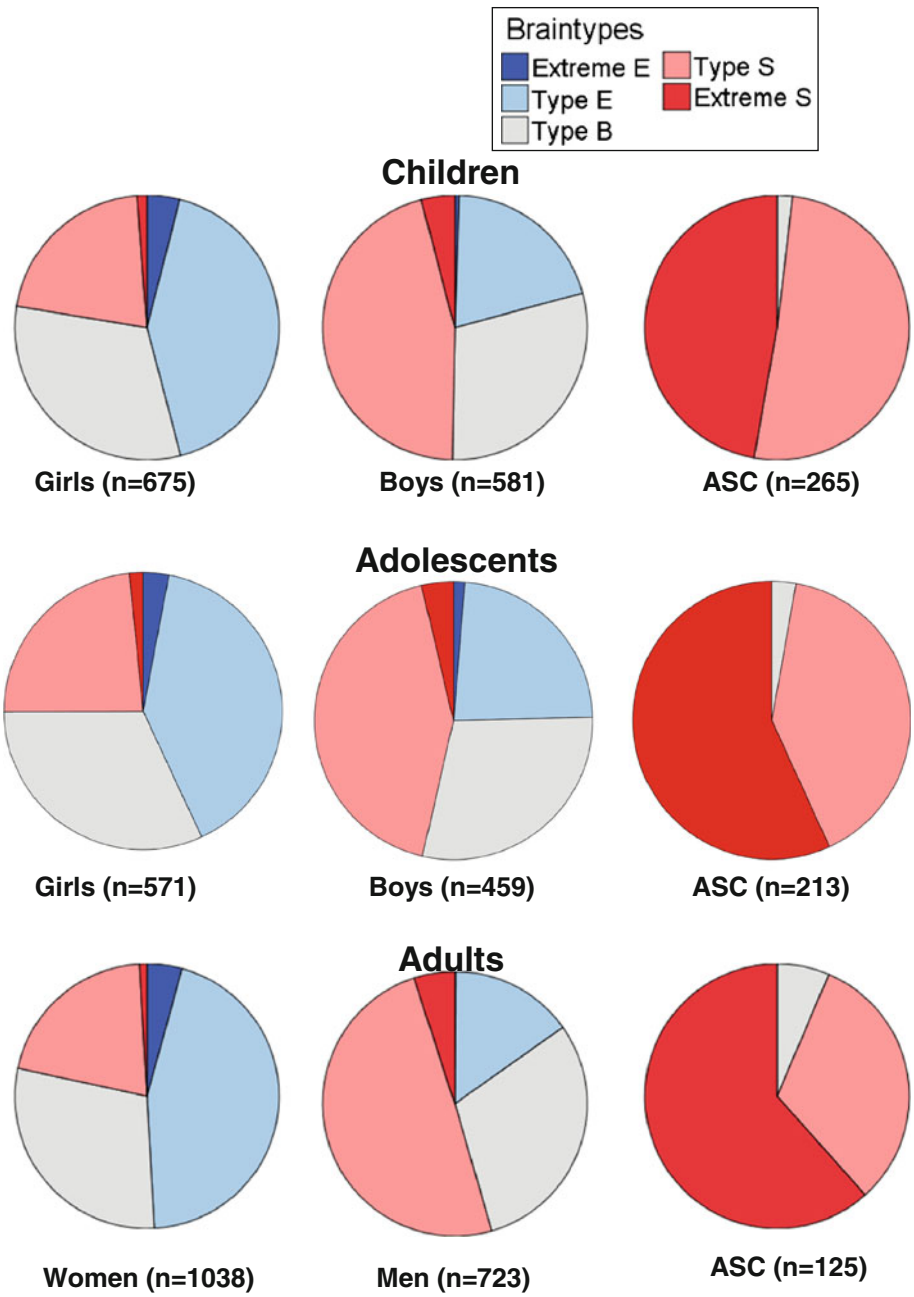

Fig. 4 Cognitive 'brain type' proportions in children, adolescents and adults

These cognitive brain type proportions observed in the different age groups are also visually represented in Fig. 4.

Discussion

The present study reports the development of the Adolescent Empathy Quotient (EQ) and Systemizing Quotient (SQ). Like the child and adult versions, these measures show good variability, internal consistency and test retest reliability. The sex differences observed were consistent with patterns observed in children and adults (Auyeung et al. 2009; Wheelwright et al. 2006), with typical adolescent girls scoring higher on the EQ than typical boys, who score higher than adolescents with ASC. Adolescents with ASC scored highest on the SQ, followed by typical boys then typical girls. Using the standardized EQ and SQ scores to calculate cognitive 'brain types', the majority of typical adolescent girls are Type E, the majority of typical boys are Type S and the majority of adolescents with ASC are Extreme S.

Examination of the cognitive brain type proportions shows that these are consistent between cross-sectional samples of school-aged children, adolescents and adults. The scoring patterns observed in the child, adolescent and adult versions suggest that the EQ and SQ can be used to quickly and easily assess these cognitive tendencies in a wide developmental age range. Consistency between the different versions of these questionnaires are observed not only in the sex differences and cognitive brain types, but also in the scoring patterns of individuals with an ASC diagnosis who show a hyper-masculinized profile compared to controls.

Similar to findings in children and adults, a negative correlation was observed between the EQ and SQ when all data were analyzed together. However, when the ASC group was analyzed separately from controls, the relationship was significant for controls but not the ASC group. Understanding if these two processes share any common underlying factor is nevertheless an important question for future research, given that they both correlate with the same biological factor (fetal testosterone) (Auyeung et al. 2006; Chapman et al. 2006).

A limitation is that independent verification of diagnoses for the adolescents with ASC was not possible since this group was recruited from the University of Cambridge Autism Research Centre database of volunteers. Parents completed the questionnaires online, which allowed for a much larger sample than could otherwise be obtained. However, parents provided additional information about their child's diagnosis such as the date of diagnosis, and the clinic where the diagnosis was made. Other studies show excellent agreement between parent- or self-reported diagnosis and clinician-reported diagnosis (Daniels et al. 2011).

These new tools appear to be useful for measuring individual, sex and group variability in typically developing adolescents as well as those with ASC. Data from the current study as well as previous studies (Auyeung et al. 2009; Wheelwright et al. 2006) suggest that the patterns in sex differences and cognitive brain types are found from an early age and remain stable throughout adolescence and adulthood, at least as assessed cross-sectionally. Future research could test this longitudinally. The current findings lend further weight to the E–S model of sex differences and show clear evidence of hypermasculinization in individuals with ASC. The biological basis of this hypermasculinization is an important focus of future research (Baron-Cohen et al. 2005, 2011).

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Appendix 1: The Adolescent EQ

Please read each statement very carefully and rate how strongly you agree or disagree with it by ticking the box that best describes your child.

		Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
1.	My child can easily tell if someone else wants to enter a conversation				
2.	My child finds it difficult to explain to others things that s/he understands easily, when they don't understand it the first time				
3.	My child really enjoys caring for other people				
4.	My child finds it hard to know what to do in a social situation				
5.	My child often goes too far in driving his/her point home in a discussion				
6.	*It doesn't bother my child too much if s/he is late meeting a friend*				
7.	Friendships and relationships are just too difficult, so my child tends not to bother with them				
8.	My child often finds it difficult to judge if something is rude or polite				
9.	In a conversation, my child tends to focus on his/her own thoughts rather than on what his/her listener might be thinking				
10.	*When s/he was younger, my child enjoyed cutting up worms to see what would happen*				
11.	My child can pick up quickly if someone says one thing but means another				
12.	It is hard for my child to see why some things upset people so much				
13.	My child finds it easy to put him/herself in somebody else's shoes				

Appendix 1 continued

	Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
14. My child is good at predicting how someone will feel				
15. My child is quick to spot when someone in a group is feeling awkward or uncomfortable				
16. If my child says something that someone else is offended by, s/he thinks that that's their problem, not his/hers				
17. If anyone asked my child if s/he liked their haircut, s/he would reply truthfully, even if s/he didn't like it				
18. My child can't always see why someone should have felt offended by a remark				
19. Seeing people cry doesn't really upset my child				
20. My child is very blunt, which some people take to be rudeness, even though this is unintentional				
21. My child doesn't tend to find social situations confusing				
22. My child is good at understanding how people are feeling and what they are thinking				
23. *When my child talks to other people, s/he tends to talk about the other person's experience rather than his/her own*				
24. It upsets my child to see an animal in pain				
25. *My child is able to make decisions without being influenced by people's feelings*				
26. My child can easily tell if someone else is interested or bored with what s/he is saying				
27. My child gets upset if s/he sees people suffering on news programmes				
28. His/her friends usually talk to my child about their problems as they say that s/he is very understanding				
29. My child can sense if s/he is intruding, even if the other person doesn't tell him/her				
30. My child sometimes goes too far with teasing				
31. My child is often insensitive, though s/he doesn't always see why				
32. If my child saw a stranger in a group, s/he would think that it is up to them to make an effort to join in				
33. My child usually stays emotionally detached when watching a film				
34. My child can tune into how someone else feels rapidly and intuitively				
35. My child can easily work out what another person might want to talk about				
36. My child can tell if someone is masking their true emotion				
37. *My child doesn't consciously work out the rules of social situations*				
38. My child is good at predicting what someone will do				
39. My child tends to get emotionally involved with a friend's problems				
40. My child can usually appreciate the other person's viewpoint, even if s/he doesn't agree with it				

Scoring

A response of 'slightly agree' scores one point and 'definitely agree' scores two points on the following items: 1, 3, 11, 13, 14, 15, 21, 22, 24, 26, 27, 28, 29, 34, 35, 36, 38, 39 and 40. A response of 'slightly disagree' or 'definitely disagree' scores zero points. 'Slightly disagree' scores one point and 'definitely disagree' scores two points on the following items: 2, 4, 5, 7, 8, 9, 12, 16, 17, 18, 19, 20, 30, 31, 32 and 33. A response of 'slightly agree' or 'definitely agree' scores zero points. The maximum score for this questionnaire is 70. Excluded items are shown in italics and do not contribute towards the total score.

Appendix 2: The Adolescent SQ

Please read each statement very carefully and rate how strongly you agree or disagree with it by ticking the box that best describes your child.

		Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
1.	My child finds it very easy to use train timetables, even if this involves several connections				
2.	My child likes music or book shops because they are clearly organised				
3.	*My child would not enjoy organising events e.g. parties*				
4.	When my child reads something, s/he always notices whether it is grammatically correct				
5.	*My child categorises people into types (in his/her own mind)*				
6.	My child finds it difficult to read and understand maps				
7.	When my child looks at a bridge s/he does not think about how precisely it was made				
8.	*My child finds it difficult to learn how to programme video recorders*				
9.	When my child likes something, s/he likes to collect a lot of different examples of that type of object, so s/he can see how they differ from each other				
10.	When my child learns a language, s/he becomes intrigued by its grammatical rules				
11.	My child is not interested in the details of the weather forecast each day e.g. pressure, temperature, windspeed, etc				
12.	If my child had a collection (e.g. CDs, coins, stamps), it would be highly organised				
13.	When my child looks at a building, s/he is not curious about the precise way it was constructed				
14.	My child is not interested in understanding how wireless communication works (e.g. mobile phones)				
15.	My child enjoys looking through catalogues of products to see the details of each product and how it compares to others				
16.	My child knows, with reasonable accuracy, how much money s/he has spent and how much s/he has got left of his/her pocket money or allowance				
17.	When my child was younger s/he did not enjoy collecting sets of things e.g. stickers, football cards etc				
18.	*My child is interested in the family tree and in understanding how everyone is related to each other in the family*				
19.	When my child learns about historical events, s/he does not focus on exact dates				
20.	My child does not enjoy games that involve a high degree of strategy (e.g. chess, risk, games workshop)				
21.	When my child learns about a new category s/he likes to go into detail to understand the small differences between different members of that category				
22.	*My child does not find it distressing if people who live with him/her upset his/her routines*				
23.	When my child looks at an animal, s/he likes to know the precise species it belongs to				
24.	My child can remember large amounts of information about a topic that interests him/her e.g. flags of the world, airline logos				
25.	*At school, my child does not carefully file all his/her work*				
26.	My child is fascinated by how machines work				
27.	When my child looks at a piece of furniture, s/he does not notice the details of how it was constructed				
28.	*My child does not try to work out the rules for what to say and do in different social situations*				
29.	My child does not tend to watch science documentaries on television or read articles about science and nature				
30.	My child would be able to give directions to most parts of town				
31.	*When my child looks at a painting, s/he does not usually think about the technique involved in making it*				
32.	My child prefers social interactions that are structured around a clear activity, e.g. a hobby				
33.	My child is interested in knowing the path a river takes from its source to the sea				
34.	My child is a collector (e.g. of books, coins, etc.)				
35.	*My child's clothes are not carefully organised into different types in his/her wardrobe*				
36.	My child rarely reads articles or webpages about new technology				

Appendix 2 continued

	Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
37. My child does not particularly enjoy learning about facts and figures in history				
38. *My child does not tend to remember people's birthdays (in terms of which day and month this falls)*				
39. When my child is walking in the country, s/he is curious about how the various kinds of trees differ				
40. *If my child was getting a camera, s/he would not look carefully into the quality of the lens*				
41. If my child was getting a computer, s/he would want to know exact details about its hard drive capacity and processor speed				
42. My child does not follow any particular system when tidying his/her room				
43. If my child was getting a stereo, s/he would want to know about its precise technical features				
44. *My child tends to keep things that other people might throw away, in case they might be useful for something in the future*				
45. *My child avoids situations which s/he can not control*				
46. My child does not care to know the names of the plants s/he sees				
47. When my child hears the weather forecast, s/he is not very interested in the meteorological patterns				
48. *It does not bother my child if things in the house are not in their proper place*				
49. In maths, my child is intrigued by the rules and patterns governing numbers				
50. *My child finds it difficult to learn his/her way around a new city*				
51. My child could list his/her favourite 10 books, recalling titles and authors' names from memory				
52. *My child prefers to read fiction than non-fiction*				
53. When my child has a lot of shopping to do, s/he likes to plan which shops s/he is going to visit and in what order				
54. When my child listens to a piece of music, s/he always notice the way it's structured				
55. My child could generate a list of his/her favourite 10 songs from memory, including the title and the artist's name who performed each song				

Scoring

A response of 'slightly agree' scores one point and 'definitely agree' scores two points on the following items: 1, 2, 4, 9, 10, 12, 15, 16, 21, 23, 24, 26, 30, 32, 33, 34, 39, 41, 43, 49, 51, 53, 54 and 55. A response of 'slightly disagree' or 'definitely disagree' scores zero points. 'Slightly disagree' scores one point and 'definitely disagree' scores two points on the following items: 6, 7, 11, 13, 14, 17, 19, 20, 27, 29, 36, 37, 42, 46 and 47. A response of 'slightly agree' or 'definitely agree' scores zero points. The maximum score for this questionnaire is 78. Excluded items are shown in italics and do not contribute to the total score.

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