Exploring traits of autism and their impact on functional disability in children with somatic symptom disorder

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Running title

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Abstract

Subclinical traits of autism were measured in children with somatic symptom disorder (SSD, n = 28) and compared with age-matched controls (n = 26) using the Autism Spectrum Quotient (AQ) children's version. The KINDL^{R} quality of life questionnaire was used to assess functional disability. Although there was no significant group difference in total traits of autism, SSD group had significantly greater difficulty in attention switching domain. Logistic regression analysis confirmed attention switching and age were associated with increased likelihood of SSD. In SSD group, difficulty in attention switching significantly negatively correlated with total, family, and friends quality of life scores. In conclusion, assessment and treatment targeting difficulties in attention switching could be useful when dealing with children with SSD.

Introduction

Somatic symptom disorder (SSD) is defined as one or more somatic symptoms that are distressing or result in a significant disruption of daily life and are accompanied with excessive thoughts, feelings, or behaviors related to the such symptoms (American Psychiatric Association 2013). SSD is common in pediatric medicine with a prevalence ranging from 8% to 17% in the general population and pain being the most common symptom (Cozzi et al. 2017; Landa et al. 2012). The course and severity of SSD vary according to individuals; however, persistent SSD may lead to an impairment of the quality of daily life, more frequent visits for medical care, school absenteeism, and emotional distress both in the child and parent (Cerutti et al. 2016; Cerutti et al. 2017). Furthermore, SSD appears to exacerbate the cost of health care: it accounts for 15%–20% of annual health-care expenditure in the United Sates (Malas et al. 2018). Despite its negative impact on the child, family, and public health system, existing treatments are only moderately effective (Bujoreanu et al. 2014). In this light, a better understanding of factors associated with SSD could lead to more effective treatments.

Previous studies have identified risk factors for SSD, such as higher age; female gender (Beck 2008); child's style of coping with stress, including alexithymia

(Natalucci et al. 2018); a history of psychiatric disorders in the family and of the child (Korterink et al. 2015); stressful life events; and pain hypersensitivity (Chang 2011). Based on these research studies, Landa et al. (2012) have proposed a developmental theory of SSD describing its etiology as follows: “suboptimal early interpersonal experiences with caregivers may interact with one's genetic predisposition, leading to disrupted maturation of neural circuits involved in affect regulation and interpersonal functioning, yielding the persistence into adulthood of developmentally earlier tendencies to experience distress somatically.”

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social interaction and communication as well as the presence of repetitive behaviors (American Psychiatric Association 2013). Research has revealed that traits of autism are continuously distributed in the general population and that individuals with marked traits of autism even without an ASD diagnosis are likely to experience difficulties in social interactions (White et al. 2009), have increased alexithymia (Sifneos 1973), experience more stressful life events and show hypersensitivity to pain (Corbett et al. 2009), all of which are risk factors for SSD as noted above. Furthermore, several case studies have implied elevated levels of symptoms of autism in children with somatization (Kimura et al. 2006; Nitahara et al.

2015; Shiokawa and Momoi 2002). However, to the best of our knowledge, no study has quantitatively assessed traits of autism in children with SSD or explored what aspect of the trait is associated with SSD.

The Autism Spectrum Quotient (AQ) children's version (Baron-Cohen et al. 2001) is a frequently used instrument to measure autism traits in children with/without ASD. It is a self-administered, 50-item questionnaire which evaluates the degree of traits of autism across five subdomains: social skills, attention switching, attention to detail, communication, and imagination. Of these domains, we specifically focused on the attention switching domain, which is reported to be associated with increased anxiety and tension, and may result in functional disability despite low total AQ scores (Kiriyama 2008).

In addition, we explored the association between traits of autism and the level of functional disability by measuring the self-perceived quality of life in children with SSD using the KINDL^{R}. The KINDL^{R} is a self-reported questionnaire for children and adolescents to assess health-related quality of life (Ravens-Sieberer and Bullinger 1998).

The current study was undertaken to evaluate traits of autism in children with SSD compared with that of typically developing peers without SSD using the entire AQ

children's version. We also investigated which traits of autism are correlated with functional disability as measured by self-rated quality of life in children with SSD. We hypothesized that children with SSD would present more intense traits of autism, especially difficulty in attention switching domain, than children without SSD and that stronger traits of autism in children with SSD would be associated with increased functional disability. In case children with SSD would present more intense traits of autism, therapy targeting these traits could be more effective in improving outcomes.

Methods

Participants

A case-control design was employed. Two groups of children were recruited with a total of 56 participants (age range: 7–15 years). Participants with a history of serious head injury or psychosis were excluded from the study. The case group comprised 30 participants who fulfilled the DSM-5 criteria for SSD and who were recruited as volunteers from the Juntendo University hospital and the National Center for Child Health and Development in Kanto region, Japan. As specified by the Japanese Society of Psychosomatic Pediatrics, physical illnesses falling under SSD included irritable bowel syndrome, orthostatic dysregulation, chronic headache, and fibromyalgia

syndrome. All diagnoses of psychiatric disorders, including SSD, were performed by pediatricians specializing in pediatric psychiatry. Two participants who had been previously diagnosed with ASD were excluded from the study. Twenty-six typically developing participants in the same age range as the experimental group were recruited from a local regular primary and secondary school in the Kanto region and acted as voluntary controls. Children with somatic symptoms, other psychiatric or neurodevelopmental problems as reported on a questionnaire by their parents were excluded from the control group.

Procedure

In the SSD group, children were asked to complete the KINDL^{R} and an original questionnaire to map their previous history of stressful life events including bullying and abuse. Their parents were asked to complete the AQ children's version, the Attention-Deficit-Hyperactivity Disorder Rating Scale (ADHD-RS) and an original questionnaire about the child and family's demographic background and medical history, including history of psychiatric disorders and life events. The questionnaires were self-administered by both child and parents during the hospital visit and a psychiatrist determined the severity of SSD according to the DSM-5 criteria at the same time. In the

control group, the same general questionnaires as in the SSD were self-administered by children and parents, and the parents were asked to complete the AQ by classroom teachers. In order to minimize the participant's burden and facilitate compliance in the control group, we limited the number of questionnaires to those noted above in the control group. Written informed consent was obtained from all parents in both groups. The study protocol was approved by the Ethical Review Board of Juntendo University.

Assessment of demographic variables and stressful life event

The following information was asked in the questionnaire specifically administered to parents: demographic information, including the child's age, sex, perinatal complication, history of hospitalization, socioeconomic status of the family, history of psychiatric disorder in the child and in the family, and marital status of the parents. To assess stressful life events in children, items were included about the experience of bullying and abuse because in general, as these are the most frequently experienced stressful life events in children (Molnar et al. 2001; Nansel et al. 2001) and are also associated with SSD as shown by many studies (Chitkara et al. 2008; Guidetti et al. 2016; Ilola et al. 2016; Korterink et al. 2015; Surdea-Blaga et al. 2012). The experience of bullying and abuse was assessed by the items "Have you ever been bullied?" and "Have you ever

been physically abused?," which could be answered by either "Yes. I have" or "No, I have not." Those who reported "Yes" were asked to answer their age at which they first experienced these events.

Assessment of trait of autism: AQ children's version

The AQ children's version is a 50-item parent-report questionnaire designed to detect traits of autism in children aged between 7 and 15 years (Auyeung et al. 2008). Response alternatives for each item are given on a four-point rating scale labeled "definitely agree," "slightly agree," "slightly disagree," and "definitely disagree." Responses that reflect traits of autism contribute one point, and item scores are summated to a total score. High total scores indicate strong traits of autism. If a respondent left more than 5 items blank, the total score was excluded from further analysis (Baron-Cohen et al. 2006). The Japanese version of the AQ children's version has been shown to have good test–retest reliability (r = 0.87, p = 0.001) and strong internal consistency (Cronbach's α = 0.84) (Wakabayashi et al. 2006).

Assessment of quality of life: KINDL^{R}

The KINDL^{R} contains 24 items grouped into the following six subscales: physical

well-being, emotional well-being, self-esteem, family, friends, and school. Responses are on a five-point scale, with lower subscale scores indicating functional disability. The Japanese version of the Kid-KINDL^{R} for children aged between 8 and 12 years and the Kiddo-KINDL^{R} for adolescents aged between 13 and 16 years were self-administered by the participants in this study (Kojima et al. 2009). The Japanese version of the Kid-KINDL^{R} has demonstrated good test–retest reliability (r = 0.79, p < 0.01) and good internal consistency (Cronbach's α = 0.84) (Shibata et al. 2003); the Kiddo-KINDL^{R} has also demonstrated good test–retest reliability (r = 0.81, p < 0.01) and good internal consistency (Cronbach's α = 0.86) (Matsuzaki et al. 2007).

Assessment of traits of ADHD: ADHD-RS

While we specifically focused on the attention switching domain of trait of autism, we also evaluated several ADHD-related traits by applying ADHD-RS in the SSD group as these difficulties are often noted to co-occur (Craig et al. 2015). The ADHD-RS is an 18-item parent-report questionnaire developed to detect ADHD-related traits in children aged between 5 and 18 years. It consists of two domains: inattention and hyperactivity/impulsivity (H/I). Responses are given on a four-point scale (0–3); all item scores are summated to obtain a total score which reflects the present severity of

symptoms (Yerys et al. 2017). The Japanese version of the ADHD-RS has demonstrated good test–retest reliability (r = 0.92, p < 0.05) and good internal consistency (Cronbach's α = 0.93) (Tanaka et al. 2016).

Statistical analysis

Results are presented as the mean and SDs. Group comparisons for categorical and continuous data were performed by χ^2 and by Mann–Whitney U tests, respectively. Correlation coefficients were calculated using Spearman's Rho test. Logistic regression analysis was conducted to calculate the odd ratios (OR) of receiving a diagnosis of SSD for AQ subscales with significant between-group differences. The model was adjusted for potential confounders (i.e., sex and age) based on previous studies (Hoekstra et al. 2008). All statistical analyses were performed using the Statistical Package for Social Science, version 7.0 for Windows, with a significance level set at $p < 0.05$.

Results

Participant characteristics

After excluding 2 children with ASD from the recruited SSD group, the final study sample comprised 28 children with SSD and 26 control subjects. Participant

characteristics are summarized in Table 1.

According to the DSM-5 severity criteria, 10 subjects in the SSD group were classified as severe, 7 as moderate, and 11 as mild cases. The mean age of the SSD group was 13.4 ± 2.0 years and 15 out of 28 subjects (53.7%) were female. In the control group, the mean age was 12.7 ± 1.9 years and 12 of 26 (46.2%) control subjects were female. No significant difference existed between the two groups with respect to sex and age ($p = 0.59$ and $p = 0.16$, respectively). Regarding comorbid psychiatric disorders in the SSD group, 2 subjects suffered from depressive disorder, two had anxiety disorder, and two had ADHD. The SSD group had a significantly higher prevalence of psychiatric disorders in the family than the control group ($p = 0.01$), including three with SSD, two with major depressive disorder, three with bipolar disorder, two with adjustment disorder, and one with ASD. Two with adjustment disorder were reported in the control group.

Scores on the AQ children's version

The mean total and subscale scores of the AQ are shown in Table 2. The mean total AQ score was 18.6 (range 6–40) for the SSD group and 16.7 (range 6–29) for the control group; however, the between-group difference was not significant ($p = 0.57$).

The mean total AQ score of both the groups laid in between the mean of the Japanese general population (11.7 ± 5.9, n = 372; Wakabayashi. 2007) and the recommended clinical cut-off score of 25 retrieved from the same Japanese sample (Wakabayashi, 2007). Moreover, after applying the definition of broader autism phenotype by Baron-Cohen (i.e., AQ scores of 1 SD above the mean), 42.9% of the children in the SSD group had more than average traits of ASD.

For subscale scores, the mean attention switching score of the SSD group was significantly higher in the SSD than in the control group (4.13 ± 1.83 vs. 2.81 ± 1.72, $p = 0.005$). The distributions of the AQ total and attention switching scores are shown in Figures 1 and 2. In the logistic regression analysis adjusted for age and sex, both attention switching domain of AQ and age were associated with an increased odds of SSD (OR = 1.76; 95% CI, 1.21–2.56 and OR = 1.47; 95% CI, 1.05–2.05, respectively; Table 3). There was no significant difference in other subscale scores between the two groups.

Correlations between AQ children's version and symptomatology

We assessed the correlations between the AQ children's version, ADHD-RS, and KINDL^{R} scores of the SSD group (Table 4). The attention switching domain was

significantly negatively associated with the KINDL^R family domain ($r = -0.49$, $p = 0.009$), the friends domain ($r = -0.39$, $p = 0.04$), and total scores ($r = -0.52$, $p = 0.004$). No significant correlations between the AQ and the total ($r = 0.21$, $p = 0.28$) and subscales of ADHD-RS were observed ($r = 0.19$, $p = 0.34$ for the inattention subscale; $r = 0.18$, $p = 0.37$ for the H/I subscale).

Discussion

To the best of our knowledge, this is the first study to compare traits of autism quantitatively in children with SSD and typically developing peers; 42.9% of the children with SSD without diagnosed ASD had more than average scores for traits of autism. Although there was no significant difference between the groups in the total AQ score, we found significant difficulty in the attention switching domain in children with SSD. Logistic regression analysis revealed that difficulty in attention switching and higher age was associated with increased odds of SSD. Furthermore, the AQ scores, including the attention switching score, correlated with the self-rated functional disability measured by the KINDL^R in the SSD group. These results support our hypothesis that children with SSD have stronger traits of autism.

Furthermore, the results of our study led us to consider that difficulty in attention

switching is an underlying psychological trait that increases the likelihood of SSD. Impaired attentional flexibility (i.e. attention switching difficulty) is assumed to underlie inflexible behavior known as “insistence on sameness,” which is characterized by behavioral rigidity and resistance to change (Gotham et al. 2013), as observed in individuals with ASD. Indeed, the attention switching domain comprises questions, such as item 2 (“I prefer to do things the same way over and over again”) and item 46 (“New situations make me anxious”), which could be considered to refer to the insistence on sameness factor (Supplementary Material Table 1). The behaviors associated with insistence on sameness are reported to negatively affect the functioning of individuals with ASD and their families (Gabriels et al. 2005; Nadig et al. 2010). In addition, these behaviors are associated with elevated levels of caregiver stress (Harrop et al. 2016; Mercier et al. 2000) as it is more difficult to manage than communication deficits (Bishop et al. 2007; Lecavalier et al. 2006; Leekam et al. 2011). This may also reduce the child’s opportunities for interaction with peers (Durand and Carr 1987; Lee 2007; Loftin et al. 2008). The developmental theory of SSD suggests that interpersonal distress and attachment are important factors in the pathogenesis of SSD as they share neurological substrates with somatic pain (Emich-Widera et al. 2012; Guidetti et al. 2016; Landa et al. 2012; Maunder and Hunter 2001; McKillop and Banez 2016). The

findings of our study demonstrating the correlation between difficulties in attention switching and increased distress of family and friends in children with SSD is in line with those of previous studies and is supported by this theory. Moreover, the insistence on sameness factor is reportedly associated with an increased internalization of problems (De Pauw et al. 2011; Uljarevic and Evans 2017; Wallace et al. 2016), which is considered to be one of the main psychological etiological factors in SSD (Bujoreanu et al. 2014; Campo et al. 2004; Yacob et al. 2013). Thus, the child's difficulty in attention switching, reflected in insistence on sameness behavior, may promote the development of SSD through increased interpersonal distress and internalization of problems.

Additionally, we speculate that difficulty in attention switching directly increases the susceptibility to SSD. Black et al (2017) reported that insistence on sameness strongly correlates with hypersensitivity in children with autism. Children with insistence on sameness in our study may have had hypersensitivity to body sense. Therefore, future studies evaluating sensory profiles of children with SSD are warranted.

In the meantime, whenever scores of the attention switching domain are high, we should consider the possibility of comorbidity with ADHD. Although two of the participants were diagnosed with ADHD, within the SSD group, no correlation was

observed between total or subscale scores of ADHD-RS with attention switching. These results indicate that increased difficulties in attention switching domain observed in children with SSD cannot be explained by the presence of ADHD-related traits.

The present study also demonstrated that higher age was associated with the likelihood of SSD. Previous reports have shown that increases in tension during adolescence, such as facing an increasingly complex social milieu, exacerbate insistence on sameness behaviors (Kiriyama 2008; White et al. 2009). It is possible that children with mild traits of autism, whose insistence on sameness behavior is not apparent during early childhood, develop this trait, and its resulting somatization as they grow older.

However, this study had several limitations. First, the sample size of both the case and control groups was small, which limits the generalizability of the findings. Future studies should be conducted with larger samples to further assess the risk and preventive factors for SSD. Second, although children with a history of developmental problems as reported by their parents were excluded from the control group, the mean total AQ score in the control group was relatively high compared to reported norms, indicating a possible sampling bias in our study. Again, future studies should include larger samples as the control group to better reflect the general population. Third, the measurement of traits of autism in this study was based on parental self-reports. The use of a more

objective instrument, such as the Autism Diagnostic Observation Schedule (ADOS), to evaluate the diagnosis and severity of autism traits would enable a more accurate evaluation of the association between traits of autism and SSD.

Conclusion

The present study revealed that about 43% of the children with SSD had subclinical traits of autism. Furthermore, the SSD group exhibited significant difficulties in the attention switching domain compared with the control group; which was associated with overall functional disability as well as disability in the domains of family and friends.

The result suggests that children with SSD have greater difficulty in attention switching compared to typically developing peers. Therefore, in clinical practice, it may be helpful to screen for traits of autism in children with intractable SSD using the AQ children's version. Moreover, for those with underlying difficulty in attention switching, approaches which target insistence on sameness behavior may open up new avenues in the treatment of SSD.

Compliance with Ethical Standards

Conflict of Interest: The authors have no conflict of interest relevant to this article to disclose.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Author contributions: KH, MH, and KT developed the study concept. KH and MH collected the data. KH performed the analyses. KH drafted the paper, MH revised the paper and KT and TS provided critical advice. All authors approved the final version of the paper for submission.

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Figure Caption Sheet

Fig. 1 Distributions of AQ total score

Fig. 2 Distributions of attention switching score

Table 1 Sample characteristics

Table 2 Mean AQ and subscale scores (and SDs) based on groups

Table 3 Logistic analysis of attention switching

Table 4 Correlations between AQ children's version and ADHD-RS and KINDL

Supplemental Material Table 1 Attention switching items

Dear Dr Fred Robert Volkmar
Editor in Chief
Journal of Autism and Developmental Disorders

27th August, 2018

Dear Dr Fred Robert Volkmar

Thank you for your sending comments from the reviewer to our manuscript entitled “Exploring traits of autism and their impact on functional disability in children with somatic symptom disorder”. We also appreciate the time and effort you and each of the reviewers have dedicated to providing insightful feedback on ways to strengthen our paper. It is with great pleasure that we resubmit our article for further consideration. We hope that our edits and the responses we provide below satisfactorily address the issues and concerns you and the reviewers have noted.

Following the suggestions in the reviewer’s comments we have made some changes in the script. Changes made in the manuscript are marked using highlight. Point-by-point responses to the reviewer' comments are included below for your reference. Again, thank you for giving us the opportunity to strengthen our manuscript with your valuable comments and queries. We look forward to a publication of our manuscript in Journal of Autism and Developmental Disorders.

Sincerely Yours,

Kyoko Hatta, M.D.
Department of Pediatrics and Adolescent Medicine,
Juntendo University Faculty of Medicine
Tokyo, Japan

Reply to the reviewers

Reviewer #1: Thank you for your valuable comments. According to your comments, we have revised the manuscript as follows.

1. Need to check the accuracy of the second conclusion: "The result suggests that difficulty in attention switching acts as an underlying psychological trait which increases the likelihood of developing SSD" as this sentence implies causation, I think what you mean to say is that children with SSD tend to have difficulties with attention switching.
⇒Thank you for your suggestion. According to your suggestion, we revised “The result suggests that difficulty in attention switching acts as an underlying psychological trait which increases the likelihood of developing SSD.” as “The result suggests that children with SSD have greater difficulty in attention switching compared to typically developing peers.” (Page 17, Line 9).

2. Need to check all the places where "administered tool/ survey" was used. Clarify if it was self-administered by the child or parent, or by administered by an interviewer via a structured interview
⇒ Thank you for your comment. According to your comment, we revised “The questionnaires were administered to both child and parents during the hospital visit and a psychiatrist determined the severity of SSD according to the DSM-5 criteria at the same time.” as “The questionnaires were self-administered by both child and parents during the hospital visit and a psychiatrist determined the severity of SSD according to the DSM-5 criteria at the same time.”, “In the control group, the same general questionnaires as in the SSD were administered to children and parents, and the parents were asked to complete the AQ by classroom teachers.” as “In the control group, the same general questionnaires as in the SSD were self-administered by children and parents, and the parents were asked to complete the AQ by classroom teachers.” and “The Japanese version of the Kid-KINDLR for children aged between 8 and 12 years and the Kiddo-KINDLR for adolescents aged between 13 and 16 years were administered to the participants in this study (Kojima et al. 2009).” as “The Japanese version of the Kid-KINDLR for children aged between 8 and 12 years and the Kiddo-KINDLR for adolescents aged between 13 and 16 years were self-administered by the participants in this study (Kojima et al. 2009).” (Page 6, Line 15, Page 6, Line 17 and Page 9, Line 2).

3. State that although you administered the entire AQ, you expected to find changes among children with SSD in the attention switching domain when compared to their typically developing peers. Don't say you focused only on this domain of the AQ, as that seems to suggest that you only interviewed the participants using the questions on the AS domain.
⇒Thank you for your suggestion. According to your suggestion, we revised “The current study was undertaken to evaluate traits of autism in children with SSD compared with that of typically developing peers without SSD using the AQ children’s version.” as “The current study was undertaken to evaluate traits of autism in children with SSD compared with that of typically developing peers without SSD using the entire AQ children’s version.” (Page 4, Line 17).

Reviewer #2: Thank you for your valuable comments. According to your comments, we have revised the manuscript as follows.

I had specifically requested that the authors use person-first language throughout and refrain from using the word "autistic". Although the authors were able to locate and revise almost every instance of the word "autistic", there was still one instance remaining ((Page 16, Line 17).
⇒Thank you for your comment. According to your comment, we revised “autism traits” to “traits of autism” (Page 16, Line 17)

	SSD (n = 28)	Controls (n = 26)	*p*-value
Age, mean (SD) years	13.37 (2.01)	12.65 (1.85)	0.16
Female, n (%)	15 (53.67)	12 (46.15)	0.59
Household income			0.83
¥0–4,999,999, n (%)	9 (32.14)	10 (38.46)	
¥5,000,000–10,000,000, n (%)	10 (35.71)	10 (38.46)	
¥10,000,000+, n (%)	7 (25.00)	5 (19.23)	
Perinatal complications, n (%)	4 (14.29)	7 (26.92)	0.25
History of hospitalization, n (%)	9 (32.14)	6 (23.08)	0.46
Experience of bullying , n (%)	6 (21.43)	3 (11.54)	0.36
Experience of abuse, n (%)	4 (14.29)	1 (3.85)	0.26
History of psychiatric disorder in the family, n (%)	11 (39.29)	2 (7.69)	0.01 *
Marital status of the parents, n (%)	4 (14.29)	4 (15.38)	0.91

* p < .05

Table 1

	AQ total	Social skills	Attention switching	Attention to detail	Communi cation	Imagination
SSD	18.63 (9.14)	4.27 (2.84)	4.13 (1.83) *	4.17 (2.04)	2.47 (2.89)	3.60 (2.34)
Controls	16.65 (6.59)	3.58 (2.87)	2.81 (1.72) *	3.50 (1.27)	2.65 (2.04)	4.12 (1.63)

* $p < .05$

Table 2

Independent variable	Univariate			Multivariate		
	Crude OR	95% CI	*p*-value	Adjusted OR †	95% CI	*p*-value
Attention switching	1.58	1.12–2.26	< 0.01 **	1.76	1.21–2.56	< 0.01 **
Age	1.22	0.92–1.63	0.17	1.47	1.05–2.05	0.02 *
Sex	0.74	0.26–2.17	0.59	1.09	0.33–3.57	0.89

† Adjusted for age and sex , * p < .05, ** p < .01

Table 3

Variables	AQ total	Social Skills	Attention switching	Attention to detail	Communication	Imagination
ADHD-RS						
Total score	.22	.35	.21	−.15	.28	.28
Inattention score	.18	.30	.19	−.22	.25	.26
Hyperactivity/impulsivity score	.23	.36	.18	.01	.24	.25
Kid-KINDL						
Total score	−.41 *	−.52 **	−.52 **	.08	−.27	−.32
Physical well-being	−.14	−.26	−.19	.14	−.07	−.04
Emotional well-being	−.15	−.26	−.25	−.18	.10	−.02
Self-esteem	−.40 *	−.44 *	−.31	.05	−.34	−.48 **
Family	−.38 *	−.32	−.49 **	−.12	−.27	−.34
Friends	−.24	−.34	−.39 *	.17	−.15	−.15
School	−.08	−.28	−.14	.17	−.05	−.06

* $p < .05$
** $p < .01$

Table 4