Brief report

Changes in autistic trait indicators in parents and their children with ASD: A preliminary longitudinal study

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ABSTRACT

This study investigated whether the longitudinal changes in symptom severity in children with autism spectrum disorder (ASD) are associated with changes in the parents' autistic traits. The results demonstrated two significant correlations between the changes in children's Social Responsiveness Scale (SRS) scores and the Social Responsiveness Scale (SRS) score changes in either the father or both parents. Autistic symptom mitigation in ASD children was associated with increased empathy levels in their parents.

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1. Introduction

Autism spectrum disorder (ASD) appears in early childhood and causes impairments in social interaction and communication, as well as a restricted range of interests (American Psychiatric Association, 2013). Although genetic factors are implicated in the etiology of ASD, its symptoms are thought to be alleviated by behavioral approaches that involve the parents (Lai et al., 2014). The aim of this study was to determine whether changes in the autistic symptoms of young children with ASD are associated with autistic trait indicator changes in their mothers and/or fathers.

2. Methods

2.1. Participants

All participants were recruited from Kanazawa University Hospital and prefectural hospitals in Toyama. Seventeen children with ASD (5 females, 12 males; between 40 and 93 months of age; mean=65.94; standard deviation, S.D.=14.07) and their parents (17 pairs of mothers and their husbands from 29 to 42 and 32 to 42 years of age, respectively) participated in this longitudinal study. During the first session, 30 subjects were recruited between 2010 and 2012. Twenty of these 30 subjects agreed to participate in the second session, which took place in 2013. We excluded 3 subjects from the analysis because of insufficient questionnaire responses. The average time between the 2 examination points was 90.24 weeks (S.D.=18.90). Recruited children were diagnosed by a clinical psychiatrist and clinical psychologist with more than 5 years of experience with ASD; the Autism Diagnostic Observational Schedule-Generic (ADOS) (Lord et al., 1999), the Diagnostic Interview for Social and Communication Disorders (DISCO) (Wing et al., 2002), and the DSM-5 (American Psychiatric Association, 2013) criteria were utilized during the initial participation encounter of this study. Children with ASD were included in this study if they fulfilled the diagnostic criteria for childhood autism, atypical autism or Asperger's syndrome using the DISCO, or if they met the ADOS criteria for autism spectrum disorder. Clinical exclusion criteria for children included having known hearing loss or a disorder involving the central nervous system other than autism.

Parents agreed to their child's participation in the research study with full knowledge of its experimental nature. Written informed consent was obtained prior to their participation. The Ethics Committee of Kanazawa University Hospital approved the study's methods, and all procedures were performed in accordance with the Declaration of Helsinki.

2.2. Psychological tasks for assessing autistic traits

Autistic traits in the children were assessed quantitatively by their parents using the Japanese version (Kamio et al., 2013) of the Social Responsiveness Scale (SRS) (Constantino, 2002). The SRS items are categorized into five treatment subscales: social awareness, social cognition, social communication, social motivation, and autistic mannerisms (Constantino, 2002). Higher scores on the SRS indicate a higher degree of social impairment. The raw scores on the SRS were converted to T-scores (with a mean of 50 and standard deviation of 10) for each gender. To estimate the intelligence level of the children, the Kaufman Assessment

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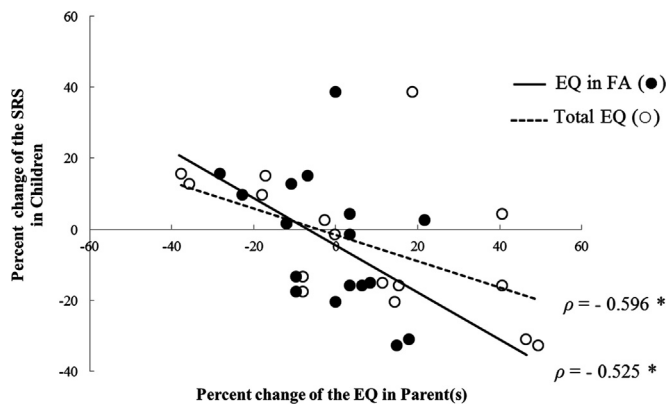
Fig. 1. Scatter plot of the change in the SRS total *T*-score for children with ASD and the change in the EQ score of their father (●) or the total EQ score of both parents (○). The solid line indicates the regression line for the former plot; the broken line indicates the regression line for the latter plot. *P < 0.05; N=17 families.

Battery for Children (K-ABC) (Kaufman and Kaufman, 1983) was employed. The average score on the K-ABC mental processing scale was 101.29 (S.D.=20.84), and the average score on the K-ABC achievement scale was 99.24 (S.D.=22.21).

ASD traits in parents were assessed using their autism-spectrum quotient (AQ) (Baron-Cohen et al., 2001), the empathy quotient (EQ) (Baron-Cohen and Wheelwright, 2004), and the systemizing quotient (SQ) (Baron-Cohen et al., 2003) scores, which consist of self-reported measures of autistic traits. These three dimensions can be used to assess milder variants of autistic-like traits (i.e., low EQ, high AQ and high SQ) in individuals with normal development (Dawson et al., 2002).

2.3. Statistical analysis

The main objective of the present study was to determine whether there are any correlations between changes in autistic symptoms in young children with ASD and changes in autistic traits in their mothers and fathers. For our statistical analysis, we used the percent change (i.e., [(second score − first score) ∗ 100/second score]) as our quantitative measure. We calculated Spearman's rank correlation coefficients between the percent change in the SRS *T*-score of children and the percent change in the AQ, EQ or SQ score of their parents (mother, father or the sum of the scores of both parents).

3. Results

As shown in Fig. 1, Spearman's rank correlation coefficients revealed two significant correlations between the percent change in the SRS score of children and the percent change in the EQ score of the father ($\rho = -0.525$, $P < 0.05$) or the total EQ score of both parents ($\rho = -0.596$, $P < 0.05$). There was a marginally significant correlation between the percent change in the SRS score of children and the percent change in the EQ score of the mother ($\rho = -0.471$, $P = 0.056$). There were no significant correlations between the percent changes in the SRS *T*-scores of the children and the AQ or SQ scores in either parent or both parents (i.e., $P > 0.10$).

4. Discussion

This is the first study to demonstrate that longitudinal changes in the individual characteristics of parents who have children with

ASD correlate with longitudinal changes in their children's ASD symptoms. However, our study design cannot ascertain any conclusions regarding whether the children, their parents or something else are responsible for the observed correlation between the phenotypic changes. Future studies can include interventional procedures to further our understanding of this topic.

This study has additional limitations. First, caution must be exercised in drawing any definitive conclusions with such a small sample size and such high dropout rates. Second, the study did not control for socioeconomic status or the intelligence levels of the parents and children. However, all parents in this study were without prior or current developmental, learning, or behavioral problems and possessed a reading level that allowed them to understand the questionnaires used in this study.

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