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# Research in Autism Spectrum Disorders

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## Psychometric properties of the Repetitive Behavior Scale-Revised for individuals with autism spectrum disorder in Japan



Naoko Inada<sup>a,\*</sup>, Hiroyuki Ito<sup>b</sup>, Kazuhiro Yasunaga<sup>a</sup>, Miho Kuroda<sup>c</sup>, Ryoichiro Iwanaga<sup>d</sup>, Taku Hagiwara<sup>e</sup>, Iori Tani<sup>f</sup>, Ryoji Yukihiro<sup>g</sup>, Tokio Uchiyama<sup>c</sup>, Kei Ogasahara<sup>h</sup>, Koichi Hara<sup>i</sup>, Masahiko Inoue<sup>j</sup>, Takashi Murakami<sup>k</sup>, Fumio Someki<sup>l</sup>, Kazuhiko Nakamura<sup>m</sup>, Toshiro Sugiyama<sup>n</sup>, Hiroyuki Uchida<sup>o</sup>, Hironobu Ichikawa<sup>p</sup>, Yuki Kawakubo<sup>q</sup>, Yukiko Kano<sup>q</sup>, Masatsugu Tsujii<sup>k</sup>

<sup>a</sup> Graduate School of Education, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan

<sup>b</sup> Research Center for Child Mental Development, Hamamatsu University School of Medicine, 1-20-1 Hanadayama, Higashi-ku, Hamamatsu 431-3192, Japan

<sup>c</sup> Faculty of Humanities, Tokaigakuen University, 2-901 Nakahira, Tenpaku-ku, Nagoya 468-8514, Japan

<sup>d</sup> Nagasaki University Graduate School of Biomedical Sciences, 1-7-1 Sakamoto, Nagasaki 852-8520, Japan

<sup>e</sup> Hokkaido University of Education Asahikawa Campus, 9 Hokumoncho, Asahikawa 070-8621, Japan

<sup>f</sup> Faculty of Human and Cultural Studies, Kyoto Gakuen University, 1-1 Nanjo Otani, Sogabecho, Kameoka 621-8555, Japan

<sup>g</sup> Faculty of Human Development and Culture, Fukushima University, 1 Kanayagawa, Fukushima 960-1296, Japan

<sup>h</sup> School of Education, Tokyo Gakugei University, 4-1-1 Nukuikitamachi, Koganei 184-8501, Japan

<sup>i</sup> Faculty of Integrated Arts and Sciences, University of Tokushima, 2-24 Shinkuracho, Tokushima 770-8501, Japan

<sup>j</sup> Graduate School of Medical Sciences, Tottori University, 4-101 Minai, Koyamacho, Tottori 680-8550, Japan

<sup>k</sup> School of Contemporary Sociology, Chukyo University, 101-2 Yagoto Honmachi, Showa-ku, Nagoya 466-8666, Japan

<sup>l</sup> Department of Education, College of Staten Island of the City University of New York, 2800 Victory Boulevard, Staten Island, NY 10314, United States

<sup>m</sup> School of Medicine, Hirosaki University, 1 Bunkyocho, Hirosaki 036-8560, Japan

<sup>n</sup> Department of Child and Adolescent Psychiatry, Hamamatsu University School of Medicine, 1-20-1 Hanadayama, Higashi-ku, Hamamatsu 431-3192, Japan

<sup>o</sup> United Graduate School of Child Development, Osaka University, 1-1 Yamadaoka, Suita 565-0871, Japan

<sup>p</sup> Japan Developmental Disorders Network, 5F 1-12-14 Hamamatsucho, Minato-ku, Tokyo 105-0013, Japan

<sup>q</sup> Department of Child Neuropsychiatry, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8655, Japan

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### ABSTRACT

Restricted and repetitive behaviors (RRBs) constitute a core symptom of autism spectrum disorder (ASD). The Repetitive Behavior Scale-Revised (RBS-R) is a widely used questionnaire administered by parents or caregivers to assess RRBs in individuals with ASD. This study evaluated the psychometric properties of the RBS-R Japanese Version (RBS-R-J). The ASD and non-ASD groups comprised 274 and 36 participants, respectively. We examined corrected item-total correlation, Cronbach's alpha, and RBS-R-J scores of different diagnostic groups, as well as correlations between RBS-R-J scores and intelligence quotient (IQ), autistic symptoms, adaptive/maladaptive functioning, aberrant

\* Corresponding author. Tel.: +81 3 5800 8664; fax: +81 3 5800 8664.

E-mail address: [nainada-tky@umin.ac.jp](mailto:nainada-tky@umin.ac.jp) (N. Inada).

Repetitive Behavior Scale-Revised Japanese Version  
Reliability  
Validity

behaviors, and sensory processing. All items showed moderate corrected item-total correlations. Cronbach's alpha coefficient was .93. We found significant differences in the mean RBS-R-J scores of the low-functioning ASD group and the intellectual disabilities group, and of low-functioning and high-functioning ASD groups. RBS-R-J scores negatively correlated with IQ and scores on the Sensory Profile (Japanese version) and Adaptive Behavior Composite of the Maladaptive Behavior Index of the Vineland Adaptive Behavior Scales-Second Edition (VABS-II; Japanese version), but positively correlated with scores on the peak and current symptoms subscales of the Pervasive Developmental Disorders Autism Society Japan Rating Scale, the VABS-II, and the Aberrant Behavior Checklist-Community (Japanese version). From these results, we conclude that RBS-R-J showed good reliability, diagnostic validity, and convergent validity, indicating that it is a reliable, valid instrument for use among ASD individuals in clinical and research settings.

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## 1. Introduction

Autism spectrum disorder (ASD) is defined by two core symptom areas: (1) deficits in social communication and social interaction and (2) restricted, repetitive patterns of behavior, interests, or activities (RRBs) such as restricted interests, compulsive behaviors, stereotyped movements, and/or unusual responses to sensory stimuli (American Psychiatric Association, 2013). Over the years, much of the research on the features of ASD has focused on core social and communication deficits, rather than on RRBs, which are another core feature. RRBs are often among the most striking signs of ASD as they involve the presence of atypical behaviors, rather than the absence of typical behaviors. Yet despite this, the body of systematic studies of RRBs has grown only recently.

The existing literature clearly indicates that RRBs are not unique to ASD; they are also characteristic of other developmental disorders (e.g. intellectual disabilities [ID]), psychiatric disorders (e.g. schizophrenia, obsessive compulsive disorder), and neurological conditions (e.g. Tourette's syndrome, Parkinson's disease) (Lewis & Bodfish, 1998). Several instruments have presently been developed to measure RRBs (Campbell et al., 1990; Goodman et al., 1989; McDougle et al., 1995; Prior & MacMillan, 1973; Scahill et al., 1997), but these instruments were not developed specifically for assessing RRBs in ASD, or can evaluate only a part of RRBs. Therefore, a comprehensive assessment instrument is required to assess the wide range of RRBs in individuals with ASD. Recently, Bodfish, Symons, Parker, and Lewis (2000) developed an informant-based questionnaire, the Repetitive Behavior Scale-Revised (RBS-R), intended to comprehensively assess the variety and severity of RRBs in individuals with ASD. Dimensional evaluation can be a more successful approach to encompass the features of RRBs than using diagnostic categories in research and clinical settings. In fact, various studies have used the RBS-R as a simple, useful instrument for evaluating RRBs in clinical trials on ASD treatment efficacy (Anagnostou et al., 2012; Dawson et al., 2010; Hardan et al., 2012), examinations of RRB subcategories (Bishop et al., 2012; Lam & Aman, 2007; Lam, Bodfish, & Piven, 2008), and research on the relationship between RRBs and associated ASD clinical features (Gabriels, Cuccaro, Hill, & Ivers, 2005).

The RBS-R-Japanese version (RBS-R-J) has already been translated, back-translated, and authorized. In a preliminary study with a small sample size, we examined reliability and validity of clinician ratings for RBS-R-J based on parental interview. Although we found the clinician-rated measure to be an effective and valid instrument (Inada et al., 2012, in Japanese), the RBS-R is originally a parent/caregiver- or teacher-administered questionnaire. Therefore, this study aimed to examine the psychometric properties of the RBS-R-J as rated by parent/caregivers in Japan.

## 2. Methods

### 2.1. Participants

The main sample comprised 310 participants from an ASD group ( $n = 274$ ; high-functioning ASD [HFASD] = 96, low-functioning ASD [LFASD] = 80, intelligence quotient [IQ]-unknown ASD = 98) and a non-ASD group ( $n = 36$ ; ID = 28, attention deficit hyperactivity disorder = 5, learning disabilities = 2, epilepsy = 1) (Table 1). Participants were referred to medical and educational facilities due to developmental concerns and were randomly recruited to this study by examiners belonging to these facilities, located in 28 prefectures across Japan. Experienced child psychiatrists or psychiatrists diagnosed participants with ASD or non-ASD based on the DSM-IV-TR (American Psychiatric Association, 2000). Best-estimate clinical diagnoses were made by integrating information from parental interviews, developmental and medical information, records provided by parents/caregivers and teachers, and direct observations of and interactions with the participants. To assess the IQ of participants, we used the Japanese version of the Wechsler Intelligence Scale for Children, Third Edition (Japanese WISC-III Publication Committee, 1998), Japanese version of the Wechsler Adult Intelligence Scale,

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