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The Repetitive Behavior Spectrum in Autism and Obsessive Compulsive Disorder: From Helpful to Harmful

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THE REPETITIVE BEHAVIOR SPECTRUM IN AUTISM AND OBSESSIVE COMPULSIVE DISORDER: FROM HELPFUL TO HARMFUL

July 24, 2014

By Robert H. Rice

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Systematic study comparing repetitive behaviors in autism with those observed in obsessive compulsive disorder (OCD) and other Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Text Revision (DSM-IV-TR) diagnoses is lacking despite its diagnostic and treatment significance. This research examines repetitive behaviors in a sample of children and adults diagnosed with an autism spectrum disorder (ASD), (OCD), or both. Data were collected from three participant pools; clinic clients, parents/caregivers, and therapists; in order to test the psychometric properties of questions for assessing the functional characteristics of repetitive thoughts and behavior (i.e., stereotypy, compulsion, obsession, perseveration, preoccupation). Exploratory factor analyses revealed four factors that demonstrated reasonable consistency across the three types of informants. These four assessed factors included: 1) intrusive effects; 2) soothing effects; 3) level of distress, and; 4) pleasure-seeking qualities. Reliability for the new scales was calculated separately for subjects, correspondents, and therapists revealing high internal consistency. Validity analyses were completed, first by examining bivariate correlations among the new scales and then by examining correlations between the new scales and established measures of functioning (i.e., Gilliam Autism Rating Scale-Second Edition; GARS-2, Yale-Brown Obsessive Compulsive Scale; Y-BOCS, and Adaptive Behavior Assessment System-Second Edition; ABAS-II). As hypothesized, the new scales measuring soothing and pleasure-seeking qualities of repetitive behavior had higher correlations with measures of ASD

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The Repetitive Behavior Spectrum in Autism and Obsessive Compulsive Disorder: From Helpful to Harmful

By Robert H. Rice

Repetitive behaviors are commonly observed in clinical settings, yet mental health practitioners still understand very little about them, particularly in the context of their potentially beneficial versus harmful role in the lives of individuals diagnosed with disorders in which repetitive behaviors are common. Because of this lack of distinction among repetitive behaviors, they are often treated using the same intervention strategies, regardless of factors such as diagnosis and intellectual and adaptive functioning (McDougle, Kresch, Goodman, Naylor, Volkmar, Cohen, and Price, 1995; Lam and Aman, 2007). A more developed functional analysis of repetitive behaviors and their relationship to other disorder symptoms would go a long way toward helping mental health professionals better understand the purpose of repetitive behavior and how to better address it.

A Brief Review of the Repetitive Behavior Literature

Repetitive behavior has been a widely studied phenomena in most of its' many forms ranging from addictions and compulsive gambling to OCD. For the purpose of the current review, the literature examining repetitive behavior in autism and OCD will be examined, with a heavy emphasis on observations of repetitive behavior in autism, as it is within this diagnostic category that mental health practitioners appear to understand the least. Repetitive behavior in autism is often mistaken for the symptoms commonly observed in OCD, a mistake that results in the implementation of interventions more suitable for the obsessive compulsive client (Bodfish, Symons, Parker, and Lewis, 2000). Unfortunately, this is not always the best course of action for behaviors that don't follow a more traditional obsessive-compulsive process in which compulsions are engaged in to neutralize the anxiety associated with primarily ego-dystonic obsessions.

Although stereotyped, repetitive behavior has been identified as a hallmark symptom of disorders on the autism spectrum (e.g., Asperger, 1944 and Kanner, 1943), research in this area has historically been neglected (Baron-Cohen, 1989; Turner, 1999). As a result, there is currently little understanding of even the most basic issues of etiology, function, maintenance, and treatment of these behaviors (Lam and Aman, 2007). Kanner (1943) was the first to reference compulsive behavior in the disorder, referring to the child with autism as governed by an anxiously obsessive desire for the maintenance of sameness that only the child, on rare occasions, may choose to disrupt.

Recent efforts to better understand repetitive behavior in autism spectrum disorders (ASD) have aimed to closely discern the various types that commonly present in people with both low and high-functioning autism (e.g., Gabriels, Cuccaro, Hill, Ivers, and Goldson, 2005). South, Ozonoff, and McMahon (2005) studied repetitive behavior profiles in Asperger syndrome and high-functioning autism. Using the Repetitive Behavior Interview (RBI; Turner, 1997) and Yale Special Interests Interview (YSII; South, Klin, and Ozonoff, 1999), South, Ozonoff, and McMahon aimed to: 1) provide a detailed characterization of repetitive behaviors in typically developing control subjects as well as individuals with Asperger syndrome and high-functioning autism; and 2) to examine whether differences in repetitive behavior profiles could provide evidence for the external validity of repetitive behavior profiles in Asperger syndrome separate from high-functioning autism. They hypothesized that circumscribed interests would be more prevalent and cause more impairment in the Asperger's group than the group with high-functioning autism. Results showed no bias toward particular forms of repetitive behavior in higher-functioning individuals with ASD. Rather, they found that both lower and higher-level repetitive behaviors were present throughout both samples and often coexisted within the repetitive behavioral repertoire of a given individual. Repetitive behaviors such as stereotypy and self-injury

were labeled lower-level and circumscribed interests and ritualistic behavior were labeled higher-level, thus reflecting their perceived involvement of more complex cognitive processes (Turner, 1997).

Comparing ASD and OCD

Comparisons between the repetitive behaviors and thought patterns exhibited by individuals with ASD and the obsessions and compulsions exhibited by individuals with OCD have long been made (e.g., McDougle, Kresch, Goodman, Naylor, Volkmar, Cohen, and Price, 1995; Hollander, King, Delaney, Smith, and Silverman, 2003; Russell, Mataix-Cols, Anson and Murphy, 2005; Scahill, et. al, 2006). McDougle et al. (1995) examined the types of repetitive thoughts and behavior demonstrated by adults with autism and compared them with those of age and sex-matched adults with OCD. They used eight categories of obsessions (i.e., aggressive, contamination, sexual, hoarding, religious, symmetry, somatic, and need to know or remember) and nine categories of compulsions (i.e., cleaning, checking, repeating, counting, ordering, hoarding, need to tell or ask, need to touch/tap/rub, and self-damaging or self-mutilating behavior) in assessing obsessive-compulsive symptoms. Although direct discrimination function analysis showed that the patients with autistic disorder could be distinguished from those with obsessive-compulsive disorder on the basis of the types of repetitive thoughts and behavior that they demonstrated (i.e., on the whole, the autistic patients studied displayed more repetitive behavior than repetitive thoughts), the authors suggest that the differences found can in large part be due to the fact that many individuals with autism do not possess the capacity to describe repetitive thoughts.

McDougle, et al. (1995) spoke of the choice to suspend the DSM-III-R ego-dystonic criterion for OCD in their study so that the Y-BOCS could be used despite the absence of information related to obsessions in their subjects. The authors stated that "because a DSM-III-R diagnosis of OCD depends upon the ego-dystonic quality of obsessive thoughts or compulsive behavior, in the absence of communication about a corresponding internal mental or emotional state, the repetitive actions of individuals with autism currently do not meet criteria for OCD" (p. 776). They also argued that perhaps repetitive behavior in individuals with mental retardation should be viewed in the same manner as children when diagnosing OCD, as the ego-dystonic criterion is waived by the DSM-IV-TR in young children. There is currently no consensus on this area of diagnostic uncertainty.

Types of Repetitive Behavior

A broad range of specific forms of disorder-related repetition including motor stereotypy, rituals, compulsions, obsessions, sameness behaviors, echolalia, perseveration, fixations, and preoccupations have been associated with various DSM-IV-TR diagnoses (American Psychiatric Association, 2000). To date, most studies of repetitive behavior fail to operationally define the specific behavior(s) under study (Bodfish, Symons, Parker, and Lewis, 2000). The forms of repetition identified for the current study, with their corresponding definitions include: 1) *stereotypy*- repetitive apparently non-functional movements of body parts or manipulation of objects (e.g., body rocking, head rolling, spinning/shaking objects); 2) *compulsions*- apparently intentional movements or manipulations of objects or other environmental features that are often used to neutralize an anxiety provoking obsession (e.g., checking, ordering, hoarding); 3) *obsessions*- persistent, often irrational, and seemingly uncontrollable thoughts that generally cause marked distress; 4) *perseverations*- repetitive vocalizations related to an issue or object of interest (e.g., in the middle of the night, a child repeatedly asking to play a guitar even though he knows it is not a good time) and; 5) *preoccupations*- perpetual, persistent, and seemingly uncontrollable thoughts, generally specific to something tangible. Preoccupations differ from obsessions primarily in that they are ego-syntonic, as opposed to ego-dystonic, and are experienced as rational.

Toward a Comprehensive Model of Repetitive Behavior in ASD

Despite the advances made, a comprehensive model of repetitive behavior, including associations among behaviors as well as links with other symptoms of the autism spectrum, has not yet been formulated. This is where the current research really begins. An examination of the combined DSM-IV-TR criteria for autistic disorder and OCD helped illuminate the many areas of disparity and overlap between repetitive symptoms. Organizing and categorizing these combined criteria then made it possible to identify themes. Calling on the literature, clinical experience, and the feedback of experts in the field of autism and OCD for insight was also helpful in this regard.

The functional characteristics studied as part of the current research were assigned categories including: 1) soothing; 2) distressing; 3) adaptive; 4) disruptive; 5) metaphoric; 6) concrete; 7) internalized; 8) intrusive; 9) pleasure-seeking; and 10) risk-avoiding properties. These functional characteristics comprise a model for repetitive behavior that served as the starting point for the current research. Each has a particularly important role in how and why a repetitive behavior evolves and what purpose it serves for the individual affected. For example, the word *soothing* is intended to represent how calming, comforting, restful, and/or relaxing a repetitive behavior is to perform. Several of the citations in this article speak to the apparent soothing quality of the repetitive behavior, especially for individuals with ASD in their samples (e.g., Scahill et al., 2006). Definitions for each of the functional characteristics studied are provided in Table 1 below.

Table 1

Functional Characteristic	**Definition**
1. Soothing	How calming, comforting, restful, and/or relaxing a repetitive behavior is to perform
2. Distressing	How upsetting, difficult, stressful, or painful a repetitive behavior is to perform
3. Adaptive	How much the repetitive behavior helps the person function
4. Disruptive	How much a repetitive behavior: 1) interferes with normal routine, occupational functioning, or usual social activities/relationships; 2) is time-consuming; and 3) is clearly excessive
5. Metaphoric	How much a repetitive behavior holds meaning for the person performing it (e.g., "I wash because I value cleanliness")
6. Concrete	The behavior does not hold any meaning for the individual performing it (e.g., "I wash because I have to and because I will be anxious if I do not")
7. Internalized	How ego-syntonic the repetitive behavior is to a person
8. Intrusive	How much a person recognizes that obsessional thoughts, impulses, or images are a product of his/her own mind, as well as a recognition that these same thoughts are excessive or unreasonable

9. Pleasure-seeking	Performing a repetitive behavior because it is desirable
10. Risk- avoiding	Performing a repetitive behavior to avoid something undesirable

This study hypothesized that each type of repetition would correlate selectively with each functional characteristic chosen for study. Specifically, it was hypothesized that stereotypies, perseverations, and preoccupations would correspond more with the functional characteristics "pleasure-seeking," "soothing," "internalized," "metaphoric," and "adaptive" while obsessions and compulsions would correspond more with the functional characteristics "risk-avoiding," "distressing," "intrusive," "concrete," and "disruptive." We also expected there to be heterogeneity in terms of the degree to which each subtype of repetitive behavior corresponded to each functional characteristic.

Methods

This study was approved by the University of Rochester's Research Subjects Review Board, which was contingent on participation in the study being voluntary.

PARTICIPANTS

Client Participants.

Participants consisted of 82 total subjects. Of those subjects 70 were male and 12 were female. Among the 70 male subjects, 31 were adults and 39 were children (under 18 years old). Of the 12 total female subjects, eight were adults and four were children. 61 of the total subjects were White, 15 African American, six Asian, and two Hispanic or Latino. Diagnostically, seven adults and 18 children (n=25) were in the group meeting criteria for OCD only, 11 adults and 12 children (n=23) were in the group meeting criteria for ASD (i.e., Autistic Disorder, Aspergers, Pervasive Developmental Disorder- Not Otherwise Specified) only, and 21 adults and 13 children (n=34) were in the group meeting criteria for both OCD and ASD.
Diagnosis was based on clinician assessment and consensus using the DSM-IV-TR. To ensure a definitive diagnosis for both ASD and OCD, individuals were only selected for the study if they: 1) had visited the research site at least three times for their autism spectrum or obsessive-compulsive symptoms; 2) had received a diagnosis of ASD, OCD or both at each interview and; 3) had met with at least 2 different mental health practitioners from the research site.
Individuals with a global adaptive composite (GAC) of less than 60 were excluded from this study in order to limit caregiver-noted data to the greatest extent possible. The research site completes adaptive behavior assessments for each of its patients upon intake. The results of these assessments were used to determine GAC and thus, whether an individual met inclusion criteria for the study.

Ancillary participants.

Each subject had one adult correspondent and one therapist who also completed a form of the survey used to assess repetitive behavior for the study. The purpose of correspondents was to provide information related to other's perspectives on the functional characteristics involved with the repetitive behaviors being assessed. Correspondent and therapist data were also used to examine reliability across informants, helping to elucidate the unique perspectives of caregivers and therapists on subject behavior. All 82 subjects were able to provide one correspondent and one therapist making 246 total respondents. In most cases, a subject's parent served as the correspondent for children and a staff member or case manager served as the correspondent for adults. The therapist in most cases was the subject's primary therapist at the research site,

but in a minority of cases (18), the therapist was from another agency or in private practice. All of the therapists who participated in this study were licensed in New York State to practice mental health (e.g., psychiatry, psychology, counseling, social work).

Research Site

The research site is an outpatient clinical setting located in the Northeastern United States. At the research site, interdisciplinary clinical services are provided for individuals of all ages diagnosed with developmental disabilities and/or mental illness.

Measures

Form One. Form One is a survey, designed to be administered to each client participant, with questions related to the functional properties of repetitive behavior. The survey contained ten functional characteristics of repetitive behavior (see Table One), each of which had six related questions designed to ascertain the impact of these functional characteristics on client participants. Survey responses were based on a 5-point Likert scale ranging from *Not at All* to *All the Time*. The survey was 60 questions in length and questions were randomized to limit subject bias. Table 2 provides a sampling of the types of statements that were used to rate the presence of each functional characteristic being examined. Each item was decided on using input from people diagnosed with ASD or OCD, as well as experts in the field of ASD and OCD. The final 60 items were chosen from over 120 possible items. This was accomplished using both online and printed surveys with professionals in the field of ASD and OCD.

Table 2

Functional Characteristics and Corresponding Items

Functional Characteristic	**Statements**
Soothing	• "It helps me feel more relaxed" • "It helps get rid of bad feelings" • "It calms me"
Distressing	• "It bothers me" • "It scares me" • "It makes me have bad feelings"
Adaptive	• "It makes it easier to get through the day" • "It makes life easier" • "It helps me get things done"
Disruptive	• "It takes too much time" • "It upsets other people" • "It makes it hard to have friends"
Pleasure-seeking	• "I like to do it" • "I always want to do it" • "It makes me feel good"

Risk-avoiding	• "It protects me" • "It prevents bad things from happening" • "It prevents me from getting anxious"
Metaphoric	• "I understand what causes it" • "It makes me think about other things" • "It symbolizes something else"
Concrete	• "I just have to do it, period" • "It has only one meaning" • "I know nothing bad will happen, but I have to do it anyway"
Internalized	• "It is part of who I am" • "It just feels right" • "It feels like part of me"
Intrusive	• "I don't want to think about it, but I have to" • "I feel like I want these thoughts to go away" • "It makes it difficult to concentrate"

A second version of this survey was given to the ancillary participants, i.e., parents or caregivers and primary therapists, for each client in the study. This was Form Two, which included the same items as Form One, but presented in a manner that the individual client's parent/caregiver and therapist could easily understand and respond to (e.g., instead of "It makes it difficult to concentrate," the item read: Do you think that this behavior makes it difficult for him/her to concentrate?).

The Yale-Brown Obsessive Compulsive Scale (Y-BOCS) (Goodman, Price, Rasmussen, and Mazure, 1989) is a test to rate the severity of OCD symptoms. It was completed by each subject with the assistance of the primary investigator. When possible and appropriate, each subject's correspondent and primary therapist were also involved in the administration of the Y-BOCS, which is a one page tool that takes approximately 10 minutes to complete. For the purposes of this study, the Y-BOCS was used to examine patterns of association between the repetitive behavior survey questions and standard measures of functioning for OCD.

The Adaptive Behavior Assessment System-Second Edition (ABAS-II) (Richardson & Burns, 2005) provides a comprehensive, norm-referenced assessment of adaptive skills for individuals ages birth to 89 years. It was completed by each subject's parent or caregiver at their leisure. The ABAS-II was used to examine patterns of association between the repetitive behavior survey and standard measures of functioning.

The Gilliam Autism Rating Scale-Second Edition (GARS-2) (Gilliam, 1995) is a brief screening test for identifying persons who have autism. It was used to examine patterns of association between the repetitive behavior survey and standard measures of functioning in ASD. Subscales 1 (Stereotyped Behaviors), 2 (Communication), and 3 (Social Interaction) were completed by each subject's parent or caregiver.

Procedure

In order to gather as much data related to functional characteristics as possible without overwhelming client participants, one repetitive behavior was chosen by and examined for each primary subject. To maximize discriminant validity, a behavior was only chosen for study if the client participant, his/her correspondent, and his/her therapist agreed on the behavior and its type (i.e., stereotypies, compulsions, obsessions, perseverations, preoccupations) after being provided with a thorough explanation of the definitions for each repetitive behavior being examined.

Form One and the Y-BOCS were administered when subjects were at the research site for a therapy appointment. Appointments were extended to allow for adequate time for research to be conducted. The primary investigator read each question to client participants and recorded his/her answer. In some cases, a second session was scheduled to complete forms that had not been completed due to client fatigue or loss of

attention. A client participant's correspondent and primary therapist were present during this time when possible and appropriate (e.g., client participant wanted them there). Once complete, Form Two, the GARS-2, and the ABAS-II parent form were given to each subject's correspondent and primary therapist to be completed either at that time or a time that was more convenient for that person.

Data Analysis

Analysis of variance (ANOVA) was used for comparative analysis of all continuous variables. As part of the instrument development analyses portion of the current study, age, gender, IQ, treatment modality, and diagnosis were used as control variables in an effort to reduce their impact on the final scales. After the new scales were developed, the content that they were assessing was placed within the larger theoretical net of adaptive functioning in individuals with ASD and OCD by examining their patterns of association with standard measures of functioning (Y-BOCS, GARS-2, ABAS-II). These patterns of association further elucidated the unique information provided by the new scales for understanding the functional meaning of repetitive behavior in these individuals. Standard test theory methods (item distributions, internal consistency, item to item correlations, item to total correlations and scale to scale correlations) were used to derive a final set of subscales capturing unique dimensions of functionality of repetitive behaviors. This process not only helped identify the items to be retained in the final measure (eliminating items with poor distributions or weak associations with their target constructs), but also helped to identify the smallest possible set of independent subscales necessary (by identifying scales that could be collapsed due to extreme overlap). The analysis was further validated with exploratory factor analyses to identify the dimensions of variance (independent subscales) represented in the data. All significance levels were two-tailed and set at the .05 level. All of the analyses were performed with SPSS statistical software (Version 15.0).

Results

Exploratory factor analyses were conducted separately in the data collected from parents, therapists, and individuals using the repetitive behavior scale. These analyses were conducted on the entire item pool using oblique rotation (oblimin) so that the resulting factors would be allowed to correlate with one another. Scree-plots across all three analyses suggested extracting 9-10 factors. When the structural coefficients (direct correlations between each item and the extracted factors) from these analyses were compared across the three sources of information (i.e., parents/caregivers, therapists, and clients), four functional characteristics emerged demonstrating reasonable consistency across the three types of informants. These assessed: 1) intrusive effects (e.g., scares me, bothers me, wish I could stop it); 2) soothing effects (e.g., calms me, relaxing, prevents anxiety); 3) level of distress (e.g., difficult to concentrate, have to do it even when I don't want to), and pleasure-seeking (e.g., makes me feel good, look forward to it, like to do it).

Reliability for the new scales (i.e., intrusiveness, soothing effects, level of distress, and pleasure-seeking qualities) was then calculated separately for each source of data (subjects, correspondents, therapists) revealing high internal consistency as evidenced by Cronbach's alpha scores mostly in the 0.7 and higher range. Although the factors were highly consistent across the three types of informants, in a few cases, it was determined that dropping a particular item from a scale in a specific informant source form was justified based on how well it loaded during the reliability analysis. For example, the item "it calms him/her" failed to show strong correlations with the soothing effects scale in data collected from parents/correspondents (item-to-total r = .14, squared multiple correlation SMC = .076), although it correlated strongly with this scale in data collected from individuals and therapists. Thus, this item was not used in the soothing scale when calculated from parent-report. Similarly, the item "It prevents anxiety" failed to demonstrate strong correlations with the soothing effects scale in data collected from individuals/primary subjects (item-to-total r = .02, SMC = .136), and the item, "I just have to do it" failed to demonstrate strong correlations with the distress scale in data collected from individuals/primary subjects (item-to-toal r = .11, SMC = .144).

Validity Analyses were completed, first by examining bi-variate correlations among the new scales and then by examining correlations between the new scales and established measures of functioning. In general,

parent/correspondent and client/primary subject responses on the new scales correlated more than therapist responses did with those of either of the other sources of information. The following table shows correlations among the new scales as well as their means and standard deviations.

Table 3.

Correlations Among the New Repetitive Behavior Scales

New Scales (Informant Source)	M	SD	α coeff	Correlations between measures											
				1	2	3	4	5	6	7	8	9	10	11	12
1. Intrusiveness (Therapist)	3.43	.76	.83												
2. Level of Distress (Therapist)	3.56	.92	.79	.20											
3. Soothing Qualities (Therapist)	2.46	.81	.78	-.27	.01										
4. Pleasure- Seeking (Therapist)	2.18	.65	.74	**-.40**	-.26	.20									
5. Intrusiveness (Parent)	3.60	1.09	.90	.27	.06	.17	**-.43**								
6. Level of Distress (Parent)	4.20	.78	.52	.01	.25	.01	-.18	**.57**							
7. Soothing Qualities (Parent)	2.36	.83	.76	.07	.08	-.02	.02	-.22	-.10						
8. Pleasure- Seeking (Parent)	2.35	1.07	.86	-.26	-.04	-.20	**.43**	**-.68**	**-.38**	-.02					
9. Intrusiveness (Individual)	3.67	.98	.86	.26	-.18	.14	**-.36**	**.65**	.27	-.11	**-.44**				
10. Level of Distress (Individual)	3.77	1.10	.73	.12	-.08	.02	-.19	.18	.26	-.19	.07	**.60**			
11. Soothing Qualities (Ind.)	3.18	1.01	.84	-.05	.04	.13	-.08	.11	-.23	-.21	.13	.11	.01		

12. Pleasure- Seeking (Individual)	2.28	1.01	.82	-.25	.20	-.09	.31	-.55	-.41	.10	.57	**-.67**	**-.53**	.20

As reflected by Table 3, individual/primary subject responses to the new scale measuring intrusiveness in repetitive behaviors correlated strongly (.60) with client/primary subject responses to the new scale measuring level of distress. As would be expected, client/primary subject responses to the new scale measuring pleasure-seeking qualities of repetitive behavior correlated strongly and negatively with their responses on the scales measuring both intrusiveness (-.67) and level of distress (-.532). Similar outcomes were observed in the forms completed by parents/caregivers where responses on the intrusiveness and distressing scales correlated at .57 and responses on the new scale measuring pleasure-seeking qualities of repetitive behavior correlated at -.68 and -.39 for the scales measuring intrusiveness and level of distress respectively. Therapists' responses correlated less than the other two types with the strongest correlation being a negative one between the scale measuring pleasure-seeking qualities and the intrusiveness scale (-.40). Although clients' perceptions of the intrusiveness of their repetitive behavior was strongly correlated with their parents' perceptions of intrusiveness (r = .65), the correlations for the remaining scales across informants were typically low. This would suggest that parents' perceptions of the soothing effects of repetitive behaviors, for example, are somewhat distinct from therapists' perceptions or the perceptions of the individual enacting those behaviors.

An analysis of the correlations among subscales of the ABAS-II (i.e., community use, functional academics, home living, health and safety, leisure, self-care, self-direction, social) revealed that they were highly correlated with each other in terms of informant responses (most above .80). This makes sense, as they are all components of mental age. As a result, mental age instead of each individual subscale was used for computing correlations among anchor scales, as well as between the new repetitive behavior scales and the anchor scales. The remaining anchor scales (i.e., mental age, GARS-stereotyped behavior, GARS-communication, GARS-social interaction, and Y-BOCS) were then analyzed for correlations revealing strong negative correlations for mental age and the GARS-2 subscales for both stereotyped behavior and communication (-.90 and -.82 respectively). Thus, lower mental age was associated with higher levels of stereotyped behavior and communication problems. While this is not surprising, the magnitude of these correlations suggests that these three scales might be measuring a single common construct. The GARS-2 subscale for social interaction was also negatively correlated with mental age, but to a lesser extent (-.60). Conversely, scores on the Y-BOCS were moderately correlated with GAC (.48) and negatively correlated with all subscales of the GARS-2.

Table 4

Correlations Among Anchor Scales (GAC, GARS-2, Y-BOCS)

Anchor Scale (Subscale)	M	SD	A coeff	Correlations between measures				
				1	2	3	4	5
1. Global Adaptive Composite	*75.25*	10.62	*.77*					

2. GARS-2 (Stereotyped Behavior)	13.42	11.85	.96	**-.90**			
3. GARS-2 (Communication)	12.14	11.33	.96	**-.82**	**.84**		
4. GARS-2 (Social Interaction)	17.05	12.19	.96	**-.60**	**.64**	**.73**	
5. Y-BOCS	25.57	4.31	.84	**.48**	-.38	**-.44**	-.33

Because the GARS-2 subscales measuring stereotyped behavior and communication correlated so highly with both each other and mental age, only the GARS-2 subscale measuring social interaction was used in subsequent analyses looking at correlations between the new repetitive behavior scales and the anchor scales. As can be seen in Table 4, higher levels of pleasure seeking qualities of repetitive behavior were associated with lower mental age, greater difficulties with social interaction, and fewer obsessive compulsive symptoms. These correlations were highly similar regardless of which informant was provided information. Similarly, higher levels of intrusiveness associated with repetitive behavior was associated with higher mental age and with better social functioning across all three informants.

Table 5

Correlations Between New Repetitive Behavior Scales and Anchor Scales

** Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

	Mental Age (GAC)	Social Interaction Differences	Obsessive Compulsive Symptoms
Intrusiveness (Therapist)	.278*	-.257*	.217
Level of Distress (Therapist)	-.141	.031	.088

Soothing Qualities (Therapist)	.271	.011	-.105
Pleasure- Seeking (Therapist)	-.466**	.343**	-.271*
Intrusiveness (Parent)	.804**	-.568**	.474**
Level of Distress (Parent)	.436**	-.404**	.324**
Soothing Qualities (Parent)	-.160	-.036	.221
Pleasure- Seeking (Parent)	-.676**	.352**	-.594**
Intrusiveness (Individual)	.527**	-.544**	.378**
Level of Distress (Individual)	.075	-.281*	.035
Soothing Qualities (Ind.)	-.031	.325**	-.043
Pleasure- Seeking (Individual)	-.464**	.326**	-.380**

To examine differences on the new repetitive behavior scales across diagnostic groups, a MANOVA was performed on each of the 12 dimensions of the new scale (see Table 3). The results of this MANOVA suggested that scores on those scales differed significantly across diagnostic groups (e.g., OCD, PDD, both; $F(24,108) = 8.4$, $p < .001$). Subsequent univariate ANOVAs and Tukey HDS post hoc analyses were performed to identify significant differences on these scales across groups. As seen in Table 5, the analysis indicated that therapist, parent, and individual ratings of the intrusiveness of repetitive behavior was highest among individuals with OCD. Client and therapist ratings of the pleasure-seeking qualities of a repetitive behavior were highest among individuals diagnosed with only an ASD or both an ASD and OCD. Client ratings of the soothing qualities of a repetitive behavior were also highest among individuals meeting criteria for both disorder types.

Table 6

Differences on New Repetitive Behavior Scales Across Diagnostic Groups (ASD, OCD, Both)

** Correlation is significant at the 0.01 level (2-tailed).

	OCD	ASD	Both	F	Partial eta squared

	M	SD	M	SD	M	SD		
Intrusiveness (Therapist)	3.9[A]	.81	3.2[B]	.79	3.3[B]	.64	5.20**	.140
Level of Distress (Therapist)	3.5	.96	3.2	.99	3.7	.87	1.42	.043
Soothing Qualities (Therapist)	2.5	.78	2.3	.38	2.5	.98	0.46	.014
Pleasure- Seeking (Therapist)	1.8[B]	.63	2.7[A]	.60	2.2[A]	.48	12.10**	.274
Intrusiveness (Parent)	4.5[A]	.37	2.8[B]	1.1	3.3[B]	.91	20.12**	.386
Level of Distress (Parent)	4.7	.70	3.9	.86	3.9	.67	7.79**	.196
Soothing Qualities (Parent)	2.5	1.0	2.4	.51	2.3	.70	0.75	.023
Pleasure- Seeking (Parent)	1.3	.33	3.4	.85	2.4	.75	47.26**	.596
Intrusiveness (Individual)	4.5[A]	.50	3.1[B]	.83	3.4[B]	1.0	15.72**	.329
Level of Distress (Individual)	4.1	.72	3.7	1.2	3.4	1.2	2.20	.064
Soothing Qualities (Ind.)	2.5[B]	.74	3.0[B]	.72	3.7[A]	.97	12.50**	.281
Pleasure- Seeking (Individual)	1.4[B]	.34	2.4[A]	.37	2.8[A]	1.2	17.10**	.348

Lastly, the new repetitive behavior scales were analyzed to determine differences across behavior types (i.e., compulsion, stereotypy, and preoccupation). The purpose of this analysis was to test the hypothesis that stereotypies, perseverations, and preoccupations would correspond more with the functional characteristics: pleasure-seeking, soothing, internalized, metaphoric, and adaptive while obsessions and compulsions would correspond more with the functional characteristics: risk-avoiding, distressing, intrusive, concrete, and disruptive. Although obsessions and perseverations were also among the original categories of repetitive behavior identified, only three subjects reported on a behavior meeting criteria for each, therefore, they were not included in the final analysis related to behavior type.

Once again, a MANOVA on the 12 dimensions of the repetitive behavior scale suggested that scores on those subscales differed significantly across behavior types. As with diagnostic groups, subsequent univariate ANOVAs and Tukey HDS post hoc analyses were performed to identify significant differences on these scales across behavior types. As seen in Table 6, the analyses indicated that both parent and client ratings of the pleasure-seeking qualities of a repetitive behavior were highest among preoccupations while parent ratings of the intrusiveness of a repetitive behavior were highest among compulsions. Interestingly and unexpectedly, therapist ratings of the soothing qualities of a repetitive behavior were highest among compulsions and

stereotypies, a finding that further speaks to the unique perspective of the therapist who may have a psychiatric understanding of the function of compulsions and their defusing quality.

Table 7

Differences on New Repetitive Behavior Scales Across Behavior Types (Compulsion, Stereotypy, Preoccupation)

** Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

	Compulsion		Stereotypy		Preoccupation		F	Partial eta squred
	M	SD	M	SD	M	SD		
Intrusiveness (Therapist)	3.6	.82	3.1	.96	3.4	.57	2.12	.065
Level of Distress (Therapist)	3.5	.97	3.2	1.1	3.7	.80	1.40	.044
Soothing Qualities (Therapist)	2.8^{A}	.79	2.7^{A}	.40	2.1^{B}	.71	6.17**	.168
Pleasure- Seeking (Therapist)	2.0	.67	2.4	.68	2.3	.56	1.78	.055
Intrusiveness (Parent)	3.8^{A}	.96	3.0^{B}	1.2	3.5^{AB}	1.1	3.16*	.094
Level of Distress (Parent)	4.1	.93	4.1	.71	4.2	.80	0.07	.002
Soothing Qualities (Parent)	2.5	.78	2.4	.44	2.3	.93	0.33	.011
Pleasure- Seeking (Parent)	1.8^{B}	.18	2.8^{A}	.26	2.8^{A}	.21	8.40**	.216
Intrusiveness (Individual)	3.9	.18	3.4	.26	3.4	.21	1.56	.049
Level of Distress (Individual)	3.6	.21	4.1	.30	3.6	.24	1.04	.033
Soothing Qualities (Ind.)	3.2	.18	2.9	.27	3.3	.22	0.80	.025
Pleasure- Seeking (Individual)	2.1^{AB}	.18	1.9^{B}	.26	2.8^{A}	.21	4.15*	.120

Discussion

This research contributes to evidence suggesting unique functional characteristics of various forms of repetitive behavior in OCD and ASD. Specifically, when compared across the three participant pools, the scales measuring: 1) intrusive effects; 2) soothing effects; 3) level of distress, and 4) pleasure-seeking qualities were reliable in measuring differences across diagnostic groups and behavior types. As hypothesized, the new scales measuring intrusiveness and level of distress were more strongly, positively and significantly correlated with standard measures of obsessive compulsive symptoms while the new scales measuring soothing and pleasure-seeking qualities of repetitive behavior were more strongly, positively and significantly correlated with standard measures for ASD involving domains such as social interaction. This relationship between more harmful qualities and OCD and more helpful qualities and ASD was also evidenced by analyses looking at differences on the new repetitive behavior scales across diagnostic groups (e.g., intrusiveness rated higher in OCD, pleasure-seeking qualities rated higher in ASD) and behavior types (e.g., intrusiveness rated higher in compulsions, pleasure-seeking rated higher in preoccupations and stereotypies).

Several important implications for mental health professionals result from this research. If replicated, the current findings could move the mental health profession one step closer to a more comprehensive and functional model of understanding repetitive behavior. This understanding would assist in better differentiating between OCD and ASD, which could have implications for how diagnostic classifications are made in the future. As a result, treatments prioritizing level of suffering and teaching replacement behaviors will be identified and implemented with improved accuracy and effectiveness.

Limitations of this Study

As with all research, the current study had some anticipated limitations while other limitations emerged as the study was conducted. In terms of anticipated limitations, the current research involved a relatively small sample size (N = 82), especially in relation to factor analysis, which is typically best utilized on a subject pool of 100 or more. Of the 82 total subjects, only 12 were female, likely because of the much higher prevalence of ASD in males. Due to the many barriers to recruiting a larger subject pool for a study of this nature (e.g., IRB approval, availability, access, diagnostic uncertainty), further studies looking to replicate the results of this study might look to collect data on multiple behaviors from single subjects, a process that may prove time-prohibitive, but would certainly add to the power and complexity of the study results.

Another limitation of the current study is related to the manner in which diagnoses were made. Even when considering the efforts that were made to ensure diagnostic certainty in the current study (e.g., only subjects having visited the research site at least 3 times and receiving the same diagnosis at each were enrolled), it is likely that more overlap between diagnostic groups than could be represented by the current sample truly exists. Future studies might formalize the use of standardized diagnostic instruments in addition to the DSM-IV-TR to determine diagnosis and assign group placement.

Other limitations that emerged as the study was being conducted included therapist and subject fatigue when completing the full scales, as well as possible limitations related to comprehension. While many efforts were made to promote subject comprehension, some limitations related to subject comprehension and ability to report on more complex phenomena (e.g., obsessions) were observed and likely contributed to lower internal consistency for items related to originally proposed functional characteristics such as *internalized, externalized, risk avoidance, metaphoric,* and *concrete*. Future studies might make further efforts to ensure subject comprehension and ability to report on more complex phenomena.

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