



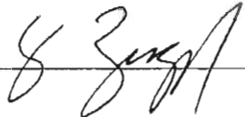


THE BEHAVIORAL FUNCTION OF FOUR OPERATIONALLY DEFINED
BEHAVIOR PROBLEMS WITH VARYING TOPOGRAPHIES (SELF-HITTING,
HITTING OTHERS, SELF BITING, VERBAL ABUSE) IN INTELLECTUAL AND
DEVELOPMENTAL DISABILITIES

by

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By

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Master of Arts
George Mason University, 2010

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DEDICATION

This is dedicated to Genc Zaja, who tirelessly supported me along this journey and never stopped believing in me. Te dua, dashuria ime, me gjithë zemer, gjithmone.

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I would like to thank all of the people who participated in data collection and data entry. This includes, but is not limited to, Johannes Rojahn, Linda Moore, Dan van Ingen, and Josh Moore. I would also like to acknowledge all of the clients who were the subjects of this research. It is my hope that this work will, in some way, help shape efforts to improve their quality of life. Further acknowledgements and thanks go to my committee members for providing sound guidance and support throughout this process.

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ABSTRACT

THE BEHAVIORAL FUNCTION OF FOUR OPERATIONALLY DEFINED BEHAVIOR PROBLEMS WITH VARYING TOPOGRAPHIES (SELF-HITTING, HITTING OTHERS, SELF BITING, VERBAL ABUSE) IN INTELLECTUAL AND DEVELOPMENTAL DISABILITIES

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George Mason University, 2011
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Behavioral interventions for challenging behavior are chosen on the basis of the behavior function, rather than on the basis of the behavior topography. Challenging behaviors in individuals with intellectual disabilities are heterogeneous in both form and function. Previous research suggests there may be a relationship between the form and the function of challenging behaviors. However, few studies have examined the extent to which the specific topographies of a challenging behavior are predictive of their behavioral function. Individuals who exhibited either self-injurious or aggressive/destructive behaviors were further subdivided into four target behavior groups: hitting self (n = 14), hitting others (n = 17), biting self (n = 7) and verbal abuse to others (n = 15). Three functional assessment rating scales (Questions about Behavioral Function [QABF; Matson & Vollmer, 1995], the Functional Assessment for Multiple Causality [FACT; Matson et al., 2003], and the Functional Analysis Screening Tool [FAST; Iwata &

DeLeon, 2005]) were completed by caregivers to determine the functional properties of these behaviors. Three separate multivariate analyses of variance (MANOVA) were performed to compare the functional properties of these behaviors. Across all three rating scales, hitting self was more highly associated with the Nonsocial and the Automatic/Self Stimulation functions than hitting others. No significant differences were found between the subscale rankings on any of the rating scales for the hitting self compared with biting self (i.e., comparison between two self-injurious behavior topographies), and verbal abuse to others vs. hitting others (comparison between two aggressive topographies). These findings suggest that within the broader categories of challenging behavior, there was not a significant amount of variation by specific topography in terms of functional properties. However, across the broader behavior categories, there was a significant difference in functional properties for certain subscales.

The Behavioral Function of Four Operationally Defined Behavior Problems with Varying Topographies (Self-Hitting, Hitting Others, Self Biting, Verbal Abuse) in Intellectual and Developmental Disabilities

Introduction

Prevalence estimates suggest that an average of 60% of individuals with intellectual or developmental disabilities engages in some form of challenging behavior (Deb, Thomas, & Bright, 2001; Emerson, 2001; Sigafos, Arthur, & O'Reilly, 2003). These behaviors pose a serious threat to one's physical and mental health and can jeopardize chances for successful community integration (Rojahn, Matson, Lott, Esbensen & Smalls, 2001; Sigafos et al., 2003). Most residential facilities and treatment programs include some form of behavioral intervention that attempts to reduce or eliminate these behaviors.

The process of identifying and classifying behaviors targeted for interventions is particularly difficult because there is much heterogeneity in both the form a behavior takes and the functional properties it has (Sigafos et al., 2003). Elements that affect this include setting/environment, personnel, intra-individual variables, reinforcement history, and other contextual idiosyncrasies (Richman, 2008).

To account for this, assessment models typically take a behavioral approach (Rush & Francis, 1999). First, the form (or topography) of the target behavior is identified. It can be described in terms of (a) broad behavioral categories or (b) narrow,

operationally defined behavioral features (i.e., what it looks like). The three broad categories of behaviors most commonly used with this population are: self-injurious, aggressive/destructive, and stereotyped (Rojahn, Matson, Lott, Esbensen & Smalls, 2001). Self-injurious behaviors are those generally defined as self-inflicted acts to one's body that occur repeatedly and in an essentially unvarying manner (Rojahn, Schroeder, & Hoch, 2008). Operational definitions of behaviors subsumed in this category include: self-hitting (body, head), self-biting, skin picking, head banging, and rumination. Aggressive or destructive behaviors are those that are deliberate and abusive to other individuals or objects and may include physical or verbal acts. Operational definitions of aggressive/destructive behaviors include: hitting, spitting, pinching, kicking, and biting others, verbal abuse, and property destruction. Stereotyped behaviors are defined as peculiar or inappropriate voluntary acts that occur habitually and repetitively. Operational definitions of stereotyped behaviors include: repetitive hand movements, grimacing, rubbing self, gazing at hands or objects, and waving hands.

Once a behavior that is targeted for intervention is objectively defined, baseline data are collected on its dimensional properties, including frequency, severity, and duration. Following this, the Functional Behavioral Assessment (FBA; O'Neill, et al., 1997) is used to identify the positive reinforcement (social, tangible, or internal/automatic reinforcers) and/or negative reinforcement contingencies (escape/avoidance of social or non-social events) that maintain the target behavior. Methods employed in this process include direct observations, informant-based rating scales, teacher/caregiver interviews, and experimental analysis.

Behavioral analysts have long maintained the predominance of a behavior's function over its topography when it comes to treatment development and results from functional experimental analyses support this. However, previous research has only begun to examine the extent of this predominance. Some studies have found associations in subscale rankings for certain broad behavioral categories (self-injurious and aggressive/destructive). For instance, Emerson and Bromley (1995) found that, in a sample of individuals with mild to severe learning disabilities in both residential and community settings, self-injurious behaviors were more likely to be rated as having nonsocial/automatic functions compared to social functions. Similar findings were described by Zaja, Rojahn, Turygin, Moore, and van Ingen, (in preparation). Also, some studies have shown that aggressive behaviors are more often rated as socially driven, specifically for the function of attention and escape/avoidance (Applegate, Matson, & Cherry, 1999; Enbregts, Didden, Schrueder, Huitink, & van Nieuwenhuijzen, 2009; Matson & Mayville, 2001).

There is also some evidence that specific topographical variations within the broader behavioral categories are not uniquely associated with functional properties or the effectiveness of interventions. Lieving, Hagopian, Long, and O'Connor (2004) found that interventions designed to extinguish specific behavioral topographies caused other, functionally analogous topographies to emerge. It was only after targeting the reinforcement contingencies that maintained these behaviors that the intervention was effective. Similar results were noted by Roberts-Gwinn, Luiten, Derby, Johnson, and Weber (2001) in a functional analysis of aberrant behaviors maintained by automatic

reinforcement for student with autism. Barrera and Graver (2007) also used an experimental analysis procedure to study physiological responses to self-injurious behaviors. They found that there was no variance in a young woman's heart rate patterns based on the topography of her self-injurious behaviors (head or hand hitting). These results suggest that targeting the functional properties a particular behavior has may, in fact, have stronger treatment efficacy than interventions designed around a behavior's specific topography.

It should be noted that these findings are based on small sample studies that use functional analysis in experimental environments. To our knowledge, there are no large-scale studies of the overall relationship between specific behavior topographies and their functional properties. The current analysis used results from functional assessment rating scales gathered on a large sample of adults with intellectual and developmental disabilities ($N=130$). Previous research on this sample had shown that there were some significant differences between functional subscale endorsements for the three broad behavioral categories (Zaja, Rojahn, Turygin, Moore, & van Ingen, in preparation). Additional information on this dataset can be found in Zaja, Moore, van Ingen, D., and Rojahn, (2010).

Based on these findings, the current analysis considered two topographically similar behaviors that belong to different behavioral categories: self-hitting vs. hitting others. We also considered two pairs of topographically dissimilar behaviors that belonged to the same behavioral categories: hitting others vs. verbal abuse to others; self-biting vs. self-hitting.

Methods

Participants

Participants were 53 adults who engaged in specific forms of challenging behaviors. They were selected from among 130 individuals enrolled at a day program with educational, vocational, and behavioral specialization in Minnesota. Descriptive statistics and demographic information for the total sample can be found in Zaja, Moore, van Ingen, and Rojahn, (2010). Demographic characteristics of those clients included in this analysis are presented in Table 1. Clients' level of intellectual functioning had been determined prior to enrolling at the center.

Respondents

Twenty-nine senior staff members at the facility served as respondents for this study. Each was asked to complete the three functional assessment instruments and the *Behavior Problems Inventory* (BPI-01; Rojahn, et al., 2001) for the clients they were most familiar with and with whom they worked with most regularly. Respondents included three program directors and seventeen team supervisors, each of which was responsible for a caseload of six to ten clients. Team supervisors had been previously trained on assessment, implementation and documentation of clinical, behavioral and other comprehensive treatment modalities (i.e. anger management group or cognitive-behavioral therapy). The program directors received rater training by a licensed psychologist with professional experience with adults with intellectual disabilities and assessment administration. Training was completed using a standardized set of

instructions outlined in the instruments' manuals and all raters' training followed the same set of procedures and instructions.

Measures

The *Questions about Behavioral Function* (Matson & Vollmer, 1995) is a 25-item measure that uses a 4-point Likert rating scale (0 = never, 1 = rarely, 2 = some, 3 = often) to assess five target behavior functions. The QABF subscales are *Attention* (draws attention from others), *Escape* (social and non-social), *Tangible* (access to items such as food/toys), *Non-Social* (self-stimulation), and *Physical* (reduction of physical discomfort). The informant is asked to rate the frequency of the behavior pertaining to where, when or why it occurs. Examples of items on the QABF include “engages in behavior to get attention,” “engages in behavior when he/she is in pain,” “engages in behavior as a form of self-stimulation.” Based on the five subscales characterizing functional attributes of a behavior, the number of items endorsed and the frequency ratings are scored to produce the function and severity subscales.

The QABF is one of the most widely used instruments in the field and several studies have been conducted by the authors and by independent researchers to explore its psychometric properties. It has been found to correlate highly with the *Motivational Assessment Scale* (MAS; Durand & Crimmins, 1988), suggesting that the QABF has good convergent validity (Freeman, Walker, & Kaufman, 2007; Paclawskyj et al., 2001; Shogren & Rojahn, 2003). Nicholson, Konstantinidi, & Furniss (2006) and Shogren & Rojahn (2003) reported moderate to strong inter-rater and test-retest reliability for QABF subscales. Paclawskyj, Matson, Rush, Smalls, and Vollmer (2000) reported subscale

internal consistencies ranging from .90 to .92, and .62 for the overall scale (Cronbach's α). Matson and Bosjolie (2007) found that the reliability of the QABF was higher for behaviors with a single maintaining function as compared with behaviors with multiple maintaining functions.

The *Functional Assessment for Multiple Causality* (Matson et al., 2003) is a 35-item behavior-rating scale with the same five subscales as the QABF (*Attention, Escape, Non-Social, Physical, Tangible*). It has a forced-choice response format, which means that for each item, the respondent must choose between three response options. For instance, "Engages in the behavior more when asked to do something (get dressed, work, etc.), or more if he/she thinks no one is in the room, or neither." Other examples of forced-choice items on the FACT include: "Engages in the behavior more to escape work or learning situations, or more because he/she is in pain, or neither." The frequency of endorsements (function) are tallied to produce subscale scores. Each of the five subscales is represented in 14 items.

To date, there have been only two empirical studies of the FACT's psychometric properties (Matson et al., 2003; Zaja, Moore, van Ingen, & Rojahn, 2010). In both studies, the authors, reported good to excellent internal consistency on all five subscales. In addition, they found that the five factors obtained on the FACT were identical to those on the QABF, which was seen as an indication of strong concurrent validity.

The *Functional Analysis Screening Tool* (FAST; Iwata & DeLeon, 2005) is a 16-item functional assessment tool designed to assess four functional properties of a problem behavior. The four subscales are labeled *Social/Attention* (gain attention or preferred

items), *Social/Escape* (escape from tasks/activities), *Automatic/Sensory Stimulation* (internal and physical actuation), and *Automatic/Pain Attenuation* (reduction of physical discomfort). It uses Yes/No/NA response format. Examples of items are “*Does the problem behavior appear to be a form of self-stimulation?*”, and “*Does the problem behavior occur even when no one is nearby or watching?*” The FAST is intended to be used as a screening instrument to guide further examination and inform intervention efforts more accurately.

To date, there has been only one empirical study of the FAST’s psychometric properties (Zaja, Moore, van Ingen, & Rojahn, 2011). In this study, the FAST had estimates of inter-rater and test-retest reliability that ranged from poor to good. In addition, some of the subscales on the FAST had good convergent validity with the QABF and the FACT, while others did not.

Procedure

The three functional assessment instruments were completed by two of the 29 senior staff members at the facility, for the client with whom they worked with most extensively. Assessments were repeated approximately eight weeks after the first assessment ($M = 7.8$, $SD = 1.5$). Two senior staff members were selected for each participant to independently complete the BPI-01 as well as the three functional assessment instruments. Raters were instructed to complete the functional assessment instruments for one, operationally identified target behavior per participant. The target behavior was defined as the one with the highest BPI-01 frequency score. In case of multiple behaviors with equally high frequency scores, the raters used the one with the

higher severity score. If both severity scores were equivalent, the raters picked the one they considered to be the most clinically relevant.

Results

This data set included results from two raters and two time points and prior analysis of the agreement between raters and time points had been conducted. Results suggested that estimates of inter-rater and test-retest reliability were good to excellent (Zaja, Moore, van Ingen, & Rojahn, 2010). As such, only data from Rater A/time 1 was selected for this analysis.

Demographic information for the 53 participants included in this study is presented in Table 1. Pearson correlations were used to determine if there was an association between the QABF, FACT and FAST subscales mean scores and demographic variables such as age, gender and level of functioning. On each rating scale and across all subscales, r values failed to reach significance, indicating that the demographic characteristics of the sample were not associated with subscale scores. Descriptive statistics of the three functional assessment instruments for each of the four behaviors included in this analysis are presented in Table 2. The values represent means and standard deviations of the percent of subscale endorsement of the total possible score.

Three separate multivariate analyses of variance (MANOVA) were performed on the results from each of the functional behavior rating scales. The QABF, FACT and FAST subscale scores were used as the dependent variables and the four specific behaviors (self-hitting, self-biting, hitting others, and verbal abuse to others) were used as the independent variables (Figure 1).

Self-Hitting vs. Hitting Others

This analysis compared two topographically similar, but categorically dissimilar behaviors (self-injurious vs. aggressive/destructive). “Self-Hitting” was comprised of those BPI-01 subscale data from individuals whose primary behavior was either “hitting head” ($n = 9$) or “hitting body” ($n = 5$). On the BPI-01, both of these were part of the Self-Injurious Behavior subscale. The comparison behavior, “Hitting others,” is classified on the BPI-01 Aggressive/Destructive Behavior subscale. Results for all three functional assessment rating scales suggest there were significant differences in the subscale ratings for the self-hitting and hitting others behaviors. The MANOVA multivariate tests were significant for all three instruments [QABF: Wilks’ $\lambda = .39$, $F(5, 25) = 7.72$, $p < .05$ with a moderate effect size (partial $\eta^2 = .61$); FACT: Wilks’ $\lambda = .54$, $F(5, 25) = 4.20$, $p < .05$ with a moderate effect size (partial $\eta^2 = .46$); FAST, Wilks’ $\lambda = .44$, $F(4, 26) = 8.40$, $p < .05$ with a moderate effect size (partial $\eta^2 = .56$)].

On both the QABF and the FACT, tests of between subjects effects showed that only the Nonsocial subscale ratings were significantly different for the self-hitting vs. hitting others groups, [QABF: $F(1, 29) = 29.76$, $p < .05$, partial $\eta^2 = .51$; FACT: $F(1, 29) = 17.19$, $p < .05$, partial $\eta^2 = .37$]. Specifically, Nonsocial subscale mean scores for the self-hitting group, were higher than the mean scores for the hitting others group for both the QABF and the FACT (See Table 2). On the FAST, ratings for the Automatic/Sensory Stimulation function were significantly different between these groups, $F(1, 29) = 24.61$, $p < .05$, partial $\eta^2 = .46$. Again, the self-hitting group had higher ratings than the hitting others group (See Table 2).

Self-Hitting vs. Self-Biting

In this analysis, we compared two topographically dissimilar behaviors that are both part of the same broad behavioral category, namely self-injurious behavior: self-biting ($n=7$) and self-hitting ($n = 14$). Across the three rating scales, we found no significant differences in the subscale rankings for these two behaviors. Results for the MANOVA multivariate tests were as follows: QABF, Wilks' $\lambda = .82$, $F(5, 15) = .68$, $p = .64$; FACT, Wilks' $\lambda = .64$, $F(5, 15) = 1.72$, $p = .19$; FAST, Wilks' $\lambda = .76$, $F(4, 16) = 1.24$, $p = .34$.

Verbal Abuse to Others vs. Hitting Others

In this analysis, we compared two topographically dissimilar behaviors that both belong to a category of behaviors described as aggressive/destructive: verbal abuse to others ($n = 15$) and hitting others ($n = 17$). Across the three rating scales, we found no significant differences in the subscale rankings for these two behaviors. Results for the MANOVA multivariate tests are as follows: QABF, Wilks' $\lambda = .82$, $F(5, 26) = .113$, $p = .37$; FACT, Wilks' $\lambda = .88$, $F(5, 26) = .72$, $p = .62$; FAST, Wilks' $\lambda = .89$, $F(4, 27) = .83$, $p = .52$.

Discussion

The purpose of this analysis was to examine the relationship between specific behavioral topographies and the functional properties that maintain them. We used three behavioral-rating scales that have been previously found to have good to excellent psychometric properties. In addition, these three rating scales are diverse in terms of their structure and response format but are also very closely aligned, conceptually.

Previous research has shown that some challenging behaviors are more highly associated with particular functional properties than others, according to functional assessment rating scales (Emerson & Bromley, 1995; Zaja, Rojahn, Turygin, Moore, & van Ingen, in press). To define the behaviors, however, these studies looked only at broadly defined categories such as self-injurious, stereotypical, or aggressive/destructive behaviors and did not consider operationally defined topographical variations of behaviors within these categories. This is likely due to the fact that it is very difficult to obtain a large enough number of cases of any one specific behavior. In these studies, there was initial evidence that certain behavior categories were more often associated with certain functional properties. For instance, Zaja et al. (in preparation) found that self-injurious behaviors were ranked significantly higher on the Nonsocial/Automatic subscale of the QABF and the FACT than aggressive/destructive behaviors. They also found that aggressive/destructive behaviors received significantly higher ratings on the Attention subscales of the QABF and the FACT. Emerson and Bromley (1995) also found that self-injurious behaviors were more likely to be ranked on the Self-Stimulation (analogous to Nonsocial/Automatic) subscale than other subscales on the MAS.

Based on these findings, we analyzed if these associations would be observed when specific behavior topographies were compared. First, we compared two forms of hitting that belong to different behavior categories. Self-hitting is included in the self-injurious behavior category and hitting others is included in the aggressive/destructive category. Second, we compared two pairs of topographically dissimilar behavior forms

that belong to the same behavior category: self-hitting/self-biting and verbal abuse to others/hitting others.

Results suggested that, on all three rating scales, Nonsocial and Automatic/Self Stimulation functions were more highly ranked for the self-hitting group than the hitting others group. This implies that the same associations hold true for specific topographies that were observed for the broader behavior categories (Emerson & Bromley, 1995; Zaja, et al., in preparation). Those behaviors that are self-directed are more highly ranked by caregivers as having automatic and self-stimulatory purposes than those behaviors that are directed at others.

There is further support for this in the results from the comparison between the behaviors that are topographically dissimilar but belong to the same behavior category. On the QABF, FACT, and FAST, subscale rankings for both of the self-injurious behaviors were similar, indicating they have the same functional properties. In addition, across all three rating scales, subscale rankings for both the aggressive/destructive behaviors were similar. These results suggest that, in terms of the functional properties, there may be more variation between the broader behavior categories, than there is within them.

Previous studies have also demonstrated the importance of function over form though these studies were smaller in scale and were held in experimental environments (Barrera & Graver, 2007; Lieving, Hagopian, Long, & O'Connor, 2004; Roberts-Gwinn, Luiten, Derby, Johnson, & Weber, 2001). The current study adds to the existing literature by using information gathered in the natural environment on a large sample.

While these results have many implications for intervention and treatment design, additional research is needed to bolster these findings.

APPENDIX A

Table 1
Demographic Characteristics by Behavior Topography

	<i>Self-Hitting</i> <i>n =14</i>	<i>Self-Biting</i> <i>n =7</i>	<i>Hitting Others</i> <i>n =17</i>	<i>Verbal Abuse to Others</i> <i>n =15</i>
<i>Gender</i>				
<i>Male</i>	12	5	13	10
<i>Female</i>	2	2	4	5
<i>Level of Functioning</i>				
<i>Mild</i>	1	0	2	7
<i>Moderate</i>	0	0	7	7
<i>Severe</i>	3	1	6	1
<i>Profound</i>	10	7	2	0
<i>Age (years)</i>				
<i>Range</i>	21-52	22-52	20-55	22-55
<i>Mean/SD</i>	39/10.74	39/13.22	35/9.20	38/10.78

APPENDIX B

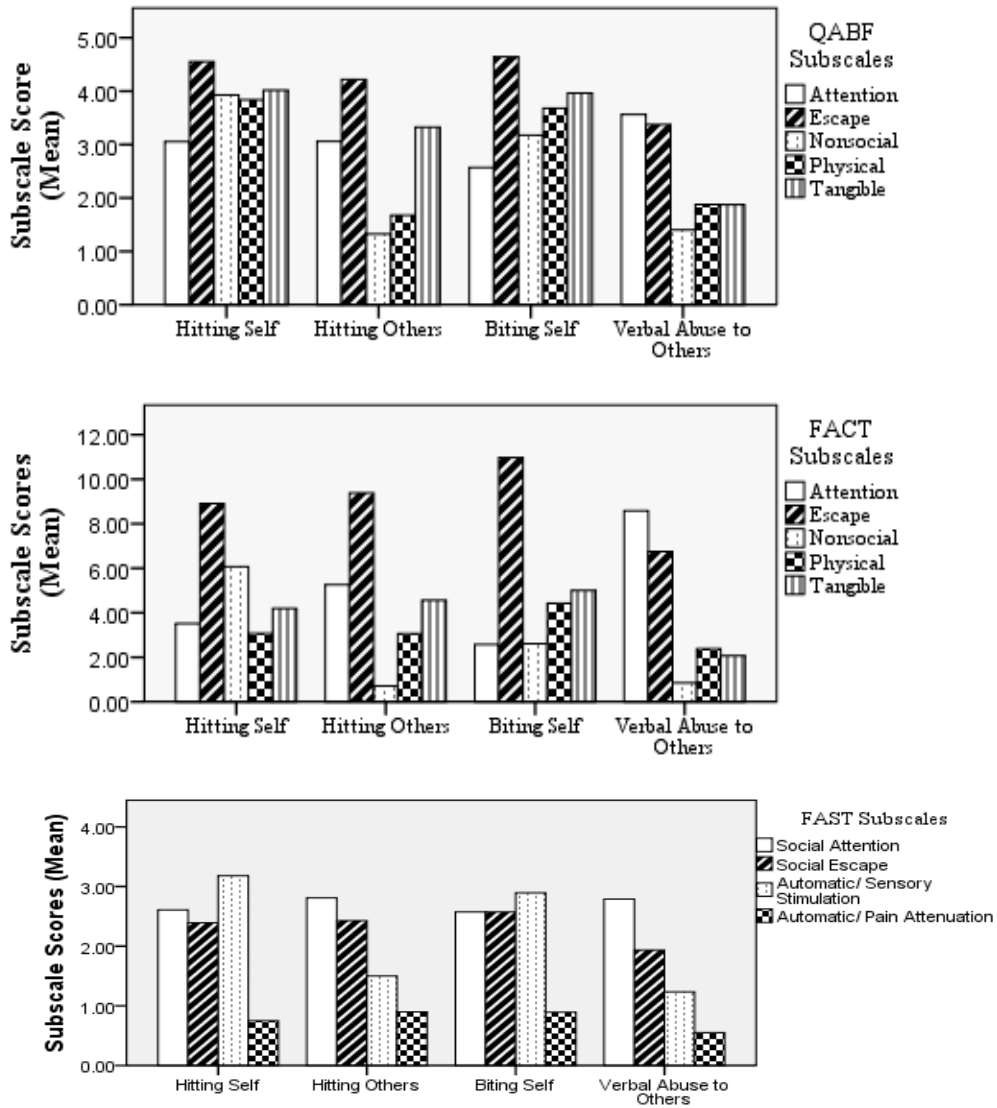
Table 2

Descriptive Statistics of the QABF, FACT, and FAST Subscale scores by Behavior Topography (percent of total possible score)

	Self-Hitting		Hitting Others		Verbal Abuse to Others		Self-Biting	
	(n = 14)		(n = 17)		(n = 15)		(n = 7)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>QABF</i>								
Attention	42.38	28.72	44.31	29.62	49.78	32.45	36.19	29.28
Escape	67.62	26.26	58.82	23.12	59.11	25.68	80.00	12.17
Nonsocial	50.48	30.12	9.02	8.14	12.44	17.43	34.29	21.23
Physical	32.86	27.85	26.27	31.04	35.56	33.87	54.29	26.51
Tangible	52.38	29.91	40.00	21.73	23.11	22.80	43.81	23.68
<i>FACT</i>								
Attention	30.1	30.71	48.32	35.13	60.47	38.07	25.51	25.37
Escape	63.27	34.98	66.81	32.33	53.81	31.81	84.69	24.20
Nonsocial	38.78	31.54	5.04	10.64	5.24	10.64	9.18	12.17
Physical	23.98	28.93	19.33	34.05	30.48	37.16	37.76	37.23
Tangible	23.98	27.96	39.5	32.15	22.38	31.81	52.04	28.19
<i>FAST</i>								
Social Attention	47.14	23.01	55.29	20.65	53.33	14.47	48.57	25.45
Social Escape	48.57	20.33	47.06	24.44	40.00	22.68	62.86	13.8
Sensory Stimulation	57.14	17.29	30.59	12.49	20.00	18.82	54.29	22.25
Pain Attenuation	14.29	21.38	16.47	22.62	16.00	21.65	25.71	22.25

APPENDIX C

Figure 1
QABF, FACT, and FAST Rating Scales Subscale Scores (Means) for Specific Topographies



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