

PSYCHOMETRIC PROPERTIES OF THE ADULT SCALE OF HOSTILITY AND  
AGGRESSION: REACTIVE/PROACTIVE (A-SHARP) FOR INDIVIDUALS WITH  
INTELLECTUAL DISABILITIES

by

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Psychometric Properties of the Adult Scale of Hostility and Aggression:  
Reactive/Proactive (A-SHARP) for Individuals with Intellectual Disabilities

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of  
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## ABSTRACT

### PSYCHOMETRIC PROPERTIES OF THE ADULT SCALE OF HOSTILITY AND AGGRESSION: REACTIVE/PROACTIVE (A-SHARP) FOR INDIVIDUALS WITH INTELLECTUAL DISABILITIES

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Background: The Adult Scale of Hostility and Aggression: Reactive/Proactive (A-SHARP; Matlock & Aman, 2011) was developed to assess aggressive problem behaviors common in adults with intellectual and developmental disabilities. The 52-item A-SHARP has five subscales (*Verbal Aggression*, *Physical Aggression*, *Hostile Affect*, *Covert Aggression*, and *Bullying*) and in addition provides a score on the degree of provocation of the exhibited aggression. Psychometric properties as reported by Matlock and Aman (2014) were very good, yet need to be corroborated. Method: In 2013, staff at a day treatment program for adults with intellectual disabilities completed ratings on the A-SHARP for all their clients (n=194) and the Behavior Problems Inventory-01 (BPI-01; Rojahn et al., 2001). The BPI-01 was also completed in 2008. The Behavior Problems Inventory-Short Form (BPI-S; Rojahn et al., 2012a) was completed in 2012. Results: Internal consistency was excellent for the A-SHARP *Problem* and *Provocation* scales (Cronbach  $\alpha$  = .96 and .90), ranging from .76 to .93 for the five subscales. As for

concurrent validity of the A-SHARP, subscale scores correlated with the 2013 BPI-01 *Aggressive/Destructive Behavior* frequency and severity ratings from .15 to .68 (Spearman  $\rho$ ). Furthermore, regression analyses suggest that scores from the 2008 BPI-01 and the 2012 BPI-S predicted scores on the relevant A-SHARP scales. Conclusions: The A-SHARP was found to have acceptable to excellent internal consistency, while evidence for concurrent validity of select A-SHARP subscales was moderate. These findings and their implications for the assessment of aggressive behavior in adults with intellectual and developmental disabilities are discussed.

## INTRODUCTION

Aggressive behavior among individuals with intellectual disability can be a very serious problem not only for those responsible for their well-being, who are the potential targets of the aggressive attacks, but ultimately also for those who aggress. Individuals with frequent and severe aggressive behavior very likely have diminished quality of life, limited opportunities to acquire adaptive or social behaviors, and interrupted personal development.

Because community-based providers for adults with intellectual disabilities usually lack adequate resources and trained staff to appropriately manage aggressive behaviors (Bouras & Holt, 2004; Edwards, Lennox, & White, 2007), especially those individuals with a history of aggressive behavior often have to be excluded from normalized living environments, and end up being relegated to restrictive institutional residential settings. This typically means losing out on many educational, occupational, and leisure time opportunities (Antonacci, Manuel, & Davis, 2008; Bruininks et al., 1994; Harris, 1993) The presence of aggressive behaviors among this population is a strong predictor of being referred to psychiatric hospitals (Modi et al., 2015), institutional placement (Meador & Osborn, 1992) and to receive psychotropic medications (Baumeister, Todd, & Sevin, 1993).

### *Intellectual disability*

Before discussing aggressive behavior in greater detail, we will first briefly address the diagnosis and the etiology of intellectual disability. The fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), classifies intellectual disability as one of the neurodevelopmental disorders (intellectual disability, communication disorder, autism spectrum disorders, motor disorders, ADHD, and specific learning disorders). Other important classification systems with similar definitions of intellectual disability as the DSM-5 are published by the American Association on Intellectual and Developmental Disability (AAIDD; 2010), and the International Classification of Diseases-10, published by the World Health Organization (1992). Neurodevelopmental disorders typically manifest relatively early in development, often before the child enters grade school. Moreover, neurodevelopment disorders frequently co-occur. The DSM-5 defines intellectual disability deficits in intellectual functioning *and* in adaptive functioning. Intellectual functioning includes mental abilities such as reasoning; problem solving; planning; abstract thinking; judgment; academic learning (ability to learn in school via traditional teaching methods); and experiential learning (the ability to learn through experience, trial and error, and observation). Intellectual functioning is normally measured by standardized intelligence tests. A standard score of approximately two standard deviations below the mean represents a significant cognitive deficit. Thus, researchers and clinicians view scores below 70 as possibly reflecting a significant cognitive deficit.

Deficits or impairments in adaptive functioning refer to skills needed to live in an independent and responsible manner. Limited abilities in these life skills make it difficult to achieve age- appropriate and socially expected standards. Without these skills, a person needs additional supports to succeed at school, work, or independent life. Main areas of adaptive functioning are: communication, social skills, personal independence at home or in community settings, and the ability to conform to the standards at work or school. Adaptive skills are ordinarily assessed with a standardized test of adaptive behavior. As with intelligence tests, a standard score below 70 is thought to reflect a significant deficit in adaptive functioning.

The prevalence of intellectual disability ranges between 1% and 3% (Harris, 2006). Among those with intellectual disability, functioning levels of mild, moderate, severe, and profound disability affects about 85%, 10%, 4%, and 2% of the population, respectively (King, Toth, Hodapp, & Dykens, 2009).

Intellectual disability can be caused by a variety of insults that can occur at or before conception (genetic), during the intrauterine development, perinatally, and during early childhood. Causes include inherited and de novo chromosomal abnormalities, infections, exposure to toxins, malnutrition, and other adverse environmental and rearing conditions that are often related to poverty. In many cases the etiology is unexplained (Shapiro, 2011).

Intellectual disability is often comorbid with a number of mental and physical disorders that add their own problems to the management of individuals with intellectual

disability (Maulik & Harbour, 2010). Similarly, individuals with intellectual disability are also at an elevated risk of exhibiting frequent challenging behavior such as aggression.

### *Aggressive behavior*

Aggressive behavior has been of intense interest for a long time by scientists from many disciplines and perspectives, including psychodynamic, structural, biological, and behavioral psychology, neuroscience, genetics, psychiatry, anthropology, ethnology, and ethology.

As mentioned earlier, individuals with intellectual disabilities are especially likely to acquire maladaptive aggressive behavior and other challenging behavior. The prevalence rates vary due to differences in how investigators define challenging behavior, diverse sampling methods, and other methodological factors across different surveys. Rojahn and Meier (2010) conducted a comprehensive review of the international epidemiological research on challenging behavior in intellectual disability and found that the prevalence of aggressive behavior ranged from 6.4% (Holden & Gitlesen, 2006) to 32% (Lowe et al., 2007). Tyrer et al. (2006) and Crocker et al. (2006) both examined the prevalence of aggression in over 3000 individuals with intellectual disability and reported overall rates of 14% and 24.4%, respectively. Aggressive behavior exists across all levels of functioning. Moreover, researchers and clinicians have established that individuals diagnosed with autism and/or intellectual disability are more likely to engage in aggressive behaviors (McClintock, Hall, & Oliver, 2003; Tsiouris, Kim, Brown, & Cohen, 2011).

Aggression can be verbal and/or physical, and it can be covert or overt. In addition, aggressive behaviors can be reactive or proactive which relates to the motivation, direction, and origin of the act. Dodge and Coie (1987) first distinguished between reactive and proactive aggression in children. Proactive (instrumental) aggression is deliberately aimed at obtaining an external goal such as something tangible or an expression of dominance. It is believed that proactive aggression derives from a neurobiological function commonly associated with the maintenance of social dominance or the opportunity to achieve higher social status (Willner, 2015). Reactive (hostile) aggression is less controlled and appears to be a provoked defensive reaction to a goal that has been blocked (Dodge and Coie, 1987). Reactive aggression can be considered as the “fight” response to a human’s “fight or flight” defense system (Willner, 2015). The clinical distinction between proactive and reactive aggression in individuals with intellectual disability is important because these types of aggression serve different functions, and understanding the function of aggressive behavior is critical for successful interventions and treatment planning (Kempes et al., 2005).

This distinction between different motivations for aggressive behavior dovetails with behavioral accounts of this type of response. Reactive aggression, for instance, may be considered an unconditioned (inborn) or conditioned (learned) reflex in response to perceived threats. Proactive aggression, on the other hand, is primarily an operant behavior that is learned and maintained by its consequences (positive or negative reinforcement). An individual’s learning history can then over time blur the distinction between reflexive and operant mechanisms, meaning for instance that someone’s

originally reflexive aggression can also have functional consequences (positive or negative reinforcement) and thus become maintained as an operant. Again, determining the nature of the principles involved in a given aggressive behavior of a specific individual under specific circumstances is critical for successful interventions and treatment planning.

The identification of so called *behavioral phenotypes* suggest that aggressive behavior may also have a genetic component. Genetic syndromes such as Smith-Magenis syndrome, Angelman syndrome, and Fragile X syndrome are associated with intellectual disability and with relatively high levels of aggressive behavior. However, new research suggests that the psychosocial mechanism likely to maintain aggressive behavior varies by syndrome as they each represent individual differences in genetic mutation and patterns of activation among neurological structures associated with emotion and cognition (Schneider, Hagerman, & Hessel, 2009; Strachan et al., 2009; Taylor & Oliver, 2008). Matlock and Aman (2011; 2014) released preliminary evidence suggesting that individuals diagnosed with a particular genetic disorder and/or classified at a certain level of functioning may be more likely to engage in a specific type of aggressive behavior than individuals with another level of functioning.

#### *Assessment of aggressive behavior*

Assessment of aggressive behavior is important for a variety of reasons, including for basic and clinical research, health service administration, and for the development, application, and evaluation of therapeutic interventions. As far as the assessment of aggression is concerned, one can use direct and indirect measures to analyze the

behavior. Direct assessment involves recording and analyzing the behavior as it is observed. Direct assessment methods, such as systematic behavior observation while being reliable and valid, can be expensive and time consuming. Indirect assessment allows professionals to analyze the behavior through surveys, interviews, and standardized behavior rating scales that are usually completed by third-party informants familiar with the individual. Indirect assessments are comparatively inexpensive and they require less time and/or human resources. They are also beneficial because they have standard criteria which apply across individuals and behaviors without the need to individually tailor each assessment tool. A potential problem is the subjective nature of indirect assessments which can render unreliable information. Therefore, it is paramount to develop and administer instruments with proven psychometric properties.

Professionals who provide therapeutic services to those with intellectual disabilities are faced with the difficult task of creating treatment interventions that decrease or eliminate the frequency and severity of aggressive behaviors. Aggression can also be treated pharmacologically. However, the use of pharmacologic treatments for aggressive behavior presents many potential complication and impediments. For instance, a pharmacologic approach to the treatment of aggressive behavior may set the stage for possible drug interactions with medication prescribed to treat other symptoms of intellectual disability. Currently, the Federal Drug Administration approves antipsychotic drugs such as risperidone and aripiprazole to treat behavioral disturbances or ‘irritability’ in individuals with autism and/or intellectual disability (Bonnot & Holzer, 2012; Stigler & McDougle, 2008). Cohen et al. (2013) found that results from clinical trials with

individuals with developmental disabilities tend to focus more on efficacy than adverse side effects of risperidone and aripiprazole and that attempts to de-emphasize side effects were not uncommon. Although successful of aggressive behavior reduction, pharmacological treatment should include the monitoring of possible secondary effects commonly associated with antipsychotic medications such as weight gain, extra-pyramidal syndrome (movement disorders), and somnolence (Bonnet, Inaoui, Lloret, & Cohen, 2010).

The doctrine of the least restrictive alternative states that the least intrusive, but most effective treatment procedures should be tried and exhausted before more intrusive procedures (Brosnan & Healy, 2011). Other treatment options for aggressive behaviors among individuals with intellectual disabilities include behavioral interventions or applied behavior analysis. Founded on the principles of learning, applied behavior analysis focuses on identifying the function (or maintaining variables) of a person's target behavior, which serves as a basis of rationale for individually customized treatment programs. Functional behavioral assessments increase the likelihood of treatment success because instead of treating aggressive behavior directly, efforts systematically target the psychosocial antecedents and maintaining conditions of the aggressive behavior (Horner et al., 2002). Antecedent modifications, consequence manipulations, and reinforcement-based strategies are all interventions used to effectively reduce or eliminate aggressive behavior.

There is a paucity of behavior rating instruments that are specifically designed for the assessment of aggressive behavior in individuals with intellectual disability, and none

of the existing scales provide information on the motivation of aggressive acts. Behavior rating scales commonly used to measure aggression among those with intellectual disabilities include the Aberrant Behavior Checklist (ABC; Aman, Singh, Stewart & Field, 1985), the Behavior Problems Inventory (BPI-01, Rojahn, Matson, Lott, Esbensen, & Smalls, 2001), the Nisonger Child Behavior Rating Form (NCBRF; Aman, Tassé, Rojahn, & Hammer, 1996), and the Developmental Behaviour Checklist (DBC; Einfeld & Tonge, 1992). The 15 item *Irritability and Agitation* subscale of the ABC fails to assess actual instances of verbal and physical aggression. The NCBRF includes a *Conduct Problem* scale, however most of the 16 items focus on temper, irritability, and agitation. Only two items on the NCBRF relate to physical aggression towards others. This scale is not used for adults with intellectual disability. The Adult version (DBC-A; Mohr, Tonge, & Einfeld, 2005) and the Primary Carer version (DBC-P; Einfeld & Tonge, 1992) of the DBC are used for adults and children with intellectual disabilities, but similar to the BPI-01, only the *Disruptive/Antisocial* subscale assesses aggressive behavior. The BPI-01 covers aggression in greater detail than the ABC, NCBRF, and both versions of the DBC. Although it has 11 items in a subscale labeled *Aggressive/Destructive Behavior*, the BPI-01 still does not capture the full range of aggressive behaviors.

In 2009, Farmer and Aman created the Children's Scale of Hostility and Aggression: Reactive/Proactive (C-SHARP) in response to the absence of a scale suitable to measure aggressive behavior among youth with intellectual and developmental disabilities. Fifty-two items address *Verbal Aggression*, *Physical Aggression*, *Hostile*

*Affect*, *Covert Aggression*, and *Bullying* on a *Problem* scale and *Provocation* scale. This scale was created simultaneously with the Adult Scale of Hostility and Aggression: Reactive/Proactive (A-SHARP; Matlock & Aman, 2011). Similar to the C-SHARP, the A-SHARP is an informant-based behavior rating scale for adults with intellectual disabilities. It is the first domain-specific instrument to assess the topography of aggressive behavior while also classifying the behavior as reactive or proactive. Fifty-two items on the A-SHARP correspond to one of the five subscales of *Verbal Aggression* (i.e., ‘calls others insulting names in their absence,’ ‘uses profanity to shock or offend others,’), *Physical Aggression* (i.e., ‘pinches others,’ ‘breaks others’ things’), *Hostile Affect* (‘is resentful over seemingly minor issues,’ ‘gets mad when caught behaving badly’), *Covert Aggression* (i.e., ‘steals from others when they aren’t looking,’ ‘starts trouble by baiting others’) and *Bullying* (i.e., ‘verbally teases others, even after being asked to stop,’ ‘intimidates others’). These items are rated on a *Problem* scale (0= does not happen, to 3= severe and/or frequent problem) and *Provocation* scale (-2= only when provoked, unplanned, or when s/he “just loses it” to 2= always the first to act [always the instigator]). The A-SHARP’s unique addition of the *Provocation* scale is intended to characterize the motivation or origin of the behavior as reactive or proactive.

The potential usefulness of the A-SHARP extends from individuals with intellectual disability and their caregivers to professionals in the field of developmental disabilities. Covering a broad array of aggressive behaviors, the prevalence, as well as the direction of a behavior, the A-SHARP has the potential to advance the care of individuals with intellectual disabilities as caretakers will gain a firmer grasp to better understand

those behaviors and treatment programs with appropriate proactive and responsive strategies can be developed. Researchers who study aggressive behavior among individuals with intellectual disabilities will also benefit from the A-SHARP. This is particularly important for clinical trials of drug effects on aggressive behaviors. A scale that covers a multitude of aggressive behaviors will allow researchers to thoroughly assess treatment effects of their variables better than using instruments that only cover minimal types.

As new behavior rating scales are developed, it is important that scientists compare them to well-established instruments to identify their strengths and weaknesses. This information allows clinicians and other professionals to make more informed choices when treating their clients and it also reveals threats to reliability and validity to the authors who created the measure. So far, psychometric properties of the A-SHARP have only been reported by the authors. Their findings suggest that the scale has strong internal consistency and concurrent, congruent, diagnostic, and external validity (Matlock & Aman, 2014). In this study, the original A-SHARP (58 items) is compared to the first version of the Behavior Problems Inventory (BPI-01, Rojahn, et al., 2001) and the Behavior Problems Inventory- Short Form (BPI-S; Rojahn et al., 2012a) to evaluate concurrent and predictive validity. Reliability of the A-SHARP *Problem* and *Provocation* scales and its five subscales are also assessed.

## METHOD

### *Participants*

The sample included 194 adults with intellectual and developmental disabilities from a day-program organization with three facilities in Minnesota, USA. This establishment accepts individuals with behavior problems and provides day-training and habilitation services. For purposes of this study, the individuals from the three separate locations were aggregated into one sample. The age of the adults ranged from 16 to 79 years old ( $M = 41.31$ ,  $SD = 12.35$ ). Most of the participants were male ( $n = 133$ , 68.2 %) and Caucasian ( $n = 153$ , 78.5%). The remaining 41 individuals were African American ( $n = 19$ , 9.8%), Asian/Pacific Islander ( $n = 12$ , 6.2%), Hispanic ( $n = 2$ , 1.0%), American Indian ( $n = 4$ , 2.1%), and ‘other’ ( $n = 3$ , 1.5%). All levels of functioning were represented mild ( $n = 42$ , 21.6%), moderate ( $n = 59$ , 30.4%), severe ( $n = 51$ , 26.3%), and profound intellectual disability ( $n = 40$ , 20.6%). Two participants (1.0%) did not meet the criteria for intellectual disability. Most of the participants had verbal communication abilities ( $n = 123$ , 63.1%). Seventy-six individuals had a diagnosis of autism spectrum disorder (autistic disorder, Asperger’s disorder, or pervasive developmental disorder- not otherwise specified) and seventy-two participants (36.9%) also had a diagnosis of a seizure disorder. The demographic information for the sample is found in Table 1.

**Table 1***Demographic Information of the Sample*

	<i>N</i>	%
<b>Sex</b>		
Male	133	68.6
Female	61	31.4
<b>Age groups</b>		
16-27	32	16.5
28-37	50	25.8
38-45	41	21.1
46-79	71	36.6
<b>ASD<sup>1</sup> diagnosis</b>		
No	117	60.3
Yes	77	39.7
<b>Ethnicity</b>		
Caucasian	153	78.9
African American	19	9.8
Asian/Pacific Islander	12	6.2
Hispanic	2	1.0
American Indian	4	2.1
Other	3	1.5
<b>Level of MR</b>		

No MR <sup>2</sup>	2	1.0
Mild	42	21.6
Moderate	59	30.4
Severe	51	26.3
Profound	40	20.6
Verbal communication		
No	71	36.6
Yes	123	63.4
Seizure disorder diagnosis		
No	122	61.9
Yes	72	36.5

<sup>1</sup>Autism spectrum disorder (i.e. autistic disorder, Asperger's disorder, or pervasive developmental disorder- not otherwise specified).

<sup>2</sup>Did not meet the criteria for intellectual disability

### *Instruments*

#### **Adult Scale of Hostility and Aggression: Reactive-Proactive (A-SHARP).**

Recognizing the need for a reliable measurement of aggression among those with intellectual disabilities, Matlock and Aman developed the A-SHARP (2011), a 52 item behavior rating tool. Matlock and Aman's factor analysis yielded five subscales. The authors designated these factors *Verbal Aggression* (9 items), *Physical Aggression* (13 items), *Hostile Affect* (11 items), *Covert Aggression* (8 items), and *Bullying* (7 items). Raters rate behavior items on the four-point *Problem scale* (0= never happens to 3=

severe and/or frequent problem). A subset of 30 items are also rated on a five-point *Provocation scale* (-2= only when provoked, when individual “just loses it,” through 0= equally likely to happen with or without provocation, to 2= always the first to act). The *Provocation scale* consists of only 30 items, as 22 items are reactive or proactive by definition (i.e., intimidates others; steals from others when they are not looking). A recent study supports the reliability and validity of the A-SHARP and suggests that the problem and provocation subscales assess different constructs (Matlock & Aman, 2014).

**Behavior Problems Inventory-01 (BPI-01).** The BPI-01 (Rojahn et al., 2001) is a respondent-based assessment that measures the occurrence and severity of problem behaviors in adults and children with intellectual disabilities. The BPI-01 includes 14 items on the *Self-Injurious Behavior* subscale, 24 items assessing *Stereotypic Behavior*, and 11 items on the *Aggressive/Destructive Behavior* subscale. Items are scored on a five-point frequency scale (0 = never, 1 = monthly, 2 = weekly, 3 = daily, 4 = hourly) in addition to a four-point severity scale (0 = no problem, 1 = a slight problem, 2 = a moderate problem, 3 = a severe problem). Research has documented that the BPI-01 has acceptable psychometric properties, including concurrent and factorial validity, as well as inter-rater agreement and internal consistency (Rojahn et al., 2001).

**Behavior Problems Inventory- Short form (BPI-S).** The BPI-S is an abbreviated version of the BPI-01 (Rojahn et al., 2012a). It includes the same subscales (*Self-Injurious Behavior*, *Aggressive/Destructive Behavior*, and *Stereotyped Behavior*), and rating system. The BPI-01 was designed to assess the occurrence and severity of maladaptive behaviors among individuals with intellectual disabilities. The BPI-S was

developed by combining highly correlated items, removing poorly performing items, low frequency items, and examining the changes in Cronbach's  $\alpha$ . The *Self-Injurious* subscale consists of 8 items, the *Aggressive/Destructive Behavior* subscale includes 10 items, and the *Stereotyped Behavior* subscale has 12 items. The authors added rating anchors of severity scales to the *Self-Injurious Behavior* and *Aggressive/Destructive Behavior* severity subscales. Previous studies found that the BPI-S demonstrated fair to excellent internal consistency, acceptable inter-rater agreement and test-retest reliability, and strong evidence for confirmatory and discriminant validity (Mascitelli et al., 2015; Rojahn et al., 2012b).

## **DATA ANALYSIS AND RESULTS**

Staff members at the day-program, who were familiar with the participants and their behaviors, rated the participants on the three separate behavior rating scales. Those ratings were part of the periodic routine assessments as requested by the day program administration. The BPI-01 was completed in 2008 ( $n = 126$ , 64%) and 2013 ( $n = 159$ , 80.7%), while the BPI-S was administered to 149 participants (75.6%) in 2012. Finally, the A-SHARP was completed by staff for 155 (78.7%) individuals in 2013. Descriptive statistics of the variables are displayed in Table 2.

**Table 2***Descriptive Statistics of the Variables*

		N	Mean	SD	Min	Max	Skewness	Kurtosis
<i>A-SHARP- (2013)</i>								
Verbal Aggression	pb	155	3.55	5.81	0	24	1.75	2.33
	pv	155	-0.17	2.68	-14	8	-0.73	6.09
Physical Aggression	pb	155	6.23	6.37	0	29	1.27	1.28
	pv	155	1.01	5.75	-16	20	0.52	1.73
Hostile Affect	pb	155	7.72	8.16	0	31	1.04	0.18
	pv	155	-0.06	1.06	-4	3	-0.12	1.90
Covert Aggression	pb	155	3.26	4.05	0	18	1.71	2.80
	pv	155	0.35	0.75	-1	2	1.43	0.78
Bullying	pb	155	3.30	3.93	0	18	1.84	3.60
	pv	155	0.48	1.41	-2	6	1.55	3.73
<i>BPI</i>								
A/D BPI-01 (2013)	f	159	6.50	6.21	0	27	1.22	1.05
	s	159	7.72	7.46	0	32	1.17	0.95
A/D BPI-S (2012)	f	149	12.97	8.83	0	38	0.54	-0.24
	s	148	13.39	16.35	0	90	2.58	7.38
A/D BPI-01 (2008)	f	126	8.32	6.19	0	26	0.62	-0.13

*Note:* pb = problem score; pv = provocation score; f = frequency score; s = severity score; A/D = Aggression/Destruction subscale

The data were analyzed using the IBM SPSS Statistics for Windows v. 19 (IBM Corp., Armonk, NY). We computed scores for the *Aggressive/Destructive Behavior* subscale on the BPI-01 and the BPI-S. Additionally, we calculated scores for *Verbal Aggression*, *Physical Aggression*, *Hostile Affect*, *Covert Aggression*, and *Bullying* subscales scores from the A-SHARP. We analyzed severity subscale scores from the BPI-01 and the BPI-S to be consistent with procedures used in the paper by Matlock and Aman (2014).

#### *A-SHARP Internal consistency*

Cronbach's alpha ( $\alpha$ ) coefficients (Cronbach, 1951) were calculated to determine internal consistency values for the A-SHARP subscales. Total scale items for the *Problem* and *Provocation* scale yielded  $\alpha$ -coefficients of .95 and .90, respectively. Internal consistency coefficients for the *Provocation* scale could only be calculated on the *Verbal Aggression* and *Physical Aggression* subscales because the remaining subscales do not contain enough items to run the analyses. The  $\alpha$ -coefficients for the *Problem* scale ranged from .82 for *Verbal Aggression* to .93 for the *Physical Aggression* subscale (see Table 3).

**Table 3***Cronbach-A Internal Consistencies of the A-SHARP Scales (N = 155)*

A-SHARP Scales	$\alpha$
A-SHARP	
Problem	.96
Provocation	.90
Verbal Aggression	
Problem	.93
Provocation	.82
Physical Aggression	
Problem	.84
Provocation	.86
Hostile Affect	
Problem	.92
Provocation	n/a
Covert Aggression	
Problem	.80
Provocation	n/a
Bullying	
Problem	.76
Provocation	n/a

*Associations between the A-SHARP Problem and Provocation Scales*

To detect associations between the *Problem* and *Provocation* scales on the A-SHARP, Pearson correlations were computed for each subscale (see Table 4). Correlations ranged from .02 on the *Verbal Aggression Problem* and *Provocation* scales to .46 on the *Bullying Problem* and *Provocation* scales. Table 4 also shows bivariate correlations across other A-SHARP subscale scores. They ranged from -.04 between the *Verbal Aggression Problem* and *Covert Provocation* scale to .76 between the *Verbal Aggression Problem* and *Hostile Affect Problem* scales.

**Table 4***Pearson Correlation Matrix between A-SHARP Provocation and Problem Scales*

	Verbal (pv)	Physical	Physical (pv)	Hostile Affect	Hostile Affect (pv)	Covert	Covert (pv)	Bullying	Bullying (pv)
Verbal	.02	.45**	-.02	.76**	.19*	.61**	-.04	.67**	.17*
Verbal (pv)		.17*	.59**	.02	.60**	.01	.10	.12	.34**
Physical			.34**	.47**	.29**	.30**	.08	.52**	.32**
Physical (pv)				-.07	.49**	.02	.12	.06	.44**
Hostile Affect					.13	.60**	-.05	.59**	.09
Hostile Affect (pv)						.09	.09	.14	.41**
Covert							.21*	.61**	.15
Covert (pv)								.17*	.41**
Bullying									.46**

Note: \* =  $p < .05$ ; \*\* =  $p < 0.01$ ; pv = provocation

*Concurrent validity*

As an index of concurrent validity, scores for the A-SHARP *Problem* scale were correlated with the severity and frequency scores for the *Aggressive/Destructive Behavior* subscale on the BPI-01 administered in 2013. Two-tailed Pearson correlations were calculated between all A-SHARP subscales and the BPI-01 *Aggressive/Destructive*

*Behavior* subscale. Correlations ranged from .15 (A-SHARP *Covert Aggression* and BPI-01 severity score) to .71 (A-SHARP *Physical Aggression* and BPI-01 severity score; see Table 5). Nine out of 10 correlations were statistically significant ( $p < .05$ ; unadjusted for multiple tests). We did not compare scores from the A-SHARP *Provocation* scale as the BPI was not designed to assess provocation.

**Table 5**

*Concurrent validity: correlations between the A-SHARP Problem Scale Scores with BPI-01 2013 Aggressive/Destructive Frequency and Severity Subscale Scores*

A-SHARP Subscale	BPI-01 Frequency	BPI-01 Severity
Verbal Aggression	.27**	.39**
Physical Aggression	.68**	.71**
Hostile Affect	.30**	.39**
Covert Aggression	.18*	.15
Bullying	.41**	.53**

Note: \* =  $p < .05$ ; \*\* =  $p < .01$

*A-SHARP scores predicted by earlier assessment*

To assess the extent to which scores from the *Aggressive/Destructive* subscale on the BPI predicted scores on the A-SHARP, we used frequency scores from the BPI-01 in 2008 and frequency and severity scores from the BPI-S in 2012. Beta and *t*-values are reported in Table 6 with their respective levels of significance.

**Table 6**

*Summary of the Linear Regression Analyses Predicting 2013 A-SHARP Subscale Scores with BPI Aggressive/Destructive Subscale Scores*

		Verbal Aggression			Physical Aggression		
		$\beta$	$t$	$p$	$\beta$	$t$	$p$
BPI-01 2008	F	.08	.78	.436	.40	4.25	.000
BPI-S 2012	F	.37	4.47	.000	.48	6.12	.000
BPI-S 2012	S	.39	4.76	.000	.36	4.38	.000
		Hostile Affect			Bullying		
BPI-01 2008	F	.12	1.15	.252	.29	2.90	.005
BPI-S 2012	F	.41	5.12	.000	.37	4.48	.000
BPI-S 2012	S	.33	3.92	.000	.36	4.38	.000
		Covert Aggression					
BPI-01 2008	F	.03	0.27	.791			
BPI-S 2012	F	.35	4.21	.000			
BPI-S 2012	S	.36	4.28	.000			

Note: f = frequency score; s = severity score

## DISCUSSION

The importance and strength of this study is that it is the first reliability and validity analyses of the A-SHARP with a newly collected sample of adults with intellectual disabilities by someone other than the instrument's authors. In general, our results suggest that the A-SHARP is a psychometrically sound instrument, with strong internal consistency, reliability and concurrent validity. Scores from the *Aggressive/Destructive* subscale of the BPI-01 from 2008 and the BPI-S from 2012 clearly predicted the 2013 A-SHARP. Although this attests to high predictability of the BPI, it is also additional evidence that the A-SHARP accomplishes its intentions of measuring aggressive behaviors.

### *A-SHARP internal consistency*

The Cronbach's alphas for the problem and provocation scales ranged from .80 to .96, except bullying, which was .76. Based on the interpretive guidelines by Cicchetti<sup>3</sup> (1994), these results provide support for the reliability of the A-SHARP with these data. Compared to the established psychometric properties of the *Aggression/Destruction* subscale of the BPI-S and the BPI-01, and the *Conduct Problem* subscale of the NCBRF, subscales on the A-SHARP's *Problem* scale achieved comparable  $\alpha$ -coefficients

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<sup>3</sup>> 0.8 = nearly perfect, between > .75 and .80 = excellent, between > .60 and .74 = good, between > .40 and .59 = fair, and < .40 = poor

(González et al., 2009; Mascitelli et al., Rojahn et al., 2010). Total scale alphas for the *Problem* and *Provocation* scales were .96 and .90, respectively. Since the internal consistency coefficients of the *Problem* and *Provocation* scales are excellent, an overall score an individual receives on either scale can reliably suggest whether their aggressive behavior is a problem and whether they are likely to engage in aggressive behaviors when provoked. The A-SHARP intends to measure aggressive behavior in a high risk population and these data suggest that it can be a reliable instrument for this purpose.

#### *Associations between the A-SHARP Problem and Provocation Scales*

The correlations between the A-SHARP *Problem* and *Provocation* scales reveal that most of the values have a negligible relationship, except the *Physical Aggression* and *Bullying* subscales. These two subscales are intended to measure different constructs and we would expect to see little to no associations as reported by Matlock and Aman (2014). Although the correspondence between *Problem* and *Provocation* scales on the *Physical Aggression* and *Bullying* subscales could be evidence of redundancy, it is also possible that these correlations are sensitive to the provocative nature of the aggressive behaviors they measure. It is also worthwhile to note that while the moderate correlation between the *Problem* and *Provocation* scales for *Physical Aggression* indicates that these subscales share a percentage of their variance, a large proportion of the variance is not shared. Moreover, in previous research by Matlock and Aman (2014), the association was smaller. Future research should continue to explore the degree to which these scales are distinct.

### *Concurrent validity*

We examined the correspondence among the A-SHARP *Problem* scale scores and compared the frequency and severity scores from the 2013 BPI-01 *Aggression/Destruction* subscale. Four of the five subscales on the A-SHARP had a moderate to large positive relationship with the BPI severity scores. Correlations between the A-SHARP *Problem* scale scores and BPI frequency scores were not as high as the BPI severity scores; however the A-SHARP's *Bullying* and *Physical Aggression* scales achieved correlations of .41 and .68, respectively with the BPI frequency scores. This suggests that some aggressive behaviors may occur in high frequency, yet they may not necessarily be considered a problem. On the other hand, aggressive behaviors occur only rarely but could represent a substantial problem. For example, aggressive behavior items on the BPI (i.e. 'hitting,' 'kicking,' and 'verbally abusive') and A-SHARP (i.e. 'shoves or pushes,' 'scratches others with fingernails,' and 'verbally threatens others with physical harm') can occur frequently but not severe in nature, or behaviors may occur rarely but severely. It is also possible that these behaviors can occur both frequently and severely.

Because *Bullying* and *Physical Aggression* were the only scores that correlated strongly with BPI frequency scores, it would make sense that these two types of aggression occurring at high rates, are also most likely to be considered a problem. Correlations between the *Covert Aggression* subscale of the A-SHARP and the frequency (.18) and severity (.15) scores on the *Aggressive/Destructive* subscale of the BPI-01 showed no relationship. Covert aggression may be difficult to observe since these behaviors are not meant to be openly displayed. Although opportunities to engage in

covert aggression exist, they may not be witnessed as often as physically or verbally aggressive behaviors.

*A-SHARP scores predicted by earlier assessment*

Linear regression analyses showed that frequency scores from the *Aggressive/Destructive* scale of the BPI-01 in 2008 as well as frequency and severity scores from the *Aggressive/Destructive* subscale of the BPI-S in 2012 predict *Problem* scale scores on the A-SHARP. Frequency scores from the BPI-01 in 2008 did not predict *Verbal Aggression*, *Hostile Affect*, or *Covert Aggression* subscales on the A-SHARP, however the *Physical Aggression* and *Bullying* subscales were predicted at the  $p < .01$  level. Both frequency and severity scores from the BPI-S in 2012 strongly predicted scores on all five scales of the A-SHARP and all  $p$ -values were smaller than .01. Overall, the results from the predictive validity assessment support the validity of the A-SHARP as a measure of aggressive behaviors as intended.

Several factors may contribute to the difference of the predictive ability between the BPI-S and the BPI-01. Besides being two different instruments, the BPI-S was administered in 2012 while the BPI-01 was administered in 2008. It is likely that the behaviors of the participants changed over time. Behavior intervention plans including other therapies and extraneous variables such as medical conditions could be responsible for a change in aggressive behavior. If this were the case, ratings that occur in a shorter timespan would better predict one another than ratings that occur far apart. In this case, the BPI-S would better predict scores on the A-SHARP as there is only a one year time gap between their collections. The BPI-01 was first administered in 2008 and at this time,

the A-SHARP was not developed. Ratings for the A-SHARP were not collected until five years later.

Moderate correlations between the A-SHARP *Provocation* and *Problem* scales on the *Physical Aggression* and *Bullying* subscales could be attributed to the number of items on the subscale and/or the nature of the aggressive behavior. For instance, bullying is provocative by nature and this may explain the moderate correlation between the *Provocation* and *Problem* scales instead of redundancy. Unfortunately, internal consistency for the *Provocation* scale could not be analyzed for three of the five subscales on the A-SHARP. *Covert Aggression* and *Bullying* only have two items on the *Provocation* scale while *Hostile Affect* has one item. These scales could be interpreted on the item level, however individual items are usually less reliable than scale scores. The total scale  $\alpha$ -coefficient for the *Provocation* scale was excellent which suggests that professionals can reliably interpret an individual's aggressive behavior to be proactive or reactive and incorporate this information into treatment intervention plans. After the conclusion of this study, we recognize that the *Provocation* scale is not as evaluated as the *Problem* scale and we suggest that additional studies focus on this new tool in particular. It would also be worthwhile to use the same sample from this study, remove the items that are no longer represented on the 52-item A-SHARP, and re-run the analyses to better evaluate the instrument that is currently available to the public.

In summary, aggression is not an easy construct to measure and requires the employment of psychometrically sound instruments. This study suggests that the A-SHARP has potential of being a useful assessment instrument of aggressive behaviors for

adults with intellectual and developmental disabilities. The alpha coefficients for the five subscales of the A-SHARP *Problem* scale with the current data were acceptable to high. Moreover, the total *Problem* and *Provocation* scales both yielded high internal reliability coefficients. These findings support the reliability of the A-SHARP. Both the BPI-01 (2008) and the BPI-S (2012) predicted ratings of aggressive behavior of the A-SHARP, and correlations with the concurrent ratings from the BPI-01 (2013) provide evidence of the validity of the A-SHARP as a measure of aggressive behavior among individuals with intellectual disability. The *Problem* scale portion of the A-SHARP alone provides researchers and clinicians with a dependable way to measure more types of aggressive behaviors than any behavior rating instrument that currently exists.

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