



Assessment Methods and Clinical Outcomes of Head-Directed Self-Injurious Behavior: A Survey of Behavior Analysts

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Article Details

Article Type: Research Article

Received date: 21st April, 2026

Accepted date: 30th July, 2026

Published date: 01st August, 2026

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Citation: Knutson, L. M., & Wiecek, R., (2026). Assessment Methods and Clinical Outcomes of Head-Directed Self-Injurious Behavior: A Survey of Behavior Analysts. *J Ment Health Soc Behav* 8(2):220. <https://doi.org/10.33790/jmhsb1100220>

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Abstract

Head-directed self-injurious behavior (HDSIB) is a severe and potentially dangerous form of self-injury commonly observed among individuals with autism. Despite its clinical significance, limited research has examined how Board Certified Behavior Analysts (BCBAs) assess and treat HDSIB in practice. This study surveyed 118 BCBAs with experience treating clients who engaged in HDSIB to examine client characteristics, assessment practices, behavioral function, intervention supports, and treatment outcomes. Results indicated that HDSIB was most commonly treated in children ages 6–10 years with a diagnosis of autism. Descriptive functional behavior assessment methods were the most frequently reported approach for identifying behavioral function (49.5%), whereas experimental assessments were used less often, including functional analyses (23.3%). Across their careers, participants found escape/avoidance as the most frequently identified maintaining function (22.5%), although most (88.2%) reported that HDSIB was typically maintained by multiple functions. The majority of participants (87%) reported using or recommending protective equipment as part of treatment, most commonly helmets (69%), blocking pads (66%), and pillows (52%). Across equipment types, protective equipment was generally rated as only slightly to moderately effective. Regarding treatment outcomes, the largest proportion of participants reported reducing HDSIB to 10% or less of baseline levels for 51%–75% of their clients, and 29% reported achieving this outcome for 76%–100% of clients. Nonparametric analyses found statistically significant results between year of certification and referring clients out that were not making progress. These findings provide one of the first descriptions of contemporary clinical practices for assessing and treating HDSIB. Results highlight the continued reliance on descriptive assessment methods, the prevalence of multiply controlled HDSIB, and the need for additional research examining factors associated with successful treatment outcomes and assessment selection.

Keywords: Autism, Behavior Analysis, Self-injurious Behavior, Protective Equipment

Introduction

Decades of behavioral research and practice have established that challenging behaviors are relatively common in individuals with autism spectrum disorder (ASD), with many studies reporting that over 90% of individuals with ASD exhibit challenging behavior [1–6]. One form of challenging behavior that is particularly prevalent for individuals with ASD is self-injurious behavior [7–9]. Van Den Bogaard et al. [10] defined SIB as “behavior in which a person harms (or attempts to harm) oneself deliberately and physically” (p. 709).

The estimated prevalence of SIB in individuals with ASD ranges from 33–71% [4, 5, 8, 11–14], making SIB one of the most common forms of challenging behavior in individuals with ASD. SIB is also a more prevalent challenging behavior for individuals with ASD than it is for individuals with Down syndrome [8] and intellectual developmental disorders [15]. Furthermore, SIB has shown a high rate of persistence, with one study finding that SIB persisted in 77.8% of individuals with ASD over a three-year period [16]. Taylor et al. [17] found no change in the topography or chronicity of SIB in individuals with autism across an 18-year timeframe, suggesting that SIB is a chronic challenging behavior. A negative association has been found between age and severity of SIB, pointing to higher severity of SIB at younger ages [17]. This aligns with previous research findings that younger children are more likely to engage in SIB [11]. These factors have played a role in SIB becoming one of the most well researched challenging behaviors for individuals with autism [18].

Topographies of SIB in the autistic population vary significantly and can be characterized by a wide range of behaviors, such as eye gouging, hand hitting, skin picking, hair-pulling, neck choking, self-biting, self-hitting, face slapping, head hitting, and head banging [9, 18, 19]. With SIB being an umbrella term for many types of injurious behaviors, the immediate effects of physical harm can widely vary. On the less severe side, SIB may result in contusions, abrasions, and lacerations [20], while more serious injuries can include fractures,

physical malformations, and in extreme cases, even death [18]. Behavioral problems, like SIB, have also been identified as the leading cause of emergency department visits for children with autism [21]. Beyond immediate physical harm, the long-term consequences of SIB are overwhelmingly negative, as well.

Emerson et al. [1] discuss many of the negative impacts on quality of life associated with more demanding challenging behaviors like SIB, including greater levels of eating assistance and hygiene assistance, as well as lower communication skills. Individuals with ASD engaging in SIB are likely at risk for social exclusion [4] and are often placed in more restrictive care settings [18, 22]. The higher rate of restrictive care placement is likely due to two factors: 1) SIB is a predictor of parental decisions to seek residential placements [17], and 2) SIB is a predictor of clinician decisions to recommend more restrictive placements, like hospitalization or short-term residential placement [23]. The literature also associates SIB with more restrictive treatment practices, including physical holds, seclusion/time-out, and loss of access to preferred stimulus [18, 24]. As a possible result of more restrictive placement and practice, individuals engaging in SIB may experience fewer educational opportunities or less access to community-based services [18, 25].

Beyond being a predictor of more restrictive care settings and practices, there is also evidence to suggest a positive relationship between SIB and developmental delays. Nøttestad and Linaker [25] found that individuals who engage in SIB had greater communication and hearing impairments, greater need of mobility assistance, and lower developmental quotients, while Baghdadli et al. [11] identified more delays in daily living skills in individuals engaging in SIB. Recent research also identifies a potential link between SIB and developmental delays, as Rattaz et al. [14] found that SIB was negatively related to adaptive skills, intellectual functioning, and language level. Furthermore, SIB has been positively related to symptom severity/intensity in the autistic population [2, 3]. Based on these findings, SIB appears to be most frequently impacting autistic individuals who are profoundly affected by the symptoms of ASD.

As established, SIB is a relatively common and dangerous challenging behavior experienced by individuals with autism, and is associated with a number of negative physical, developmental, and placement/practice outcomes. However, SIB becomes particularly dangerous when the head is targeted, a challenging behavior known as head-directed self-injurious behavior (HDSIB). In the literature, HDSIB has been identified as one of the most common forms of self-injury, with an estimated prevalence of 45%-58% in individuals with autism that engage in SIB [10, 26, 27]. In addition, HDSIB appears to have an early age of onset, as Fodstad et al. [28] identified emerging self-injurious behaviors, including instances of HDSIB in infants and toddlers as young as 12 – 18 months old.

Similarly to general self-injury, HDSIB presents in a number of topographies, including head banging, head hitting, knee-to-head hitting, or object-to-head hitting [9, 16, 19, 20]. The immediate physical harm caused by HDSIB can range from bruising, swelling, bumps, lacerations, or minor head contusions [20, 29] to brain damage, retinal detachment, and irreversible injury/death [17, 29, 30]. Individuals engaging in HDSIB are at an increased risk of traumatic brain injuries (TBIs).

According to the U.S. Department of Health and Human Services [31], TBI is a common type of brain injury that disrupts function as a result of trauma to the head. More specifically, individuals engaging in HDSIB are likely at-risk for coup-contrecoup brain injuries, in which a brain contusion forms at both the site of impact and the site directly opposite the impact [32]. TBIs, including coup-contrecoup injuries, are associated with a host of negative outcomes, including increased risk of respiratory disease, circulatory disease, seizures, and neurodegenerative diseases [33, 34]. While research regarding

TBIs in the HDSIB population is lacking, other populations that experience repeated head traumas, like football players, have been identified as at-risk for TBI [35] and neurodegenerative diseases, like Alzheimer's or chronic traumatic encephalopathy [36]. These other at-risk populations receive an extensive amount of research and development to improve brain safety and education [37-39]. However, this is not the case for individuals with autism who exhibit HDSIB. The risk for potential brain injury and damage makes HDSIB an even more pressing challenging behavior for behavior analysts to address, not only for client safety but also to address the treatment disparities between the sports and disability communities.

In the field of Applied Behavior Analysis, treatment of challenging behaviors, such as HDSIB, includes the achievement and documentation of meaningful behavior changes that improve individuals' quality of life [40, 41]. To meet these treatment goals, behavior analysts complete an assessment, develop a function-based treatment based on the assessment results, and collect ongoing data to evaluate effectiveness of an intervention. The first step to effective behavior change is to identify sources of reinforcement in the environment that maintain behavior. To do this, a comprehensive functional behavior assessment (FBA) must be completed. Broadly speaking, FBAs can fall into one of three categories: 1) indirect (interviews, rating scales, checklists), 2) descriptive, and 3) functional analyses [42].

Indirect methods often serve as a starting point for behavioral assessment and intervention, helping to establish patterns and develop hypotheses about reinforcers [43, 44]. Indirect FBA methods do not establish causality between behavior and the environment [44] and often have a large margin for error [45]. Research has found that indirect FBA methods preceded nearly 80% of descriptive FBAs in school settings [43], showing utility for indirect FBAs. Descriptive FBAs are a frequently used form of non-experimental assessments that are conducted using direct observation in a naturalistic setting and ABC recording [46, 47]. ABC recording refers to the practice of recording events that occur directly before (antecedents) and directly after (consequences) a target behavior [43, 46, 48]. Similarly to indirect FBA methods, descriptive FBAs can be used to establish correlations between the target behavior and environmental reinforcers [49]; however, descriptive FBAs do not have the precision to establish causation between two variables [44]. Over-reliance on indirect and descriptive methods can lead practitioners to inaccurate conclusions, such as the misidentification of a behavior's function [45, 50]. In a field where treatment is dependent upon accurate identification of maintaining functions of behavior, inaccurate assessment conclusions can be detrimental to treatment effectiveness for clients who engage in dangerous challenging behaviors, such as HDSIB.

To establish causality and avoid misidentification of behavioral functions, practitioners turn to the "gold standard" and most rigorous FBA methodology, the functional analysis [51-53]. The FA [19] is an experimental methodology for studying the operant functions of challenging behaviors, like HDSIB, by directly manipulating antecedents and consequences of the target behavior in a controlled setting [54, 55]. The typical procedures of an FA involve placing an individual who has a history of displaying challenging behaviors in alternating reinforcement conditions (attention, escape, avoidance, and tangible) to determine the condition(s) under which a challenging behavior is most likely to occur [19, 44]. Decades of research have established the validity and accuracy of the FA for assessing challenging behaviors [52, 55, 56], which has led the FA to become the standard by which other assessment methods are gauged [51, 53]. However, the FA comes with unique limitations and drawbacks, as well.

One limitation to FA procedures is that the assessment procedures could strengthen or reinforce challenging behavior or even create new functions for behavior [57]. While unlikely, some researchers have argued against exposing a client to a potential reinforcement

contingency that has not otherwise been suggested as a condition of concern through indirect methods [20, 58]. The FA is also limited by the need for practitioners to undergo specialized training on the procedures [44]; although, research suggests that a minority of Board Certified Behavior Analysts (BCBAs) receive adequate training on FA procedures [22, 59]. However, this drawback can be applied to all FA procedures as they each require the behavior analyst to receive specialized training. The final, and likely most significant, drawback to the FA is that practitioners may not know about the acceptability of experimental procedures, seeing the possibility of reinforcing challenging behaviors as counterintuitive to treatment [42]. To ameliorate concerns regarding client safety and ensuring ethical practices, modifications to assessment methods and practices have been developed. Each of these modified assessment procedures has aimed to maximize client safety, while obtaining the most accurate and complete data necessary to effectively treat the challenging behavior.

One alternative to the FA is the brief functional analysis [60], which can be implemented when behavioral severity or resource constraints limit the number of sessions that can be conducted [60, 61]. In a traditional FA, practitioners oversee several 10–15-minute sessions for each reinforcement condition [19], while a typical BFA involves only one or two 5–10-minute sessions per condition [60, 62]. The BFA can be an accurate assessment tool that sustains several advantages from a traditional FA [63]. However, other research suggests that the BFA less accurately reveals the maintaining functions of challenging behaviors, with a tendency to report false positives for reinforcement during assessment [64, 65]. These studies highlight both the utility and limitations of the BFA in behavioral assessment.

Hanley [64] conducted a review of existing functional behavioral assessments that identified several strengths and shortcomings to these methodologies, while also outlining a more standardized and effective approach to behavioral assessment. Based on this framework, Hanley et al. [66] developed and implemented the Practical Functional Assessment (PFA). In the PFA methodology, there is a standard process of indirect assessment (open-ended interview) and descriptive assessment (observations) that can help identify possible contingencies, ultimately increasing ecological validity and assessment efficiency [54, 66, 67]. Following indirect and descriptive assessment, individuals engaging in challenging behaviors are placed into brief (5–10-minute) experimental conditions to test contingency hypotheses [66, 68]. One unique feature of the PFA is the flexibility to present multiple contingencies at once in test conditions [66]. Due to this, the PFA may have particular utility when a challenging behavior appears to have multiple functions [42], as past research has identified weaknesses in the ability of BFA methods to discriminate between undifferentiated responding and multiply maintained behaviors [52, 62].

Following the accurate assessment of maintaining functions, individualized behavioral interventions are implemented to reduce the occurrence of challenging behavior [54, 57]. Common interventions for severe challenging behaviors, like HDSIB, include, but are not limited to: 1) noncontingent reinforcement, 2) differential reinforcement, and 3) functional communication training [42]. It is beyond the scope of this paper to review the multitude of evidence-based intervention strategies available to behavior analysts in the treatment of SIB. Readers interested in treatment strategies are encouraged to explore Moore et al. [69] or Labarca et al. [70].

As established, SIB is one of the most common forms of challenging behavior displayed by individuals with ASD. Self-injury becomes more dangerous when the head is targeted due to the potential for TBIs and brain damage, making HDSIB a particularly worrying behavior for BCBAs to address. Other at-risk populations for this type of injury have received extensive research to minimize their risk for brain injury; however, this does not appear to be the case for individuals engaging in HDSIB.

Although head-directed self-injurious behavior (HDSIB) is considered a subtype of self-injurious behavior, its unique risk for traumatic brain injury and severe physical harm warrants independent investigation of current assessment and treatment practices. The purpose of this study was to survey Board Certified Behavior Analysts (BCBAs) regarding their experiences treating HDSIB in order to describe client characteristics, assessment selection, functional outcomes, intervention supports, and treatment effectiveness. By characterizing current clinical practices and outcomes, this study seeks to inform future research and evidence-based clinical decision-making regarding assessment and treatment of HDSIB.

Methods

Ethical Approval

The study protocol and survey were approved by authors' institutional review board at the authors' university (IRB-2303005-EXM) on 3/24/2023. The survey was open for 4 weeks between 4/2023 and 5/2023. Board Certified Behavior Analysts (BCBA) and Board Certified Behavior Analysts – Doctoral (BCBA-D) who had worked with at least one client who engaged in HDSIB were eligible to participate. Non-certified individuals and certified individuals who had not worked with a client who engaged in HDSIB were ineligible for participation and their data excluded from the results. Certification status was self-reported at the beginning of the survey. Participants were recruited through dissemination emails shared to behavior analytic state associations and special interest groups (SIGs), as well as through a recruitment post shared on social media platforms (i.e. Facebook, LinkedIn). Participants who accessed the link were free to participate in the survey from a location of their choosing. After accessing the survey, participants were presented with a brief description of the study, the operational definition of HDSIB, a freedom to withdraw statement, and the lead investigator's contact information. By selecting the "start" button, consent was implied and participants could begin the survey. No compensation was provided for participation in the survey.

Participants

A total of 1,145 individuals viewed the survey. From the 1,145, 126 people elected to begin participation, representing an 11% response rate of those who viewed the survey. Eight individuals were excluded for consenting to participate, but not answering any questions, bringing the final sample to 118 participants. The mean year participants received their certification was 2015, with year of certification ranging from 2000 to 2023 across participants. The average survey completion time was 6 minutes and 40 seconds.

Materials

In the present study, the researchers created a 20-question survey using QuestionPro, a cloud-based survey and research platform. Several question types, including Yes/No, single-selection, multi-selection, and open-ended questions, were employed to gather information about client demographics, assessment and clinical outcomes of HDSIB. Client demographic questions focused on age, comorbid diagnoses, and prevalence of HDSIB. Assessment and treatment questions pertained to most frequently used assessment methods for HDSIB, most common maintaining functions, whether there was a single function or multiple functions, and usage of protective equipment (headgear, mouthguards, etc.). Treatment outcomes were assessed based on participant reports of "referral-out" rates and successful behavioral reductions for clients engaging in HDSIB. To prevent duplicate responses, the single submission option was selected in the survey settings. To protect participant anonymity, no IP tracking was used. The complete survey is available from the first author upon reasonable request.

Procedure

During survey creation, HDSIB was operationally defined as an action that could cause harm or pain to the self that is directed at one's own head/face. This definition excludes any accidental incidents, such as bumping one's head during an unintended fall, but includes

direct actions such as banging one's own head on the surface of an object or hitting one's own head with an object or body part. This operational definition was provided to all participants to ensure consistent interpretations of HDSIB.

Participants who accessed the link were free to participate in the survey from a location of their choosing. After accessing the survey, participants were presented with a brief description of the study, the operational definition of HDSIB, a freedom to withdraw statement, and the lead investigator's contact information. By selecting the "start" button, consent was implied and participants could begin the survey. First, participants answered self- and client demographic questions. Next, participants answered questions about behavioral assessment, intervention strategies and clinical outcomes of treating HDSIB. At the end of the survey, participants received a message thanking them for their participation.

Results

The current study was conducted to contribute to the body of literature that describes client characteristics of HDSIB, as well as identify common assessment strategies used by BCBAs, identified behavioral functions, and treatment outcomes for HDSIB. The collected data were analyzed using descriptive statistics, including central tendency figures and percentages. If participants met inclusion criteria and answered at least one question, all available data points were analyzed. However, participants were free to skip any questions, so response numbers vary across questions. The results of the current study are reported in three sections: 1) client characteristics of HDSIB, 2) assessment strategies, and 3) intervention and clinical outcomes.

Client Characteristics of HDSIB

In their clinical careers, BCBAs most frequently reported treating between 1 – 5 clients who engaged in HDSIB ($n = 40/109$, 36.7%), while other participants reported treating 6 – 10 clients ($n = 28/109$, 25.7%), 11 – 15 clients ($n = 17/109$, 15.6%), 16 – 20 clients ($n = 5/109$, 4.6%), and more than 20 clients ($n = 19/109$, 17.4%). Among all clients they had treated for HDSIB, the most common age range was 6 – 10 years old ($n = 84/105$, 80%), although many BCBAs also reported treating clients between 2 – 5 years old ($n = 69/105$, 65.7%) and 11 – 15 years old ($n = 63/105$, 60%) for HDSIB. Fewer BCBAs had worked with clients between 16 – 20 years old ($n = 40/105$, 38.1%), 21 – 25 years old ($n = 20/105$, 19.1%), or older than 25 years old ($n = 19/105$, 18.1%).

A vast majority of participants worked with clients engaging in HDSIB who had an existing medical diagnosis or disability ($n = 103/104$, 99%), while one participant (1%) reported working with clients who did not have an existing diagnosis. When asked to select all comorbid conditions seen alongside HDSIB, the most common diagnoses were ASD ($n = 102/104$, 98.1%) and intellectual disability ($n = 81/104$, 77.9%). Less common comorbid diagnoses were attention-deficit/hyperactivity disorder (ADHD; $n = 38/104$, 36.5%), Down syndrome ($n = 19/104$, 18.3%), and oppositional defiant disorder (ODD; $n = 18/104$, 17.3%). Participants also reported "other" comorbid diagnoses ($n = 25/104$, 24%), which included schizophrenia, epilepsy, fetal alcohol syndrome, and TBI. For a full view of client characteristics, see Table 1.

Characteristic	<i>n</i>	%
Age of Client's Treated*		
2-5 years old	69	65.7
6-10 years old	84	80
11-15 years old	63	60
16-20 years old	40	38.1
21-25 years old	20	19.1
25+ years old	19	18.1
Existing Diagnosis?		
Yes	103	99
No	1	1
Type of Diagnosis*		
Autism spectrum disorder	102	98.1
Intellectual disability	81	77.9
ADHD	38	36.5
Down syndrome	19	18.3
ODD	18	17.3
Other	25	24

Table 1 Client Characteristics

N = 104

*Respondents were allowed to make multiple selections

Assessment Strategies

In the assessment of HDSIB, participants most frequently use descriptive FBA methods ($n = 51/103$, 49.5%) to determine behavioral function. Experimental assessments used less frequently included functional analyses ($n = 24/103$, 23.3%), practical functional assessment ($n = 15/103$, 14.6%), and brief functional analyses ($n = 12/103$, 11.7%). For their most recent client with HDSIB, participants identified escape/avoidance ($n = 80/103$, 77.7%), tangible ($n = 64/103$, 62.1%), automatic ($n = 55/103$, 53.4%), attention ($n = 39/103$, 37.9%), and undetermined ($n = 15/103$, 14.6%) as maintaining functions. Because participants could select multiple

functions, specifically for those whose clients displayed multiple functions, percentages exceed 100%.

Across their clinical histories of assessing and treating HDSIB, 63/102 (61.8%) participants reported identifying one maintaining function more frequently than others. Escape/avoidance was reported most often ($n = 23/102$, 22.5%), followed by tangible ($n = 16/102$, 15.7%), automatic ($n = 13/102$, 12.7%), and attention ($n = 10/102$, 9.8%). However, 39/102 (38.2%) participants reported that no single function emerged more frequently than others (see Table 2). Additionally, most participants reported that HDSIB was typically maintained by multiple functions ($n = 90/102$, 88.2%).

Functions	<i>n</i>	%
Most Recent Client*		
Escape/Avoidance	80	77.7
Tangible	64	62.1
Automatic	55	53.4
Attention	39	37.9
Undetermined	15	14.6
Clinical Career		
Escape/Avoidance	23	22.5
Tangible	16	15.7
Automatic	13	12.7
Attention	10	9.8
None more common than others	39	38.2

Table 2: Maintaining Functions of HDSIB

N = 103

*Respondents were allowed to make multiple selections

Intervention and Clinical Outcomes

Most participants (*n* = 87/100, 87%) reported using or recommending protective equipment during treatment of HDSIB. Headgear/helmets were the most commonly reported form of equipment (*n* = 69/100, 69%), followed by blocking pads (*n* = 66/100, 66%) and pillows

(*n* = 52/100, 52%); mouthguards were infrequently used (*n* = 4/100, 4%). Across equipment types, participants rated protective equipment as slightly to moderately effective, with relatively few reports of high effectiveness (see Table 3).

Equipment	<i>n</i>	%
Effectiveness of Headgear/Helmets		
Highly Effective	13	13
Moderately Effective	27	27
Slightly Effective	19	19
Ineffective	6	6
Highly Ineffective	4	4
Did not use	31	31
Effectiveness of Blocking Pads		
Highly Effective	2	2
Moderately Effective	18	18
Slightly Effective	22	22
Ineffective	8	8
Highly Ineffective	2	2
Did not use	48	48
Effectiveness of Pillows		
Highly Effective	5	5
Moderately Effective	23	23
Slightly Effective	30	30
Ineffective	8	8
Highly Ineffective	0	0
Did not use	34	34
Effectiveness of Mouthguards		
Highly Effective	1	1
Moderately Effective	1	1
Slightly Effective	1	1
Ineffective	1	1
Highly Ineffective	0	0
Did not use	96	96
<i>N</i> = 100		

Table 3 Effectiveness of Supportive Equipment

When asked to estimate treatment outcomes, the largest proportion of participants reported reducing HDSIB to 10% or less of baseline levels for 51%–75% of their clients ($n = 36/100$, 36%). An additional 29% ($n = 29/100$) reported achieving this outcome for 76%–100% of clients. Smaller proportions reported success for 1%–25%

($n = 19/100$, 19%) or 26%–50% ($n = 16/100$, 16%) of clients (see Table 4). Most participants ($n = 74/100$, 74%) reported never having to discharge or refer a client with HDSIB because of behavioral severity. Conversely, 26% ($n = 26/100$) reported discharging or referring at least one client due to the severity of HDSIB.

Percentage of Cases with Successful Treatment	<i>n</i>	%
1% - 25%	19	19
26% - 50%	16	16
51% - 75%	36	36
76% 100%	29	29

Table 4 Treatment Success**

$N = 100$

**Treatment success is defined as a reduction in occurrences of HDSIB to less than 10% of baseline responding.

Clinical Experience

To examine whether participants' years of clinical experience was related to survey responses, BCBA year of certification was compared across response categories using non-parametric analyses. Specifically, we explored the year of certification to preferred assessment method, whether they had recommended protective equipment to supplement their interventions, and if they had referred a client out due to lack of progress. A Kruskal-Wallis test indicated that year of certification did not differ significantly across participants' preferred assessment approach, $H(3) = 4.00$, $p = .407$. Likewise, Mann-Whitney U tests revealed no significant differences in year of certification and participants who reported recommending protective equipment versus those who did not, $U = 656.50$, $p = .352$. However, participants who indicated they had referred a client to another provider differed significantly in year of certification from those who would not refer out a client, $U = 696.50$, $z = -2.09$, $p = .037$, $r = .21$. Data suggest that individuals who had been certified longer ($M = 2014.5$) were more likely to report having referred a client out than more recently certified BCBAs ($M = 2017$).

Discussion

The present study was conducted to describe the characteristics of clients who engage in HDSIB, as well as current assessment practices and clinical outcomes reported by BCBAs. Overall, the findings indicated several client demographics, particularly client age and co-occurring diagnoses, were consistent with patterns reported in past literature. In addition, the present study identified notable differences in HDSIB assessment approaches, intervention supports, and treatment outcomes.

In behavioral treatments, a consideration of client demographics provides practitioners with important context for understanding and intervening on challenging behavior [71]. In the present sample, clients engaging in HDSIB were typically between 2 – 15 years old, which is consistent with age ranges reported in the SIB literature [46, 55, 72]. The present study also identified high rates of overlap between HDSIB and co-occurring diagnoses, specifically ASD and intellectual disability. This is consistent with past reviews of the literature [10, 18] as well as the primary clientele for BCBAs [73]. Additionally, some co-occurring disorders reported by participants, such as oppositional defiant disorder, epilepsy, and fetal alcohol syndrome, were scarcely reported or entirely unmentioned in the previous literature. Further investigation on less common comorbid disorders with HDSIB, like those listed above, may be a valuable direction for future research.

In their clinical careers, participants in the current study identified escape/avoidance as the most common maintaining function of HDSIB. This is inconsistent with past research findings that suggest

SIB is most frequently maintained by social attention [55, 61]. However, the context in which BCBAs work may offer an explanation for these findings. Practitioners often work one-on-one with clients to develop skills and reduce challenging behaviors, potentially satiating the clients' motivation for social attention in this sample. Participants also reported that HDSIB was most commonly maintained by multiple functions, which is inconsistent with past findings that SIB is only multiply maintained in around 5% of cases [55]. While HDSIB is considered a specific response class within SIB, these findings suggest the two challenging behaviors may be used to gain access to very different sources of reinforcement. To note, the literature lacks an up-to-date review on HDSIB-specific functions. A wide-ranging review of HDSIB case/experimental studies to determine common functional characteristics of head-direct self-injury should be an avenue for future research.

One of the most notable findings was the frequent use of descriptive FBA methods despite the known limitations associated with descriptive methodologies, such as assessment inaccuracies [45, 50] and a lack of causation [44]. An over-reliance on descriptive methods could be leading practitioners to inaccurate or incomplete conclusions [45], which could play a role in HDSIB's high rate of persistence in past research [10, 16, 17]. The high usage of descriptive FBA could have two possible explanations from the existing literature: 1) practitioners may be unaware of the acceptability of experimental procedures for problem behavior [42] or 2) a majority of practitioners are inadequately trained in experimental FA procedures [23, 59]. These findings highlight the need to further explore the degree that BCBAs are receiving high-quality training for experimental FA procedures to ensure they can be flexible to client needs and the severity of the case.

Even among experimental procedure methods, participants in the current sample reported using FA, BFA, and PFA methods relatively equally; a noteworthy result when considering the previously discussed prevalence of multiple functions for HDSIB in the current study. Past research has identified the tendency for FBA methods to conflate multiply maintained behaviors with undifferentiated results [52, 62], which may offer an explanation for the minority of participants in the present sample that were unable to determine behavioral function in their most recent case. The literature suggests that PFA methods are well suited for assessing challenging behaviors with multiple functions [42]. As such, one would expect to see higher usage of PFA for clients who engage in HDSIB. One possible explanation for the lower-than-expected use of PFA methods could be the recency of its development when compared to FA and BFA methods. Research that contributes to the understanding of why practitioners opt for specific assessment methods could be another path for future research.

In behavioral treatments, a reduction of problem behavior to 10% or less of baseline commonly represents a successful treatment [49, 74, 75]. In the current sample, only a minority of participants (29%) were able to successfully treat HDSIB for 76%–100% of clients, signifying that a majority of the sample is not meeting this standard of treatment success. In isolation, these findings suggest that HDSIB shows persistence and resistance to treatment, which is consistent with past literature [10, 16, 17]. However, previously discussed findings of the current study could offer an alternative explanation: participants may have used an assessment method that yielded inaccurate results of behavioral function. In turn, behavioral interventions designed from these assessment results become less effective [76], negatively impacting treatment outcomes for clients. Future research in this area should be focused on treatment outcomes for HDSIB based on various assessment methods, an area of comparative research that is limited in the literature.

Working within one's own scope of practice and acknowledging professional limits are essential to ethical practice [77]. Recognizing when a case is beyond a practitioner's skills and abilities is an important step to ensuring effective treatment for clients. Less than one-third of current participants have referred out at least one client with HDSIB due to lack of progress and statistically significant results were found between participants who had been certified longer and having referred a client to another provider due to HDSIB. These results indicate that despite not achieving desired treatment outcomes, recently certified individuals who are treating clients with HDSIB are less likely to refer a client to another provider. These findings raise the concern that newly certified BCBAs may be reluctant to refer clients out with severe and dangerous challenging behaviors, even when insufficient clinical progress is being shown. A factor that may be influencing these findings is a lack of access to known professionals with demonstrated success with HDSIB to refer clients to or to access for mentorship. Future research should explore the clinical decision-making of BCBAs as it pertains to treatment outcomes, the referral process as well as ease of access to more experienced providers to refer clients to or to seek mentorship.

Limitations

The current study has several limitations. First, due to the nature of survey research, there was no direct manipulation of variables. However, the descriptive purpose of the current study did not require direct manipulations, making survey research a convenient and appropriate way to investigate this topic. Future research could move away from survey design to achieve experimental control and further expand our understanding of the clinical outcomes of HDSIB. Additionally, the survey lacked participant demographic information such as gender, race, more specific geographic location beyond the United States, and/or clinical setting represented. As such, conclusions are limited to the reported outcomes as they relate specifically to the year of certification of the behavior analyst. The purpose of the study was to gather current practices of BCBAs and BCBA-Ds in the treatment of HDSIB, and not to develop a specific tool. However, future survey research should consider assessing reliability and validity to minimize measurement errors during data collection [78]. Finally, although the survey was brief, with average completion durations approximating six minutes, the inclusion of attention checks may have been warranted [79].

The present sample was also limited to BCBAs or BCBA-Ds, who typically work with clients that have ASD [80]. This likely inflated the number of participants who had treated a client with ASD for HDSIB in the current sample, although many participants reported treating individuals with a wide variety of clinical diagnoses, as well. Additionally, typical service systems and insurance mandates for treatment for individuals with disabilities tend to drop off after individuals graduate high school [81], which likely skewed the reported age range of clients engaging in HDSIB in the current study.

Finally, it is important to remember that the purpose of the current study was to gather information on how current BCBAs are addressing this clinical need and not to develop and validate a specific tool. While other validated tools exist to evaluate self-injurious behaviors, none are designed to specifically measure HDSIB, nor were they focused on addressing neurodivergent populations commonly receiving care by behavior analysts [82–84].

Despite these limitations, this study provides an important initial examination of contemporary clinical practices for assessing and treating HDSIB. Given the severity of HDSIB and its associated risk of injury, a greater understanding of how behavior analysts select assessments, treatment supports, and intervention strategies is needed. Future research should evaluate which assessment and treatment approaches are most strongly associated with successful clinical outcomes, ultimately contributing to the development of more effective and efficient interventions for individuals who engage in HDSIB.

Acknowledgments

The authors would like to thank the many BCBA's who took their time to support this important work.

Declarations

Funding/Competing Interests

All authors certify that they have no affiliations with or involvement in any entity with financial or non-financial interests in the subject matter of this manuscript.

Consent to Participate

Implied informed consent was obtained from all participants included in the study. Implied consent was presumed by the participants continuing into the survey and completing responses.

Ethics Approval

Approval was obtained from the institutional review board of South Dakota State University. The procedures used in this study adhere to the tenets of the 1964 Helsinki Declaration.

Data Availability

The data that support the findings of this study are available from the authors upon reasonable request.

CRedit Author Contribution Statement

LK: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – review & editing, Visualization. **RW:** Formal Analysis, Writing – original draft, Writing – review & editing, Visualization.

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