

Functional Behavior Assessment of Self-Injurious Behavior for Individuals with an
Autism Spectrum Disorder

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Challenging behaviors are among the most studied problems in the field of developmental disabilities and are common in children and adults with autism spectrum disorders (ASD; Matson, Kozlowski, Worley, Shoemaker, Sipes, & Horowitz, 2011). Among these challenging behaviors are self-injurious behaviors (SIB), which are the most studied of all challenging behaviors (Matson et al., 2011). This monograph will define SIB and discuss the adverse consequences of such behavior. As many advances in the research on autism spectrum disorders have been made, procedures for developing treatment plans for these challenging behaviors have also been developed. Functional Behavior Assessment (FBA) is a term used to describe procedures that are used to understand why a behavior is occurring. The procedures for conducting a FBA will be discussed; these include indirect assessment, descriptive assessment, and experimental functional analysis. The ethical issues in the assessment and treatment of SIB will be discussed. Finally, intervention approaches for self-injurious behaviors will be discussed, including extinction-based, reinforcement-based, and a specific focus on Functional Communication Training (FCT).

Self-Injurious Behavior

Self-Injurious behavior (SIB) is defined as “behavior directed toward oneself that causes, or has the potential to cause, tissue damage, exclusive of acts associated with suicide, sexual arousal, or socially sanctioned practices” (Matson, 2012, p. 27). Self-Injurious behavior is one of the most challenging problems faced by individuals with an autism spectrum disorder and/or intellectual disability. Common forms of SIB include

head hitting, head banging, self-biting, hair pulling, eye pressing or gouging, self-pinching, face slapping, and skin picking and scratching (Minshawi et al., 2014). In individuals with intellectual disability (ID), SIB is estimated to occur in 4% to 12% of the population (Richards, 2012). Prevalence estimates for SIB range from 33% to 71% in autism spectrum disorders (Richards, 2012). A risk factor that has been identified for SIB among those with ID is the presence of an autism spectrum disorder (Baghdadli, 2003). According to a study by McClintock et al. (2003) individuals with an ASD were approximately six times more likely to engage in SIB than those without an ASD. SIB is more prevalent among those with ASD and severe ID, compared to individuals with ASD and either mild/moderate levels of ID or no ID; the prevalence of SIB is higher among individuals with more severe symptoms of autism when compare to individuals with less severe autism symptoms; an ASD diagnosis increases the risk of SIB among individuals with ID (Matson, 2012).

Self-Injurious behavior is one of the most difficult problems facing those with an ASD and their families. The presence of SIB can hinder the development of appropriate adaptive skills and has been correlated with a number of negative outcomes. These include reduced access to education, limited social interactions with peers, significant increase in family stress, restriction of opportunities to interact with the community and may result in rejection by peers and caregivers, more restrictive placement and increased cost of care. Mandell (2008) noted that SIB is a significant antecedent to the hospitalization of children with ASD. These individuals are also more likely to be placed in a residential facility in comparison to those individuals with an ASD who do not engage in SIB (Minishawi, 2014). Due to the potentially life-threatening nature of SIB,

along with the stress placed on a number of caregivers and resources, it is important to develop successful treatments for this behavior.

Functional Behavior Assessment

In the past two decades, major advances have been made in the treatment of challenging behaviors in individuals with ASD and/or ID. In order to change the challenging behavior that is occurring, one must first understand that the behavior serves a communicative function for the individual. It has been determined that the most common communicative functions of SIB and other challenging behaviors are to obtain attention from others, gain access to tangible items, to avoid or escape from tasks, and to obtain automatic stimulation (Carr & LeBlanc, 2003). Self-Injurious behavior has been the most studied of all challenging behaviors using functional behavior assessment (Matson et al., 2011). As this behavior serves a communicative function, it is first necessary to identify the factors surrounding the SIB in an individual, as these factors and communicative function will vary across individuals. A functional behavior assessment is a term used to describe a group of procedures for understanding why challenging behavior occurs. A FBA can take a number of different forms. The three main categories of FBA include indirect assessments, descriptive assessments, and experimental functional analysis. By conducting a FBA, information is gathered on the behavioral contingencies that surround the SIB or other problem behaviors in order to develop an effective behavioral intervention (Kern, Gallagher, Starosta, Hickman, & George, 2006).

Indirect Assessments

Indirect assessments are those that aim to gather information on the environmental variables surrounding the SIB without actually eliciting or observing the behavior itself. Interviews and rating scales are commonly used as forms of indirect assessment. During a functional assessment interview, the informants (caregiver, teacher, etc.) provide a description of the behavior, situations in which the behavior is least and most likely to occur, what typically occurs prior to the behavior (antecedent), and what happens directly after the SIB occurs (consequence). An example interview form by Carbone and Zecchin is shown below. Carbone and Zecchin recommend conducting at least two interviews with two informants who know the individual and have been involved in situations where the behavior has been present.

Figure 1. Functional Interview Form (Carbone & Zecchin).

FUNCTIONAL INTERVIEW

FUNCTIONAL ANALYSIS INTERVIEW

Student: _____ ID# _____ date: ____/____/____
 Teacher: _____
 Behavior of Concern: _____
 Positive Reinforcers: _____
 Negative Reinforcers: _____

Instructions: Interview a person who has observed the behavior of the student for an extended period of time in many different situations. Check the boxes whenever the respondent answer "YES" to a question. For every "YES" response there should be a qualifying comment written on the line corresponding to the question.

1. **Physiological, Medical, EO Factors**
 - Does the behavior occur during certain seasons of the year? _____
 - Could the behavior be the result of any form of discomfort (escape response to headache, stomach ache, dizziness, blurred vision, ear infection, etc.). _____
 - Could the behavior be signaling some deprivation condition? (Thirst, hunger, lack of rest, etc.) _____
 - Could the behavior be a side effect of medication? (Tired, unsteady, thirst, confused, toxic levels) _____
 - Could the behavior be the result of a medical condition? (Seizures, PKU, allergies, CP) _____
2. **Antecedents and Setting Event Factors**
 - Are there any circumstances in which the behavior ALWAYS occurs? _____
 - Are there any circumstances in which the behavior NEVER occurs? _____
 - Does it occur at certain times of the day? _____
 - Does the behavior occur only with certain people? _____
 - Could the behavior be related to any skill deficits? (Communication, excessive task requirements, physical ability) _____
 - Is the behavior related to any particular activities? _____
 - Is the behavior in response to aversive stimuli? (Tone of voice, ignoring, demands, noise level, number of people in the room, agitation/consequences delivered to other students, lighting, change in routine, transitions) _____
3. **Operant (consequences) Factors**
 - What does the behavior allow the student to gain? (Attention, preferred activities or items) _____
 - Does the behavior allow the student to postpone, avoid, or escape aversive stimulation? (Unpreferred activities, demands, social interaction, pain) _____
 - Does the behavior provide self-stimulation activity? (Boredom, impoverished environment) _____
 - Does the behavior occur collateral with any other behavior or as part of a chain of behaviors? _____
 - Does the behavior occur as a result of having a preferred activity terminated? _____

A common rating scale that is used as an indirect assessment tool is called the Motivational Assessment Scale (MAS; Durand, 1986). The MAS is a tool that assesses the functions or motivations of behavior problems. It is designed to help determine which motivator(s) reinforce the behavior. It assesses four categories of reinforcement including access to tangible items or activities, attention, escape from demands, and sensory or automatic reinforcement. There are 16 items that describe situations in which the behavior might occur. The informant selects how often, on a scale of one to six, the behavior occurs in different situations. Next, the total scores are calculated using the scoring sheet. The results on the scoring sheet suggest what the function(s) of the behavior are. The function with the highest score is the most likely function of the behavior. When there is another function that also has a high score, this might be a secondary function of the behavior.

Figure 2. MAS, (Durand, 1986).

Motivation Assessment Scale

1986 V. Mark Durand, Ph.D.

Name _____ Rater _____

Date _____

Behavior Description

Setting Description

Instructions: The Motivation Assessment Scale is a questionnaire designed to identify those situations in which an individual is likely to behavior in certain ways. From this information, more informed decisions can be made concerning the selection of appropriate reinforcers and treatments. To complete the MAS, select one behavior that is of particular interest. It is important that you identify the behavior very specifically. "Aggressive", for example, is not as good a description as "hits his sister". Once you have specified the behavior to be rated, read each question carefully and circle the one number that best describes your observations of this behavior.

0=Never, 1=Almost Never, 2=Seldom, 3=Half the Time, 4=Usually,

5=Almost Always, 6=Always

Questions	Answers
1. Would the behavior occur continuously, over and over, if this person were left alone for long periods of time? (For example, several hours)	0 1 2 3 4 5 6
2. Does the behavior occur following a request to perform a difficult task?	0 1 2 3 4 5 6
3. Does the behavior seem to occur in response to you talking to other persons in the room?	0 1 2 3 4 5 6
4. Does the behavior ever occur to get a toy, food, or activity that this person has been told that he or she can't have?	0 1 2 3 4 5 6
5. Would the behavior occur repeatedly, in the same way, for very long periods of time, if no one were around? (For example, rocking back and forth for over an hour.)	0 1 2 3 4 5 6
6. Does the behavior occur when any request is made of this person?	0 1 2 3 4 5 6
7. Does the behavior occur whenever you stop attending to this person?	0 1 2 3 4 5 6
8. Does the behavior occur when you take away a favorite toy, food, or activity?	0 1 2 3 4 5 6
9. Does it appear to you that this person enjoys performing the behavior? (It feels, tastes, looks, smells, and/or sounds pleasing.)	0 1 2 3 4 5 6
10. Does this person seem to do the behavior to upset or annoy you when you are trying to get him or her to do what you ask?	0 1 2 3 4 5 6
11. Does this person seem to do the behavior to upset or annoy you when you are not paying attention to him or her? (For example, if you are sitting in a separate room, interacting with another person.)	0 1 2 3 4 5 6
12. Does the behavior stop occurring shortly after you give this person the toy, food, or activity he or she has requested?	0 1 2 3 4 5 6
13. When the behavior is occurring, does this person seem calm and unaware of anything else going on around him or her?	0 1 2 3 4 5 6
14. Does the behavior stop occurring shortly after (one to five minutes) you stop working or making demands of this person?	0 1 2 3 4 5 6
15. Does this person seem to do the behavior to get you to spend some time with him or her?	0 1 2 3 4 5 6
16. Does the behavior seem to occur when this person has been told that he or she can't do something he or she had wanted to do?	0 1 2 3 4 5 6

	Sensory	Escape	Attention	Tangible
	1. _____	2. _____	3. _____	4. _____
	5. _____	6. _____	7. _____	8. _____
	9. _____	10. _____	11. _____	12. _____
	13. _____	14. _____	15. _____	16. _____
Total Score =	_____	_____	_____	_____
Mean Score = <i>(divide the total score by 4)</i>	_____	_____	_____	_____
Relative Ranking <i>(high score to low score)</i>	_____	_____	_____	_____

If there is a tie for the highest score or if the means of the top two categories are within **.25 to .50** points (and you have clearly specified the behaviour and setting), then both are considered as influences that may be causing the problem behaviour to continue.

In addition to the Functional Interview and the MAS, Carbone and Zecchin adapted the Functional Analysis Screening Tool (FAST; Iwata & DeLeon, 1996). This tool is designed to identify factors that may contribute to the occurrences of the problem behavior. The information and results gathered from the FAST should be used to inform further assessments and observations of the individual. Use of the FAST recommends that two informants complete it, similar to the interview discussed above, with or in place of a MAS.

Figure 3. FAST (Iwata & DeLeon, 1996).

FUNCTIONAL ANALYSIS SCREENING TOOL (FAST)

Student: _____ ID# _____ Exceptionality: _____
 Date: ____/____/____ DOB: ____/____/____ School: _____ Grade: _____
 Behavior Problem: _____
 Informant: _____ Interviewer: _____

To the Interviewer: The FAST is designed to identify a number of factors that may influence the occurrence of behavior problems. It should be used only as an initial screening tool and as part of a comprehensive functional analysis of the behavior problem. The FAST should be administered to several individuals who interact with the client frequently. Results should then be used as the basis for conducting direct observations in several different contexts to verify likely behavioral functions, clarify ambiguous functions, and identify other relevant factors that may not have been included in this instrument.

To the Informant: After completing the section on "Informant-Client Relationship," read each of the numbered items carefully. If a statement accurately describes the student's target behavior problem, circle "Yes." If not, circle "No."

INFORMANT-CLIENT RELATIONSHIP

Indicate your relationship to the student: Parent Teacher/Instructor
 Therapist Residential Staff

How long have you known the student? _____ Years _____ Months

Do you interact with the student on a daily basis? Yes No
 If "Yes," how many hours per day? _____ If "No," how many hours per week? _____

In what situations do you typically observe the student? (Mark all that apply)

Self-care routines Academic skills training Meals When the student has nothing to do
 Leisure activities Work or vocational training Evenings Other:| _____

Part I. Problem Behavior Identification:
 List behavior problems of concern. Describe each in clear and objective terms.

1. _____
 2. _____
 3. _____
 4. _____

Part II. Dimensions of Problem Behavior.
 Provide an estimate of the frequency and severity of each problem behavior. Use the following criteria for severity:
 Mild (disruptive but not dangerous), Moderate (destructive to physical environment), Severe (poses physical danger to student or others)

<u>FREQUENCY</u>	<u>SEVERITY</u>
1. Hourly/Daily/Weekly/Less Often	Mild/Moderate/Severe
2. Hourly/Daily/Weekly/Less Often	Mild/Moderate/Severe
3. Hourly/Daily/Weekly/Less Often	Mild/Moderate/Severe
4. Hourly/Daily/Weekly/Less Often	Mild/Moderate/Severe

PART III. Critical Situations:

Describe the situations in which the problem behavior is **most** likely to occur.

Days/times _____
 Setting _____
 Persons Present: _____
 Activity _____
 What happens right before the problem behavior occurs? _____

Describe the situations in which the behavior is **least** likely to occur:

Days/times _____
 Setting _____
 Persons Present: _____
 Activity _____

Part IV. Social Influences On Behavior

- | | | |
|--|-----|----|
| 1. The behavior usually occurs in your presence or in the presence of other students. | Yes | No |
| 2. The behavior usually occurs soon after you or others interact with the student in some way, such as delivering an instruction or reprimand, walking away from (ignoring) the student, taking away a "preferred" item, requiring the student to change activities, talking to someone else in the student's presence, etc. | Yes | No |
| 3. The behavior often is accompanied by other "emotional" responses, such as yelling or crying. | Yes | No |

Complete Part V if you answered "Yes" to items 1, 2, or 3. Skip Part V if you answered "No" to **all three** items in Part I.

Part V. Social Reinforcement

- | | | |
|---|-----|----|
| 4. The behavior often occurs when the student has not received much attention. | Yes | No |
| 5. When the behavior occurs, you or others usually respond by interacting with the student in some way (e.g., comforting statements, verbal correction or reprimand, response blocking, redirection). | Yes | No |
| 6. The student often engages in <u>other</u> annoying behaviors that produce attention. | Yes | No |
| 7. The student frequently approaches you (or others) and/or initiates social interaction. | Yes | No |
| 8. The behavior rarely occurs when you give the student lots of attention. | Yes | No |
| 9. The behavior often occurs when you take a particular item away from the student or when you terminate a preferred leisure activity. (If "yes," identify: _____) | Yes | No |
| 10. The behavior often occurs when you inform the student that (s)he cannot have a certain item or cannot engage in a particular activity. (If "Yes," identify: _____) | Yes | No |
| 11. When the behavior occurs, you often respond by giving the student a specific item, such as a favorite toy, food, or some other item. (If "Yes," identify: _____) | Yes | No |

- | | |
|--|--------|
| 12. The student often engages in <u>other</u> annoying behaviors that produce access to preferred items or activities. | Yes No |
| 13. The behavior rarely occurs when you give the student free access to his or her favorite items or activities. | Yes No |
| 14. The behavior often occurs during training activities or when you place other types of demands on the student. (If "Yes," identify the activities: __ self-care __ academic __ work __ other) | Yes No |
| 15. The student often is noncompliant during training activities or when asked to complete tasks. | Yes No |
| 16. The behavior often occurs when the immediate environment is very noisy or crowded | Yes No |
| 17. When the behavior occurs, you often respond by giving the student a brief "break" from an ongoing task. | Yes No |
| 18. The behavior rarely occurs when you place few demands on the student or when you leave the student alone. | Yes No |

Part VI. Nonsocial (Automatic) Reinforcement

- | | |
|---|--------|
| 19. The behavior occurs frequently when the student is alone or unoccupied. | Yes No |
| 20. The behavior occurs at relatively high rates regardless of what is going on in the student's immediate surrounding environment. | Yes No |
| 21. The student seems to have few known reinforcers or rarely engages in appropriate object manipulation or "play" behavior. | Yes No |
| 22. The student is generally unresponsive to social stimulation. | Yes No |
| 23. The student often engages in repetitive, stereotyped behaviors such as body rocking, hand or finger waving, object twirling, or mouthing, etc. | Yes No |
| 24. When the student engages in the behavior, you and others usually respond by doing nothing (i.e., you never or rarely attend to the behavior). | Yes No |
| 25. The behavior seems to occur in cycles. During a "high" cycle, the behavior occurs frequently and is extremely difficult to interrupt. During a "low" cycle, the behavior rarely occurs. | Yes No |
| 26. The behavior seems to occur more often when the student is ill. | Yes No |
| 27. The student has a history of recurrent illness (e.g., ear or sinus infections, allergies, dermatitis). | Yes No |

SCORING SUMMARY

Circle the items answered "Yes." If you completed only Part II, also circle Items 1, 2, and 3.

								<u>Likely Maintaining Variable:</u>
1	2	3	4	5	6	7	8	Social positive reinforcement (attention)
1	2	3	9	1	1	1	1	Social positive reinforcement (access to activities)
1	2	3	1	1	1	1	1	Social negative reinforcement (escape)
			4	5	6	7	8	
1	2	2	2	2	2			Automatic reinforcement (sensory stimulation)
9	0	1	2	3	4			
1	2	2	2	2	2			Automatic negative reinforcement (pain attenuation)
9	0	4	5	6	7			

Part VII: Replacement Behaviors

Describe some alternative behaviors that could be strengthened as replacements for the student's problem behaviors.

<u>Problem Behavior</u>	<u>Replacements</u>
1. _____	
2. _____	
3. _____	
4. _____	

VIII. Communication Skills:

1. Indicate the student's primary form of communication

_____ Vocal _____ Sign _____ Gestures _____ Other

2. How the does the student communicate a want or need (for attention, food, activities, etc.)?

3. How does the student communicate a desire to stop and on-going activity?

IX. Preferences

List things that appear to be student preferences and might be used therefore as reinforcers for appropriate behavior.

1. Preferred Persons _____

2. Preferred Activities (videos, toys, swing, games, _____)

3. Food, snacks an drink _____

Indirect assessments have several advantages in the FBA process. The completion of an indirect assessment is the fastest and easiest of the assessment procedures. This type of assessment may be advantageous when assessing SIB as

one would want to limit the occurrence of the behavior. Although avoiding the direct observation of the behavior is preferred, relying on the accuracy and subjective interpretations of informants' observations can prove to be a disadvantage.

Descriptive Assessments

Descriptive assessment requires the direct observation of the SIB or other problem behavior. These direct observations are done in the naturally occurring environment. Clinicians, as well as individuals who are a part of the child's natural environment including parents, caregivers, teachers, or staff members can do these observations. In a narrative assessment, for example, the individual observing records what happened immediately before and after the targeted problem behavior. This type of descriptive assessment is called an antecedents-behavior-consequences (ABC) assessment. The antecedent events to the problem behavior are recorded in order to help identify activities that are likely to evoke an occurrence of the behavior. The targeted behavior is clearly defined and recorded in order to separate when occurrences versus non-occurrences take place. Also, having the problem behaviors defined clearly helps in the occurrence of more than one problem behavior, which helps separate different antecedents and consequences. Finally, the identification of the consequences is important as these might be reinforcing or make the problem behavior more likely to occur as the individual is able to obtain what they wanted.

Experimental Functional Analysis

It is thought by many behavior analysts that the functional analysis (FA) is the "gold standard" of the FBA. A FA is an experimental procedure to determine the function of behaviors. Iwata, Dorsey, Slifer, Bauman, and Richman (1994) developed a standard

set of procedures for testing relations between antecedent and consequent events and the occurrence of SIB. In other words, it is a process for determining which reinforcers maintain a behavior and the stimulus conditions and setting events that set the occasion for that behavior. This analysis consists of four test conditions described by Iwata et al. (1994) testing for positive (attention), negative (escape or avoidance), and automatic reinforcement (alone) contingencies, as well as one control (play) condition. These conditions typically last between five and fifteen minutes and are alternated non-consecutively. In general, FAs are conducted until stability is attained.

Control condition. In the control (play) condition, the assessment room is prepared with toys, and no demands are placed on the child. The experimenter also delivers brief social and physical attention to the individual, contingent upon the absence of the SIB, or at least every thirty seconds. Any instances of the SIB during this condition are ignored. The overall objective of this condition is to organize an environment so there is no reason for the problem behavior to occur.

Attention condition. In the attention condition, the experimenter and individual enter an assessment room that is prepared with a variety of toys. The experimenter tells the participant to play with the toys while they “do some work.” The experimenter sits in a chair across the room and appears to be “working”, potentially in the form of reading a book or magazine. Contingent on each occurrence of SIB, the experimenter delivers a brief statement of concern (“don’t do that, you will hurt yourself”) while also providing brief physical attention (patting the individual on the shoulder). Any other behaviors performed by the individual in this condition are ignored. The purpose of this condition is

to test for the possible function of positive reinforcement in the form of access to attention from others.

Negative reinforcement condition. In the negative reinforcement (escape or avoidance) condition, the experimenter and individual are to sit at a desk and a task is presented using a three step prompting sequence. The tasks that are placed upon the individual are those that have a low probability of occurrence, in other words, the individual does not complete these spontaneously in the natural environment. These tasks are difficult to perform for the individual even when physically directed. Social praise is delivered upon completion of the task, regardless of whether or not modeling or physical prompting was provided. Contingent upon SIB at any time during the session, the experimenter discontinues the trial and turns away from the individual for 30 seconds. The purpose of this condition is to evaluate whether escaping a task is a reinforcer for the SIB or other problem behavior.

Alone condition. In the alone condition, the individual is placed in an assessment room by him- or herself, with no toys or items of any kind. This condition is designed to assess whether the SIB is automatically reinforced; in other words, the SIB is serving some internal reinforcement to the individual, making it more likely to continue. It is also designed to capture the types of deprived environments hypothesized to contribute to automatically reinforced behaviors.

Tangible condition. In the tangible condition, a preferred item is provided to the individual contingent upon the occurrence of the SIB or other problem behavior. The item is then removed following a set period of the individual displaying appropriate

behavior. The tangible condition has become common over the development of the functional analysis research, and is typically considered to be a standard condition.

Interpreting results. Following the FA, results of the control or play condition are compared to the test conditions in order to identify the reinforcers that are related to the child's SIB or other problem behavior. The amount of time that the individual engaged in the SIB during each condition is determined and the rates of responding are compared across the different conditions. This is done in order to help identify why the individual is engaging in the SIB. The conditions that result in the highest rates of behavior are assumed to reveal the reinforcers of the SIB or other problem behaviors.

Ethical Issues

Some major ethical issues in the treatment of SIB include concern about ensuring the individuals' rights and dignity throughout treatment. Additionally, self-injurious behaviors must be addressed quickly before physical damage is done. Although a FA may be considered "best practice" and can correctly identify the function of the behavior, it is not the quickest way to address the SIB and subsequently discontinue it. Every Individual has the right to have an effective treatment, but it is also ethical for a treatment to be both appropriate and timely. A potential ethical issue with any form of FBA is that treatment is not designed and implemented until assessment is finished, which reiterates the time consuming nature of the FBA (Vollmer & Smith, 1996). When performing a FA, a serious ethical concern arises in the case of serious self-injury because the target behavior would be allowed to occur in many contexts to determine the function. Despite the possibility that harmful behavior will be temporarily reinforced during FA sessions, it is important to point out that a properly conducted FA

does not increase the risk of harm to the individual, relative to that which the individual encounters in their everyday environment (Iwata et al. 1994). If it is ethically acceptable for the SIB to occur outside FA sessions, then the same should hold true within such sessions, although precautions to prevent serious harm may be required (Matson, 2012). Because of the potential to strengthen harmful behavior temporarily during an FA, minimizing occurrences of the target behavior to the lowest number and intensity sufficient to reveal controlling variables is an ethically sound goal.

One debate relating to FBA is the question: Do interventions have to meet the function of the challenging behavior as long as the behavior stops? Most investigations within this limited literature suggest that function-based interventions produce better treatment outcomes, but the findings are not entirely positive (Matson, 2012). There is a growing consensus that FBA is in general “best practice” in developing behavioral interventions (e.g., Gresham, Watson, & Skinner, 2001; Steege & Watson, 2008). Several authors have suggested conducting FBAs prior to selecting interventions will produce better treatment outcomes compared to selecting interventions with no FBA data (e.g., Asmus, Vollmer, & Borrero, 2002; Crone & Horner, 2000; Vollmer & Northup, 1996). Given that “best” practices are evidence-based, one would expect there to be more compelling data clearly showing that interventions based on FBAs are significantly more effective compared to alternative interventions. Many studies have produced conflicting results. Gresham, McIntyre, Olsen-Tinker, Dolstra, McLaughlin, and Van (2004) reviewed 150 school-based intervention studies over a nine-year period (1991-1999). This meta-analysis revealed that treatments preceded by FBAs were no more effective than those in which FBAs were absent (or at least not reported). Similar results

were found in meta-analyses of autism interventions to reduce self-stimulatory behavior (Steffey, 2005) and self-injurious behavior (Christiansen, 2005/2009). Table 1 was taken from Christiansen's (2009) research. This researcher found that effect sizes for using a FBA (-4.05) and FA (-3.31) were quite large, but effect size from no FBA/FA or not indicated was also substantial (-3.30). The effect sizes between these groups were not found to be significantly different, suggesting that treatment effectiveness wasn't influenced by the implementation of a pretreatment functional assessment.

Other ethical considerations include the amount of resources required (time and personal investment) and the potential of self-injury during assessment procedures (Christiansen, 2009). There is question as to whether the time and resources would be better-spent teaching key skills rather than conducting a FBA or FA. The time expended on these procedures may also unnecessarily delay treatment and may be unethical in situations if there is risk of serious immediate harm to the individual. Another ethical principle to consider is that of avoiding unnecessary harm to the individual. The concern for many is that functional analyses are designed to evoke the problem behaviors, in this case SIB, under controlled experimental conditions in order to determine its function.

A substantial amount of research is needed to provide a strong empirical base for the use of FBAs prior to treatment planning. Until further research is conducted, Matson (2012) believes there are not sufficient data to conclude with confidence that interventions tied to FBA are always, or even typically, more effective than alternative interventions for reducing undesired target behaviors in school settings. There may be many instances where an FBA is simply not warranted for effective intervention, and in

these cases, ethical conduct might involve behavioral interventions that are not preceded by an FBA.

Table 1: Effect Sizes by Variable (Christiansen, 2009, p. 20).

Table 9. Effect Sizes by Variable

Moderator Variable	<i>N</i>	Mean Effect Size
Diagnosis/Classification		
DD/ID/MR	152	-3.62*
Autism Spectrum (with or without ID/MR)	47	-2.40
Genetic Disorders/Syndromes	25	-3.51
Gender		
Male	128	-3.16
Female	96	-3.59
SIB Type		
Head Banging	47	-2.22
Self-Hitting/Slapping	23	-2.79
Self-Biting	33	-3.41
Hand-Mouthing	14	-3.82
Multiple	86	-3.42
Other	21	-4.55*
Language		
Verbal	14	-3.15
Nonverbal	77	-3.50
Not Indicated	133	-3.22
Sensory Impairment		
Visually Impaired/Blind	31	-4.33*
Hearing Impaired/Deaf	8	-4.37
Combination	21	-3.39
Not Indicated	164	-3.11
Ambulation		
Ambulatory	9	-3.99
Nonambulatory	38	-3.79
Not Indicated	177	-3.22
Pretreatment Functional Assessment		
Functional Behavior Assessment	14	-4.05
Functional Analysis	77	-3.31
None/Not Indicated	133	-3.30
Treatment Type		
Nonaversive	58	-2.33
Aversive	94	-3.67**
Communication	11	-3.32
Sensory Stimulation	7	-.89
Combination: Nonaversive & Aversive	46	-4.19***
Combination: Aversive & Communication	8	-2.91
Implementer		
Professional	175	-3.32
Teacher	24	-3.14
Parent	9	-3.78
Combined	10	-3.48
Other	3	-3.18
Not Identified	3	-5.47

The results of the Christiansen (2009) meta-analysis raises some questions to be considered in the ethical decision-making process with regard to treating challenging behaviors in children and adolescents with developmental disabilities. The study found that interventions using a non-aversive approach resulted in an effect size of -2.33 (large effect), while interventions utilizing an aversive approach had an effect size of -3.67 (also a large effect). The combination of non-aversive and aversive interventions resulted in the largest effect size of -4.19. This data suggests that interventions that combine both non-aversive and aversive strategies are significantly more effective for reducing SIB compared to interventions that rely solely on non-aversive strategies.

In conclusion, the meta-analysis reveals that when treating individuals with developmental disabilities for self-injurious behavior, results will be maximized if treatments use either aversive procedures or a combination of aversive and non-aversive techniques (Christiansen, 2009). The analysis also found that treatments based on a pretreatment functional assessment or functional analysis were no more effective than treatments implemented without a pretreatment assessment. This leaves some question as to the value of performing FA and FBAs as a regular component of treatment due to the amount of time and cost involved as well as the possibility that interventions may be equally effective whether or not they are performed.

Treatment

Reinforcement-Based Treatments

Noncontingent reinforcement. Noncontingent reinforcement (NCR) incorporates the presentation of the reinforcer for the SIB on a response-independent or time-based schedule (Cooper, 2007). In the case that the SIB is maintained by

attention, the reinforcer would be positive attention from adults or peers. If the individual's behavior is escape maintained, then the reinforcer would be access to a break from a demand that is being placed on the individual. In the case of escape maintained SIB, noncontingent negative reinforcement may be composed of giving breaks from tasks on a fixed schedule so that breaks are not provided contingent upon the SIB. A main criticism of NCR is that reinforcement is provided without the individual engaging in a more socially appropriate behavior that is functionally equivalent to the SIB, as one is not being taught (Goh, Iwata, & DeLeon, 2000; Carr et al., 2000). Another criticism includes the unintentional reinforcement of the SIB or other problem behavior since the reinforcement schedule is fixed. As a result of these criticisms, differential reinforcement schedules are preferred often times.

Differential reinforcement. Differential reinforcement involves the use of positive or negative reinforcement contingent upon behaviors that are not the SIB. We will discuss two types, differential reinforcement of other behaviors (DRO) and differential reinforcement of alternative behaviors (DRA). It is important to note that reinforcement is not given when the SIB occurs with these schedules, but instead is given based on the presence of a different behavior.

Differential reinforcement of other behaviors. The principle behind DRO is that if a behavior besides the SIB can result in reinforcement, then the individual will begin to use the behavior being reinforced at a higher frequency and in turn the SIB will decrease. A predetermined schedule is used in DRO; meaning reinforcement would be provided to the individual given that they did not engage in SIB for a predetermined set

of time. Further variations of the DRO contingency include whole-interval DRO and momentary DRO.

Whole-interval DRO, which is the most common variation, involves delivering reinforcers only if the SIB did not occur at any time during the interval. Momentary DRO involves providing reinforcement if the SIB does not occur at the end of a predetermined interval regardless of whether the SIB took place during the interval. Whole-interval DRO has been shown to be more effective than momentary DRO, although momentary DRO has been shown to be an effective maintenance procedure (Barton, Brulle, & Repp, 1986). DRO has been shown to be an effective treatment in reducing SIB (Cowdery, Iwata, & Pace, 1990; Tiger, Fisher, & Bouxsein, 2009; Mazaleski, Iwata, Vollmer, & Zarcone, 1993; Vollmer, 1993).

Differential reinforcement of alternative behaviors. DRA schedules involve systematically reinforcing a specific alternative behavior to displace SIB. The difference between DRO and DRA is that DRA contingencies establish a specific functional response. DRA frequently takes the form of teaching the student to ask or request attention, activities, or to take a break from a task depending on the function that the SIB serves. A common variation of DRA is functional communication training (FCT; Carr & Durand, 1985).

Functional Communication Training. The purpose of Functional Communication Training (FCT) is to teach individuals communication behaviors as a replacement for the maladaptive behavior. FCT involves identifying the function of the behavior and then teaching an appropriate replacement behavior that will serve the same purpose for the individual. FCT can help individuals acquire the skills to request attention, items or

breaks, seek help, and independently meet their needs. Research demonstrates that FCT skills can be effective in reducing SIB and other problem behaviors, effects are well maintained over time, and FCT generalizes well to other contexts such as homes, school, employment, and community locations (Durand & Carr, 1991).

FCT requires that a FBA be conducted to identify the function of the problem behavior. The next step is to determine a more desirable or acceptable form of communication for the child to use as a replacement for the problem behavior. This replacement behavior should be something that:

- 1) the child is capable of performing;
- 2) can be taught very easily;
- 3) will be easily noticed and acknowledged whenever the child uses it; and
- 4) works quickly and takes less effort than the problem behavior for the child.

The replacement behavior can involve speech, gestures, signs, or pictures; it needs to be something readily available and appropriate to the child's developmental level. To do this, identify the child's skills (especially communication skills) and determine if the child is able to use words to communicate or is more likely to point or make gestures.

Once a replacement behavior is selected, the next step of FCT involves ignoring the problem behavior and prompting and acknowledging the use of the replacement behavior. It is important to follow through with the individual's request, especially in the early stages, as this will reinforce the use of the replacement behavior. For FCT to be effective, the new skill should work better for the child than the old problem behavior. If the problem behavior was more effective at getting the individual what they wanted, then they are likely to revert back to using that instead of the new replacement behavior.

Lastly, be persistent with the intervention. Initially, the individual may use the problem behavior more often, but continue to be consistent until the individual understands that the new skill will be useful in obtaining what he wants (Dunlap & Duda, 2004).

Extinction-Based Treatments

Interventions involving extinction procedures are frequently used to treat SIB. The procedures that are involved include terminating the reinforcement contingency that maintains the SIB. For SIB that is maintained by positive reinforcement (attention or tangible items), the reinforcer would be withheld following the occurrence of the SIB. Essentially, planned ignoring is implemented with the people in the individual's environment ignoring the SIB. The elimination of the reinforcement results in the decrease of the SIB over time (Iwata, Pace, Kalsher, & Cowdery, 1990; Foxx, 1982; Rose, Sloop, & Baker, 1980; Magee & Ellis, 2000). In the case of SIB that is maintained by negative reinforcement, escape extinction would be an appropriate approach to use. Escape extinction involves the continuation of the demand or task when the individual engages in the SIB. If the possibility of escape is no longer provided in the presence of the SIB, then the SIB should decrease, as compliance with tasks should increase (Lalli, Casey, Goh, & Merlino, 1994; Iwata et al., 1990; Blindert, Hartridge, & Gwadry, 1995; Goh & Iwata, 1994; Neidert, Iwata, & Dozier, 2005; Zarcone, Iwata, Vollmer, & Jagtiani, 1993). For SIB that is maintained by automatic reinforcement, sensory extinction can be employed. This procedure involves blocking the sensory stimulation that occurs when the individual engages in the behavior. Typically, protective equipment is used in order to block such stimulation. Studies have shown that the use of protective equipment

results in the decrease of SIB (Borrero, Vollmer, Wright, Lerman, & Kelley, 2002; Moore, Fisher, & Pennington, 2004; Le & Smith, 2002).

An important component of the extinction procedures of interventions is high-integrity implementation (Fisher et al., 1993; Mazaleski, Iwata, Vollmer, Zarcone, & Smith, 1993; Shirley, Iwata, Kahng, Mazaleski, & Lerman, 1997). Some of the concerns with using extinction procedures include the possibility of extinction bursts, which occurs when the behavior gets worse before it gets better. A way to minimize extinction bursts is to incorporate other behavior intervention strategies (Lerman, Iwata, & Wallace, 1999).

Conclusion

Challenging behaviors are common in individuals with an autism spectrum disorder; self-injurious behavior in particular has many negative consequences, therefore it is very important to address SIB quickly. These self-injurious behaviors interfere with the development of optimal adaptive living skills, effective learning, and pro-social interactions when untreated. In addition, these individuals are more likely to be exposed to severe or unregulated management of behaviors.

Functional Behavior Assessment (FBA) is a term used to describe procedures that are used to determine why challenging behaviors occur. The issues of pretreatment functional behavior assessment were discussed, including doubts regarding the ethical case for the use of functional assessment. The practice of pretreatment functional assessment has gained popularity in recent years; some state that FBA is in general “best practice” in developing behavioral interventions however the results of five recent meta-analyses have found that interventions based on FBA were no more effective than

interventions that were not based on FBA (Christiansen, 2005/2009; Gresham, McIntyre, Olsen-Tinker, Dolstra, McLaughlin, & Van, 2004; Stage & Quiroz, 1997; Steffey, 2005). Other ethical considerations include the amount of resources required and the potential of SIB throughout the assessment. The time spent on these procedures may also unnecessarily delay treatment and may be unethical in situations if there is risk of serious injury. The results of many studies discussed suggest that treatment effectiveness is not enhanced by the use of these assessments and it is difficult to draw firm conclusions about the appropriateness of their use. These factors need to be considered in the ethical decision-making process when determining if the use of functional assessment procedures in the treatment of challenging behaviors is appropriate.

Another ethical/controversial issue discussed was the use of aversive interventions. One meta-analysis presented (Christiansen, 2009) found that interventions using a combination of non-aversive and aversive interventions resulted in the largest effect size, suggesting that interventions which combine both non-aversive and aversive strategies are significantly more effective in treating individuals with developmental disabilities for self-injurious behavior.

Treatment approaches were presented which have been shown to be successful interventions for self-injurious behaviors. Among these were extinction-based interventions in which the reinforcement that maintains the SIB is terminated. Reinforcement-based treatments included noncontingent reinforcement, which places the reinforcer on a time-based schedule making access to not dependent upon the presence of the SIB. Two differential reinforcement schedules were discussed,

differential reinforcement of other behavior (DRO) and differential reinforcement of alternative behavior (DRA). DRO uses a predetermined schedule in which the individual would have access to reinforcement given that the SIB did not occur in the specified interval. DRA specifies an alternative behavior in which the individual has to engage in in order to have access to reinforcement. One variation of DRA was discussed; functional communication training is used to teach individuals communication behaviors as a replacement for maladaptive behavior. It involves identifying the function of the behavior, then teaching an appropriate behavior that will serve the same purpose for the child.

In conclusion, although there are many ethical issues and controversies, clinicians have an ethical obligation to provide the most effective treatments. Careful consideration should be given to ensure that decisions regarding treatment are individualized. Finally, treatment should be based on a strong consideration of both ethics and data.

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