

Racheal Clark
June 11th, 2015

Autism Spectrum Disorder, Self-Injurious Behavior, & Functional Behavior Assessment

Superheroes social skills training, Rethink Autism internet interventions, parent training, EBP classroom training, functional behavior assessment: An autism spectrum disorder, evidence based practice (EBP) training track for school psychologists

US Office of Education Personnel Preparation Grant H325K12306

Principal Investigators: William Jenson & Elaine Clark

Grant Director: Julia Hood
University of Utah - School Psychology



Overview

- Self-Injurious Behavior (SIB)
 - Definition and presentations
- SIB in Autism Spectrum Disorders
 - Importance of treatment
- Functional Behavior Assessment (FBA)
 - Components
- Interventions for SIB based on function



Self-Injurious Behavior (SIB)

- SIB refers to a class of behaviors an individual directs toward themselves that results in physical injury, more specifically tissue damage. (Tate & Baroff, 1966)
- Some Types of SIB:
 - Head banging
 - Head hitting
 - Scratching
 - Biting
 - Eye poking
 - Pinching
 - Skin Picking



Examples of SIB

- <https://www.youtube.com/watch?v=UNTPDRaPakQ>
- <https://www.youtube.com/watch?v=ZxMHedgsFs4>
- <https://www.youtube.com/watch?v=gM1qLwkBF6U>

SIB in Autism Spectrum Disorders

- SIB is seen in as many as 50 % of young children with ASD, with a categorization of severe in approximately 15 % of cases (Baghdadli, Pascal, Grisi, & Aussilloux, 2003)
- Individuals with co-occurring ASD and ID are likely to display higher levels of SIB than those with ASD or ID alone. (Rojahn, Wilkins, Matson, & Boisjoli, 2010)
- Individuals engaging in SIB are more likely to be placed in residential, as opposed to community settings. (Crossland, Burns, Leach, & Quinn, 2005)
- Therefore, accurate assessment and effective treatment are imperative.
- Untreated SIB can be life threatening or can limit an individual's opportunities to engage in mainstream activities (Rojahn, Matson, Lott, Esbensen, & Smalls, 2001)



Possible Health Conditions Contributing to SIB

- Frequently noted conditions include:
 - Allergies
 - Asthma
 - Constipation
 - Dysmenorrhea
 - Gastroesophageal reflux disease (GERD)
 - Otitis Media
 - Sleep Deprivation



Functional Behavior Assessment (FBA)

- Is a term used to describe a group of procedures for understanding why challenging behaviors occur.
- Can be grouped into three general categories:
 - Indirect assessments
 - Descriptive assessment
 - Experimental functional analysis



Functions of Behavior

- Socially Mediated Positive Reinforcement
 - Attention, Activities, Tangible items
- Socially Mediated Negative Reinforcement
 - Escape/Avoidance
- Automatic Positive Reinforcement
 - Self-Stimulation



Indirect Assessment

- Rating Scales

- Motivation Assessment Scale (MAS) (Durand, 1986)

- Assesses the functions or motivations of behavior problems

- Questions About Behavior Functions (QABF) (Matson & Vollmer, 1995)

- Informant-based questionnaire

- Interview

- Describes the antecedents, target behavior, and consequences.

MAS

(Durand, 1986)

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

MAS

(Durand, 1986)

	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.



Descriptive Assessment

- Descriptive assessment requires the direct observation of the behavior.
- The purpose is to observe the behavior under the conditions it occurs in the natural environment.
- By observing in the natural environment, the observer can evaluate if the behavior is associated with specific antecedent and consequence events.



An ABC Assessment

- **Antecedents**

- Events that occur prior to the problem behavior

- **Behavior**

- Recording and defining the type of problem behavior taking place

- **Consequence**

- Events that occur after the problem behavior has been displayed

Time of Day	How often?	What activity was involved? (antecedent)	What did your child do? (behavior)	What did you do about your child's behavior? (consequence)
Morning 5:00-5:30 am 5:30-6:00 am 6:00-6:30 am				

Time of day	How often did behavior occur?	Antecedent	Behavior	Consequence
5:00-5:30 AM	8	I tried to put her in her bed but she didn't want to	Cried, screamed, kicked her feet, and pulled her hair	I left her but it didn't work until her dad moved her to our bed
4:00-4:30 PM	3	Changing her clothes	She refused to change her clothes. She threw herself, hit herself	I made her change herself
8:00-8:30 PM	15	I asked her to come with me. I was at my sister's house.	She threw herself on the floor, hit my sister and me.	I let her do her tantrums and then I made her leave.



Experimental Functional Analysis

- An assessment procedure for identifying the controlling environmental variables (functions) of behavior. (Iwata, Dorsey, Slifer, Bauman, & Richman, 1994)
- Once these variables are identified they are manipulated in different conditions so that behavior changes.
- These conditions include:
 - Attention
 - Tangible
 - Demand
 - Control

FA Conditions

- **Control or Free Play**
 - Objective to organize environment so there is no reason for problem behavior to occur
- **Attention**
 - To see if access to attention is a reinforcer for problem behavior
- **Tangible**
 - To see if gaining access to preferred items is reinforcing problem behavior
- **Demand**
 - To see if avoiding/escaping a task is a reinforcer for problem behavior

Condition	Antecedent	Behavior	Consequence
Free Play	Attention and toys are available continuously. No demands are presented.	Problem behavior	Problem behavior is ignored.
Attention	Parent's attention is diverted by reading a magazine.	Problem behavior	Parent provides attention for 20 seconds.
Tangible	Highly preferred toy is removed and less preferred toy is presented.	Problem behavior	Parent returns highly preferred toy for 20 seconds.
Demand	Work task is presented.	Problem behavior	Parent removes work task for 20 seconds.



Ethical Issues

- The need for quick change in these behaviors
 - Treatment should be appropriate and timely
 - Treatment developed through an FBA is not implemented until assessment is finished
 - In an FA, allowing the SIB to occur and persist through the analysis.

EFFECTIVENESS OF INTERVENTIONS TARGETING SELF-INJURY IN
CHILDREN AND ADOLESCENTS WITH DEVELOPMENTAL
DISABILITIES: A META-ANALYSIS

ELIZABETH A. CHRISTIANSEN

Table 9. Effect Sizes by Variable

Moderator Variable	N	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



Meta-Analysis

(Christiansen, 2005)

- 224 studies included
- mean effect sizes of different interventions were calculated.
 - Non-aversive interventions -2.33
 - Aversive interventions -3.67
 - Combination: Non-aversive & Aversive -4.19
- Non-aversive and Aversive interventions were found to be effective, with the combination of both being even more effective



Meta-Analysis

(Christiansen, 2005)

- Effect sizes for presence on pretreatment functional behavior assessment
 - FBA -4.05
 - Functional Analysis -3.31
 - None/not indicated -3.30
- Effect size of not using a FBA vs. using a FBA is quite close
 - Worth considering the situation and time consumption



Meta-Analysis Conclusions (Christiansen, 2009)

- Effect sizes between groups were not found to be significantly different
- Suggests that treatment effectiveness wasn't influenced by implementation of a FBA
- With these comparable effect sizes, decisions about doing a FBA should take into consideration the amount of resources required and the potential of self-injury during the assessment.



Function-Based Interventions

- Treatment of SIB maintained by:
 - Positive Reinforcement
 - Negative Reinforcement
 - Automatic Reinforcement
- Treatment of Multiply Controlled SIB

Treatment of SIB maintained by Positive Reinforcement

- **Extinction** (Lerman & Iwata, 1996)
 - Remove positive reinforcer for the behavior
- **Noncontingent Reinforcement (NCR)**
 - Reinforcer delivery on a continuous or relatively dense fixed-time schedule
 - Extinction for problem behavior
 - Schedule thinning
- **Timeout**
 - Remove access to positive reinforcer that is maintaining the problem behavior



Treatment of SIB maintained by Positive Reinforcement

- Differential Reinforcement of Other Behavior (DRO)
 - Positive reinforcer is delivered if problem behavior has not occurred for a period of time
- Differential Reinforcement of Alternative Behavior (DRA)
 - Teach the child another behavior that is more appropriate, but still conveys what they want



Treatment of SIB maintained by Negative Reinforcement

- Extinction through Prevention of Escape
 - Continuation of demand
- Differential Negative Reinforcement of other Behavior (DNRO)
 - Escape provided for not engaging in SIB
- Differential Negative Reinforcement of Alternative Behavior (DNRA)
 - Escape provided upon appropriate request/compliance



Treatment of SIB maintained by Negative Reinforcement

- Noncontingent Reinforcement (NCR)
 - Delivery of escape independent of SIB
- Demand Fading
 - Systematic increase in number of demands
- Curricular Revision
 - Altering Establishing Operations to decrease the aversiveness of the demand context



Functional Communication Training

- A procedure for teaching a child to communicate appropriately in order to obtain reinforcement as an alternative to engaging in problem behavior.
- FCT skills can be effective in reducing SIB, are well maintained over time, and generalizes well to other contexts.

Function of problem behavior (identified during the FA)	Replacement communication (mand)	Procedures for appropriate communication	Procedures for problem behavior
Gain parent attention	Appropriate gesture (touching parent), saying, "Mom," manual signing, or touching picture of parent on microswitch with recorded message, "Mom, play please."	Appropriate communication is reinforced with parent attention.	Mild problem behavior is ignored. Destructive behavior is blocked in a neutral fashion (no discussion).
Gain tangible item	Appropriate gesture (pointing), saying, "More," manual signing, or touching "More" picture on microswitch with recorded message, "More, please."	Appropriate communication is reinforced with highly preferred tangible items.	Mild problem behavior is ignored and item is not delivered. Destructive behavior is blocked in a neutral fashion (no discussion).
Obtain a break or escape from work task	Child must first comply and then mand by making an appropriate gesture: saying "Play," manual signing, or touching "Play" picture on microswitch with recorded message, "Play, please."	Appropriate communication is reinforced with breaks from demands	Mild problem behavior is ignored and destructive behavior is blocked in a neutral fashion. Destructive behavior at any time during the session results in additional work tasks.



Treatment of SIB maintained by Automatic Reinforcement

- Sensory Extinction
 - Sensory reinforcement is blocked or mitigated
- Competing Stimuli
 - Items found to decrease occurrence of SIB are freely provided
- Differential Reinforcement
 - DRA – alternative behavior taught, reinforcement for displaying that behavior
 - DRO – reinforcers are given for not displaying the SIB

Treatment of Multiply Controlled SIB

- Fewer examples have been demonstrated in the literature
 - In 14.6% of published FAs, multiple maintaining contingencies were maintaining problem behavior. (Hanley, Iwata, and McCord, 2003)
- Treatment difficult if SIB requires competing contingencies.
 - Participant SIB maintained by attention and automatic reinforcement → DRO schedule (behavior maintained by positive reinforcement) and noncontingent access to toys (behavior maintained by automatic reinforcement) (Smith, Iwata, Vollmer, and Zarcone, 1993)

Table 3.1. Common behavioral interventions for SIB and advantages and disadvantages of each

Treatment	Contingency description	Strengths	Weaknesses or risks
Extinction of SR+	Nondelivery or termination of attention or tangible item	Highly effective	<ol style="list-style-type: none"> 1. Potential for behavior to get worse before it gets better 2. Restricts access to SR+ 3. High-level integrity required but may be difficult
DRO for SR+	Delivery of attention or tangible item for the absence of responding	<ol style="list-style-type: none"> 1. EXT component 2. SR+ component 	<ol style="list-style-type: none"> 1. No functional replacement skills taught 2. High-level integrity required
DRA for SR+	Delivery of attention or tangible item for appropriate alternative response	Functional alternative to SIB	High-level integrity required
NCR for SR+	Delivery of attention or tangible item independent of SIB	Ease of implementation	No functional replacement skills taught
Extinction of SR-	Continuation of demands or social interaction	Highly effective	<ol style="list-style-type: none"> 1. Potential for behavior to get worse before it gets better 2. Restricts access to SR- 3. High-level integrity required
DNRO	Delivery of escape for not engaging in SIB	<ol style="list-style-type: none"> 1. EXT component 2. SR- component 	<ol style="list-style-type: none"> 1. No functional replacement skills taught 2. High-level integrity required
DNRA	Delivery of escape for appropriate behavior (compliance or request)	Functional alternative to SIB	High-level integrity required
NCR for SR-	Delivery of escape independent of SIB	Ease of implementation	Loss of time engaged in academic learning

NCR for SR-	Delivery of escape independent of SIB	Ease of implementation	Loss of time engaged in academic learning
Demand fading	Systematic increase in the number of demands	<ol style="list-style-type: none"> 1. Immediate and sustained decrease in SIB 2. Larger number of demand can be required 	<ol style="list-style-type: none"> 1. May be ineffective without EXT 2. Lengthy procedure
Curricular revision	Altering EO to decrease the aversiveness of the demand context	<ol style="list-style-type: none"> 1. No changes to the consequences for SIB required 2. May be a more socially accepted modification 	May require extensive assessment to determine required manipulations
Sensory extinction	Sensory reinforcement blocked or mitigated	Highly effective	May be difficult or impossible to implement
Competing stimuli	Items that decrease the occurrence of SIB are freely provided	May create appropriate alternative skill	Required multiple assessments to implement
DRO for automatic SR	Delivery of reinforcers for not engaging in SIB	May identify items that are preferred to SIB	<ol style="list-style-type: none"> 1. Extinction cannot be implemented 2. No functional replacement skills taught
DRA for automatic SR	Reinforcement for alternative behavior (toy play) provide	Trains appropriate alternative skill	<ol style="list-style-type: none"> 1. Extinction cannot be implemented 2. May be difficult to train appropriate alternative



Practical Implications for Treatment Selection

- Severity and Frequency of SIB
 - Use of extinction with severe SIB → extinction burst
- Resources Necessary to Implement Treatment
 - Therapist/staff required for Extinction, DRO, & DRA
 - Antecedent manipulations should be considered first line intervention
- Functioning Level of the Individual (Tiger, Hanley, & Bruzek, 2008)
 - Use of Functional Communication Training
 - DRO that provide few signals and require no discrete response



Practical Implications for Treatment Selection

- Treatment Generalization and Maintenance (Shore, Iwata, Lerman, & Shirley, 1994)
 - Environment in which intervention takes place
- Change of Behavioral Functions (Luiselli, 2012)
 - Reemergence of behavior
 - Assessment of behavioral function → ongoing activity



Conclusion

- Rate of SIB in ASD
- Treatment development
 - FBA/FA
 - Important Considerations
- Ethical Considerations
 - Assessment & Interventions

References

- Adelinis, J. D., Piazza, C. C., Fisher, W. W., & Hanley, G. P. (1997). The establishing effects of client location on self-injurious behavior. *Research in Developmental Disabilities, 18*, 383-391
- Baghdadli, A., Pascal, C., Grisi, S., & Aussilloux, C. (2003). Risk factors for self-injurious behaviors among 222 children with autistic disorders. *Journal of Intellectual Disability Research, 47*, 622-627.
- Christiansen, E. A. (2009). *Effectiveness of interventions targeting self-injury in children and adolescents with developmental disabilities: A meta-analysis*. Unpublished doctoral dissertation, University of Utah, Salt Lake City, Utah.
- Crossland, S., Burns, M., Leach, C., & Quinn, P. (2005). Needs assessment in forensic learning disability. *Medicine, Science and the Law, 45*, 147–153.
- Durand, M. (1986). Motivation Assessment Scale.
- Fisher, W., Piazza, C., Cataldo, M., Harrel, R., Jefferson, G., & Conner, R. (1993). Functional communication training with and without extinction and punishment. *Journal of Applied Behavior Analysis, 26*, 23-26.
- Hanley, G. P., Iwata, B. A., & McCord, B. E. (2003). Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis, 36*, 147–185.

References

- Iwata, B. A., Dorsey, M. R., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis*, 27, 197-209.
- Lerman, D. C., & Iwata, B. A. (1996). Developing a technology for the use of operant extinction in clinical settings: An examination of basic and applied research. *Journal of Applied Behavior Analysis*, 29, 345-382.
- Lindgren, S. D., & Wacker, D. P. (2011). Behavioral treatment through in-home telehealth for young children with autism [Grant R40MC22644]. Washington, DC: US Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau.
- Luiselli, J.K. (2012). *The handbook of high-risk challenging behaviors in people with intellectual and developmental disabilities*. Baltimore, Maryland: Paul H. Brookes Publishing Co.
- Matson, J. L., & Vollmer, T. (1995). Questions about behavioral function (QABF). Baton Rouge, LA: Disability Consultants, LLC.
- Rojahn, J., Matson, J. L., Lott, D., Esbensen, A. J., & Smalls, Y. (2001). The behavior problems inventory: An instrument for the assessment of self-injury, stereotyped behavior, and aggression/destruction in individuals with developmental disabilities. *Journal of Autism and Developmental Disorders*, 31, 577-588.

References

- Rojahn, J., Wilkins, J., Matson, J. L., & Boisjoli, J. (2010). A comparison of adults with intellectual disabilities with and without ASD on parallel measures of challenging behaviour: The behavior problems inventory-01 (BPI-01) and autism spectrum disorders-behavior problems for intellectually disabled adults (ASD-BPA). *Journal of Applied Research in Intellectual Disabilities*, 23, 179–185.
- Shore, B. A., Iwata, B. A., Lerman, D. C., & Shirley, M. J. (1994). Assessing and programming generalized behavioral reduction across multiple stimulus parameters. *Journal of Applied Behavior Analysis*, 27, 371-384.
- Smith, R. G., Iwata, B. A., Vollmer, T. R., & Zarcone, J. R. (1993). Experimental analysis and treatment of multiply controlled self-injury. *Journal of Applied Behavior Analysis*, 26, 183-196.
- Tate, B. G., & Baroff, A. S. (1966). Aversive control of self-injurious behavior in a psychotic boy. *Behaviour Research and Therapy*, 4, 281-287.
- Tiger, J. H., Hanley, G. P., & Bruzek, J. (2008). Functional communication training: A review and practical guide. *Behavior Analysis in Practice*, 1, 10-23.