Multicomponent Assessment and Treatment of Severe Pica

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The ingestion of non-nutritive substances, repeated for a period of at least 1 month, developmentally inappropriate, not culturally sanctioned, and severe enough to warrant clinical investigation if occurring in the context of another disorder.

(5th ed.; DSM–5; American Psychiatric Association, 2013)
A life-threatening condition associated with negative social and medical outcomes including exposure to restrictive procedures, parasitic infection, choking, poisoning, intestinal blockage, emergency surgery and death (Sturmey & Williams, 2016).

Described as the most dangerous form of self-injury (Foxx & Livesay, 1984; McLoughlin, 1988).
The prevalence of pica in general population is unclear due to methodological issues with existing epidemiological studies (range of 0.02-76.5%).

- 27.8% prevalence in pregnant women (Fawcett, Fawcett, & Mazmanian, 2016).
- 4% prevalence in individuals with schizophrenia (Tracey et. al, 1996).
- Observed in as many as 22% of individuals diagnosed with an intellectual disability (Sturmey & Williams, 2016).
History of Pica “treatment”

- Homo Habilis - 2 million B.C.E
- Byzantine Greece – ‘Perversion of the Appetite’
- Mouth locks & institutionalization era
- Focus on treatment of associated medical conditions
- Arbitrary reinforcement & punishment
- Behaviour Analytic Function-based treatments
Background

- 19-year-old male of Eritrean descent
- Autism spectrum disorder
- Severe intellectual disability
- Epilepsy
- Pica
- Aggression
- Severe communication deficits
- Restricted/repetitive behaviour
The risks and benefits of assessment, intervention, and information sharing were clearly described to Johnny’s substitute decision maker with consents obtained in writing.

* Audio/video consent
* Consent to assessment & treatment
* Consent to conduct Functional Analyses
* Consent to release of personal information for educational purposes

Consultation with bioethics and research ethics throughout assessment & intervention.
Reason for Referral

- Increase in frequency of pica, preference for more dangerous items
- Increase in aggressive behaviour (injury to mother)
- Restricted/repetitive behaviours posed a safety risk
- Ingestion of several medical gloves required emergency surgery (January 2012). Surgeon warned that a similar incident could be fatal in the future.
- Inpatient unit provided safe location to complete assessment of Pica.
1. Conduct a functional analysis of pica and aggression.

2. Conduct a treatment analysis to investigate options for effective, safe, and practical interventions.

3. Support a discharge to an appropriate community setting.
Medical Assessment & Treatment

- Iron deficiency
- Stabilization of epilepsy
- Post surgery wound care
- Dental assessment
- Gastrointestinal evaluation
- PRN medication for agitation
- Genetic testing
Medication Regime

* Carbamazepine
* Phenytoin Sodium
* Diazepam
* Ferrous Gluconate
* Fluoxetine
* Olanzapine
* Zinc Sulphate Suppository
Predictors

- Age
- IQ
- Seizure disorder
- Certain genetic syndromes
- Diabetes
- Deafness
- Sickle-cell anemia
- Lead poisoning

- Autism
- Geographical location
- Sociocultural variables
- Iron deficiency
- Other behavioural problems
- Neuroleptics
- Institutionalization
- Weak communication and social skills

Barltrop, 1966; Gravestock, 2000; Grigsby, 1999; Jawed et al., 1993; Libnoch, 1984; McAdam et al., 2004; Sturmey & Williams 2016
**Target Behaviours**

- **Pica**: ingestion of an inedible substance by placing the item past the plane of the lips.

- **Aggression**: forceful contact between the participant and another individual, which may include scratching, striking, or choking with hands/arms.

- **Collateral Behaviour**: Manipulating the helmet with hands, jumping or running, vocalizations above conversational volume, or forceful contact of the individuals hands or arms with himself or the environment.
Setting

- Intensive Observation Treatment Area (IOTA)
- 12 x 12 ft. lounge area
- 3 bedrooms with magnetic locking capabilities, padded walls, and weighted tear-proof beds equipped for mechanical restraint
- Nursing station with 270 degree observation window.
IOTA
Assessing Pica

- Direct and indirect descriptive assessment measures
- Brief multi-element functional analysis (Northrup, Fisher, Kahang, Harrell, & Kurtz, 1997)
- “Baited” environment (Piazza et al., 1998)
- Dietician consultation to determine safe non-edibles
- Nursing supervision
- BCBA involvement
Control Condition: compared against test conditions, intended to function as an abolishing operation for a variety of response classes.

Demand Condition: A test for negative social reinforcement.

Attention: A test for positive social reinforcement by access to interaction with caregivers or peers.

Alone: A test for automatic reinforcement through sensory stimulation or pain attenuation.
Functional Analysis - Pica

- Control
- Alone
- Attention
- Demand

SESSION
ITEMS INGESTED
“While pica can be socially mediated, it is often maintained at least in part by automatic reinforcement making treatment more difficult.”

(Piazza et al., 1998)
FUNCTIONAL ANALYSIS - AGGRESSION

**SESSION FREQUENCY OF AGGRESSION**

- Control
- Attention
- Demand
- Tangible

**Graphical Representation**

- **Y-Axis**: Frequency of Aggression
- **X-Axis**: Session

This graph illustrates the frequency of aggression over sessions for various conditions: Control, Attention, Demand, and Tangible. The data shows a significant increase in frequency during the Attention session, with a subsequent decrease in other sessions.
“Although response blocking can decrease problem behavior, one potential adverse side effect is the induction of aggression.”

(Hagopian & Adelinis, 2001)
Preference assessment may enhance the effectiveness of differential reinforcement and stimulus competition procedures (Vollmer, Marcus, & LeBlanc, 1994; Piazza, Fisher, Hanley, Hilker, & Derby, 1996)

- Paired Stimulus Preference Assessment for edible items
- Single Stimulus Preference Assessment for activities
- Brief Free Operant Assessment
Variety of edibles presented in pairs.

All items matched with each other with percentage of times each item selected calculated into a hierarchy.
Paired Stimulus Preference Assessment

PERCENT SELECTED

PAIRED STIMULI

Toilet Paper
Muffin Wrapper
Orange Slice
Cola Candy
Raisin
Jujube
Chips
Onion
Popcorn
Pop Rocks
Activity Preference Assessment:

* Single Stimulus Presentation

(Pace et Al., 1985; Spavek et al. 2008; Piazza, Fisher, Hanley, Hilker, & Derby, 1996)

* Items are presented one at a time, with duration of “active approach” measured

* Active Approach: reaching for, touching, or manipulating an items without additional prompting after initial presentation of the item. Interaction time will be terminated if Johnny walks away from the item, drops the item, or engages in aggressive behaviour.
Single Stimulus Preference Assessment

ACTIVITY

- Bubbles
- Xylophone
- Head Massager
- Massage Glove
- Hammer & Blocks
- Shape Box
- Rubber Ball
- Hand Strengthener
- Animal Puzzle
- Bowling Pins

DURATION (SECONDS)

0
100
200
300
400
Prior to training trials, a number of items are presented to Johnny, with therapists taking note of reach, eye gaze, and length of interaction with items.

* Edibles and activity items are selected from previous formal preference assessments.

* Approached items used following during training.
Assessment Summary

* Pica maintained by automatic reinforcement
* Aggression maintained by escape from demands and access to tangibles
* Restricting access to pica items via blocking may evoke aggressive behaviour
* Pica items more preferred than other edibles
* Some items/activities may be used as reinforcers
Treatment Component Analysis (Reversal Design)

* Non-contingent access to edibles
* Response effort manipulations
* Extinction (protective devices)
* Access to a receptacle
* Differential reinforcement of incompatible behaviour
Session Details

* Baseline & treatment sessions 5 minutes in length

* 5 baited items available
Baseline 1

* Johnny is alone in IOTA

* Pica items are placed throughout the environment

* No consequences or prevention strategies applied for the occurrence of Pica
* Johnny is alone in IOTA

* Pica items are placed throughout the environment

* No consequences or prevention strategies applied for the occurrence of Pica

* A variety of edibles are readily available.
Johnny is alone in IOTA

Pica items are placed throughout the environment

No consequences for pica

Johnny is wearing a protective helmet which he has been observed to place items underneath with some effort
* Johnny is alone in IOTA

* Pica items are placed throughout the environment

* No consequences for pica

* Johnny is wearing a protective helmet modified to include adjustable straps
“If we eliminate emotion by repeated exposure to extinction, or in other ways, the curve emerges in a simpler form.”

B. F. Skinner
Science & Human Behavior
Baseline 2

* Johnny is alone in IOTA

* Pica items are placed throughout the environment

* No consequences or preventative strategies for pica

* A receptacle (shredder bin) is placed in the environment
Johnny and a therapist are in IOTA

- Pica items are placed throughout the environment
- Johnny wearing modified helmet
- Modeling and prompting of incompatible response
- Only praise is provided for correct responses
Differential Reinforcement of Incompatible Behaviour 2

- Johnny and a therapist are in IOTA
- Pica items are placed throughout the environment
- Johnny wearing modified helmet
- Modeling and prompting of incompatible response
- Praise and a preferred item provided for correct response
Planning for Generalization

- Multiple environments
- Multiple exemplars
- Multiple therapists
- Family involvement
Fading Procedures

- Restrictiveness of environments
- Protective devices
- Supervision levels
- Staff prompts
- Increased proximity
3 Consecutive Sessions with:

* At least 80% items placed in bin
* No items ingested
* Two different therapists
Outcomes

* Reduction in frequency of pica
* Reduction in collateral behaviour
* Family involvement
* Training videos
* Participation in day programming
* Expansion of privileges
* Discharge to community setting
Zero instances of pica or aggression reported over a three year period.
Thank You!

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Ontario Association for Behaviour Analysis
www.ontabla.org

Ontario Behaviour Analytic Community of Practice
https://www.porticonetwork.ca/web/obacop/about-us