

Increasing Response Variability in Autism

Research and Practice

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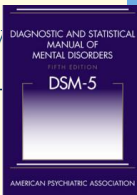
Agenda

- What is the clinical/applied problem?
- What is behavioral technology in place to address that problem? What are the limitations?
- Considerations going forward.



The Clinical Problem: Repetitive in ASD

- Stereotyped or repetitive...motor movements, use of objects, or speech.
- Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior.
- Highly restricted, fixated interests...preoccupation with unusual objects...or perseverative interests



Current Behavioral Technology

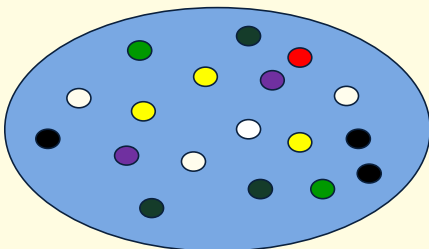
- **Language deficits**
 - ↑ verbal responses, communication
- **Inappropriate/lack of varied play**
 - ↑ Play/recreational/social play skills
- **Preoccupations with parts of objects/restricted patterns of interests.**
 - Redirection to/reinforcement of competing, incompatible, or alternative behavior



Current Behavioral Technology

- **Inflexible adherence to routines/rituals...**
 - Graduated exposure
 - ↑ Tolerating, accepting, compliance to changes in the environment
- **Stereotyped/Repetitive motor mannerisms**
 - Differential reinforcement of incompatible behavior
 - Differential reinforcement of alternative behavior





“Programming” for response variability.

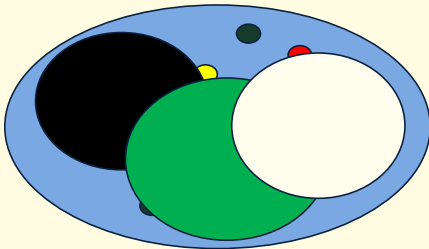
- Skill acquisition.
- A diverse repertoire is necessary...



...Is it sufficient?

- What if we get...
 - Repetitive forms of appropriate play?
 - Repetitive use of appropriate sentences or social responses?
 - Repetitive selection/choice of activities/reinforcers?
 - Repetitive selection of a single, or few, sequences of activities?
- What might be expected from some of the most popular behavioral protocols?







What might be expected from some of the most popular behavioral protocols?




Lessons learned.



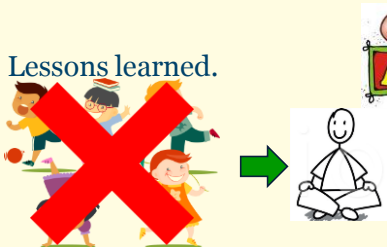

Readiness




Instruction : Target → Reinforcement
Nontarget → Correction



Lessons learned.

Instruction : Target → Reinforcement
Nontarget → Correction



Lessons learned...

- Skill-building is a priority
 - Acquisition techniques are effective.
 - Response variability may be an indirect effect.
 - Akin to a “Teach and Hope” perspective



Best Practices

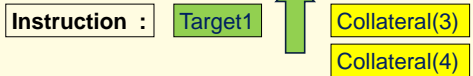
- Skill acquisition.
- Expand reinforcers.
- Model a variety of responses.
- Prompt a variety of responses.
- Ask for varied responses.
- Program for **response generalization**.



Response Generalization



Response Generalization



Spread of effects...



Response Generalization

Target1
Target2
Target3
Target4

Instruction :

Reinforcement

Response Generalization

Target1
Target2
Target3
Target4

Collateral(5)
Collateral(6)
Collateral(7)
Collateral(8)

Instruction :

Reinforcement

Increasing Response Variability.

- Program for response generalization.
 - Teach a variety of responses to a antecedent stimulus (e.g., instruction, context...)
 - Teach topographically similar responses
 - Do not differentiate consequences

Programming for Response Generalization

For response “sequences”, teach multiple combinations.

| | | | |
|-------------------|---------------------|---------------------|-----------------------|
| "That's a" | Big | Huge | Large |
| Toy | "Big toy" | "Huge toy" | ? |
| Block | ? | "Huge block" | "Large block" |
| Bottle | "Big bottle" | ? | "Large bottle" |

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Programming for Response Generalization

Teach functionally equivalent responses; “synonyms”

| | | | |
|-------------------|--------------------|-------------------|---------------------|
| "That's a" | Big = Huge = Large | | |
| Toy | Big toy | ? | ? |
| Block | ? | Huge block | ? |
| Bottle | ? | ? | Large bottle |

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Increasing Response Variability

- Skill acquisition.
 - Expand reinforcers.
 - Model, Prompt, Ask for a variety of responses.
- Program for response generalization.



Teach to fluency

- Fluency = Rate or responding & Accuracy
- RESAA
 - Retention, Endurance, Stability, Application
 - Adduction
 - The performance of previously learned skills in never before performed combinations.
 - E.g., component motor skills
 - Creative problem-solving

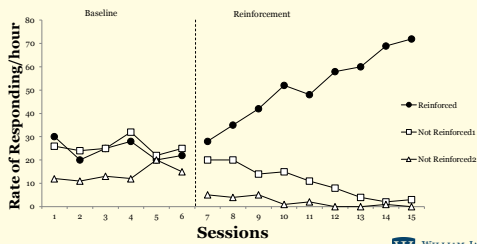


Increasing Response Variability

- Skill acquisition.
 - Expand reinforcers.
 - Model, Prompt, Ask for a variety of responses.
- Program for response generalization.
- Matrix Training
- Teach to Fluency



Reinforcement produces Stereotypy



Defining Response Variability

- Something new
 - Never seen before; Novelty
- Something different
 - From recent behavior.

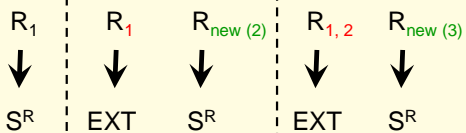


The First Instance of Response Variability

- Understanding human behavior
 - “Do something. If successful, do more of it.”
 - “If at first you don’t succeed, try again. If that doesn’t work, try something else.”
- “Extinction-*induced* variability”



Differential reinforcement of novel forms.



Reinforcement Procedures

- Differential Reinforcement of Novel Forms
 - Page & Neuringer (1985) Sequence variability
 - Goetz & Baer (1973) prek blockbuilding forms
 - Lalli, Zanolli, & Wahn (1994) toy play
 - Duker & van Lent (1991) communicative gestures
- Might not be a desirable contingency

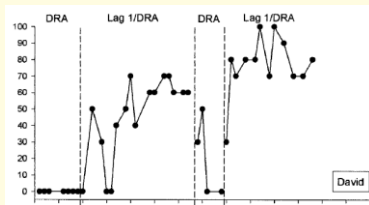


Differential Reinforcement of nonrecent behavior.

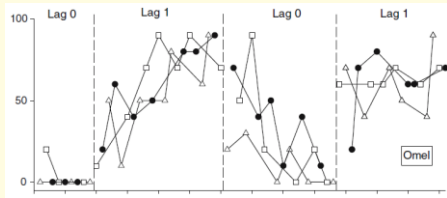
- Lag x reinforcement schedule
 - Also, “Lookback” schedule
 - X = scope of the “lookback”;
 - The number of previous responses/trials to compare the current response to.
 - e.g., Lee, McComas, & Jawor (2002); Lee & Sturmey (2006); Lee (2014)



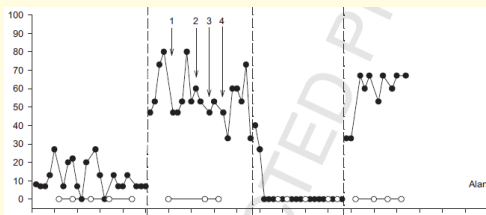
Lag x reinforcement



Lag x reinforcement



Lag x reinforcement



Conclusions

- Our Technology (some of it...)
 - Skill acquisition.
 - Expand reinforcers.
 - Model, Prompt, Ask for a variety of responses.
 - Program for response generalization
 - Matrix Training
 - Teach to Fluency
 - Direct reinforcement of response variability
- There's more...
 - Equivalence-training
 - Pivotal Response Training
 - ...



Future Directions

- Social validity, social validity, & more social validity.
- Generalization & maintenance of effects.
- Best practices for teaching technologies.
- A functional analysis of creativity.