Reinforcement and Extinction-Induced Behavioral Variability in Older Adults with Dementia

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Repetitive Behavior

- Lack of research in this area
  - Unlikely to result in harm to staff or residents
  - Staff can ignore it

- Despite lack of harm, potential benefits for research
  - Reinforcement and extinction
  - Lack of extinction-induced behavioral variability (EIBV)
  - Behavioral Momentum
Extinction Research with Older Adults

- Plaud, Plaud, and von Duvillard (1999)
  - Older adult participants responded in accordance with behavioral momentum theory (i.e., biased responding toward reinforcement)

- Spira and Edelstein (2007)
  - Older adult participants with mild dementia demonstrated sensitivity to extinction
Purpose

- Begin to examine effects of reinforcement and extinction on severely impaired older adults
- Will participants continue to respond in extinction despite lack of reinforcement?
- Will participants exhibit “bursting” in extinction?
Participants

- **Marilyn**
  - 84 years old
  - Dementia
  - MMSE = 20

- **Helen**
  - 77 years old
  - Alzheimer’s disease
  - MMSE = 4
Setting

- 168-bed nursing and rehab facility for older adults

- Maximum daily participation was 20 minutes
Materials

- Touch screen computer displaying these buttons:
Stimuli

- Target response
  Touch yellow, then green (within 5 seconds of touching yellow)

- Consequence stimuli:
  - pre-recorded videos of experimenter saying various statements of praise
Dependent Variables

- Rate of button pressing (per minute)

- Inter-response time of button pressing (in seconds)

- Vocal-verbal statements about:
  - computer, leaving the room, researcher
Procedure

- MMSE

- 3 phases
  - Baseline
  - Intervention
  - Reversal

- ABA reversal design
Procedure

- Computer training

- Familiarize participant with touch screen

- Was conducted once before each condition

- Experimenter instructed participant to press each button one at a time
  - Blue, green, yellow, red
Procedure

- Instructions were identical for each session across all conditions

- Each session was 5-min long

- Experimenter script for interactions

- Each condition began immediately after computer training
Baseline

- No consequences provided

- If participant did not emit the response to begin the session, the participant was prompted until the response was made

- Stability criteria: frequency of target responses could not differ for 3 consecutive sessions by more than 20%
Intervention

- Yellow-green sequence activated timer immediately following a video

- If the participant did not emit the response to begin the session, the participant was prompted until the response was made

- Stability criteria: target responses 3 times the baseline average and could not differ by more than 20% for three consecutive sessions
Reversal

- Emitting yellow-green sequence activated timer

- If the participant did not emit the response to begin the session the participant was prompted until the response was made

- Stability criteria: target responses could not differ by more than 20% for 3 consecutive sessions
Results

![Graph showing results with sessions, responses per minute, and different phases such as Baseline, Intervention, and Extinction. The graph illustrates changes over time with markers indicating average responses for 'All buttons' and 'Target response' for two subjects, Marilyn and another subject.](image-url)
Results
Results
Results
Results
Results
Results
Results

![Graph showing results for Helen with three phases: Baseline, Intervention, and Extinction. The x-axis represents minutes, and the y-axis represents average IRT (in seconds). The graph illustrates changes over time.]
Summary of Results

- Marilyn
  - Slight increase in intervention

- Helen
  - No increase in intervention

- Both responded slowest during intervention

- Both responded the most and the fastest during the first minute of the session
Discussion

- Purpose

- Neither participant acquired the task

- Extinction condition was not possible

- Interesting findings in terms of reinforcement
Discussion

Points of interest

- IRT
  - Target response slightly faster for both participants
  - Minute-by-minute analysis

- Vocal-verbal statements
  - “Okay, now what?”
  - “I did it.”
  - “There.”
Limitations

- Novelty of device
- Videos not the same as “live” praise?
- Task too complex
Future Research

- Preference Assessment
  - Interview for preferred items
  - Paired stimulus preference assessment

- Simplified Procedure
  - One button
  - 5 second access to randomly drawn stimulus

- Is it working?
  - Yes!
Conclusion

- First study to use touch screen with this population
- First to systematically examine reinforcement with moderate to severe dementia
- Future research is necessary to provide most effective treatments
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