Can We Eliminate Problem Behavior Without Extinguishing it?

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Problems in technology transfer

❖ Common refrain from teachers and parents
❖ “I’ve tried that behavior mod* stuff; it doesn’t work”
  *Insert EXT (or any other procedure) here
❖ Our typical response
❖ “Perhaps there was a detail you missed”
  *(Translated: “I suspect you have no idea what you did”)*
❖ Does extinction involve a special case of not working?
What is extinction (EXT)?

- Not any one procedure per se
- Reversal of a fundamental principle of learning
  - Termination of a reinforcement contingency
- Procedural variations
  - PB maintained by Sr+: Do not attend to PB
  - PB maintained by Sr-: Do not allow escape
  - PB maintained by automatic Sr: Attenuate stimulation produced by PB
- Effects
  - Direct: Decrease in response frequency
  - Indirect: Increase in response variability

EXT DOES WORK!!!

- Over 3,000 clinical studies
  - Simple mechanism (contingency termination)
  - Rapid, large, and enduring decreases in behavior
  - Effects more reliable than with NCR, DRO, and DRA
  - Enhances effects of NCR, DRO, and DRA
  - Important component of shaping procedures
- Conclusion: EXT is the most direct and efficient method for reducing the frequency of behavior
“EXT doesn’t work” means what?

- EXT (“planned ignoring”) does not decrease behavior
- EXT produces inadequate therapeutic outcome
- EXT produces undesirable effects
- EXT cannot be implemented

1. EXT (planned ignoring) is ineffective

- Timeout may not decrease behavior
  - Plummer, Baer, & LeBlanc (1977)
  - Solnick, Rincover, & Peterson (1977)
  - PB maintained by Sr-?

- Some forms of EXT do not decrease behavior
  - Iwata, Pace, Cowdery, & Miltenberger (1994)
    - PB (Sr+): EXT (sensory) ineffective
    - PB (Sr-): EXT (sensory) and EXT (attn) ineffective
    - PB (automatic Sr): EXT (escape) and EXT (attn) ineffective
  - Kuhn, DeLeon, Fisher, & Wilke (1999)

- Conclusions:
  - Planned ignoring ≠ EXT
  - EXT procedures are function specific
Elopement as an Example

Potential reinforcing consequences

- **Social Sr+**
  - Attention from teacher ("the chase")
  - Interaction with peers in other area
  - Access to tangible items in other area

- **Social Sr-**
  - Escape from work
  - Escape from social interaction

- **Automatic Sr**
  - Running around outside

2. EXT produces inadequate therapeutic effects

- **EXT produces gradual decrease in response frequency**
  - Responding during EXT influenced by many factors: Reinforcement history, response characteristics, stimulus change, session length, etc. (Lerman & Iwata, 1996)

- **EXT does not strengthen appropriate behavior**
  - True, but EXT a critical component of:
    - NCR (Reed et al., 2004; Vollmer et al., 1997)
    - DRO (Mazaleski et al., 1993)
    - DRA (Hagopian et al., 1998; Kelley et al., 2002; Zarcone et al., 1994)
  - EXT promotes response variability (Lalli et al., 1994)

**Conclusions:**
- EXT can produce rapid, widespread effects
- Alternatives: No EXT? Punishment?
3. EXT produces undesirable effects

- **EXT burst**
  - Lerman & Iwata (1995) examined 113 sets of EXT data
    - EXT alone: Bursting in 36% of data
    - EXT + Sr: Bursting in 12% of data

- **Other potential negative effects**
  - Aggression (Goh & Iwata, 1994)
  - Behavioral contrast (maybe, Magee & Ellis, 2000)
  - Spontaneous recovery (Lerman et al., 1999)
  - Disinhibition (maybe, no published data)

- **Conclusions:**
  - Undesirable effects are minimal
  - Alternatives: No EXT? Punishment?

4. EXT cannot be implemented
   *(Practical constraints prevent the use of EXT)*

- **Maintenance by social Sr+ (e.g., attention)**
  - Dangerous problem behavior requires attention

- **Maintenance by social Sr- (escape from task demands)**
  - Large or combative clients often escape

- **Maintenance by automatic Sr+ (sensory stimulation)**
  - Self-stimulation may be unpreventable
Reinforcement-Based Approaches for Decreasing Behavior

- Eliminate the behavior’s establishing operation (EO)
  - Noncontingent reinforcement (NCR)
- Eliminate the behavior’s maintaining contingency
  - Extinction
- Strengthen a competing response
  - Differential reinforcement (DRO, DRA)

Can we eliminate problem behavior without extinguishing it?

- Strategy #1: Minimize the reinforcing aspects of social consequences

- Strategy #2: Maximize the effects of interventions that make responding less susceptible to ongoing reinforcement
Maintenance by Social Sr+

- PB ➞ Access to attention or tangible items
- EXT: No consequence (NO attention or tangible)
- Difficulty: Severe PB requires response interruption

An evaluation of the types of attention that maintain problem behavior
(Kodak et al., 2007)

- What forms of attention are most reinforcing for PB?
- N=2 (DD), multiple PB
- FA: Maintenance by attention
- Attention Evaluation (consequences for PB)
  - Reprimands
  - Unrelated comments
  - Tickles
  - Eye contact
  - Praise
  - Physical attention
An evaluation of the properties of attention as reinforcement for destructive and appropriate behavior (Piazza et al., 1999)

- What consequences compete with reprimands as consequences for problem behavior?
- N=2 (DD), multiple PB
- FA: Maintenance by attention
- Paul
  - PB ➞ Reprimands
  - Alt R #1 ➞ Tickles
  - Alt R #2 ➞ Praise
Effects of continuous and intermittent reinforcement for problem behavior during functional communication training

(Worsdell et al., 2000)

- What happens if problem behavior is inadvertently reinforced?
- N=5 (DD), SIB or AGG
- FA: Maintenance by Sr+ (n=2), Sr- (n=3)
- BL: PB → Sr (FR1)
- Phase 1: DRA (No EXT)
  - Alt R → Sr+ (FR 1)
  - SIB → Sr+ (FR 1)
- Phase 2: DRA (Inconsistent EXT)
  - Alt R → Sr+ (FR 1)
  - SIB → Sr+ (FR 2, FR 3, FR 5, FR 20)
Worsdell et al. (2000)

Effects of response blocking on attention-maintained problem behavior
(Dempsey et al., in prep)

- Does response blocking:
  - Serve as reinforcement for PB maintained by attention?
  - Interfere with attempts to establish alternative behavior?
- N=3 (DD), SIB or AGG
- FA: Maintenance by attention
- Phase 1: Response Blocking
  - PB → Block (No eye contact, no words)
- Phase 2: Response Blocking + DRA
  - PB → Block (No eye contact, no words)
  - Alt R → Attention (eye contact, praise)
Dempsey et al. (in prep)

Maintenance by Social Sr+

Strategy #1: Minimize the reinforcing aspects of social consequences

- Intermittent Sr for PB: Intervene only when PB is clearly dangerous (Vollmer et al., 1999; Worsdell et al., 2000)
- Analysis of reinforcing aspects of attention (Kodak et al., 2007)
- Reprimand for PB (Piazza et al., 1999)
- Response block w/ minimal attention (Dempsey et al., in prep)
The effects of noncontingent delivery of high- and low-preference stimuli on attention-maintained destructive behavior
(Fisher et al., 2000)

- Would free access to preferred items make PB less sensitive to attention?
- N=1 (DD), multiple PB
- FA: Maintenance by attention
- Preference assessment: HP and LP leisure items
- FR-1: PB → attention
- NCR (HP): Free access to HP leisure
- NCR (LP): Free access to LP leisure

Fisher et al. (2000)
Comparison of single and multiple functional communication training responses for the treatment of problem behavior
(Kahng et al., 2000)

❖ Does multiple-mand training compete more effectively than single-mand training with reinforcement for PB?
❖ N=1 (DD), multiple PB
❖ FA: Maintenance by attention
❖ Preference assessment: 6 HP items
❖ BL: PB → 1 of 6 items (random)
❖ FCT single:
  ◆ PB → 1 of 6 items (random)
  ◆ “I want treats” → 1 of 6 items (random)
❖ FCT multiple:
  ◆ PB → 1 of 6 items (random)
  ◆ “I want X” → 1 of 6 items (specific item)
**Maintenance by Social Sr+**

Strategy #2: Maximize the effects of interventions that make responding less susceptible to ongoing reinforcement

- **Noncontingent reinforcement (NCR):** Free access to alternative reinforcers, but applies only to dense schedules of NCR [NC food v. attention or tangible for PB (Fischer et al., 1997), NC tangible v. attention for PB (Hanley et al., 1997; Fisher et al., 2000), NCR tangible vs. tangible for PB (Lalli et al., 1997)]
- **Teach multiple mands for Sr+** (Kahng et al., 2000)

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**Maintenance by Social Sr-**

- **PB ➤** Escape from or avoidance of task demands or social interaction
- **EXT:** Prevention of escape (continuation of demands or interaction)
- **Difficulty:**
  - Severe SIB terminates ongoing activity
  - Highly aggressive clients often escape
Competing contingencies for escape behavior and compliance  
(Hammond, Study 2, in prep)

- Will low-quality Sr- for PB produce EXT-like effects?  
- N=4 (DD), SIB, AGG, PD  
- FA: Maintenance by escape  
- BL: Compliance → praise, PB→ break  
- Sr- / Sr-: Compliance → break, PB → break  
- Sr- / LQ Sr-: Compliance → break, PB → response block

Hammond et al. (in prep)
Maintenance by Social Sr-
Strategy #1: Minimize the reinforcing aspects of social consequences (escape)

- Escape to no activity: No data
- Response blocking & return to task (Hammond et al., in prep)

Antecedent interventions for problem behavior maintained by escape (Rolider et al., in prep)
- How well do antecedent interventions compete with Sr- for PB?
- Subjects: N=6 (DD), SIB or PD
- FA: Maintenance by escape
- BL: FT low-P demands (30-s schedule)
- Antecedent interventions:
  - Demand fading: 1 low-p demand → BL rate of low-p demands
  - High-p sequence: 3 high-p demands : 1 low-p demand
Rolider et al. (cont’d)

- Antecedent interventions (cont’d)
  - Fading + high-p sequence: 1 high-p sequence → X high-p sequences
  - High-p → Fading: FT high-p demands + 1 low-p demand → BL rate of low-p demands
  - NCR (food): Low-p demands + continuous edibles

- Consequent-based interventions
  - $S^+ \text{ (compliance)} / S^- \text{ (PB)}$: Compliance → HP edible item
  - $S^+ / \text{EXT}$: Compliance → HP edible item, PB → Physical prompt to complete task

Hi-p Sequence Effective

![Graph of percent trials over sessions showing the effectiveness of high-p sequences]
NCR (food) Effective

S^+/S^- Effective
### Summary

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**Does Sr- for compliance compete with Sr- for problem behavior?**

*(see partial evaluation in other studies)*
Competing contingencies for escape behavior and compliance

(Hammond, Study 1, in prep)

- Will longer a longer duration of Sr- for compliance compete with Sr- for PB?
- N=7 (DD), SIB, AGG, PD
- FA: Maintenance by escape
- BL: Compliance → praise, PB → 30-s break
- Sr- / Sr-: Compliance → 30-s break, PB → 30-s break
- Enhanced Sr- / Sr-: Compliance → 120-s break, PB → 30-s or 5-s break
- Sr+ / Sr-: Compliance → Sr+, PB → 30-s break

Hammond et al. (in prep)
Concurrent reinforcement schedules: Behavior change and maintenance without extinction
(Hoch et al., 2002)

- Does high-quality Sr+ for compliance compete with escape for PB?
- N=3 (autism or DD), SIB, AGG, disruption
- FA: Maintenance by escape
- Preference assessment: HP leisure items
- No Sr: PB → break; compliance → ∅
- Sr-/PA: PB → break; compliance → preferred activity
- Sr-/Sr-: PB → break; compliance → break
- Maintenance: Same as Sr-/PA, but task requirement increased (FR 2, 34, 102)
**Maintenance by Social Sr-**

*Strategy #2: Maximize the effects of interventions that make responding less susceptible to ongoing reinforcement*

- **NCR (escape):** Noncontingent breaks from work (No data when used w/o EXT)
- **Other antecedent interventions:** Easier tasks, shorter sessions, Hi-P sequence, demand fading, etc. (generally negative findings)
- **Sr- for compliance (DRA)** (generally negative findings)
- **Hi-quality Sr+ for compliance** (DeLeon et al., 2001; Hoch et al., 2002; Lalli et al., 1999; Piazza et al., 1997)

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**Maintenance by Automatic Sr**

- **PB ➤ Sensory stimulation**
- **EXT:** Attenuation of response-produced stimulation
- **Difficulty:** Some responses difficult to stop (echolalia)
Distinguishing between extinction and punishment effects of response blocking: A replication (Smith et al., 1999)

- What is the effect of intermittent blocking of PB maintained by automatic Sr?
- N=1 (DD), SIB
- FA: Maintenance by automatic Sr
- BL: SIB → no consequences
- Continuous block: SIB attempts → block
- Intermittent block: SIB attempts → proportional block (.5, .67, .8)

Smith et al. (1999)
The use of wrist weights to reduce self-injury maintained by sensory reinforcement
(Van Houten, 1993)

- Will increased response effort produce EXT-like effects?
- N=1 (DD), SIB
- FA: Maintenance by automatic Sr
- No weights: SIB → no consequences
- Weights: Same as BL except that S wore 1.5 lb weights on each wrist

Van Houten (1993)
Effects of increased response effort on self-injury and object manipulation as competing responses (Zhou et al., 2000)

- Would devices that make SIB more effortful have detrimental effects on leisure-item interaction?
- N=4 (DD), SIB (all hand mouthing)
- FA: Maintenance by automatic Sr
- BL: SIB → no consequences
- Arm sleeves: Same as BL except that S wore flexible sleeves (3 lb required to bend 90°)

Zhou et al. (2000)
**Maintenance by Automatic Sr**

*Strategy #1: Minimize the reinforcing aspects of social consequences*

- Not generally a problem; social consequences irrelevant
- Response blocking (Lerman & Iwata, 1996; Reid et al., 1993; Smith et al., 1999; Tarbox et al., 2007; and lots more)
- BUT, PB may acquire social function if blocking paired with attention or escape (no published data)
- Response effort: Increased effort for PB produces EXT-like effects (Van Houten, 1993; Zhou et al., 2000)

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**A comparison of noncontingent reinforcement and sensory extinction as treatments for self-injurious behavior** (Roscoe et al., 1998)

- Does noncontingent access to preferred items compete with SIB maintained by automatic reinforcement?
- N=3 (DD), SIB
- FA: Maintenance by automatic Sr
- BL: SIB → no consequences
- NCR: Same as BL except that S had continuous access to highly preferred item
- Sensory EXT: Same as BL except that S wore device to attenuate stimulation (foam sleeves, gloves)
Roscoe et al. (1998)

Does noncontingent access to preferred items compete with SIB maintained by automatic reinforcement?

N=2 (DD), SIB

FA: Maintenance by automatic Sr

BL: SIB → no consequences

Prompts: Same as BL except that S prompted to contact preferred leisure item every 30 s

Prompts + Sr+: Same as previous except that S received edible for increased duration of item contact

Block: Same as previous except that SIB blocked (but counted)
Maintenance by Automatic Sr

Strategy #2: Maximize the effects of interventions that make responding less susceptible to ongoing reinforcement

- NCR: Free access to alt preferred items (Piazza et al., 2000; Roscoe et al., 1998; Shore et al., 1997; Vollmer et al., 1994)
- Establish a response that produces direct access to sensory Sr (Lindberg et al., 2003; Singh & Millichamp, 1987)
So . . . Can we eliminate problem behavior without extinguishing it?

- **Strategy #1: Minimize the reinforcing aspects of response interruption**
  - Maintenance by social Sr+ and social Sr-: Unsure
  - Maintenance by automatic Sr+: Yes

- **Strategy #2: Maximize the effects of interventions that make responding less susceptible to reinforcement**
  - NCR: Maybe, with dense NCR schedules
  - DRA: Maybe, if parameters favor Alt R over PB

Suggestions for Clinicians

- **Continue to emphasize the importance of EXT**
  - EXT can be implemented with most problem behaviors
  - Minimal social consequences might be reinforcing
  - Interruption could introduce new contingencies
  - *Response remains functional unless extinguished*

- **When EXT cannot be implemented**
  - #1: Minimal reactive strategy
  - # 2: Deliver NCR (attention, escape, preferred items) on a dense schedule
  - #3: Thin NCR and transition to DRA whose parameters favor Alt R
Suggestions for Researchers

- Identify qualitative and quantitative limits of reinforcement for problem behavior
- Evaluate NCR schedule thinning w/o EXT
- Identify factors that compete with ongoing reinforcement
  - Qualitative characteristics of consequences
  - Parametric values (schedule, magnitude, delay, effort)
  - Competing contingencies (Sr+ v. Sr-, social v. automatic Sr)
  - Combined interventions
- Evaluate intervention effects in the absence of EXT

Overall Goals

- Response-interruption strategies that are environmentally neutral
- Technology of indirect response suppression


