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

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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?

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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?

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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

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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)

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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
  - Tickle
e- 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 ➔ Tickle
  - 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)

Fisher et al. (2000)

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
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)

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

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

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
  - 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
  - $S^+$ (compliance)/ $S^-$ (PB): Compliance → HP edible item
  - $S^+$/ EXT: Compliance → HP edible item, PB → Physical prompt to complete task

NCR (food) Effective

Hi-p Sequence Effective

$S^+$/ $S^-$ Effective
Does Sr- for compliance compete with Sr- for problem behavior? (see partial evaluation in other studies)

**Summary**

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**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

**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 → Ø
- 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)

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Hammond et al. (in prep)

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

**Maintenance by Automatic Sr**

- PB ➔ Sensory stimulation
- EXT: Attenuation of response-produced stimulation
- Difficulty: Some responses difficult to stop (echolalia)

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**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)

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**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
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 & Ivate, 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)

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)

On the relation between object manipulation and stereotypic self-injurious behavior (Lindberg et al., 1999)

- 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)
Lindberg et al. (199)

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

Suggestions for Researchers

- Identify qualitative and quantitative limits of reinforcement for problem behavior
- Evaluate NCR schedule thinning w/o EXT
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Overall Goals

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


