Chapter 4 (Cont.)
Indirect Conditioning
Applications of Conditioning
Extinction

- Extinction – a method for eliminating a conditioned response.

- Extinction paradigm:
  - Present the CS alone (without the UCS).

- With repeated exposure to the CS, it stops being a predictor of the UCS and the CR decreases and eventually stops.
What Influences Extinction?

- The total duration of exposure to the CS alone, not the number of trials, determines how fast the CR is extinguished.
- Shipley measured effects of tone-shock pairing on water licking.
  - Suppression ratio for licking behavior
  - 100 sec or 25 sec exposures to CS alone.
Total Duration Matters Most

**Figure 4.10** The suppression of the licking-for-water response to the conditioned stimulus decreases (or the suppression ratio increases) with greater duration of CS exposure during extinction.
Resistance to Extinction

FIGURE 4.9 The extinction of the CR as a function of the percentage of trials in which the UCS followed the CS during acquisition. Subjects in Groups 1 and 3 received CS-UCS pairings on 100% of the acquisition trials; those in Group 2 on 50% of the acquisition trials. Resistance to extinction was greater with only partial pairings of CS and UCS during acquisition.

UCS followed CS on 50% of the learning trials
Spontaneous Recovery

- Pavlov – extinction is caused by inhibition of the CR.
- Spontaneous recovery occurs when inhibition is temporarily removed.
- Continued experience of the CS without the UCS results in long-term suppression of the CR.
Conditioned Inhibition

- CS+ the original CS
- CS- a new CS similar to CS+
- Presentation of CS- without the UCS inhibits the CR.
- The idea is that CS- becomes associated with the absence of the UCS – it becomes an “all clear” cue.
  - CS+ is associated with presence of the UCS.
Other Kinds of Inhibition

- **External inhibition** – presence of a novel cue during conditioning inhibits the CR.
- **Latent inhibition** (learned irrelevance) – not really inhibition.
  - Preexposure to the CS (without the UCS) inhibits later conditioning (+ or -)
- **Inhibition of Delay** – the CR is withheld until an appropriate time.
Inhibition of Delay

The more experience (acquisition trials), the closer the CR occurs to the onset of the UCS
Disinhibition

- **Disinhibition** – removal of inhibition.
  - The CR increases in strength.
- Presentation of a novel stimulus during extinction interrupts it.
- Example: Kimmel – disinhibition of inhibition of delay occurred with a novel stimulus.
  - CR was withheld 4.0 secs but 2.3 secs with a novel stimulus.
Higher-Order Conditioning

- A new stimulus (CS₂) acquires the ability to produce a CR because it is paired with another CS (CS₁).
- The CR to CS₂ is weaker than to CS₁ – 50% as strong.
- Higher-order conditioning is difficult to accomplish because conditioned inhibition also arises.
  - More pairings result in inhibition.
Higher Order Conditioning

FIGURE 4.12 The higher-order conditioning process. In Phase 1, the CS₁ (light) is paired with the UCS; in Phase 2, the CS₁ (light) and the CS₂ (buzzer) are presented together. The ability of the CS₂ to elicit the CR is evaluated in Phase 3.
Sensory Preconditioning

- When two stimuli are associated with each other, if one becomes a CS, the other will become a CS too.
  - Dog and neighbor example.

- To get the strongest CR:
  - Timing is important – first CS must precede second CS.
  - Do only a few CS-CS pairings to prevent learned irrelevance.
Sensory Preconditioning

**Figure 4.14**

The sensory preconditioning process. In Phase 1, the CS$_1$ (light) and CS$_2$ (buzzer) are paired; in Phase 2, the CS$_1$ (light) is presented with the UCS. The ability of the CS$_2$ (buzzer) to elicit the CR is evaluated in Phase 3.

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>CS$_2$ (Buzzer)</th>
<th>CS$_1$ (Light)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2</td>
<td>CS$_1$ (Light)</td>
<td>UCS (Shock)</td>
</tr>
<tr>
<td>Phase 3</td>
<td>CS$_2$ (Buzzer)</td>
<td></td>
</tr>
</tbody>
</table>

Two CS's paired

Test
Vicarious Conditioning

- Berger – people hearing a tone and watching another person be shocked acquired a fear response.
- Watching another person fail at a task can induce a stress response.
- Monkeys can acquire vicarious fear responses to objects or snakes.
- Arousal is needed for conditioning.
Applications of Conditioning

- Treatment of phobias
  - Systematic desensitization

- Treatment of addictions
  - Elimination of conditioned withdrawal reactions
How a Phobia Works

- A phobia is an unrealistic fear.
- A learning experience causes fear to become associated with a neutral stimulus.
- Avoidance prevents extinction.
- The stimulus is generalized.
- Eventually, too many experiences must be avoided and a person’s functioning is impaired.
Systematic Desensitization

- Wolpe applied ideas from classical conditioning to treatment of phobia.
  - **Reciprocal inhibition** – an organism can only feel one emotion at a time.
  - Mary Cover Jones – used counterconditioning to extinguish fear.
  - Cats could be counterconditioned using food.
Clinical Procedure

- Construct an anxiety hierarchy.
- Teach a relaxation response.
  - Cue-controlled relaxation.
- Counterconditioning – pairing of relaxation with imagined feared stimuli, starting with least scary.
- Assessment of whether the treatment worked – interacting with the feared stimulus.
# Sample Thematic Hierarchy

<table>
<thead>
<tr>
<th>Level</th>
<th>Scene</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In your office with an agent, R.C., discussing a prospective interview. The client in question is stalling on his payment, and you must tell R.C. what to do.</td>
</tr>
<tr>
<td>2</td>
<td>Monday morning working in your office. In a few minutes you will attend the regularly scheduled sales meeting. You are prepared for the meeting.</td>
</tr>
<tr>
<td>3</td>
<td>Conducting an exploratory interview with a prospective client.</td>
</tr>
<tr>
<td>4</td>
<td>Sitting at home. The telephone rings.</td>
</tr>
<tr>
<td>5</td>
<td>Anticipating returning a call from the district director.</td>
</tr>
<tr>
<td>6</td>
<td>Anticipating returning a call from a stranger.</td>
</tr>
<tr>
<td>7</td>
<td>Entering the Monday sales meeting unprepared.</td>
</tr>
<tr>
<td>8</td>
<td>Anticipating a visit from the regional director.</td>
</tr>
<tr>
<td>9</td>
<td>Listening as a fellow agent requests a joint visit with a client.</td>
</tr>
<tr>
<td>10</td>
<td>Conducting a joint visit with a fellow agent.</td>
</tr>
<tr>
<td>11</td>
<td>Attempting to close a sale.</td>
</tr>
<tr>
<td>12</td>
<td>Thinking about attending an agents and managers’ meeting.</td>
</tr>
<tr>
<td>13</td>
<td>Thinking of contacting a client who should have been contacted earlier.</td>
</tr>
<tr>
<td>14</td>
<td>Thinking about calling a prospective client.</td>
</tr>
<tr>
<td>15</td>
<td>Thinking about the regional director’s request for names of prospective agents.</td>
</tr>
<tr>
<td>16</td>
<td>Alone, driving to prospective client’s home.</td>
</tr>
<tr>
<td>17</td>
<td>Calling a prospective client.</td>
</tr>
</tbody>
</table>

*Note: In the fear hierarchy, a higher level represents greater fear.*
Effectiveness of Desensitization

- Wolpe reported 90% success rate, compared to 60% for psychoanalysis.
  - 12-29 sessions
  - Relapse after 1-3 yrs easily treated.
- Works with a wide range of fears.
- Can also be used with anxiety disorders.
## Sample Spatial-Temporal Hierarchy

<table>
<thead>
<tr>
<th>Level</th>
<th>Scene</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Four days before an examination.</td>
</tr>
<tr>
<td>2</td>
<td>Three days before an examination.</td>
</tr>
<tr>
<td>3</td>
<td>Two days before an examination.</td>
</tr>
<tr>
<td>4</td>
<td>One day before an examination.</td>
</tr>
<tr>
<td>5</td>
<td>The night before an examination.</td>
</tr>
<tr>
<td>6</td>
<td>The examination paper lies face down before the student.</td>
</tr>
<tr>
<td>7</td>
<td>Awaiting the distribution of examination papers.</td>
</tr>
<tr>
<td>8</td>
<td>Standing before the unopened doors of the examination room.</td>
</tr>
<tr>
<td>9</td>
<td>In the process of answering an examination paper.</td>
</tr>
<tr>
<td>10</td>
<td>On the way to the university on the day of the examination.</td>
</tr>
</tbody>
</table>

*Note: In the fear hierarchy, a higher level represents greater fear.*
Limitations on Desensitization

- The client must be able to vividly imagine the feared stimulus.
  - 10% cannot do this.
- Confrontation of a real rather than an imagined object is more effective.
  - Difficult for the client to endure the anxiety associated with this.
Virtual Reality Desensitization

- Graded height-related stimuli presented via virtual reality were effective in treating acrophobia.
  - Subjects were able to endure real stimuli after virtual treatment.

- Successful in treating spider phobia.
Treatment of Withdrawal

- Conditioned withdrawal reaction – environmental cues become associated with withdrawal stage.
  - Exposure to cues triggers symptoms.
  - Withdrawal motivates substance use.
- Extinction by exposure to environmental cues is needed, especially to avoid spontaneous recovery.
- Non-drug cues can be used to avoid relapse.