Chapter 4

Theories and Models of Exercise Behavior II
Models

• Stimulus-response Theory

• Transtheoretical Model

• Social Ecological Model
In-class discussion

• How has positive and negative experiences in exercising influences your intention to exercise in the future?
Stimulus–Response Theory

• Suggests that future exercise behavior depends primarily on whether the exerciser has experienced positive or negative outcomes following previous exercise bouts
More on Stimulus–Response Theory

• Identifies four types of events that can follow a behavior and the effects these events will have on future behavior:
  – Positive reinforcement
  – Negative reinforcement
  – Punishment
  – Extinction
How People Learn New Behaviors

• Classical conditioning
  – A reflexive behavior can be elicited through repeated pairings of behavior with an antecedent cue

• Instrumental conditioning
  – A voluntary behavior can be learned by pairing the behavior with consequent reinforcement
Positive Reinforcement

• An enjoyable or pleasant outcome that makes a person feel good and that strengthens a particular behavior

• Reinforcers and rewards
  – Intrinsic reinforcers: Rewards that come from within oneself (sense of accomplishment)
  – Extrinsic reinforcers: Rewards that come from other people (praise, compliments)
Negative Reinforcement

• Generally unpleasant or aversive stimuli that, when withdrawn after a behavior, will increase the frequency of that behavior in the future
  – For example, exercise may help to reduce pain, so experiencing a reduction in pain increases the likelihood that one will continue to exercise.
Punishment

• Usually involves an unpleasant or uncomfortable stimulus encountered after a behavior, decreasing the probability of that behavior happening in the future.
  – For example, uncomfortable consequences—such as experiencing pain or feeling sweaty—might deter the exerciser from being physically active.

• Physical activity should never be used as a punishment; otherwise, individuals will come to see it as highly aversive.
Extinction

• Withholding a positive stimulus after a behavior in order to decrease the likelihood of that behavior happening again in the future.
  – For example, people will decrease their exercise behavior if they stop attaining the positive benefits they associate with it (such as losing weight or feeling better physically).

• Fitness professionals can prevent extinction by helping people realize what they value about exercise and by pointing out additional benefits.
## Predictions of Stimulus–Response Theory

<table>
<thead>
<tr>
<th>EVENTS THAT CAN FOLLOW A BEHAVIOR</th>
<th>DESCRIPTION OF EVENTS</th>
<th>PREDICTED EFFECTS ON FUTURE EXERCISE BEHAVIOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Positive reinforcement</td>
<td>Adding something positive (e.g., money, praise)</td>
<td>Increases exercise</td>
</tr>
<tr>
<td>2. Negative reinforcement</td>
<td>Taking away something negative (e.g., pain, depression)</td>
<td>Increases exercise</td>
</tr>
<tr>
<td>3. Punishment</td>
<td>Adding something negative (e.g., injury, embarrassment)</td>
<td>Decreases exercise</td>
</tr>
<tr>
<td>4. Extinction</td>
<td>Taking away something positive (e.g., opportunities to socialize)</td>
<td>Decreases exercise</td>
</tr>
</tbody>
</table>
Limitations of Stimulus–Response Theory

- Does not consider the role of cognition or beliefs about an outcome
  - Expectations
  - Perceived control
  - Perceived value
- Is limited in its ability to predict and explain exercise behavior
- Fails to provide information that can be used to develop interventions to change exercisers’ perceptions of a particular outcome
Transtheoretical Model (TTM)

Changing unhealthy behaviors is challenging

Change is lengthy process, involves progressing through several stages

Integrative model of behavior change born out of the combination of over 300 theories of psychotherapy

TTM comprised of 5 constructs
TTM

Five constructs of the TTM include:

1. Stages of Change
2. Processes of Change in TTM
3. Decision Balance
4. Self-efficacy
5. Temptation
Transtheoretical’s Stages of Change

- Health behavior unfolds slowly over time through a series of stages.
- There are six stages of health behavior changes
  - Precontemplation
  - Contemplation
  - Preparation
  - Action
  - Maintenance
  - Termination
Questionnaire for Determining a Person’s Current Exercise Stage

“Regular exercise” is any planned physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed three to five times per week for 20 to 60 minutes per session.

Do you exercise regularly according to that definition?

☐ 1. Yes, I have been exercising regularly for MORE than six months.

☐ 2. Yes, I have been exercising regularly for LESS than six months.

☐ 3. No, but I intend to start exercising regularly in the next 30 days.

☐ 4. No, but I intend to start exercising regularly in the next six months.

☐ 5. No, and I do NOT intend to start exercising regularly in the next six months.

RESULTS

If you checked the last box, you are in the precontemplation stage.
If you checked the fourth box, you are in the contemplation stage.
If you checked the third box, you are in the preparation stage.
If you checked the second box, you are in the action stage.
If you checked the first box, congratulations! You are in the maintenance stage.

Adapted from the Exercise: Stages of Change—Short Form.
Behavior change involves moving through six stages:
Individual does not intend to take action in the foreseeable future (i.e., next 6 mo.).

Precontemplation
“I won’t/I can’t”

Individual thinking about changing behavior within the next 6 mo. Open to new information.

Contemplation
“I might”

Individual intends to take action in the immediate future. Normally associated with a plan of action.

Preparation
“I will”

Individual has made specific overt change in life style within the past six mo. Requires the greatest commitment of time & energy.

Action
“I am”

Maintenance
“I have”

Individual has maintained healthy life style change for over 6 mo. and is trying to prevent relapse.

Termination

Individual has zero temptation to return to unhealthy behavior & 100% self-efficacy for maintaining healthy lifestyle.
How People Move Through the Stages

• Movement involves changing the following:
  – How people think about exercise
  – How people think about themselves
  – Aspects of the environment that influence exercise behavior

• Changes occur through a combination of 10 basic experiential and behavioral processes
Experiential and Behavioral Processes

• Experiential processes:
  – Directed toward increasing people’s awareness of, and changing their thoughts and feelings about, themselves and their exercise behavior.

• Behavioral processes:
  – Directed toward changing aspects of the environment that can affect exercise participation.
### Definitions and Examples of Experiential Processes

<table>
<thead>
<tr>
<th>PROCESS</th>
<th>DEFINITION</th>
<th>INTERVENTION EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiential Processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consciousness raising</td>
<td>Seeking new information and a better understanding of exercise</td>
<td>Read pamphlets, talk to a health care professional about the benefits of exercise</td>
</tr>
<tr>
<td>Self-reevaluation</td>
<td>Assessing how one thinks and feels about oneself as an inactive person</td>
<td>Consider whether being inactive is truly in line with the person’s values</td>
</tr>
<tr>
<td>Environmental reevaluation</td>
<td>Considering how inactivity affects the physical and social environment</td>
<td>Find out the costs of inactivity to the health care system</td>
</tr>
<tr>
<td>Dramatic relief</td>
<td>Experiencing and expressing feelings about becoming more active or remaining inactive</td>
<td>Imagine the feelings of regret and loss for not having prevented the loss of health through exercise</td>
</tr>
<tr>
<td>Social liberation</td>
<td>Increasing awareness of the social and environmental factors that support physical activity</td>
<td>Seek out information about exercise groups and resources in the community, workplace, etc.</td>
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</tbody>
</table>
### Definitions and Examples of Behavioral Processes

<table>
<thead>
<tr>
<th>Behavioral Processes</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-liberation</td>
<td>Activities that strengthen one’s commitment to change and the belief that one can change</td>
<td>Announce one’s commitment to exercise to family and friends; stay positive and remind oneself “I can do it!”</td>
</tr>
<tr>
<td>Counterconditioning</td>
<td>Substituting physical activities for sedentary activities</td>
<td>Go for a walk after dinner rather than watch television</td>
</tr>
<tr>
<td>Stimulus control</td>
<td>Controlling situations and cues that trigger inactivity and skipped workouts</td>
<td>Plan ahead for a busy period at work/school and schedule exercise on a calendar</td>
</tr>
<tr>
<td>Reinforcement management</td>
<td>Rewarding oneself for being active</td>
<td>Establish goals and reward oneself for achieving them</td>
</tr>
<tr>
<td>Helping relationships</td>
<td>Using support from others during attempts to change</td>
<td>Buddy up with a friend who is also trying to start an exercise regimen</td>
</tr>
</tbody>
</table>
Decision Balance

An individual will list more pros than cons of exercising.

- Increase in self-efficacy to overcome temptations:
  - An individual is confident that he or she can deal with high-risk situations that might tempt him or her to lapse into old sedentary ways.
Self-efficacy

- Increase in self-efficacy to overcome temptations:
  - An individual is confident that he or she can deal with high-risk situations that might tempt him or her to lapse into old sedentary ways.
Nigg & Courneya (1998) studied 819 high school students & their stage of change of change.
Table 1. Percentage Response of Transtheoretical Stages by Class Level

<table>
<thead>
<tr>
<th>Stage</th>
<th>Freshmen</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>2.0%</td>
<td>0.8%</td>
<td>1.7%</td>
<td>1.2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Contemplation</td>
<td>6.8%</td>
<td>7.6%</td>
<td>7.0%</td>
<td>7.4%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Preparation</td>
<td>39.6%</td>
<td>43.2%</td>
<td>33.3%</td>
<td>30.6%</td>
<td>36.3%</td>
</tr>
<tr>
<td>Maintenance</td>
<td>14.5%</td>
<td>16.1%</td>
<td>19.2%</td>
<td>12.8%</td>
<td>15.3%</td>
</tr>
<tr>
<td>Action</td>
<td>36.6%</td>
<td>32.2%</td>
<td>38.5%</td>
<td>47.2%</td>
<td>39.3%</td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------</td>
<td>----------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>Exercising takes too much of my time.</td>
<td>3.8%</td>
<td>25.4%</td>
<td>52.6%</td>
<td>18.4%</td>
<td></td>
</tr>
<tr>
<td>Exercise tires me.</td>
<td>3.2%</td>
<td>35.1%</td>
<td>48.0%</td>
<td>13.4%</td>
<td></td>
</tr>
<tr>
<td>Places for me to exercise are too far away.</td>
<td>3.8%</td>
<td>15.0%</td>
<td>48.2%</td>
<td>32.8%</td>
<td></td>
</tr>
<tr>
<td>I am too embarrassed to exercise.</td>
<td>3.4%</td>
<td>13.4%</td>
<td>38.7%</td>
<td>44.2%</td>
<td></td>
</tr>
<tr>
<td>It cost too much money to exercise.</td>
<td>2.8%</td>
<td>11.0%</td>
<td>40.6%</td>
<td>45.4%</td>
<td></td>
</tr>
<tr>
<td>Exercise facilities do not have convenient schedules for me.</td>
<td>5.5%</td>
<td>17.6%</td>
<td>50.5%</td>
<td>26.2%</td>
<td></td>
</tr>
<tr>
<td>I am fatigued by exercise.</td>
<td>2.0%</td>
<td>26.6%</td>
<td>54.9%</td>
<td>16.3%</td>
<td></td>
</tr>
<tr>
<td>My spouse (or significant other) does not encourage exercising.</td>
<td>1.1%</td>
<td>6.6%</td>
<td>43.3%</td>
<td>48.8%</td>
<td></td>
</tr>
<tr>
<td>Exercise takes too much time from family/friend relationships.</td>
<td>0.7%</td>
<td>10.6%</td>
<td>60.0%</td>
<td>28.5%</td>
<td></td>
</tr>
<tr>
<td>I think people in exercise clothes look funny.</td>
<td>1.1%</td>
<td>5.8%</td>
<td>46.0%</td>
<td>46.9%</td>
<td></td>
</tr>
<tr>
<td>My family members do not encourage me to exercise.</td>
<td>1.5%</td>
<td>11.9%</td>
<td>43.3%</td>
<td>43.1%</td>
<td></td>
</tr>
<tr>
<td>Exercise takes too much time from family/friend responsibilities.</td>
<td>0.7%</td>
<td>11.2%</td>
<td>57.9%</td>
<td>30.0%</td>
<td></td>
</tr>
<tr>
<td>Exercise is hard work for me.</td>
<td>3.2%</td>
<td>30.9%</td>
<td>50.0%</td>
<td>15.7%</td>
<td></td>
</tr>
<tr>
<td>There are too few places for me to exercise.</td>
<td>4.3%</td>
<td>16.3%</td>
<td>52.6%</td>
<td>26.6%</td>
<td></td>
</tr>
</tbody>
</table>
Application of TT Model

1. Provides researchers with opportunity to match interventions to the different needs of individuals (matching hypothesis).

2. Provides researchers with opportunity to identify the at-risk population.

3. Can be used for recruitment and retention of individuals to adopt a healthy lifestyle
Marcus et al. (1998) used TTM to increase physical activity of 1,559 employees

- Employee where classified based on the TTM survey.

- Then randomly assigned to a stage-matched or standard self-help group

- After 3 months those in stage-matched group had more positive changes

- More individuals in self-help group failed to progress to another stage or even showed regression to an earlier stage.
Limitations of the Transtheoretical Model

• Cannot reliably predict which stage a person will move to and when
• Does not allow for the fact that many people do not exhibit a steady progression through the stages; they may skip forward or regress back
Social Ecological Models

• Individuals bear responsibility for engaging in healthful behaviors.
• Other levels of influence on healthful behaviors also exist:
  – Physical environment
  – Community
  – Society
  – Government
Social Ecological Model

- Bronfenbrenner contended that our behavior is influenced by forming relations with each other and with the physical environment.
- We form systems by how we react to one another and physical environment which is called a ecosystem.
Ecosystem

Each person is significantly affected by interactions among overlapping ecosystems:
**Microsystem:**

- Immediate systems in which people interact.
- Environments where people might be physically active or where they might receive support for being physically active such as workplace, parts, or home.
Mesosystem

- Interaction take place in the mesosystem.
- Interactions occur between fitness specialists and members within a club.
Exosystem

– All external systems that influence the microsystem

– e.g. UMD administration influence on access to the center influences the physical activity that takes place on campus.
**Macrosystem**

Larger sociocultural context in which a person resides; encompasses all other systems. It includes the cultural values, economic system, and social conditions. Example would be the neighborhood in which one is physically active.
Social-Ecological Model

A Social Ecological Model for Physical Activity

• Community agencies and groups can influence policies that will provide supportive physical activity environments

• More supportive environments will lead to greater physical activity among community members

• For example:
  – Improve availability of and access to facilities and programs
  – Support active transportation (walking, biking)
Limitations of the Social Ecological Models

- Environmental and policy changes can take a long time and a lot of money to implement.
- Simply building fitness facilities does not mean that people will automatically become more physically active.
- Educational and incentive programs to motivate people can be expensive and time consuming.
Your Viewpoint

• Imagine that you have been hired to increase physical activity among freshman students at UMD, and you have been given all the money and resources you need. Using a social ecological approach and model, develop a plan to promote physical activity among the freshman at UMD who live in the dorm.