Chapter 12
Depression and Exercise
Myth or Fact: Does PA lower one’s feeling of being depressed?
Depression—A Mood Disorder

- Disorders that influence mood regulation beyond the usual variations between sadness and happiness/excitement
Depression Defined

- Disorders that influence mood regulation beyond the usual variations between sadness and happiness/excitement
- Persistent low mood and inability to find enjoyment in activities
- Lack of motivation to begin or continue activities
- Feelings of worthlessness
## Symptoms That May Accompany Depression

- Feelings of sadness/elation
- Feelings of guilt/worthlessness
- Disturbances of appetite
- Disturbances in sleep patterns
- Lack of energy
- Difficulty concentrating
- Loss of interest in all/most activities
- Problems with memory
- Thoughts of suicide
- Hallucinations
Causes of Depression

- Not well understood

- Likely an interaction of physiological and psychosocial factors
  - e.g., neurotransmitter function interacts with Individual variation in stress responses
Main Depressive Disorders

- Major depressive disorder
  - ≥ 5 symptoms including depressed mood, loss of interest/pleasure

- Bipolar disorder
  - Episodes of mania and depression

- Dysthymia
  - <5 symptoms, chronic

- Cyclothymia
  - Precursor to bipolar disorder
Prevalence

- Disability adjusted life years (DALYs)
  - Estimate of the years of healthy life lost to premature death and years lived with a disability
  - Using DALYs, mental illnesses rank second only to cardiovascular problems in disease burden in industrialized nations

- It has been estimated (e.g., CDC, 1998) that 20–25 percent of U.S. adults suffer from some form of mental health problem.
Mood disorders (e.g., major depression, bipolar disorders) rank within the top 10 causes of disability worldwide.

National Comorbidity Survey (Kessler et al., 1994) estimated that in a given year 23.4 percent of U.S. adult population will have a diagnosable mental disorder.

Follow-up study in 2005 mirrored these results.
Costs

- **Overall costs of Mental Illness:**
  - $63 billion per year in 2008

- **Breakdown of costs:**
  - 31 percent spent on direct treatment and rehabilitation, 7 percent on mortality, and 62 percent for absenteeism and reduced work productivity

- **Other costs:**
  - Increased risk for other diseases
  - Decreased quality of life for individual and families
Clinical and Non clinical Depression
Depression

Non-clinical Depression

➤ Listlessness, feelings of gloom

Clinical Depression

➤ Loss of interest, lowered mood, at least 2 weeks
➤ At least 5 of the following:
➤ Loss of appetite, weight gain or loss, sleep disturbance, decreased energy, psychomotor retardation, sense of worthlessness, guilt, concentration problems, thoughts of suicide
Measurement

- Standard classification criteria
  - *Diagnostic and Statistical Manual of Mental Disorders* (4th edition, revised; DSM-IV-TR)
  - Research Diagnostic Criteria (RDC)
  - International Classification of Diseases (ICD-10)

- Self-report measures
  - Questionnaires (e.g., Center for Epidemiologic Studies—Depression Scale; CES-D)
Measurement

- Standard classification criteria
  - *Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; American Psychological Association, 1994, 2000)*

- Self-reporting measures
  - Beck Depression Inventory
  - Zung Self-Rating Depression Scale

- Questionnaires
  - Profile of mood states subscale of depression
  - Center for Epidemiologic Studies – Depression scale (CES-D)
    - Score of 16 or more indicates that the individual experienced some level of depression over the past week.
Center for Epidemiologic Studies—Depression Scale (CES-D) Sample Items

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

<table>
<thead>
<tr>
<th>Sample Items</th>
<th>Rarely or none of the time (less than 1 day)</th>
<th>Some or a little the time (1–2 days)</th>
<th>Occasionally or a moderate amount of time (3–4 days)</th>
<th>Most or all of the time (5–7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I was bothered by things that usually don’t bother me.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>2. I did not feel like eating; my appetite was poor.</td>
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<td>☐</td>
<td>☐</td>
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<td>3. I felt that I could not shake off the blues even with help from my family or friends.</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>4. I felt that I was just as good as other people.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>5. I had trouble keeping my mind on what I was doing.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>6. I felt depressed.</td>
<td>☐</td>
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<tr>
<td>7. I felt that everything I did was an effort.</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>8. I felt hopeful about the future.</td>
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<tr>
<td>9. I thought my life had been a failure.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>10. I felt fearful.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

SCORING: Zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth column. The scoring of positive items is reversed. Possible range of scores is zero to 60, with the higher scores indicating the presence of more symptomatology.

Source: National Institute of Mental Health.
Treatment of Depression
Many individuals are reluctant to seek treatment because of stigma associated with mental illness.

When depression is treated:
- Pharmacotherapy; psychotherapy
- Noncompliance is frequent
- Can be expensive and have unwanted side-effects

Physical activity could help both prevent and treat depression.
Exercise versus Medication

Status of patients diagnosed as remitted following four months of either exercise, medication, or an exercise-and-medication-combined treatment when reassessed six months following the end of treatment.

Evidence for Preventive Effects

Source: Adapted from Goodwin (2003).

Prevalence of major depressive disorder (%)

FREQUENCY OF PHYSICAL ACTIVITY
- Regularly
- Occasionally
- Rarely
- Never
Research on Preventive Effects of Exercise

- Research shows a connection between growing lack of physical activity and increasing prevalence of mental health problems.

- A consistent finding indicates that the least active individuals have the greatest incidence of mental health problems.

- Regular physical activity can be useful in preventing mental health disorders or in reducing their risk of occurrence.
Preventive Effects

- Cross-sectional study by Stephens (1988) reported that physically inactive were more than 3 times more likely to have depressive symptoms than those who regularly exercise.

- A 2 year study of Adolescents found that physically active adolescents had lower levels of depression (Motl, et al, 2004).
Research on Treatment of Nonclinical Depression

- Findings of North, McCullagh, and Tran (1990):
  - Exercise resulted in decreased depression.
  - Some factors moderated exercise treatment effects while others did not.
  - Exercise was as effective as, and sometimes more effective than, traditional therapies.
Nonclinical Depression & Exercise
Treatment Effect on Non-clinical Depression

- Exercise resulted in decreased depression, yielding a moderate sizable effect size.
- There is no difference in the mode of exercise in reduction of non-clinical depression.
- Longer the physical activity program goes the greater the benefit
- The effects of exercise intensity and duration on reducing depression is unknown.
- Benefits of exercise on reducing depression occurs across age and gender.
Evidence for Treatment Effects
Non-Clinical Depression

- North, McCullagh, and Tran first quantitative review (1990 meta-analysis)

- Found that:
  - Exercise resulted in decreased depression
  - Exercise was as effective as, and sometimes more effective than, traditional therapies
  - Certain factors moderated exercise treatment effects while others did not.
Clinical Depression & Exercise
Research on Treatment of Clinical Depression

- Martinsen, Medhus, and Sandvik (1985): In a study of hospitalized psychiatric patients, patients rated exercise as the most important part of comprehensive treatment plan.

- Martinsen, Hoffart, and Solberg (1989): Showed that both aerobic and nonaerobic exercise resulted in significant psychological improvements.

More on the Treatment of Clinical Depression

- Blumenthal and colleagues (1999): Showed that an exercise treatment was as effective as a pharmacotherapy treatment and a combination drug/exercise treatment; follow-up studies showed the exercise group was more likely to be fully or partially recovered.

- Tkachuk and Martin (1999): Found that exercise might reduce the level of medication needed, length of time it is needed, and perhaps even the need for medication at all.
Treatment Effect of Exercise on Clinical Depression

- The overall effect size of PA on clinical depression was highly moderate (.72).

- Exercise program 9-12 weeks showed double the depression reduction of programs that only lasting 8 weeks or less.

- Light intensity exercise had a moderate effect size where as moderate intensity exercise has a high effect size on reducing clinical depression.

- Exercise above “a comfortable pace” yields greater depression-reducing effects.

- Hospitalized depressed patients involved in a 9 week exercise program had significant reductions in depressive symptoms.

- Aerobic and non-aerobic exercise resulted in similar significant improvements in clinically depressed patients.

- Similar depression reduction across age and gender

- Best for moderate to severe clinically depressed patients (ES = .88) as compared to mild to moderate depressed (ES = .34) patients.
Evidence for Treatment Effects
Consensus Statements on Clinical Depression

1. Physical activity has protective benefits against symptoms of depression
2. The protective effects of exercise seem to increase with greater levels of physical activity
3. Exercise can be associated with a decreased level of mild-to-moderate depression
4. Exercise may be an adjunct to the professional treatment of severe depression
5. Optimal types and/or amounts of physical activity are not known
Mechanisms for Change
Mechanism for Change

1. Expectancy hypothesis
   Individuals expect to feel better so they report feeling better (Giant placebo effect?)
   Doesn’t seem likely given physiology evidence
   PA benefits are beyond just expectancy

2. Monoamine hypothesis
   Exercise is a stimulus that increases level of neurotransmitters (i.e., dopamine, norepinephrine, serotonin)
   Neurotransmitters facilitate neural impulses across synapses.
3. Endorphin Hypothesis

Endorphin act to reduce pain and contribute to feelings of euphoria.

Exercise increases endorphin levels:
- Associated with runners high
- Beta-endorphins increases well after PA has been discontinued
- Only proven in animals not humans
Summary

Depression and Exercise
Consensus Statements about Exercise and Depression

- Exercise can be associated with a decreased level of mild to moderate depression.

- Exercise may be an adjunct to the professional treatment of severe depression.

Source: Adapted from Morgan & Goldston (1987).
Practical Recommendations

- Exercise done on a regular basis can be useful in treating depression as well as in protecting against depression.

- Research consistently “shows that 30 minutes of aerobic exercise three times a week will significantly reduce depression” (Johnsgard, 1989, p. 280).

- Type of exercise doesn’t seem to matter.
Exercise Guidelines

- Obtain information from the individual as to what activities he or she likes/dislikes.

- Exercise with the individual, to provide support and to model correct behavior.

- Make the exercise adaptable to the individual’s lifestyle.

- Use the individual’s home environment.

- Monitor exercise dosage and modify as necessary.

- Help the individual realize that setbacks do occur, and devise strategies to deal with them.
Mechanisms of Change

- Anthropological hypothesis
- Endorphin hypothesis
- Monoamine hypothesis
- Mastery hypothesis
- Social interaction hypothesis
Anthropological Hypothesis

- Technology—we no longer have to engage in vigorous activity for our survival.

- We are genetically predisposed to be physically active.

- If we violate our genetic predisposition by being sedentary, it is not surprising that we then face a host of health problems.
Anthropological Hypothesis
Endorphin Hypothesis

- During stress (e.g., exercise), the body produces endorphins—natural painkillers.
- Increase in endorphins may reduce depression.
- More research is needed before firm conclusions can be reached.
Monoamine Hypothesis

Effects of exercise on depression are due to altered brain neurotransmitters:
- Serotonin
- Norepinephrine
- Epinephrine
- Dopamine

Neurotransmitters have all been implicated in the regulation of emotion.

Exercise increases the rate of neurotransmitter production.
Other Hypotheses

- **Mastery hypothesis**
  - Psychological effects of exercise are derived from the accomplishment or mastery felt upon completion
  - Mastery gives a sense of greater self-worth and personal control over the environment

- **Social interaction hypothesis**
  - Exercise provides an individual an opportunity to interact with others
  - This hypothesis may account for part of depression reduction, but it cannot be the sole explanation
Your Perspective

Which hypothesis do you most agree with?

Why?

Which do you not agree with?
Exercise vs. Traditional Treatments

- Exercise decreases depression better than not having any treatment.
- Exercise is as effective as traditional treatments (i.e., relaxation, psychotherapy, some medication).
- Exercise with psychotherapy yields best depression-reducing effects.
- Exercise is cost effective.
- Exercise also increases physical health, as an added benefit.