Chapter 13

Emotional Well-Being and Exercise
Emotional Well-Being Defined

- A greater amount of positive affect than negative affect
- Favorable thoughts such as satisfaction with life
Your Viewpoint?

• Before participating in an activity/exercise you enjoy, do you feel active, energetic, lively, sleepy, jittery, or tense?
• How about after that activity?
• How do you feel before and after participating in an activity you do not enjoy?
Effect of Exercise on Emotional Well-Being

- Reduction of negative emotions
- Increase in positive emotions
- Greater self-confidence and self-esteem
- Improved cognitive function
Emotions and Moods

• Exercise psychology literature sometimes treats these concepts as if they are synonymous, but there are important differences among them.

• Emotion: Immediate response to specific stimulus that requires some level of cognitive input
  – E.g., the personal trainer adds additional poundage for the next attempted bench press exercise; the client say, “no way!”

• Mood: Transient subjective states of feeling with a cognitive basis
  – E.g. “I have more energy from a moderately intense workout”
  – Negative constructs of mood are:
    • Anxiety, Depression, Fatigue, Anger, Confusion
  – Positive constructs of mood are:
    • Vigor, Pleasantness, Euphoria
Mood vs. Emotions

• Moods usually imply a longer course of time, whereas emotions are short-lived.
• Causes of emotion can usually be identified, whereas moods come and go with sometimes unidentifiable causes.
• Emotions are usually more intense and variable than moods.
Generalized Measures

• Profile of Mood States (POMS)
  – Most popular self-report instrument
  – A 65-item rating scale that yields scores on six different moods—but these may not be the only moods in the entire mood domain
  – Employed to examine mood changes in response to various exercise manipulations

(continued)
Meta Analysis Research Results

Negative moods are:
- anger, tension, fatigue, depression, & confusion

Positive moods are:
- vigor

Physical activity effected all six mood states.
- Negative moods were reduced
- Positive mood (vigor) increased

(Mcdonald & Holdgdon, 1991; Arent, Landers, and Etnier, 2003)
POMS and Physical Activity

McDonald & Hodgdon (1991)
Typical Administration Mood Inventories & PA Research

• Before, during, and after acute physical activity session:
  – Differing in intensity
  – Differing in duration
  – Differing in mode (aerobic versus weight training)
  – Differing in phases (warm-up, aerobic, anaerobic, cool down)

• Fit people versus unfit

• Effects of chronic PA across ages.
More Generalized Measures

- Thayer Activation-Deactivation Adjective Check List (AD ACL)
  - A 20-item measure
  - Measures energetic arousal (EA; energy, vigor, fatigue) and tense arousal (TA; tension, placidity, stillness)
  - As level of energy is increased, EA will increase while TA decreases
## Thayer’s AD ACL Inventory

**Exhibit 13.3** Self-Assessment Inventory (Thayer’s Activation-Deactivation Adjective Check List (AD ACL)).

**Instructions:** Following are some adjectives that describe people’s feelings. Please read each of the adjectives and then indicate how you are feeling at this particular moment, by circling the appropriate response. There are no right or wrong answers, so do not spend too much time on any one item. Check to make sure you have responded to all the items.

<table>
<thead>
<tr>
<th></th>
<th>Definitely feel</th>
<th>Feel slightly</th>
<th>Cannot decide</th>
<th>Definitely do not feel</th>
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<tr>
<td>1. Active</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
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<tr>
<td>2. Placid</td>
<td>✔️ ✔️</td>
<td>✔️</td>
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<td>no</td>
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<tr>
<td>3. Sleepy</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
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<tr>
<td>4. Jittery</td>
<td>✔️ ✔️</td>
<td>✔️</td>
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<td>no</td>
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<tr>
<td>5. Energetic</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>6. Intense</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>7. Calm</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>8. Tired</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>9. Vigorous</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>10. At rest</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>11. Drowsy</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>12. Fearful</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>13. Lively</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>14. Still</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>15. Wide-awake</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>16. Clutched-up</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>17. Quiet</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>18. Full-of-pep</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>19. Tense</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>20. Wakeful</td>
<td>✔️ ✔️</td>
<td>✔️</td>
<td>?</td>
<td>no</td>
</tr>
</tbody>
</table>

*Note: The AD ACL is scored by assigning the following scores: ✔️ ✔️ = 4, ✔️ = 3, ? = 2, and no = 1. The scores for each subscale are ten summed, with subscale adjectives as follows: Energy (active, energetic, vigorous, lively, full-of-pep); Tired (sleepy, tired, drowsy, wide-awake, wakeful); Tension (jittery, intense, fearful, clutched-up, tense); Calmness (placid, calm, at-rest, still, quiet). Scoring for wakeful” and “wide-awake” must be reversed for the Tiredness subscale. To derive the Energetic Arousal (EA) and Tense Arousal (A) dimensions, see Thayer (1989, Appendix I) or www.csulb.edu/~thayer/thayer/adacl.htm for additional instructions.*
A Diagram of the Relationship between EA and TA

Dissatisfaction with General Measures

• Measures such as the POMS were not sensitive enough to exercise stimuli
• Existing measures failed to detect unique and distinct properties of exercise
• As a result, new exercise-specific measures were developed
Exercise-Specific Measures

• Exercise-induced Feeling Inventory (EFI)
  – A 12-item measure with four subscales
  – Measures exercise-induced feeling states

• Subjective Exercise Experience Scale (SEES)
  – A 12-item measure with three subscales
  – Measures subjective experiences unique to exercise, paying specific attention to positive dimensions of affect
Dissatisfaction with Exercise-Specific Measures

- Each was developed in the absence of a guiding theoretical framework
- EFI and SEES were not shown to satisfactorily address the concerns that led to their development
Research Issues Related to the Study of Exercise-Related Affect

• Categorical vs. dimensional approaches
  – E.g. exercise affects depression in a specific way (categorical approach)
  – E.g. exercise affects anxiety, mood, depression, and self-image (dimensional approach)

• Temporal dynamics of affective responses
  – Timing issue (e.g. exercise affect before, during, and after on mood)

• Dose-response issues
  – How intense and/or long is needed to reach changes?
  – What mode or type of PA or exercise is the best?
Categorical vs. Dimensional Approaches

• Categorical
  – Assumes that affective states (emotions, moods, or affect) are distinct and have unique properties and antecedents

• Dimensional
  – Assumes that affective states are interrelated and can be accurately captured by a small number of dimensions
  – Dimensional models are broader and more encompassing
Circumplex Model

• A dimensional model describing affective states along the perimeter of a circle defined by two dimensions: affective moods and activation

• The two dimensions form four quadrants:
  – Pleasant–activated: reflecting excitement, enthusiasm, energy
  – Pleasant–unactivated: reflecting relaxation and calmness
  – Unpleasant–unactivated: reflecting boredom, fatigue, depression
  – Unpleasant–activated: reflecting anxiety, tension, distress
The Circumplex Model (Dimensional Model)

2. Use the circumplex approach to examining affective responses. Using the circumplex diagram below, in which the dimensions of activation and valence are represented, try the following exercises. Incorporate the following time points as appropriate:

- **Moderate Exercise**
  - Pre-exercise
  - 5 minutes
  - 15 minutes
  - Immediately post-exercise
  - 20 minutes post-exercise

- **Intense Exercise**
  - Pre-exercise
  - 5 minutes
  - 15 minutes
  - Immediately post-exercise
  - 20 minutes post-exercise
Summary

• Exercise intensity required at or above anaerobic thresholds have a negatively affective impact during exercise but this affect is only temporary.

• In exercise programming:
  – Program needs to be individualized so he/she does not experience a negative affect during activity.
Temporal Dynamics of Affective Responses

• When should affect be measured?
  – Before, during, or after exercise?

• Affect experienced *during* an exercise bout may be distinct from the affective change reported *before* and *after* exercise.

• Implications for exercise prescription
  – Post-exercise positive feelings might not be sufficient to override negative feelings during exercise.
Dose-Response Issues

• How much exercise is enough? How intense should the exercise be?
  – The minimum and maximum levels of exercise intensity and duration needed to produce desired response are still unclear.
• Individually determined metabolic landmarks (i.e., lactate threshold) might be useful.
  – Lactate threshold: The point at which lactate concentrations in the blood exceed the rate at which lactate is removed from the blood.
Results of Research on Before-and After-Exercise Responses

- Exercise seems to increase positive mood states and to reduce negative mood states.
- Moderate amounts of exercise usually energize the exerciser.
Pre-Post AD ACL Findings

Results of Pre- to Post-exercise responses reveal beneficial affective response by increased energetic arousal with decreased tension arousal.
Results of Research on Before- and After-Exercise Responses (continued)

• Following *moderate-intensity* exercise, positive affective states (i.e., energy, vigor) are increased while negative affective states (i.e., fatigue, tension) are unchanged or reduced.
Your Viewpoint

• Do you find that taking a 10-minute brisk walk gives you more energy? Try this experiment one evening when you’re feeling fatigued.
Results of Research on In-Task Exercise Responses

• Even though people feel better after exercising, how they feel during exercise may be part of the reason why they don’t exercise.

• A person is not likely to continue an activity that isn’t fun.

(continued)
Results of Research on In-Task Exercise Responses (continued)

• Affect gets progressively more negative as exercise intensity increases.
• Moderate-intensity exercise results in more positive affective change, but individual differences need to be considered.
Responses Across the Stages of Exercise

During exercise, emotions (valence) became negative after ventilatory threshold and continued to be negative until exhaustion. Rebounded after completing exercise!
Negative Psychological Effects of Exercise

- Exercise dependence syndrome
- Exercise deprivation
- Staleness syndrome
- Overtraining
Are you exercise dependent?

Are you considered to be dependent on exercise if you workout 6 or 7 times per week?
Iceberg Profile

Exercise Dependence Syndrome

• “A craving for leisure-time physical activity, resulting in uncontrollable excessive exercise behavior, that manifests itself in physiological . . . and/or psychological . . . symptoms.”
(Hausenblas and Symons Downs, 2002a, p. 90)
More on the Exercise Dependence Syndrome

- **Primary dependence**
  - Exercise is an end in itself
  - Alterations of body composition or diet are done to enhance performance

- **Secondary dependence**
  - Exercise is used exclusively to control body composition
Operational Definitions of Exercise Dependence

• Tolerance: Need for increased amount of exercise to achieve desired effect
• Withdrawal: Withdrawal symptoms are felt when exercise is missed
• Intention effect: Exercise lasts longer than was originally intended
• Loss of control: Unsuccessful effort to control or cut back on amount of exercise

(continued)
Operational Definitions of Exercise Dependence (continued)

• Time: Lots of time is spent in activities needed to obtain exercise
• Conflict: Giving up important social or relationship activities because of exercise
• Continuance: Exercise is maintained in spite of knowing that it is problematic
Physiological Factors in Exercise Dependence

• Endorphin hypothesis
  – An actual physiological dependence on the chemical released during exercise
  – The release of endorphins, which the body craves, leads to more exercise, which leads to more endorphin release

• Psychophysiological hypothesis
  – The effect of training is a decrease in sympathetic nervous system output, so an increase in fitness can potentially result in a state of lethargy, fatigue, and decreased arousal.
Practical Recommendations

• Become aware of how people feel when they do and do not exercise.
• Schedule exercise time during low-energy periods.
• Exercise in a nonexcessive manner, to result in more positive experiences during and following the exercise.
• Have a better understanding of psychological benefits of exercise, to improve adherence.
Exercise Dependency

Just because you are physically active 5, 6, or even 7 days a week does not mean you are exercise dependent.
Exercise Dependence

Exercise dependence can be defined as a multidimensional maladaptive pattern of PA, leading to significant impairment or distress, as manifested by three or more of the following 7 criterion
Mental Disorder-IV Inventory (Exercise Dependence Scale)

- Dependency is defined as a score of 5 or 6 for that item.
- Symptomatic is scores of 3 or 4.
- Asymptomatic is scores 1 or 2.

Add each score then divide by number of questions to determine your score.
Exercise Dependence Research

A recent review, concluded that the exercise dependence research is characterized by three general approaches:

- Comparing exercisers to eating disorder patients
- Comparing “excessive” to “less excessive” exercisers
- Comparing exercisers to non-exercisers
Recent Exercise Dependence Research

Hausenblas and Symons examined exercise dependence in over 2,300 exercisers who varied in their involvement.

- 9% of the exercisers could be classified as exercise dependent
- 40% as nondependent-symptomatic
- 41% as nondependent-asymptomatic
Exercise Dependency
Findings

People high in exercise self-efficacy and/or a disposition of perfectionism seem to have a higher probability to become exercise dependent (Hausenblas & Symon Downs, 1997)
Is there a treatment for exercise dependency?

-71% physiotherapists (e.g., physical therapists, athletic trainers) experienced problems; that is injured clients simply refused to stop exercising.
Treatment of Exercise Dependence


Physiotherapists Treatments were:

a) Educate about injury and likely outcomes
b) Prescribe reduced or alternative activities (cross training)
c) Refer them to a professional psychologist
d) Behavior modification that includes contract and goal setting.
e) Seek out persons who have controlled their exercise dependency (modeling)
f) Try a radical approach give your mind and body a holiday by simply stopping
g) Periodization training schedule
What usually happens to a regularly active person who for some reason misses their daily workout? Or goes several days without working out?

(Exercise Deprivation)
Exercise Deprivation

Represent psychological and/or physiological effects during periods of no physical activity

Considered by Szabo as the cardinal sign of exercise dependency

Symptoms:

- Affective: i.e., high anxiety and non-clinical depression
- Cognitive: i.e., high confusion, and low concentration
- Physiological: i.e., high psychological fatigue and low sleep
- Social: i.e., withdraws or anti-social(social interaction)
Consequences of Deprivation in Habitual Exercisers

Mondin et al. (1996) Study

- Evaluated the influence of 3 day exercise deprivation on psychological variables involving young adult males and female runners who ran 6-7 days a week (45 minutes average per run)

- Measured the runners mood (POMs), anxiety (State Anxiety), & depression.

- Asked to exercise on monday but not on tues, weds, or thurs then exercised on friday
3 days of exercise deprivation resulted in increases in:

- Total mood disturbance
- State anxiety
- Depression

Once they resumed exercise resulted in:

- Mood improvement (immediately)
Staleness Syndrome

• Increased negative mental health
  – Depression, anxiety, fatigue, reduced energy

• Poor performance
Overtraining

• Occurs when individuals train at levels greater than they are accustomed to in terms of frequency, intensity, and duration

• Used to help athletes adapt to greater levels of training stress

• Can lead to the staleness syndrome and clinical depression

(continued)
Overtraining (continued)

• Iceberg profile:
  – Using the POMS, the average elite athlete has vigor scores that are above the 50th percentile and negative mood scores that are below the 50th percentile
  – With increasing workloads, vigor scores decrease and negative mood scores increase
Overtraining

- Short period of training during which people increase their training loads to near or to maximal capacity
  - Associated with high intensity of exercise and frequency than duration
  - Exercise pattern where this no restoration phase
Over Training and Staleness

Over training may lead to staleness

- Causes deterioration of readiness
- Impairment of performance
- Increased depression (80% of athletes who are stale are clinically depressed)
Homestasis Curve & Supercompensation Cycle

(Body adaptation & increase in performance)

Supercompensation

Fatigue

Compensation

(energy & psychological replenish)

I II III IV

Training

Stimulus

Involution
Sum of Training Effect

(a)

Stimulus

(b)

Performance improvement

Performance improvement
### Psychological Symptoms of Overtraining

<table>
<thead>
<tr>
<th>Subject fatigue ratings</th>
<th>Increased feelings of fatigue despite adequate recovery time</th>
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<tbody>
<tr>
<td>Mood state</td>
<td>Decreased positive and increased negative feelings</td>
</tr>
<tr>
<td>Muscle fatigue</td>
<td>Increased despite recovery time</td>
</tr>
<tr>
<td>Perceived exertion during constant exercise load</td>
<td>Increased</td>
</tr>
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Physiological Symptoms of Overtraining

<p>| | |</p>
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<tr>
<td>Heart rate during submax load</td>
<td>Increased</td>
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<tr>
<td>Time to exhaustion during constant velocity</td>
<td>Decreased</td>
</tr>
<tr>
<td>Resting morning heart rate</td>
<td>(Increased-sympathetic) (decreased-parasympathetic)</td>
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<tr>
<td>Mechanical efficiency during submax load</td>
<td>Decreased</td>
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<tr>
<td>Maximal performance capacity (VO$_2$ max; time to exhaustion)</td>
<td>Decreased</td>
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<tr>
<td>Length of Sleep</td>
<td>Month</td>
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<tr>
<td>-----------------</td>
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</tr>
<tr>
<td>12+ hours</td>
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<td>11</td>
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<td>5</td>
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<td>4</td>
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<th>Quality of Sleep</th>
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<td>Very deep</td>
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<td>Normal</td>
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<td>Restless</td>
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<td>Bad with breaks</td>
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<td>Tired</td>
<td></td>
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<tr>
<td>Very tired</td>
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<td>Painful tiredness</td>
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<th>Training willingness</th>
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<tr>
<td>Good</td>
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<tr>
<td>Poor</td>
<td></td>
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<tr>
<td>Unwilling</td>
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<td>Did not train</td>
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<th>Appetite</th>
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<tr>
<td>Very good</td>
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<tr>
<td>Good</td>
<td></td>
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<tr>
<td>Poor</td>
<td></td>
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<td>Emaciated should eat</td>
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<td>Did not eat</td>
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<th>Competitive Willingness</th>
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<td>Average</td>
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<th>Muscle Stiffness</th>
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<tr>
<td>No pain</td>
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<tr>
<td>Little pain</td>
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</tr>
<tr>
<td>Moderate pain</td>
<td></td>
</tr>
<tr>
<td>Severe pain</td>
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Symptoms of Overtraining

- The first symptoms of overtraining occur psychologically rather than physiologically (Bompa).

- The POMs inventory can give exercisers a clue if they are overtraining because vigor is low and fatigue is high.
Overtraining States

- **Sympathetic**
  - Similar to acute stress reaction
  - Sympathetic usually occurs in young, inexperienced exercisers or athletes (e.g. resting HRT high)
  - Occurs in power training clients or athletes (Israel, 1976)

- **Parasympathetic**
  - Parasympathetic usually occurs in the mature, experienced exerciser or athlete (e.g. resting HRT actually drops)
  - Common in endurance clients or athletes (Israel, 1976)
Treatment of Overtraining

• First one needs to determine which type of overtraining
  – Each type requires a different strategy
  – Training logs maybe effective in assessing the status of overtraining

• Strict periodization program is the best prevention
Sympathetic Overtraining Interventions

• Eat alkaline foods (milk, fruit, fresh vegetables)
• Avoid stimulatory substances (coffee)
• Increase quantities of vitamin B groups
• Swim
• Warm baths but not sauna
• Light exercise
• Change exercise routine (time or type of workout)
Parasympathetic Overtraining Interventions

- Favor acidifying foods (cheese, meat, cake, eggs)
- Vitamins (B & C)
- Sauna at medium temperature
- Massage
- Sea level altitude training
- Train in a warm climate
Periodization

• Phase or cyclic training
• Work to restoration ratio
• Systematic means to assure training matches the energy system requirement of the activity or sport.
• Combine psychological and physiological principles in training clients
Phases/Cycles

1. Training
2. Competition
3. Peaking
Training Phase

<table>
<thead>
<tr>
<th>Intensity</th>
<th>M</th>
<th>T</th>
<th>W</th>
<th>Th</th>
<th>F</th>
<th>Sat</th>
<th>Sun</th>
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<tbody>
<tr>
<td>90-100%</td>
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<td></td>
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<tr>
<td>80-90%</td>
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<td>M</td>
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**Figure 7.12** Three-peak microcycle alternated with lower intensity training lessons
Training Phase

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<th>M</th>
<th>T</th>
<th>W</th>
<th>Th</th>
<th>F</th>
<th>Sat</th>
<th>Sun</th>
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*Figure 7.7 Two-peak microcycle*
Training Phase

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<th>Th</th>
<th>F</th>
<th>Sat</th>
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</thead>
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**Figure 7.6** Microcycle with one peak
Competition Phase

![Figure 7.19](image.png) Microcycle for weekly competitions
Competition Phase

Figure 7.21  Microcycle for a sport in which two competitions (C) are organized in the weekend.
# Peak Phase

<table>
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<th>Low</th>
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**Figure 10.12** Curve of peaking the load in training during the interval between competitions