Defining Arousal

• Consists of neural excitation ranging on a continuum from a comatose state to extreme excitement /panic attack
• Viewed as an energizing function that is responsible for harnessing the body’s resources for intense and vigorous activity
• Natural and nondirectional state (neither positive nor negative)
• Synonymous with activation and intensity
  – Use these terms with athletes to avoid the sexual connotations of arousal
Is Arousal the Same As Anxiety?

_Arousal_ is a blend of psychological and psychological activation, varying in intensity along a continuum.

_Anxiety_ is a negative emotional state with feelings of worry, nervousness, and apprehension associated with activation or arousal of the body.
Measurement of Arousal

• Physiological measures
  – EEG, skin conductance, HR, BP, muscle activity

• Biochemical measures
  – Epinephrine, norepinephrine, cortisol

• Questionnaires
  – Somatic Perception Questionnaire
  – Activation Deactivation Adjective Checklist
Mis-Measuring Arousal

• Early (1970’s to 2000?) sport psychology research erroneously used anxiety questionnaires to measure “arousal”

• Frequent mis-labelling of the x-axis as “arousal” not “anxiety” with Inverted-U Figures (Bacon, 2010)
Defining Anxiety

• A negative emotional state or reaction characterized by unpleasant feelings of intensity, preoccupation, worry, and apprehension

• In sport, most likely to occur when an athlete’s cognitive appraisal perceives an inability to deal with the demands of the situation and dire consequences if fail
Types of Anxiety

• **Trait anxiety**- A *general* predisposition to perceive many situations as threatening and to respond to them with high anxiety
  – Stable over time
• **State anxiety**- An individual’s anxiety at a particular moment (“right now”)
• **Somatic anxiety**- Physical component reflecting perception of physiological responses such as heart rate, respiration, and muscle tension
• **Cognitive Anxiety**- Thought component (worry, fear, concentration disruption)
Recognizing Symptoms of Arousal and State Anxiety

- Cold, clammy hands
- Constant need to urinate
- Profuse sweating
- Negative self-talk
- Dazed look in eyes

(continued)
Recognizing Symptoms of Arousal and State Anxiety (continued)

- Feeling ill
- Headache
- Cotton (dry) mouth
- Constant sickness
- Difficulty sleeping
Unidimensional Anxiety Measures

SCAT (Sport Competition Anxiety Test, Martens, 1975)
- Specific to sport
- Measures competitive trait anxiety (CTA)
Arousal/Anxiety-Performance Theories

- Drive Theory
- Inverted-U Theory
- Zone of Optimal Functioning Theory
- Multidimensional Anxiety Theory
- Catastrophe Theory
Drive Theory

- Performance directly related to arousal (activation)
- Positive linear relationship
Drive Theory: Linear Relationship
Inverted-U Hypothesis

Performance

Low  High

Low  High

Physiological arousal
IZOF Theory

• Extends inverted-U theory by incorporating individual differences into its framework
• ZOF is the level of arousal (intensity) that enables an athlete to perform at his/her best
• Determine individually because ZOF varies from athlete to athlete
  – On the same skill, some prefer low, some moderate, some high
Individualized Zones of Optimal Functioning (IZOF) Hypothesis

- **Athlete A** (low IZOF)
  - In zone (best performance)
  - Out of zone

- **Athlete B** (moderate IZOF)
  - Out of zone
  - In zone (best performance)
  - Out of zone

- **Athlete C** (high IZOF)
  - Out of zone
  - In zone (best performance)

State anxiety level: Low to High
IZOF Theory

Performance vs. Arousal

- Sue
- Sally
- Jane

Low to High Arousal

Performance peaks at moderate arousal levels for each individual.
IZOF (cont.)

- Key is knowing where the ZOF is for each athlete in a given situation and then helping the athlete reproduce this arousal state more consistently
- If athletes are outside their ZOFs, the outcome is typically poorer performance
- Need skill at both raising and lowering arousal level (see chapters 15 and 17)
Multidimensional Anxiety Theory

- Cognitive and somatic anxiety correlate, but are different constructs
Multidimensional Anxiety Theory

• Mind and body intertwined, but not completely—thus distinguishes between somatic and cognitive anxiety

• Cognitive anxiety- thought component (worry, fear, concentration problems)
  – Caused by things such a fear of negative social evaluation, fear of failure, and loss of self-esteem

• Somatic anxiety- perceptions of bodily symptoms of autonomic arousal such as racing heart, butterflies in the stomach, and muscle tension
  – Results more from a stimulus-response reaction to the physical cues in the environment
Hypotheses from Multidimensional Anxiety Theory

1. Somatic anxiety has a curvilinear relationship to performance and cognitive anxiety a negative linear relationship

2. Cognitive anxiety remains essentially stable prior to competition and somatic anxiety progressively increases

3. Somatic anxiety dissipates once performance begins, but cognitive anxiety can vary because the subjective probability of success can change
Multidimensional Anxiety Theory

- Cognitive state anxiety
- Somatic state anxiety

Performance vs. Anxiety Graph:
- High Anxiety: Low Performance
- Low Anxiety: High Performance
- Peak Anxiety: Neutral Performance
Multidimensional Anxiety Measures

- CSAI-2 (Competitive State Anxiety Inventory-2)
  - Somatic state anxiety scale
  - Cognitive state anxiety scale
  - Self-confidence scale
Catastrophe Theory

- Challenges multidimensional anxiety theory for predicting performance by examining somatic anxiety and cognitive anxiety in isolation.

- Catastrophe theory hypothesizes that the best understanding of the arousal-performance relationship comes from looking at how cognitive anxiety and physiological arousal interact.
Fig. 3: Hardy & Fazey’s (1987) Catastrophe Model demonstrating the association between anxiety and performance.
Catastrophe Theory Predictions

- Low cognitive anxiety = gentle inverted-U relationship between physiological arousal and performance
- High cognitive anxiety = performance improvement as arousal increases to an optimal threshold, but increases past that point result in a catastrophic drop in performance
- Low to optimal arousal = positive correlation between cognitive anxiety and performance
- High arousal = negative correlation between cognitive anxiety and performance
Catastrophe Model

Low cognitive anxiety (worry)

Performance

Low

Physiological arousal

High

Low

High

(continued)
Catastrophe Model
(continued)