

Anxiety & Performance

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Anxiety & Performance

I. The relationship

Definitions

- arousal
- stress
- anxiety

Measurement of anxiety

Antecedents

Temporal patterns

Anxiety – performance relationship

- drive theory
- inverted-U theory
- reversal theory
- IZOF
- multidimensional anxiety theory
- direction of anxiety
- catastrophe model

Definitions

Stress

- a state in which demands are placed on an individual, who is required to react in some way to cope with the situation (Jones, 1990)
- a substantial imbalance between physical or psychological demands and response capability, under conditions where failure to meet the demands has important consequences (McGrath, 1970)

Definitions

Arousal

- alertness, a physiological state of readiness (Cox, 1990)
- activation, the process in the central nervous system that increases the activity in the brain; a general energizing response (Ursin, 1978)
- multidimensional construct that refers to an energising function of the mind and the body (Zaichkowsky & Takenaka, 1993)
- a general physiological and psychological activation, varying from deep sleep to intense excitement (Weinberg & Gould , 2007)

Definitions

Anxiety

a negative emotional state in which feelings of nervousness, worry, and apprehension are associated with activation or arousal of the body (Weinberg & Gould , 2007)

Trait anxiety

behavioural disposition to perceive circumstances as threatening and to respond with elevated state anxiety

State anxiety

a temporary emotional state of consciously perceived feelings of apprehension and tension associated with activation of the autonomic nervous system (Weinberg & Gould , 2007)

Definitions

State Anxiety

Cognitive anxiety

negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences

Somatic anxiety

one's *perceptions* of the physiological-affective elements of the anxiety experience – indications of autonomic arousal and unpleasant feelings states such as nervousness and tension

(Morris, Davis, & Hutchings, 1981)

Measurements of Anxiety

Sport Competition Trait anxiety (Martens, 1977)

Unidimensional scale of trait anxiety

Competitive State Anxiety Inventory (Martens, Burton, Rivkin, & Simon, 1980)

Unidimensional scale of state anxiety

Sport Anxiety Scale (Smith, Smoll, & Schutz, 1990)

Multidimensional scale of trait anxiety

worry, somatic anxiety, concentration disruption

Competitive State anxiety Inventory-2 (Martens, Burton, Vealey, Bump, & Smith, 1990)

Multidimensional scale of state anxiety

cognitive anxiety, somatic anxiety, self-confidence

Three-dimensional Performance anxiety (Cheng, Hardy, & Markland, 2009)

Multidimensional scale of state anxiety

cognitive, physiological, regulatory dimensions

Measurements of Anxiety

Examples of items from sport anxiety questionnaires

I feel tense

I have self-doubts

Before I compete I feel uneasy

I feel nervous

I feel my stomach sinking

Before I compete I am worried about making mistakes

My hands are clammy

I'm concerned about performing poorly

I feel worried

I'm concerned about losing

Just before competition my heart beats faster than usual

Antecedents

What causes anxiety

What factors make anxiety to rise

Why people get anxious

Antecedents

Personal factors

- Personality characteristics
- Trait anxiety
- Self-esteem
- Experience

Situational factors

- Expectancies
- Importance of situation
- Perceptions of readiness
- Attitudes towards previous performance
- Difficulty of goals

Environmental factors

- coaching behaviour
- motivational climate
- social support
- group cohesion

(Jones & Hardy, 1990; Morris & Summers, 1995; Weinberg & Gould, 2007)

Temporal patterns

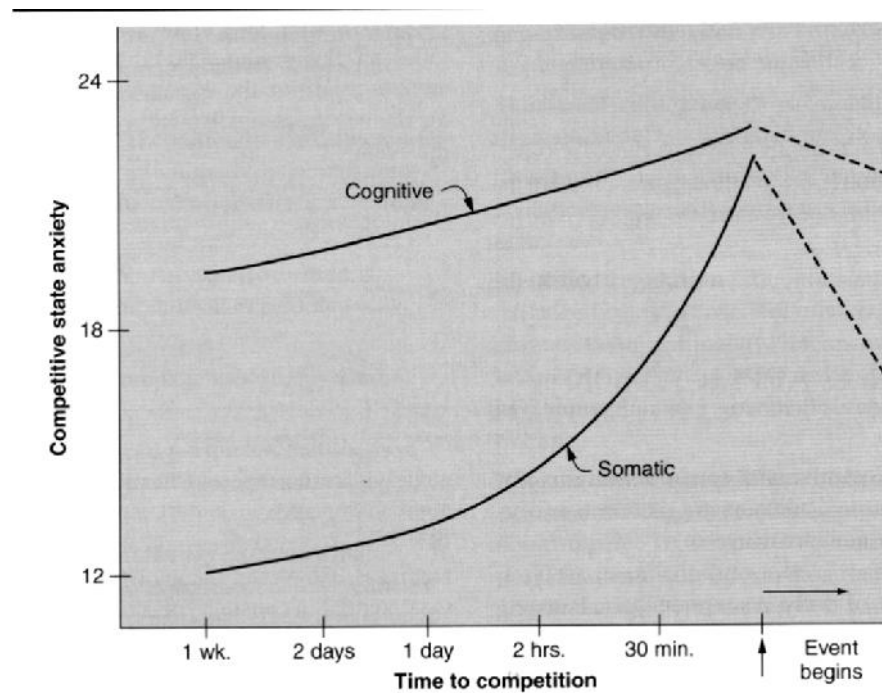
Cognitive anxiety

high and stable prior to competition

Somatic anxiety

low up to one or two days of competition

increases steadily thereafter



Anxiety - Performance

Drive theory

Inverted -U hypothesis

Individualized Zones of Optimal Performance (IZOF)

Reversal Theory

Multidimensional Anxiety Theory

Catastrophe Model

Direction of anxiety hypothesis

Anxiety - Performance

Drive theory (Spence & Spence, 1966)

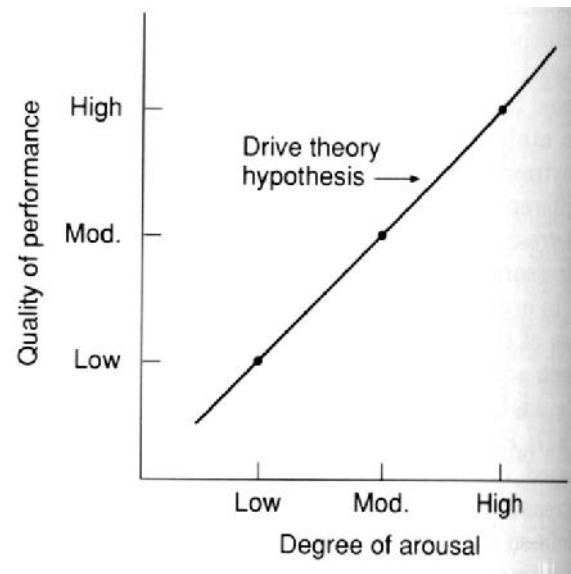
Direct linear relationship between arousal and performance

arousal oriented

simplistic

little empirical support

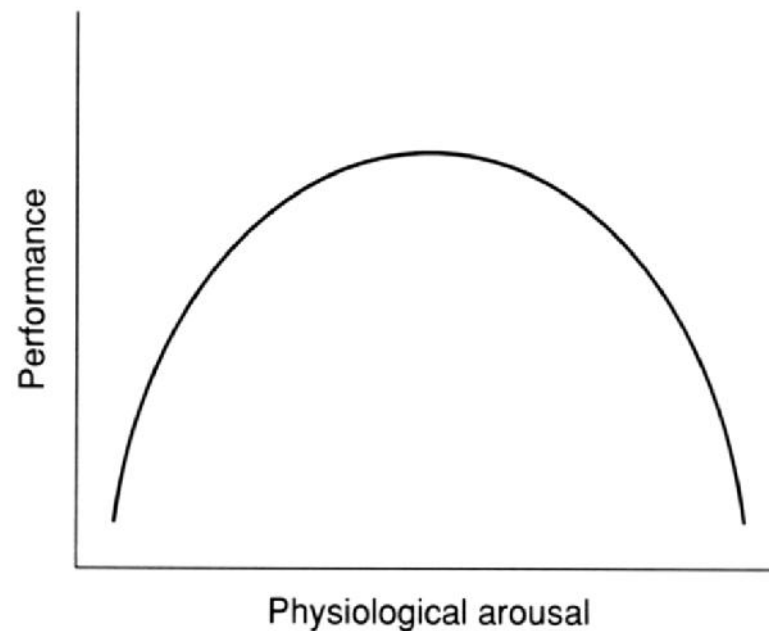
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Anxiety - Performance

Inverted-U hypothesis (Yerkes & Dodson, 1908; Cox 1990)

Increases in arousal will result in increases in performance up to a point, beyond which further increases in arousal will result in decrement of performance

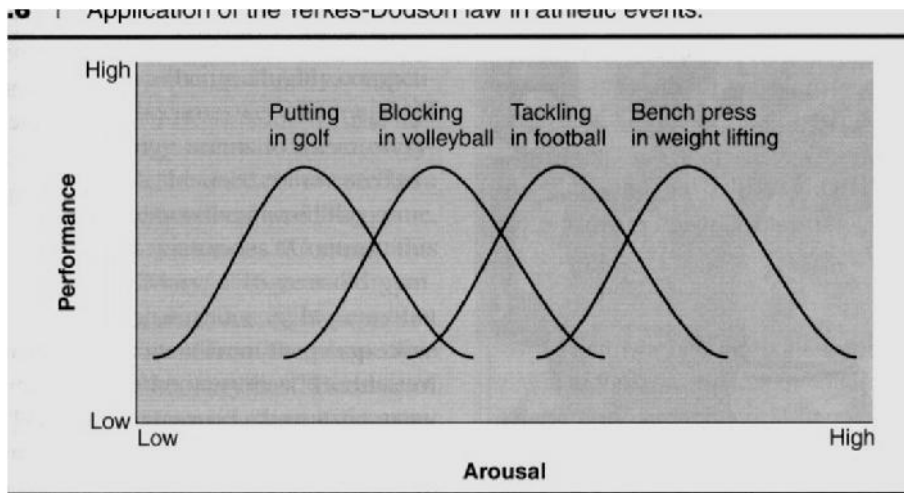


Anxiety - Performance

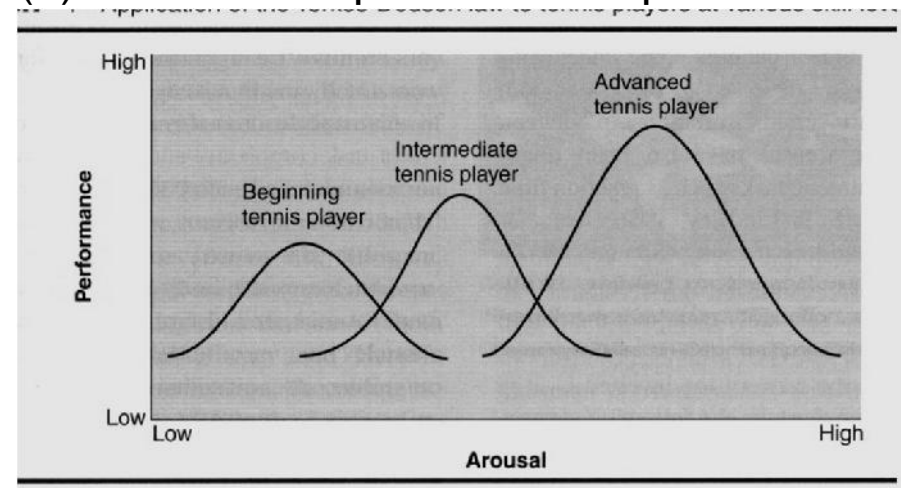
Inverted-U hypothesis (Yerkes & Dodson, 1908; Cox 1990)

Determinants of the position of the curve

(a) task complexity



(b) individual experience – expertise



Anxiety - Performance

Inverted-U hypothesis – criticism

arousal oriented

shape of the curve – point of optimal arousal

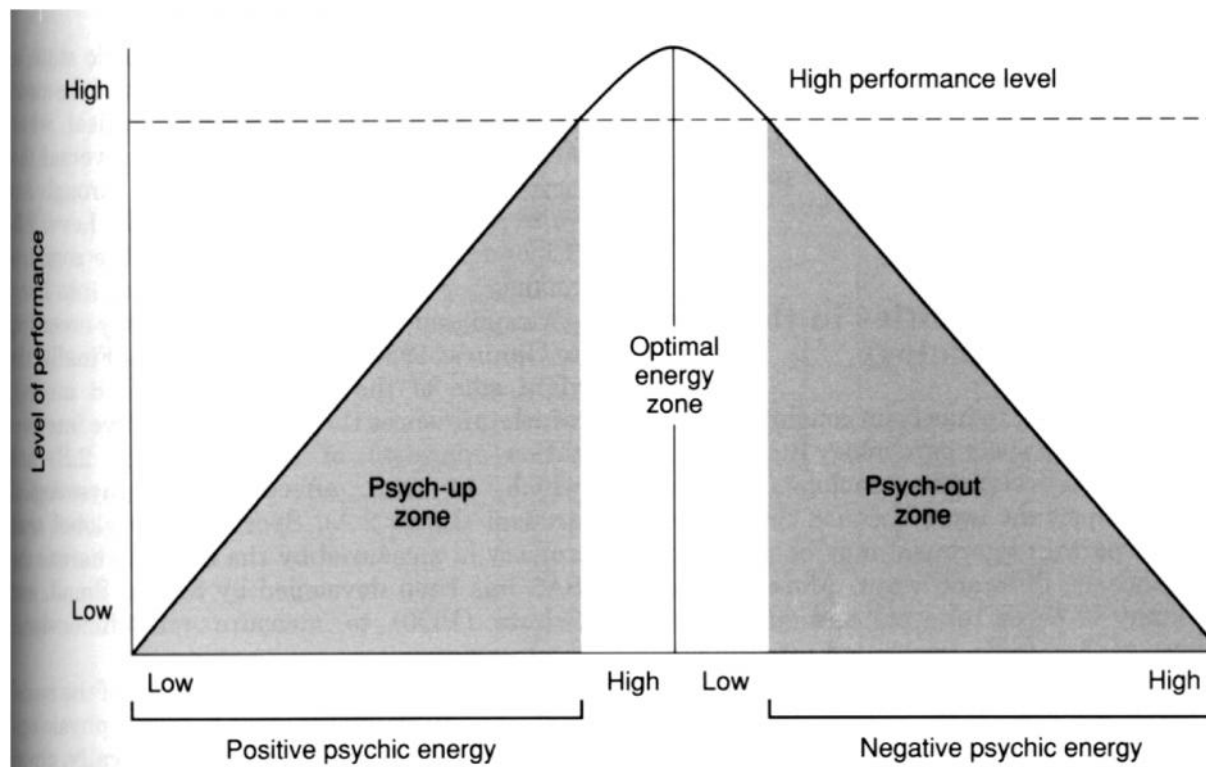
conceptualization of arousal

=> abandoned

Anxiety - Performance

Individualized Zone of Optimal Performance (Hanin, 1986)

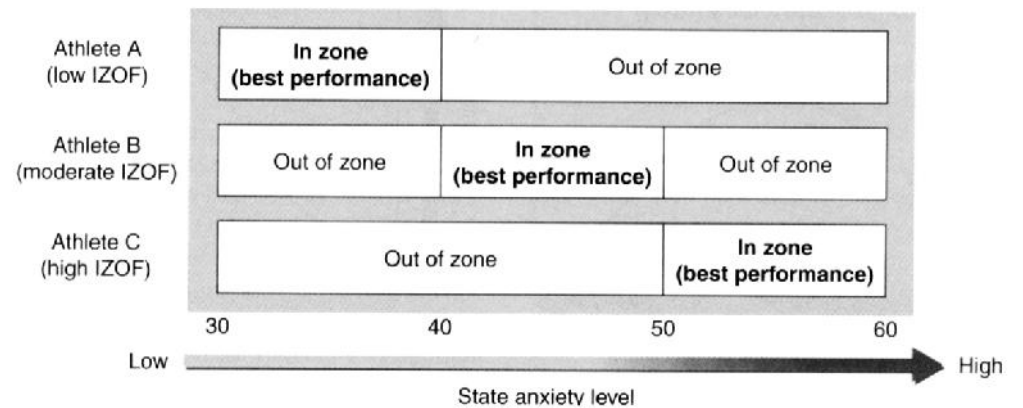
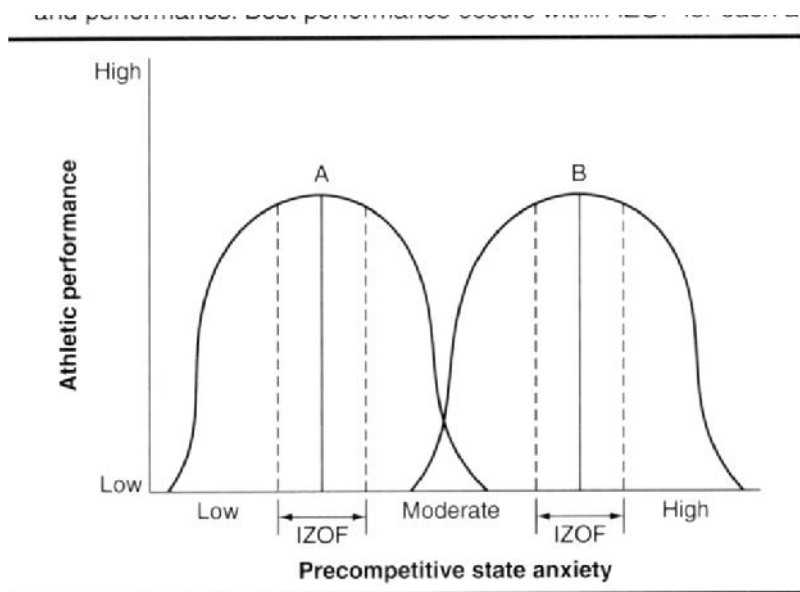
Every individual has a zone of optimal anxiety within which the athlete is more likely to attain optimal performance



Anxiety - Performance

Individualized Zone of Optimal Performance (Hanin, 1986)

This zone can be at the lower, middle or upper end of the anxiety continuum



Anxiety - Performance

Individualized Zone of Optimal Performance

Compared to Inverted-U

the optimal level of anxiety is not necessarily at the midpoint of the anxiety continuum, but it varies from individual to individual

the optimal level of anxiety is not a single point, but a bandwidth

Criticism

anxiety as unidimensional construct
lacks theoretical elements – basis
restricted research

=> Practical value
Continued research
Expanded to the broader field of emotions

Anxiety - Performance

Multidimensional Anxiety Model (Martens et al., 1990)

Cognitive anxiety – Somatic anxiety – (Self-confidence)

Cognitive anxiety has a negative linear relationship to performance

Somatic Anxiety has an inverted-U relationship to performance

(Self-confidence has a positive relationship to performance)

Anxiety - Performance

Multidimensional Anxiety Model – Research evidence

Burton (1988) – support all three hypotheses!

Burton (1998, review) – strong support 2 studies
 – moderate support 6 studies
 – weak support 8 studies

...

Meta-analyses (Craft et al., 2003; Woodman & Hardy, 2003)
inconsistent results (positive, negative, no relationships)
weak relationships

Limitations

Methodological designs, conceptualization (CSAI-2)
Interpretation of three-dimensional relationships through two-
dimensional relationships

=> Forwarded research a great deal
No clear answers

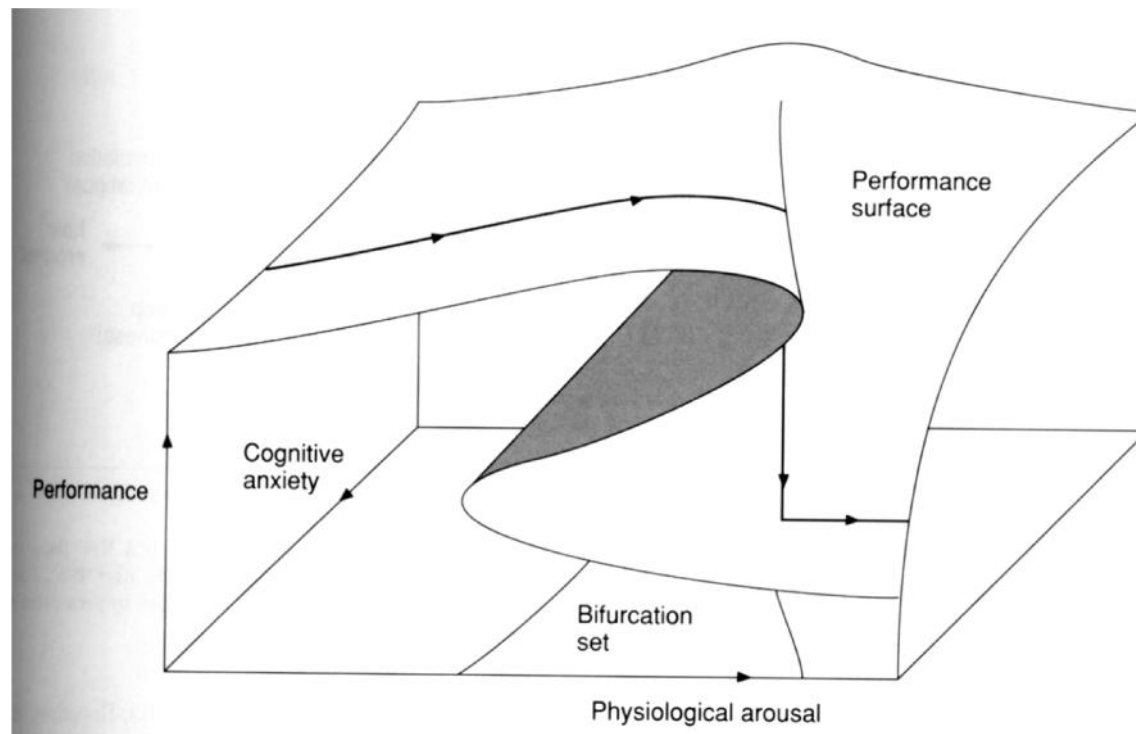
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Catastrophe Model (Hardy, 1990)

Sophisticated approach to the anxiety-performance relationship

Interactions of anxiety components (criticism on multidimensional anxiety model)

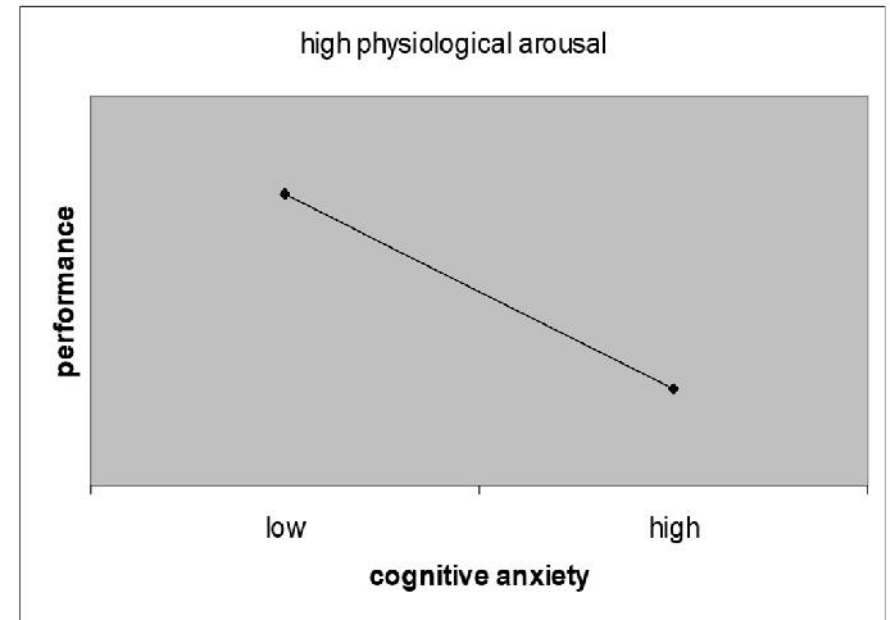
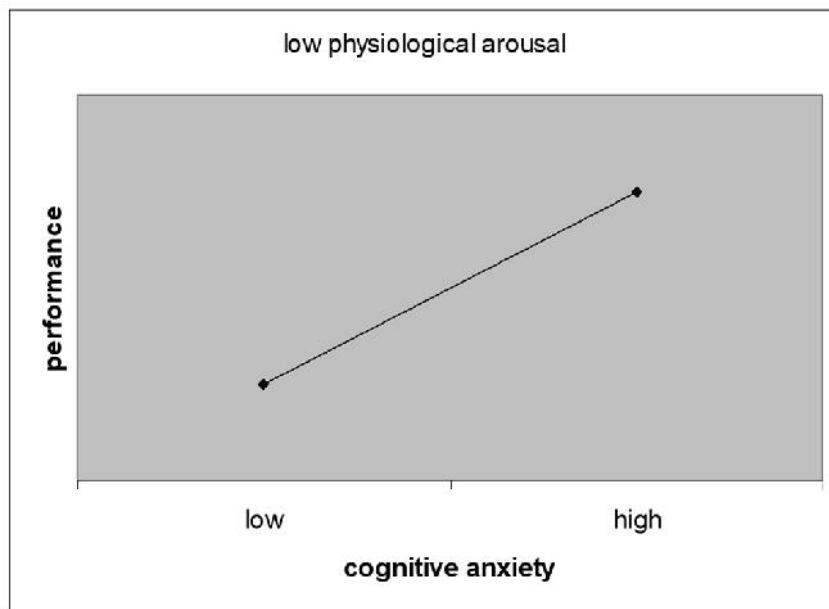
cognitive anxiety
physiological arousal
performance



Anxiety - Performance

Catastrophe Model – Predictions

Interactions of anxiety components I

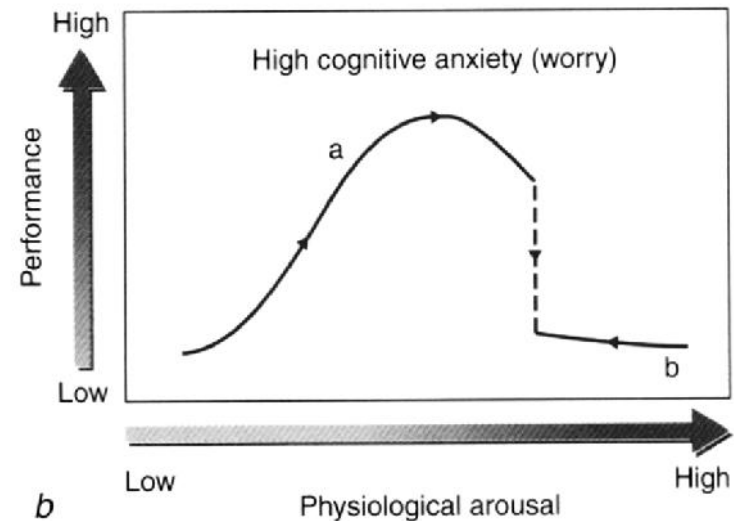
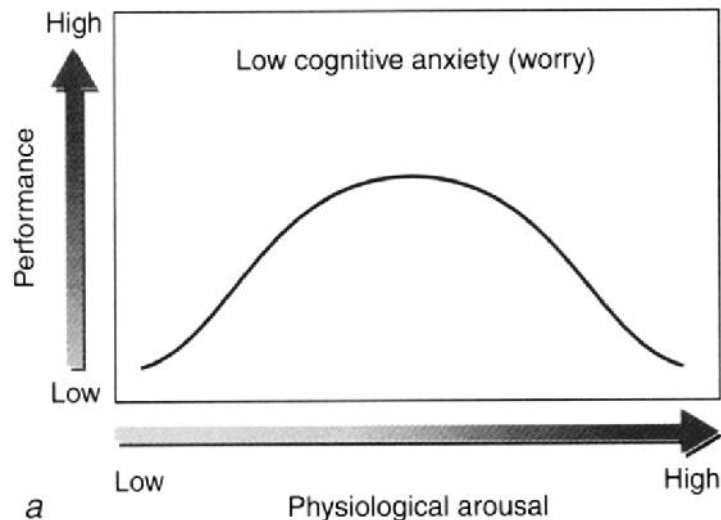


- When physiological arousal is low increases in cognitive anxiety will benefit performance
- When physiological arousal is high increases in cognitive anxiety will be detrimental to performance

Anxiety - Performance

Catastrophe Model – Predictions

Interactions of anxiety components II

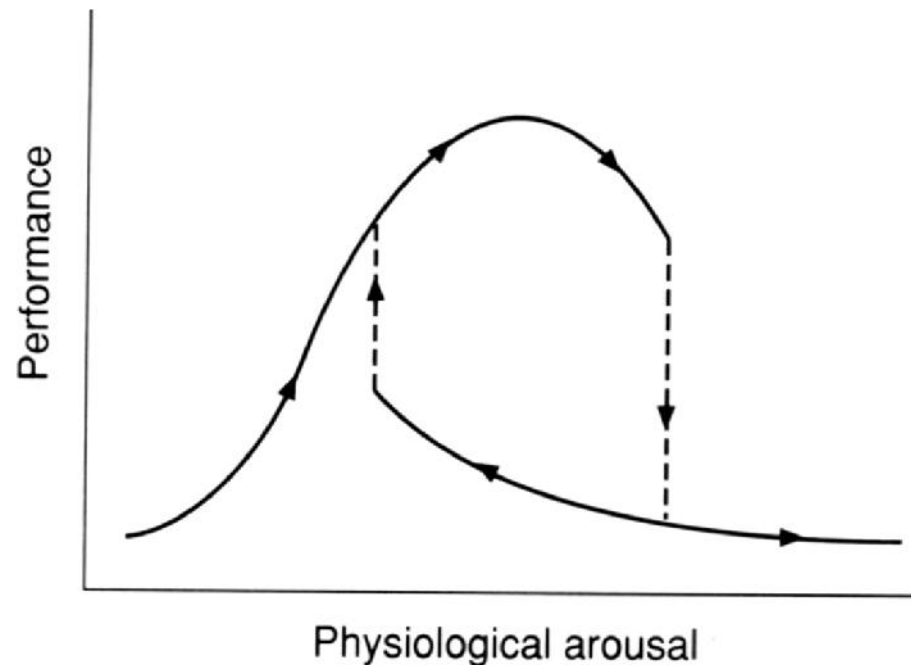


- When cognitive anxiety is low, physiological arousal will have an inverted-U relationship to performance
- When cognitive anxiety is high, physiological arousal can benefit or decrease performance depending on the levels of arousal – still, large increases in physiological arousal beyond a point causes performance to decrease rapidly (catastrophe - hysteresis)

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Catastrophe Model – Predictions

Hysteresis hypothesis



- Once performance catastrophes occur, considerable reductions in both physiological arousal and cognitive anxiety are required to restore performance

Anxiety - Performance

Catastrophe Model – Critique

There is evidence for the interaction of the anxiety components in relation to performance – mostly provided partially

Too sophisticated – hard to test

Little research

The anxiety-performance relationship is a complex phenomenon!

Anxiety - Performance

Interpretation of Anxiety States (Jones, 1995)

Based on the literature suggesting that anxiety intensity positively, negatively, or not related to performance

Direction of anxiety – Facilitative # Debilitative

Athletes' perception regarding the interpretation of anxiety symptoms

Facilitative (in control, excitement) – helpful to performance

Debilitative (lack of control – fear) – detrimental to performance

Intensity and Direction relative independent

similar intensity can be perceived as facilitative or debilitative by different athletes or by the same athlete in different situations

Direction related to performance more consistently than Intensity

Anxiety – Performance

Interpretation of Anxiety States – Critique

Intensity of anxiety alone provides a limited insight into the anxiety phenomenon

Direction of anxiety a useful element in the anxiety-performance relationship

Encouraging findings

Limited validation of the anxiety direction instruments

Conceptualization of anxiety (is it 'anxiety' if it is 'positive'?)

Great practical value

Anxiety – Performance

Research approaches

The multidimensional anxiety model has dominated the literature

Field

- Pre-competition anxiety measures

- Evaluation of performance

- Evaluation of performance components

Experimental

- Conditions of low–high anxiety OR teams of high–low anxious individuals

- Performance tests on laboratory & field tasks

Anxiety – Performance

Research limitations

Conceptualization of anxiety

Measurement of anxiety (instruments and timing)

Intra-individual designs

Conceptualization of performance

Evaluation of performance

Focus on description

Lack of research on possible mechanisms that explain the relationship

Anxiety – Performance

Research limitations

Lack of research on possible mechanisms that explain the relationship

arousal causes muscle tension and fatigue that may affect coordination

arousal and state anxiety narrow attention

anxiety reduces information processing

anxiety causes cognitive interferences

Anxiety – Performance

What have we learned – Practical implications

Athletes should strive for attainable and controllable goals

Athletes and coaches should learn to identify anxiety symptoms

Stress management should involve techniques for both cognitive and somatic anxiety

Athletes should learn what levels of anxiety are optimal for their performance

Anxiety regulation should be the focus – not necessarily anxiety reduction

Athletes should learn that anxiety is part of the game – Apart from anxiety intensity athletes should practice on how to interpret their anxiety effectively

Coping strategies should be well learned and practiced so that athletes can cope with unexpected stressors arising in competitions

Anxiety & Performance

II. The mechanisms

Cognitive approaches to anxiety

The cognitive interference theory

The processing efficiency theory

The control process theory

Findings in the sport literature

Implications for sport anxiety research

Implications for practice

Test anxiety

Test anxiety

feelings of apprehension/tension/threat/arousal
evoking under evaluative situations (worry – emotionality)

Test anxiety – Performance relationship

Under evaluative situations
individuals with higher test anxiety perform poorer than
individuals with lower levels of test anxiety

Why?

“high test anxious persons spend a part of their task-time doing things which are not task oriented. They worry about their performance and about how well others might do, ruminate over choices open to them, and are often repetitive in their attempts to complete the task”

Marlett & Watson (1968)

Cognitive interference hypothesis

Cognitive interference

intrusive thoughts

thoughts individuals experience while performing a task, which are not related to the execution of the task

self-preoccupation, criticism, negative evaluation

worry

I doing poorly, I'm not good enough, I will fail, ...

irrelevant thoughts

what am I doing later, personal worries, ...

thoughts of escape

I want to get out of here, I'm fed up with it, ...

Sarason et al., 1986

Cognitive interference hypothesis

Wine's 1971 – attentional interpretation

cognitive interference is a result of test anxiety

cognitive interference has detrimental effects on performance

Test anxiety → cognitive interference → performance

Test anxiety–Cognitive interference

Sarason & Stoops 1978

Sarason, 1984

Zats & Chassin 1983

Deffenbacher & Hazaleus, 1985

Cognitive interference-Performance

Paulman & Kennelly, 1984

Seibert & Ellis, 1991

Hoffman, 1993

Cognitive interference theory

Cognitive interference, and in particular worry, is a product of test anxiety, and is detrimental to performance because individuals' attention is diverted from the task; cognitive resources that could be used for task processing purposes are (mis)used.

Sarason, 1988

Cognitive interference theory

Other factors contributing to cognitive interference

Study skills (Naveh-Benjamin, 1991)

Task difficulty (Arkin, Detchon, & Maruyama, 1982)

Perceived ability, Importance of examination

Perceived preparation, Grade expectancy (Hunsley, 1987)

Cognitive interference theory

Critique

Field studies (exam situations) based on self-reports provided considerable support for the cognitive interference hypotheses

Still, no solid inferences about the mechanisms or the direction of the relationships could be made – only hypotheses

BUT

Experimental studies, to test the mechanisms and establish causality

Manipulation of

task difficulty, attentional demands, distractors, stress levels

Examination of

effects on performance

Results not consistently supported the cognitive interference hypothesis

Anxiety may have negative, neutral, or positive effects on performance

Processing efficiency theory

Eysenck 1992; Eysenck & Calco, 1992

Anxiety has detrimental effects of processing efficiency, but not necessarily to performance effectiveness, because it might serve a motivational function.

Anxiety affects performance through (a) attention and (b) effort (resources)

(a) Worry pre-empts processing resources of the working memory

(b) Worry may lead to the allocation of additional resources (effort, strategies) to overcome the aversive consequences of poor performance

Processing efficiency theory

“In order to escape from the state of apprehension associated with worrisome thoughts and to avoid the likely aversive consequences of poor performance, anxious subjects try to cope with threat and worry by allocating additional resources (i.e., effort) and/or initiating processing activities (i.e., strategies). Such attempts, if successful, increase available working memory capacity. As a consequence, potential performance impairments caused by the utilisation of working memory resources can be compensated for by the allocation of additional resources or activities.”

(Eysenck & Calvo, 1992, p. 415).

Processing efficiency theory

Predictions

- Anxiety typically impairs processing efficiency more than performance effectiveness
- Anxiety reduces spare processing capacity during performance
- Impaired processing efficiency can be detected through extended processing times
- High anxious individuals should report greater levels of effort than low anxious individuals when performance is comparable
- Motivational factors enhancing effort will benefit performance of low anxious individuals more than that of high anxious individuals
- The adverse effects of anxiety on performance is directly related to task complexity (working memory demands)

Processing efficiency theory

Critique

The theory accepts that anxiety has a detrimental attentional effect, but also justifies why anxiety does not always impair performance.

The findings are based on laboratory experimental research which allows inferences regarding direction of causality, but lacks ecological validity (applicability in field)

Fails to provide specific predictions regarding 'when' (under what circumstances) additional resources come into play, and 'when' they can be effective

Control process theory

Self regulation

Human behaviour is regulated in a system of feedback control.

GOALS

SELF-MONITORING

GOAL-PERFORMANCE DISCREPANCIES

WORRY

GOAL ATTAINMENT EXPECTANCIES

COGNITIVE AND BEHAVIOURAL RESPONSES

Control process theory

Human behaviour is regulated in a system of feedback control.

people establish GOALS in relation to certain values and use them as reference points

when behaviour is displayed they MONITOR their progress towards the goal

if GOAL-PERFORMANCE DISCREPANCIES are identified

individuals will experience WORRY.

Depending on their GOAL ATTAINMENT EXPECTANCIES they will

RESPOND by (a) adjusting their action towards goal attainment (if expectancies are positive) or (b) experiencing impulses to disengage (mentally or behaviourally) from attempts to attain the goal (if expectancies are negative)

Control process theory

The person who expects to be able to cope (*in the face of adversity*), who is sufficiently confident of being able to complete the action, responds to anxiety-arousal with renewed effort. The person who has serious doubts about being able to cope, who has the expectation of bad outcome, is likely not to persist in the face of anxiety arousal. This person is more likely to experience an impulse to disengage... This impulse sometimes results in overt withdrawal from the behaviour setting. It is sometimes expressed more subtly as disengagement of effort toward goal attainment. These responses, in turn, can result in impaired performance.”

(Carver & Scheier, 1988, p. 19).

Put together

(in a simplistic way)

Worry limits cognitive resources (thus is detrimental performance)

BUT

Can also serve a motivational functions (increase effort), thus not necessarily impairing performance

STILL

Whether individuals invest resources (effort, strategies) depends on their expectancies to attain the goal

Sport anxiety – performance research

Sport psychology

Vast amounts of research has been devoted to the examination of the anxiety-performance relationship

Results from meta-analyses reveals

- (a) that there is no conclusive evidence
- (b) that only small relationships have been identified between anxiety dimensions (cognitive and somatic) and performance
- (c) limitations in research instruments
- (d) limitations in research designs

Kleine, 1990; Craft, Magyar, Becker & Feltz, 2003; Woodman & Hardy, 2003

Research has neglected to investigate the mechanisms through which anxiety affects performance

Implications for research

Processing efficiency theory

Task difficulty – Task demands in terms of working memory

Relative influence of processing efficiency deficits and effort in relation to sport characteristics

Control process theory

Self-regulation over process, performance, outcome goals

Assessment of goal-performance discrepancies during competition

Implications for research

Issues to consider

Experimental studies

Physiological/Psychophysiological measures (processing efficiency, effort)

Dispositional vs Situational anxiety (and interaction)

Ecological validity

 Manipulation of anxiety (close to competition levels)

 Nature of tasks (in relation to field)

Reciprocity

 anxiety affects performance OR performance affects anxiety?

Field studies

Assessment of performance components in relation to working memory
 demands

Identification of underlying mechanisms

 Assessment of processing efficiency?

 Evaluation of overall outcome

Implications for practice

FIND THEM!!!

Identify which of the psychological skills training strategies (reported at the right column) are mostly applicable, and what would be the goals of each strategy (why would we use it?), in relation to the presented psychological theories / mechanisms.

Involved constructs

Anxiety – Worry

Processing efficiency

Effort

Performance effectiveness

Goal – performance discrepancies

Goal attainment expectancies

Responses to discrepancies

Psychological skills training

Goal setting

Self-talk

Relaxation

Attention control

Imagery