

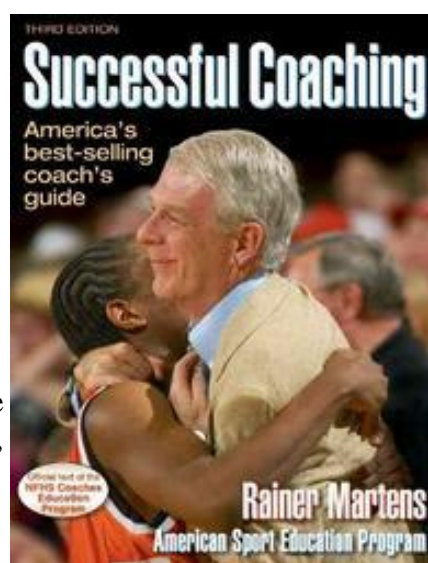
STATE / TRAIT ANXIETY

Anxiety is a negative emotional state associated with arousal; it involves fear, worry and doubt. Anxiety is caused by situations which are PERCEIVED as threatening because they

1. threaten our self-esteem (**shame**)
2. cause **personal harm**
3. create **uncertainty**
4. create **frustration** (such as being unable to achieve goals)
5. create **pressure** (eg having to take a penalty shot to win a match)

Charles Spielberger (1966) distinguishes between TRAIT anxiety, which is a permanent predisposition to see situations as threatening, and STATE anxiety, which is a temporary emotion in response to a particular situation. People with high trait anxiety are more likely to respond to challenges with state anxiety.

Rainer Martens, professor of Physical Education at the University of Illinois, designed a psychometric test in 1977 to score athletes for trait anxiety, which he calls A-TRAIT. This test is called the **Sport Competition Anxiety Test (SCAT)** and aims to be objective, proof against response bias (DEMAND CHARACTERISTICS) and easy to fill in and score. It was originally designed for children and tested on 193 boys from Chicago junior high schools. The boys were aged 12-15, mainly white and middle class. The SCAT was found to be high in test-retest reliability ($r = 0.77$). Martens carried out 11 more studies and showed the SCAT was high in various types of validity (face, construct, predictive, etc).



[You can see the SCAT and fill it in online here.](#)

Alternatively, [download a copy of the SCAT](#) (PDF format)

The test has 15 questions, each answered by ticking "Rarely", "Sometimes" or "Often". Items 1, 4, 7, 10 and 13 are distracter questions. The rest are scored 1 for "Rarely", 2 for "Sometimes" and 3 for "Often", except for items 6 and 11 which are scored in reverse ("Rarely" is 3 and "Often" is 1). A total of less than 17 means low trait anxiety and over 24 means high trait anxiety.

The SCAT is still a very widely used test in Sport Psychology, probably because it's so easy for respondents to understand and quick for researchers to score. Martens himself has gone on to publish many books on coaching and founded the **American Sport Education Program**, which promotes physical education in schools and colleges based on psychological principles.

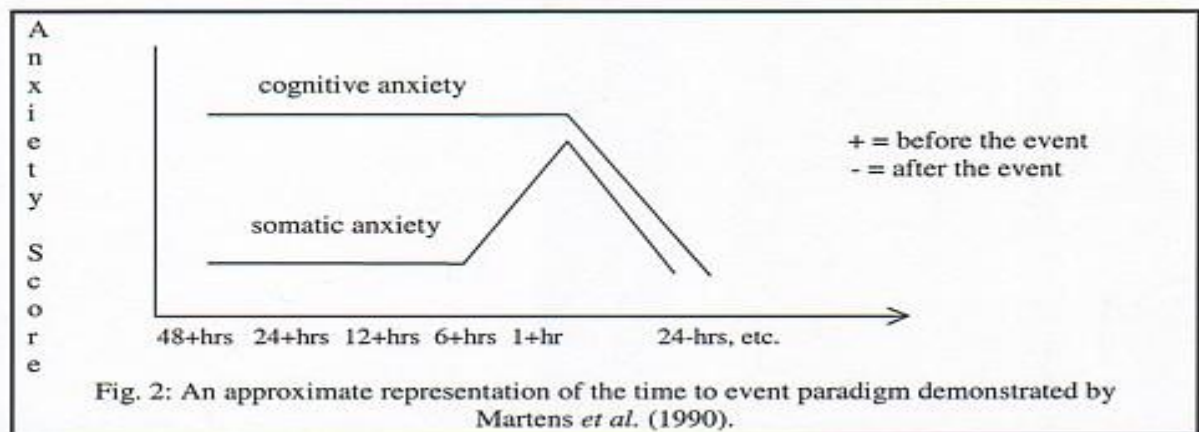
MULTIDIMENSIONAL MODELS OF ANXIETY

Since the 1960s, lots of tests have been produced to measure trait anxiety (like the **SCAT**) or state anxiety. Other measures have been created for cognitive or for somatic anxiety. All of these tests are UNIDIMENSIONAL because they only measure one thing. **Rainer Martens**

started researching how these different types of anxiety relate to each other, producing a multi-dimensional model. Martens proposes:

- **Somatic anxiety** includes the physical, biological side of anxiety - sweating, trembling, etc. It has an inverted-u relationship with performance (just like **arousal**)
- **Self-confidence** is the opposite of A-trait and has a positive correlational relationship with performance (the more the better!)
- **Cognitive anxiety** or “worry” has a negative correlational relationship with performance (the more the worse!)

Martens et al. (1990) developed the **Competitive State Anxiety Inventory (CSAI)**. Martens’ original CSAI just measured state anxiety, but the CSAI-2 measures different sorts of state anxiety (somatic and cognitive) as well as self-confidence. The procedure is to test athletes 48 hours, 24 hours, 2 hours and 5 minutes before a competition: Martens calls this a **TIME-TO-EVENT PARADIGM**. The first test establishes baseline measures and we can see how the later tests show more or less anxiety than the baseline. Martens found that cognitive anxiety stayed constant or dropped steadily on the run-up to the event, rising suddenly after the warm-up; somatic anxiety rose steadily before the competition and peaked dramatically in the minutes before the event.



The questionnaire has 27 questions which are answered by ticking "Not At All", "Somewhat", "Moderately So" or "Very Much So". The test produces three scores (somatic, cognitive and confidence) which range from 9 (lowest) to 36 (highest). Here are some examples of the questions:

- My body feels tense (somatic anxiety)
- I'm confident I can meet the challenge (self-confidence)
- I feel nervous (cognitive anxiety)

The CSAI-2 has been used in lots of sport psychology research, by Rainer Martens and by lots of other researchers. Despite being 20 years old, the CSAI-2 remains pretty much the last word in sport-specific anxiety testing. There have been over 50 published studies using the CSAI-2 to test the link between anxiety and sporting performance, in particular the direction of anxiety; ie does anxiety improve performance or reduce it?

MODELS OF ANXIETY

Psychologists have considered anxiety from different perspectives. Biopsychologists have discovered that structures in the brain – the amygdala and hippocampus – play a role in creating anxiety. A candidate for the “anxiety gene” is PLXNA2. Cognitive psychologists are much more interested in how we appraise some situations as threatening and others as manageable. From the Psychodynamic perspective, anxiety comes from conflicts in the unconscious mind that we don’t acknowledge and the power of the Super-ego to “punish” us for forbidden desires or urges. Other researches continue to look for a connection between anxiety and the **Yerkes-Dodson Law**.

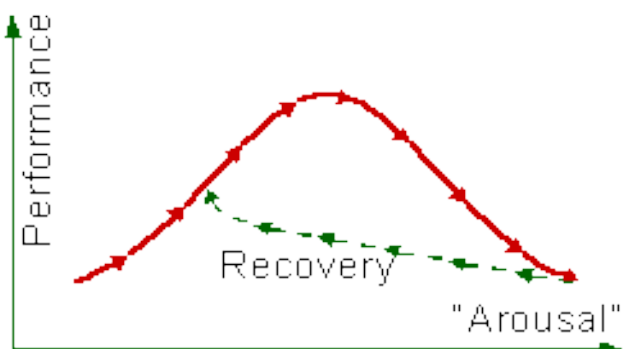
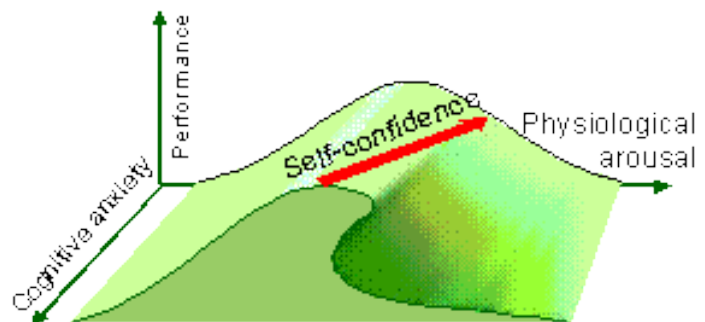
Lew Fazy & John Hardy (1988) proposed a new model called CATASTROPHE THEORY. They were two British researchers at the University of Wales who were dissatisfied with the inverted-u theory as a description of anxiety. They proposed three criticisms:

1. Somatic (physical) anxiety is not separate from cognitive anxiety – the one affects the other
2. When someone passes the optimal point and their performance drops, it doesn’t always tail off gradually but often plummets suddenly
3. Even if you “tweak” a player’s anxiety back to the optimal level, performance doesn’t usually recover from a collapse like this

Fazy & Hardy suggest a different set of rules for how anxiety affects performance:

- Cognitive anxiety is the “**SPLITTING FACTOR**” which determines whether arousal has a slow and gradual effect or a sudden and dramatic effect on performance
- The inverted-u is fine for showing how arousal affects performance with low cognitive anxiety, but with high cognitive anxiety and a *different pattern occurs*
- Under high cognitive anxiety, if arousal goes past the optimal point a **CATASTROPHE** will occur – performance drops suddenly; John Hardy compares this to a breaking wave

If you look at the graph [right] you can see how, when cognitive anxiety is low, performance rises to an optimal point with arousal then dips back down again



– a classic inverted-u. But when cognitive anxiety is high [closer to the viewer], performance falls off a cliff after the optimal point and even arousal drops slightly. One factor that might stop the wave from “breaking” is self-confidence.

After a catastrophe, performance doesn’t go back to its high level even if cognitive anxiety drops back down again. Instead,

cognitive anxiety has to drop back to baseline so that performance can start increasing again from scratch. This pattern is called **HYSTERESIS** – the tendency for things not to go back to their old state once a critical point has been passed.

Hardy et al. (1994) put the theory to the test by looking at eight crown green bowlers. The bowlers were asked to bowl three balls at a jack on two different days. The first day was the control condition (normal anxiety) but on the second day they were given “threatening” instructions. The **CSAI-2** was used to confirm that the bowlers did in fact have higher cognitive anxiety on the second day. The players were given running tasks to increase their physical arousal and their heart rate was measured on both days. On the first day the results followed a weak inverted-u but on the second day performance was much better, but dropped away catastrophically once heart rate got too high.

Catastrophe Theory has been very well received because it fills in some of the gaps in the inverted-u relationship between arousal, anxiety and performance. It would seem to explain the experience of “choking” that seems to affect even elite sports players. For example, Czech tennis star Jana Novotná played Steffi Graf in the [1993 Wimbledon women’s singles](#) final. After losing the first set, Novotná took a commanding lead and was playing for championship point, 40-15. Instead, she lost her nerve and began missing easy shots. When Steffi took the prize, Novotná cried onto the Duchess of Kent’s shoulder. (A happy ending: Jana Novotná came back to win at Wimbledon in 1998).



A lot of psychologists approve of Catastrophe Theory for its sophistication. However, **Diane Gill (1994)** criticized the theory for being too complicated and difficult to test. For example, at what point does cognitive anxiety stop producing simple inverted-u relationships and start creating the “breaking wave” relationships of a catastrophe? Just how exactly does self-confidence fit into this? How does anxiety affect the hysteresis pattern – at what point can an athlete start to rebuild their performance again? Other researchers, such as **Rainer Martens (1990)** are not convinced that cognitive anxiety can improve performance.