National Aeronautics and
Space Administration

technology solution

Instrumentation

ZONE (Zeroing Out Negative Effects)

Biofeedback training for optimal athletic performance

NASA's Langley Research Center has developed ZONE, an innovative method for improving athletes responses to stress, anxiety, and loss of concentration during competition. In the training environment, when the user successfully attains an optimal target state of psychophysiological functioning, the technology informs and/or rewards that user through real-time physical changes in the athletic equipment. For example, in the training setting, a golfer can work toward optimal concentration in the act of putting, leading to improved performance in real situations.

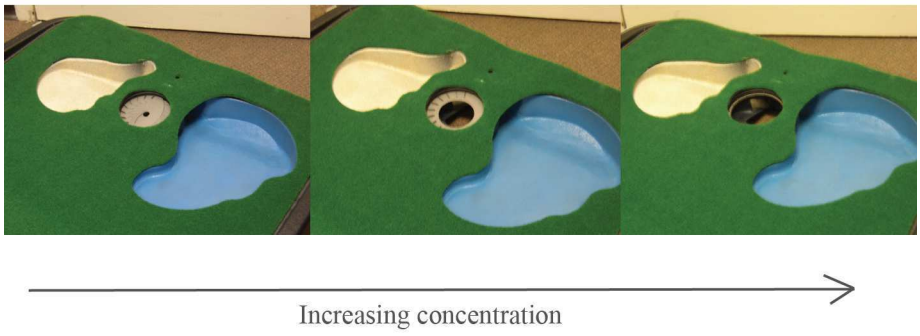
BENEFITS

- Improves responses to stress, anxiety, and loss of concentration during competition
- Appeals to users by embedding biofeedback training in actual athletic task required to perform better
- User simultaneously masters muscle skill and optimal mental state for executing in real situations

THE TECHNOLOGY

The system uses perturbation feedback to help the athlete get into the zone through an original method of ZONE. The method allows a trainee to learn physiological self-regulation in order to modify the difficulty of the performance task and/or environment in which training is conducted. For example, better concentration leads to a variety of easier conditions on a training putting green.

The technology incorporates software and hardware to provide real-time feedback to the athlete about how close his or her arousal and emotive responses are to an optimal state required to successfully perform the athletic task. This innovation presents the capability to extend current sports training and psychological practices of guided imagery visualization and cognitive reinforcement learning by systematically providing demonstrable and relevant feedback through the use of closed-loop, cybernetic feedback principles that provide immediate reinforcement of pyschophysiological self-regulation and translate into better skill-based performance.



Effect of concentration brainwaves on putting hole size in ZONE training setting

APPLICATIONS

The technology has several potential applications:

- Sports psychology improving skill-based performance
  -- golf, tennis, baseball, football, hockey, basketball, lacrosse
- Marksmanship training improving aim and concentration
- Video gaming mental game technology leveraging motion sensor controllers
- Defense special forces training

PUBLICATIONS

Patent No: 8,628,333

Patent Pending

More Information

National Aeronautics and Space Administration

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