Enhancing human performance with Alive®

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Alive combines uniquely developed psychological training techniques with state-of-the-art biofeedback technology

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Optimal performance in business and sports

Business and sports activities share a common factor: intense pressure to succeed under demanding and stressful conditions. These activities require an innovative way to better understand and improve performance by changing the way internal processes interact with external demands.

Empowering people in their quest for optimal performance has led Somatic Vision to create an easy-to-use, very practical and efficient comprehensive training environment combining multi-modal biofeedback options for flexible and individualized training.

Improved ability to regulate different autonomic nervous system variables can have a very positive impact on performance. Combined with proven psychological methods, Alive offers a powerful training platform.

Alive uses two sensors (SCL and PPG). The combination of the following peripheral physiological modalities is recorded, processed and fed back to facilitate mental training and maximize the trainee's potential. Using the following modalities gives a comprehensive picture of sympathetic and parasympathetic levels and dynamics:

Feedback	Benefits	Techniques
SCL SCL graphing measures the changes in sympathetic arousal	Illustrate how thoughts affect body and performance Identify anticipatory and performance anxiety Monitor physiological relaxation Identify stressful components of performance during imagery rehearsal Practice countering irrational thoughts Practice physiological desensitization Learn to relax or energize and boost arousal level on demand Learn to achieve pre-competition optimal level of arousal Improve attentional focus Maintain inner balance while controlling distractions Modulate the level of arousal necessary for performance and getting into the "zone" Facilitate the skill to regenerate or fall asleep with ease when one is under stress Learn to quickly recover from residual tension Sweat Stability Graph Facilitate awareness of cognitive and emotional intrusions Facilitate concentration (sustained attention)	Use with attentional control techniques (Body Scan, Zoom Out™, Mental Mini-Breaks™, and Mindfulness), imagery rehearsal and self–talk. Also use when applying cognitive restructuring techniques, future projection, and brief imagery techniques. 

Feedback	Benefits	Techniques
HR HR graphing measures exertional intensity	Learn to lower HR even while maintaining a steady workload Improve concentration and reaction speed Improve psychomotor coordination Improve resilience Identify harmful overtraining Reduce competitive anxiety Improve cardiovascular flexibility Decrease cardiovascular effects of exercise before and during exercise regimen	Use with PMR, breathing exercises, and training strategies for concentration
HRV HRV graphing measures changes in sympathetic-parasympathetic balance	*Thoughts and emotions have a profound effect on heart rhythm — this rhythm impacts performance* Achieve balance in the autonomic nervous system to stabilize emotions Develop a clear mind, improve attention, concentration, planning, and control precise body movements Improve attention, concentration, planning and control of precise body movements Build a beneficial sense of wellbeing and self-confidence Improve the ability to get into “the zone.” Improve teamwork and communication (by achieving higher levels of resting HRV) Learn to intensify or control emotional reactions, manage mood swings Control performance anxiety Practice open, non-judgmental awareness and keep perspective Decrease "mental chatter"	Use with breathing techniques, CBT, Mental Mini-Breaks, mental imagery, and mindfulness training Find resonant frequency with the Alive Coach Maximize the peak-valley difference using the heart rate line graph Train for quick recovery  Maximize the time spent in high smoothness 
BVP Graphs indicate relative changes in the vascular bed due to increase or decrease in blood perfusion	Monitor and improve deep relaxation skills Monitor anticipatory anxiety Monitor ongoing arousal and vigilance Maintain attention Practice physiological desensitization Explore emotions, thoughts and feelings associated with hyper-vigilance Use BVP amplitude as an indicator of changes in peripheral temperature (rapid BVP changes precede changes in peripheral temperature) Improve “psyching–up” for enhanced performance	Use with vivid imagery, before-and-after-event PMR, and hand-warming techniques 

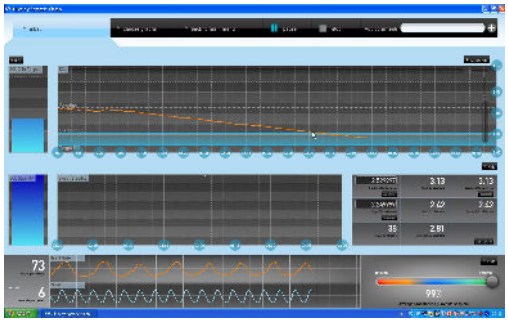
It is important to remember that what defines optimal performance is different for each individual: Some performers need to be more relaxed while others need to boost their arousal level in order to achieve optimal performance. Most cases demand a flexible and constant shift.

Many factors influence the effectiveness of performance under stressful conditions:

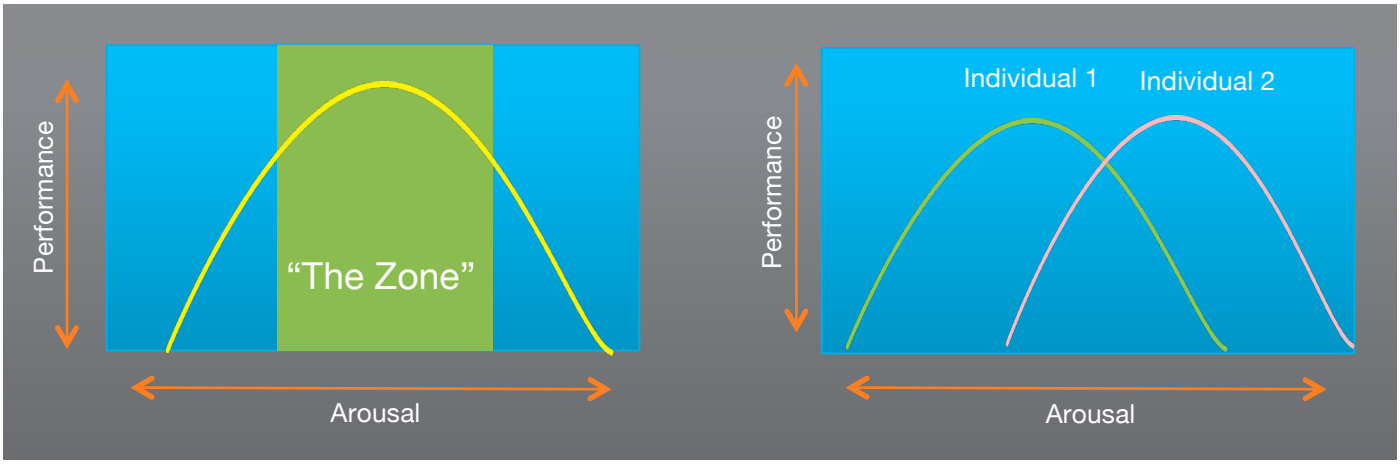
- Self-efficacy, which is influenced by the individual's physical and mental skills and abilities, his previous experience, his coping style and personality characteristics.
- Self-regulation abilities: affective, cognitive, physiological and behavioral
- Environmental and performance demands: the challenging circumstances such as the work and competitive, interpersonal or organizational environment.

Several authors have discussed the ideal performance state. "Flow" is considered the ideal state of mind associated with achievement or optimal performance *(Jackson & Csikszentmihalyi, 1999).* This state is characterized by automatic and effortless attention to the task. Hanin *(1995)* used the term **"zone of optimal functioning"** to describe the arousal state necessary for optimal performance. In essence, it seems that the appropriate combination and state-dependent balance between physiological, cognitive and affective conditions allow a skilled individual to optimally apply his knowledge and abilities.

Biofeedback is very useful in achieving the ideal physiological and cognitive state for allowing the "flow" experience to happen. Each individual has his own optimal **performance zone** depending on the characteristics of the specific task:



An optimal performance zone is characterized by a quieted mind and high smoothness, as reflected in this graph



Adapted from *Jackson & Csikszentmihalyi, 1999*

Training process

STEP 1

Identify stress affecting the trainees' performance and monitor each individual's unique psychophysiological reaction to it

First we must analyze the person we are training for a specific task. Each trainee will have a unique psychophysiological profile and Alive's comprehensive clinical views help us understand the individual response stereotypy. Profiling is easy with Alive: Comments and indices can be inserted very easily.

Statistics are given for average smoothness (coherence), min & max smoothness, session-start and end smoothness. Change in smoothness can be tracked for the whole session: Average heart rate and % change in heart rate, % skin sweat change, average sweat stability, and BVP amplitude change.

STEP 2

Acquiring and applying tools for maintaining mental balance and gaining confidence and proficiency

The characteristics of being in the zone and how Alive helps you to get there: A combination of SCL, HRV and BVP training ensures different aspects of the mind-body reaction to stress can be addressed.

Relaxed – A calm mind and a body that is "ready-to-go."

Through training to calm the mind using SCL graphs with Alive's audio-visual technique workshops, the trainee gains better control of his arousal levels and sweat stability. Techniques include: Body Scan, Mental Mini-Breaks, Zoom Out, and mindfulness training.

Different HRV graph training modes help achieve a more balanced autonomic nervous system and increased psychophysiological resilience. Alive offers several breathing and emotion-regulation workshops.

BVP changes in amplitude reflect parasympathetic/sympathetic dynamics influenced by cognitive and emotional activity. BVP amplitude training helps to reduce anticipatory anxiety and hyper-vigilant states. Furthermore, measuring changes in peripheral blood circulation is very useful in monitoring deep relaxation states and the relaxation response. Alive's PMR and imagery workshops are suited to enhance peripheral warming.

Confident — knowing that everything necessary to achieve success will be done without an "inner critic" analyzing and distracting. While performing, not allowing lapses in performance to undermine your basic belief in your ability.

After training for body and mind control with Alive's different workshops and graph training, using Alive's environments and games take the trainee gradually into applying the new skills with tasks which are getting more and more challenging.

Building confidence with Alive comprehensive training environment is possible due to the wealth of training options. All games can be played with HRV and SCL, there are different challenge levels and the Dual Drive game can even be played manually creating a very challenging environment were self regulation skills are tested in a very competitive mode.

Staying focused and confident is necessary to succeed in those games.

While playing, the trainee may experience "failures" but instead of becoming upset and raising his arousal levels, or getting out of synch with his heart rhythms, he learns to maintain a confident and "cool" attitude.

Completely focused — totally absorbed in the moment.

Training with a combination of Alive mindfulness exercises and SCL and sweat stability graphing can enable the trainee can greatly enhance his or her ability to stay focused without being distracted and can improve accuracy in performance.

Effortless.

The Alive & Beyond 8-Week Program and the Alive interactive coach put an emphasis on achieving training goals effortlessly. "Trying too hard" is physiologically detected and coach suggestions appear which help guide the trainee toward effortless breathing or performing

Automatic.

"Thinking less to achieve more" can be trained wonderfully using Alive SCL graphing options and then playing the SCL game options. Trying too hard or thinking too intensively will immediately show: The result will be a rise in SCL and a drop in sweat stability.

Fun.

When you're "in flow," it's a real pleasure. Alive games intensify this feeling as they are fun to play and the player is given positive feedback on improvements in self-regulation.

In-Control.

Biofeedback is a great way to strengthen feelings of control. It simultaneously acts both physiologically and psychologically. "Seeing is believing." Achieving success while implementing new skills greatly and positively affects self-efficacy. Mind and body control are acquired through training and then reinforced again and again while playing. Perfectionists learn to substitute "extra effortful control" with optimal control.

STEP 3

Generalizing skills into real-world scenarios

1. Facilitate improved concentration and self-regulation skills in a fun dyadic or up-to-4-participant practice with Alive multiplayer Dual Drive option (selection of graphing type enables HRV, SCL or HRV-and-SCL training). As ability improves, players can also try to distract each other, challenging and helping to build each other's ability to maintain focused attention.

2. Practice skills "out in the real world" and generalize training using Mental Mini-Breaks and 5-Minute Breathing Breaks away from the computer.
3. Realize skills in competitive situations and maintain routines daily.

Expected outcomes for executives, athletes and performers who train with Alive

The Alive comprehensive training environment helps the trainee demonstrate better abilities in the areas of:

1. Decision making and multi-tasking
2. Staying focused on task
3. Dealing effectively with the unexpected
4. Making fewer mistakes caused by stress
5. Increased productivity and performance
6. Leading a healthier and higher quality of professional life
7. Reduced competitive anxiety
8. Identifying desired training intensity
9. Staying in the "zone"
10. Achieving one's personal best by generating the sense of inner confidence and greater self-efficacy

Blumenstein, B., Bar-Eli, M., and Tenenbaum, G. (1997). A five-step approach to mental training incorporating biofeedback. The Sport Psychologist, 1, 440-453

Hanin Y., (1995) Individual zones of optimal functioning (IZOF) model: An idiographic approach to performance anxiety (Book Chapter in Sport Psychology: an analysis of athletes behavior Henchen and Straub eds, Mouvement Longmeadow MA)

Gevirtz, R. N. (2003) The promise of HRV biofeedback: Some preliminary results and speculations. Biofeedback, 31 (3), 18-19

Jackson, S.A. & Csikszentmihalyi, M. (1999). Flow in Sports. Champaign, IL: Human Kinetics.

Kauss, D. (2001). Mastering Your Inner Game. Champaign, IL: Human Kinetics.

Leonards, J., (2003) Sport Psychophysiology: The Current status of Biofeedback with Athletes (part II). Biofeedback 31 (4), 20-23

Peper, E., Harvey, R., Lin I mei., Tylova, H., and Moss, d.,(2007) Is there more to Blood Volume Pulse than Heart Rate Variability, Respiratory Sinus Arrythmia, and Cardiorespiratory Synchrony? Biofeedback 35 (2), 54-61.

Peper, E. and Williams. E.A. From the Inside Out: A Self-Teaching and Laboratory Manual for Biofeedback. New York: Plenum, 1981.

Peper, E. Ancoli, S. and Quinn. Mind/Body Integration: Essential Readings in Biofeedback. New York: Plenum, 1979.

Perski, A., Tzankoff, S., and Engel, B. (1985). Central control of cardiovascular adjustment to exercise. Journal of Applied Physiology, 58(2), 431-435.

Raymond, J., Sajid, I., Parkinson, L.A., and Gruzelier, J. (2005). Biofeedback and Dance Performance: A Preliminary Investigation. Biofeedback. 30(1), 65-73.

Schmid, A. & Peper, E. (1998). Strategies for Training Concentration.In Williams, J.M. (ed) Applied Sport Psychology. Mountain View: Mayfield Publishing Co., 316-328

Strack, B. (2003). The Effect of Heart Rate Variability Biofeedback on Batting Performance in Baseball. Dissertation Abstracts International: Section B: The Sciences and Engineering, 64, 1540.

Strack, B., Biofeedback and Neurofeedback Applications in Sport Psychology — Workshop. AAPB Meeting 2010

Vaschillo, E., Lehrer, P., Rishe, N., & Konstantinov, M. (2002). Heart rate variability biofeedback as a method for assessing baroreflex function: a preliminary study of resonance in the cardiovascular system. Applied Psychophysiology and Biofeedback, 27(1), 1–27

Vaschillo, E., Vaschillo, B., & Lehrer, P. (2004). Heartbeat synchronizes with respiratory rhythm only under specific circumstances. Chest, 126(4), 1385–1386.

Wilson, V.E., Training for Executive Performance — Workshop, BFE, Udine, Italy, 2003

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Yuval Oded, PhD (c) is the founder of Psy-Phi, a company that uses a "Mental Gym" to train elite defense units and combat pilots to achieve and maintain optimal performance under stress. He also provides biofeedback and peak performance training to the French Ministry of Defense, athletes, psychologists, physicians, social workers and tech companies. Oded is a clinical psychophysiologist specializing in treatment of extreme stress. The founder and director of clinics throughout Israel that integrate biofeedback to treat a wide array of conditions, including anxiety disorders, behavioral disorders, chronic illnesses, neurological problems, psychosomatic problems, head trauma and post traumatic stress disorder.

Apart from this paper, Oded is also the author of the Alive Clinical Version User Guide, the Alive Clinical Version Introduction Video, and the Alive Workshops (on- and off-screen) found in Alive and in the Alive User Guide.