Addressing Key Psychological, Social and Physiological Factors in Preparation for Long Duration Manned Missions . Suggested Adaptations of the Current Astronaut Selection and Training

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Behaviour science for increasing the well-being and performance of crew and mission control: Training people how to act deliberately towards meaningful ends in each moment promotes long-duration manned mission success

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Goldsmiths



Institute of Management Studies, Goldsmiths, University of London

Interdisciplinary team of scientists looking at the borderlines of psychology, behavioural science, organisational behaviour, management and economics.

Apply our evidence-based knowledge in diversely in mental health, premiere sports, investment and retail banking, British Government, arts, multidisciplinary teams.

For how long can you do "extreme"?



My work..

Develop interventions for different groups or organisations

How to maintain focus under demanding scenarios that require high performance

Create groups that work together effectively under high pressure

Develop leaders to be "transformational"

Increase the team cohesion, well-being and productivity of individuals and groups using psychological flexibility.

4 I's of Transformational Leadership

Idealized Influence Leader serves as an ideal role model for followers and is admired for this

Inspirational Motivation Transformational leaders have the ability to inspire and motivate followers

Individualized Consideration Transformational leaders demonstrate genuine concern for the needs and feelings of followers which brings out the best efforts from each individual

Intellectual Stimulation Transformational leaders challenges followers to be innovative and creative



Psychological flexibility

is the ability of people to focus on the present situation, so that they are able to take advantage of every possible moment in taking bold actions to achieve meaningful goals.

means to contact the present moment fully as a conscious human being, and based on what the situation affords, changing or persisting in behavior in the service of chosen values.

Enables people how to understand and use their difficult internal experiences (thoughts, feelings, sensations) and set goals that helps them to create meaning.

a unified model of human functioning

Research shows ...

PF's focus is on accomplishing goals, despite feeling mentally unwell, is a key to its success in life (meta-analysis by Hayes, Pisterello & Levin, 2012) and high performance situations (Bond, Hayes, & Barnes-Holmes, 2006). Another meta-analysis by Ruiz (2012) compared ACT with older versions of CBT and found that ACT outperforms (in case of chronic pain and depression) or (in case of mixed anxiety) is at least equivalent to older CBTs in improving mental illnesses.

Consistent with these positive findings, the American Psychological Association has listed ACT as an evidence-based approach for chronic pain, and depression. Randomised controlled trials have also shown that ACT is effective in improving anxiety (Forsyth, 2010), addiction (Smoking: Wilson and Luciano, 2002; Alcohol: Heffner and Eifert, 2003, Substance Abuse: Lanza and Menéndez, 2013; López *et al.* 2009), coping with cancer pain (Dahl et al. , 2005; Dahl and Lundgren, 2006; McCracken, 2005), post-traumatic stress disorder (Walser and Hayes, 2006), and organisational behaviour, innovation and leadership (Bond, Hayes, & Barnes-Holmes, 2006; and Bond et al. 2016 for a review).

ACT's use of secular mindfulness meditation techniques follows their overwhelmingly successful medical use by Jon Kabat-Zinn (1974) at the Massachusetts Institute of Technology. There, research has shown that mindfulness has effectively treated stress, chronic pain, and depression (Brown & Ryan, 2003; Keng, Smoski & Robins, 2011). It also has been found to enhance empathy, compassion, and positive social interactions whilst also decreasing people's sense of loneliness and burnout (Krasner et al. 2009; Creswell et al., 2012; and Hagan, Manktelow, Taylor & Mallet, 2014). In all, research suggests that PF could ease a sense of isolation that astronauts may experience during a mission, as well as enhancing their ability to attain their goals (as noted above).

This might be useful when...









How do we do that?



By helping people to adapt to their environment effectively using contextual behavioural science, that is, by targeting *psychological flexibility*, a fundamental human process.

- → Increases well-being, productivity, innovation, transformational leadership behaviours, group cohesion
- → Decreases fatigue, sense of loneliness and burnout, omission errors, occurance of mental health problems

Bond F.W., Hayes S.C., Baer R.A., Carpenter K., Orcutt H.K., Waltz Te., (2011) Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: A revised measure of psychological flexibility and acceptance. Behavior Therapy. 42, 676–688.

https://www.gold.ac.uk/institute-management-studies/staff/bond/

The Matrix Diagram in Primary Care Kevin Polk, Ph.D. www.drkevinpolk.com



What we propose:

Adapt and iintegrate the advances of contemporary evidence based psychology, namely contextual behaviour science into astronauts and the mission control team training and potentially management systems involved to increase their level of psychological flexibility, a fundamental human process that is evolutionarily hardwired.

In so doing, theory and research suggest the following benefits will ensue;

Increased level of performance, well-being, and group coherence:

- Ability crew and mission control to focus on the present moment, and take bold actions that the
 mission requires and deal with isolation, difficulty and discomfort adaptively. Increased ability to
 willingly experience difficulties and anticipate failure in order to constantly adapt, communicate and
 to identify possible solutions and act effectively in demanding and unique situations.
- Established group cohesiveness and group values in order to help up members of the group when they fail and adaptively seeks out solutions. Promote connectedness and perspective taking among group members, to make effective decisions and act in the present to achieve the shared goals of the mission.
- Increased ability of group leaders in motivating members to innovate new ideas and to recognise when team members need support. Enhanced competence of leadership to build trust and mutual respect, in part by recognising members' individuality within an interrelated group.



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