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SPECIAL ISSUE

Taking Human Performance to the Next Level (with FLARE)

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This paper introduces a comprehensive methodology for achieving optimal human performance in a variety of professional settings, including highly challenging ones. This methodology harnesses the power of empirically validated biofeedback and mindfulness techniques. As part of this methodology, I present a step-by-step approach to training, including an easy-to-use technique called FLARE.

Introduction

Imagine yourself . . . Sitting in the front row of a large conference room, waiting for the current speaker to finish, before it's your turn—your turn to come up on to the stage and present. You have your materials prepared. You rehearsed. You memorized. Yet, as you are sitting in that chair, you do not feel in control of yourself. You are not at ease. You are in a panic! You can't focus on what the current speaker is saying or on anything else. Your mind is foggy. You keep repeating in your head the opening sentences of your presentation, praying that you don't screw up the words. Your heart is beating fast. Your breathing is shallow. Your palms are clammy . . . Maybe instead of a large conference room, it's a boardroom. Or it's a small meeting with an important prospective client or an investor. Or it's a negotiation with another company. You get the point. You have been there. The stakes are high, your mind is foggy, your heart is racing, and it is SHOWTIME! . . . If only you could relax, right?

As human beings, we are constantly striving to do better. As students, we strive to improve our grades and test scores. As athletes, we strive to increase the number of wins. As musicians, we strive to express the meaning of the music we play. As professionals, we strive to be engaging and interesting in public speaking, efficient and productive in our work, and effective and respected in our leadership.

Most of us have beliefs and ideas about the best ways to improve our performance that we spend a significant amount of time implementing. Think about how you might be responding to the scenario described above—what might you be saying to yourself as you prepare for speaking? You may be surprised to hear that, as shown by recent research, most of our ideas about what to do to optimize our performance are wrong. We spend a lot of time and put much emphasis on efforts that are not only not helpful to our performance, but are, in fact, detrimental to it. A 2014 study by Alison Wood Brooks showed that over 90% of participants hold the belief that the key to optimizing performance is to relax and/or calm down. It seems pretty natural to say "just relax" prior to an important academic, professional, or athletic performance. And yet, that is the opposite of what we need.

Prior to a performance situation of any kind, our bodies prepare for that situation with increased physiological activity—heart beating faster, breathing becoming faster, and increased sweating. This is natural, normal, and helpful. Imagine what would happen if you were actually relaxed when going in for a job interview or sitting for an exam. Imagine what would happen if the goalie in a championship soccer game was relaxing in the goal.

You may be familiar with the Yerkes-Dodson (1908) curve illustrating the relationship between physiological activation and performance. This curve (see Figure 1) shows that we need a moderate amount of physiological activation in order to perform at our best. When activation is low (i.e., feeling relaxed), so is our level of performance. When activation is overly high, performance level suffers as well. In other words, we need to find an optimal level of activation that will help produce an optimal level of performance.

The Yerkes-Dodson curve begs the question: How to do that? How do we find that sweet spot of activation? As Brooks (2014) confirms, RELAXATION IS NOT THE ANSWER.

In her studies, participants who attempted to get into a relaxed state prior to a performance were both unsuccessful in that goal (their heart rate did not decrease) and did not actually perform at their best, both in their own estimation

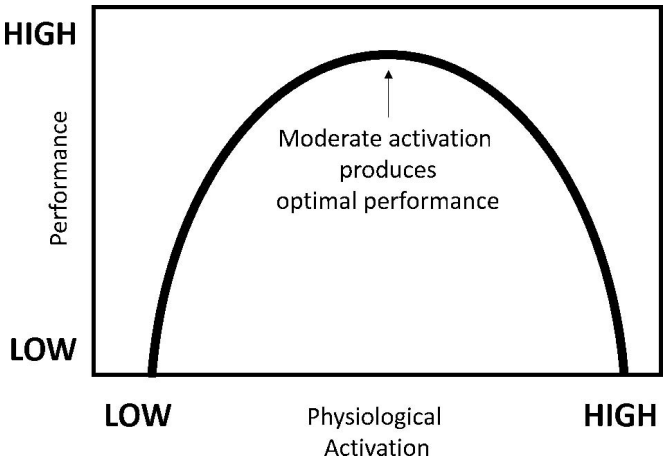

Figure 1. Yerkes-Dodson curve (1908) demonstrating relationship between activation and performance.

and according to the evaluation of objective judges. These findings are consistent with earlier findings by Wegner, Broome, and Blumberg (1997) who demonstrated that participants instructed to relax while solving a challenging mental task exhibited physiological activation (measured by skin conductance) significantly higher than participants solving the same task without the instruction to relax.

And yet, becoming overly activated is also not helpful to performance. When physiological activation is too high, anxiety may feel overwhelming. We may have trouble thinking straight and have trouble finding the skills we know we have to perform the task at hand, and our performance suffers.

A study by Indovina, Robbins, Núñez-Elizalde, Dunn, and Bishop (2011) demonstrated that people with high trait anxiety (those who frequently get overly activated) show higher activation of the amygdala (the fight or flight center of the brain) and lower activation of the ventral prefrontal cortex (vPFC; responsible for regulation of emotional responses and decision making). It is difficult, if not impossible, to perform at your best when your actions are being guided by an automatic, often irrational, reaction, and the part of the brain responsible for problem solving and decision making is not sufficiently active.

The task of achieving optimal performance is two-fold:

1. Activation: Optimize activation of the brain and the autonomic nervous system during times of stress to meet the challenge without becoming overly activated.
2. Recovery: Optimize ability of mind and body to recover once the challenge is met.

How do we train our minds and bodies to optimize activation and recovery?

In this paper, I propose that we have at our disposal two powerful tools: *mindfulness* and *biofeedback*, that, when combined into a comprehensive training approach, provide an opportunity to take our professional performance to its peak. This paper brings together a broad body of empirical evidence supporting the effectiveness of biofeedback and mindfulness in optimizing performance. The research on reappraisal and proper interpretation of physiological sensations is also related to optimal performance. I briefly review this evidence in the next section.

In the third section, I describe a methodology for combining biofeedback and mindfulness to enable optimal physiological and emotional activation. As part of this methodology, I introduce the FLARE technique that can be used in the moment to bring up the skills learned during training.[1] Conclusions and future directions are discussed in the final section.

Performance-Focused Empirical Evidence for Biofeedback and Mindfulness Biofeedback

Biofeedback is a tool used to train self-regulation, the ingredient necessary for optimizing activation. Multiple modalities of biofeedback can be effectively used to optimize performance. An excellent article by Larson, Wyckoff, and Sherlin (2016), provides guidance for using neurofeedback together with mindfulness for peak performance training with athletes. In this section, I briefly address ways in which heart rate variability (HRV) biofeedback may be used to optimize performance.

Heart rate variability is an indicator of the autonomic nervous system's ability to regulate itself (Gevirtz, 2013). More specifically, it is an indicator of the strength of the vagal nerve and the ability of the parasympathetic nervous system to put on the brakes to stress activation (Gevirtz, 2013). In other words, it is the balancing mechanism we need to regulate the amount of physiological activation necessary to function at our best during performance related situations.

HRV biofeedback training increases the flexibility of the autonomic nervous system and its ability to recover from stress-related, fight or flight situations, and return to a state of balance (Gevirtz, 2013). HRV biofeedback has been shown to increase heart rate variability (Del Pozo, Gevirtz, Scher, & Guarneri, 2004; Nolan, Kamath, Floras, &

[1] The FLARE technique presented here is an adaptation to optimal performance of the FLARE technique first introduced by Khazan (2015) as a skill used in mindfulness and acceptance based biofeedback in clinical practice.

Stanley, 2005; Prinsloo, Rauch, & Derman, 2014); reduce symptoms of anxiety (Henriquez, Keffer, Abrahamson, & Horst, 2011), depression (Karavidas et al., 2007; Siepmann, Unterdörfer, Petrowski, & Mueck-Weymann, 2008), and chronic pain (Hallman, Olsson, von Scheele, Melin, & Lyskov, 2011); increase endurance (Kiviniemi, Hautala, Kinnunen, & Tulppo, 2007); and enhance performance in music (Thurber, 2006; Wells, Outhred, Heathers, Quintana, & Kemp, 2012), dance (Raymond et al., 2005), and baseball (Strack & Gevirtz, 2011).

Recent research also shows the role of HRV in executive function of the brain, and therefore further demonstrates its crucial importance in optimizing performance. Studies have shown that higher HRV is associated with better memory retrieval (Gillie, Vasey, & Thayer, 2014), working memory, sustained attention, situational awareness, and goal directed behavior (Hansen, Johnsen, & Thayer, 2003; Hansen, Johnsen, Sollers, Stenvik, & Thayer, 2004; Thayer, Hansen, Saus-Rose, & Johnsen, 2009), as well as emotion regulation (Kim et al., 2013). Furthermore, a meta-analysis performed by Thayer, Ahs, Fredrikson, Sollers, and Wagere (2012) indicated that higher HRV is associated with better ability to reappraise manifestations of stress in more helpful ways. We will return to this point in the section of this paper that specifically addresses the importance of healthy appraisals of physiological and emotional manifestations of stress and arousal. The same meta-analysis also discusses the role of HRV in decreasing activation of the amygdala and increasing activation of the ventromedial prefrontal cortex, a balance vital to proper emotion regulation and executive functioning under stress.

Take-away. Collectively, these findings demonstrate the effectiveness of biofeedback as a tool for optimizing performance, by improving both physiological functioning of the body and executive function of the brain.

Mindfulness

Mindfulness is another powerful empirically validated tool for improving performance. Brad Lichtenstein (2016) provides an excellent overview of mindfulness and its definitions in another paper in this issue. In this section, I briefly address evidence for the effectiveness of mindfulness in optimizing performance.

Mounting evidence demonstrates the functional and structural changes that occur in the brain as a result of mindfulness meditation practice. Hölzel and colleagues (2010, 2011) have conducted a series of studies examining the effect of an 8-week mindfulness-based stress reduction (MBSR) course on participants' brains. In these studies, participants with no meditation experience were assigned either to the MBSR (experimental) group or a wait-listed control group. All the participants' brains were then scanned using an fMRI machine. The experimental group took part in the 8-week course, and the control group was placed on the waiting list for the same course to be completed after the study. All the participants' brains were scanned again after the course (or the equivalent waiting period for the control group) was over. Results of these studies demonstrated remarkable changes that took place in the brains of the participants that practiced mindfulness meditation for 8 weeks. I provide a summary of findings most relevant to optimizing performance.

- Hippocampus, the part of the brain responsible for *learning, memory,* and *emotion regulation,* became larger.
- Lateral cerebellum and cerebellar vermis, responsible for *emotional and cognitive regulation; speed, capacity, consistency, and appropriateness of cognitive and emotional processes*, became larger.
- Anterior cingulate cortex (ACC), responsible for *regulation of attention and behavioral control,* became more active.
- Right amygdala, responsible for *fear and anxiety,* became smaller.
- Right insula, responsible for *interoceptive awareness, empathy, and perspective taking,* became larger and more active.
- Temporoparietal junction (TPJ), responsible for *conscious experience of the self, social cognition, and compassion,* became larger.
- Posterior cingulate cortex (PCC), responsible for *integration of self-referential stimuli*, such as body position and body ownership (Guterstam, Bjornsdotter, Gentile, & Ehrsson, 2015), became larger.

These findings are directly relevant to optimizing performance. Functions such as awareness, attention, memory, and learning impact our ability to learn and utilize new skills. Improved emotion regulation and a reduction in the fear response improve our ability to focus on the task at hand.

There is also ample evidence of the positive impact of mindfulness training on performance. A randomized controlled study by Mrazek, Franklin, Phillips, Baird, & Schooler (2013) showed that a 2-week mindfulness training resulted in improved reading comprehension GRE scores and increased working memory capacity. The authors

pointed out that these improvements were mediated by a reduction in mind wandering.

Similarly, studies have demonstrated the effects of mindfulness training on several aspects of executive function. A study by Jha, Stanley, Kiyonaga, Wong, & Gelfand (2010) showed that mindfulness training mitigates the impact of high stress situations on working memory capacity, preventing its deterioration during highly stressful times. Mindfulness training has also been shown to improve attention (e.g., Brefcyznski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Jha et al., 2015), alleviate physiological response to high stress (e.g., Meland et al., 2015), enhance episodic memory (e.g., Brown, Goodman, Ryan, & Analayo, 2016), improve learning effectiveness (e.g., Ching, Koo, Tsai, & Chen, 2015), and improve high stakes academic performance (e.g., Bellinger, DeCaro, & Ralston, 2015).

These findings are consistent with the conclusion drawn by Gallant (2016) in a meta-analysis of the effects of mindfulness-based training on executive functioning. Gallant demonstrated that mindfulness training most consistently affects the inhibitory aspects of executive functioning, namely the ability to ignore irrelevant stimuli (e.g., mind wandering, intrusive thoughts, stimuli not relevant to the task at hand). In the performance arena, this benefit shows up in situations such as the ability to direct your attention to the speech you are giving, disregarding the movement and irrelevant conversation of people in the audience, the ability to refocus on the athletic performance following a mistake, and the ability to keep calm in the middle of an intense negotiation with an aggressive opponent.

Bellinger et al. (2015), who conducted a meta-analysis of complementary therapies in the workplace, concluded that mindfulness interventions are helpful in improving employee health and performance, but cautioned that long-term effects need continued examination. Studies included in this meta-analysis focused on employee health and performance in varied settings, from health care (e.g., Cohen-Katz et al., 2005; Shapiro, Astin, Bishop, & Cordova, 2005) to corporate (e.g, Aikens et al., 2014; Bazarko, Cate, Azocar, & Kreitzer, 2013).

Take-away. Collectively, these findings demonstrate that mindfulness-based training optimizes brain activation, enhances performance-related skills, and leads to superior performance. While the results are similar to those achieved with biofeedback, the mechanisms of action are different.

Reappraising Physiological Sensations

In addition to biofeedback and mindfulness applications to performance training, another crucial ingredient in optimizing performance is reappraisal and proper interpretation of physiological sensations of activation.

Biofeedback gives us a way to regulate our physiological activation to achieve the optimal level needed for the situation. Biofeedback also trains awareness of our physiological sensations. Mindfulness gives us a way to observe our experience without getting caught up in it, allowing us to choose a response best suited for the situation at hand. In order to choose the best response in a challenging performance situation, we also need to know how to interpret the physiological sensations we are experiencing. With biofeedback and mindfulness training, our bodies may be better able to produce optimal activation, and our minds may be better able to give us the space to choose the most helpful response. However, if we continue choosing a response inconsistent with optimal performance, we will not achieve our goal.

Remember the study by Brooks (2014), which showed that most of us believe that relaxation is necessary for optimizing performance? That study also showed that attempts at relaxation or calming down are, in fact, detrimental to performance. Brooks also demonstrated that interpreting physiological sensations that naturally come along with preparing to perform (singing karaoke in front of strangers, giving a speech, and solving challenging math tasks) as excitement instead of anxiety or relaxation produces both best performance and best internal perception of one's performance.

These findings are consistent with several other studies. A study by Beltzer, Nock, Peters, and Jamieson (2014) examined the role of reappraisal of arousal in a socially evaluative situation and examined the differences that reappraisal makes for those meeting criteria for social anxiety disorder and nonanxious controls. In this study, socially anxious and nonanxious participants took part in a stressful public speaking task. One group was instructed to interpret their arousal as functional and adaptive, while the second group was given no instruction. The results showed that participants who reappraised their sensations of arousal as adaptive and functional reported less difficult emotions such as anxiety and shame, exhibited less avoidant nonverbal behavior, and were rated by objective judges as having performed better during the speech. Both anxious and nonanxious participants benefited from reappraisals.

Just like in the study by Brooks (2014), the Beltzer et al. (2014) study showed that the sympathetic nervous system activation exhibited by the reappraisal group did not

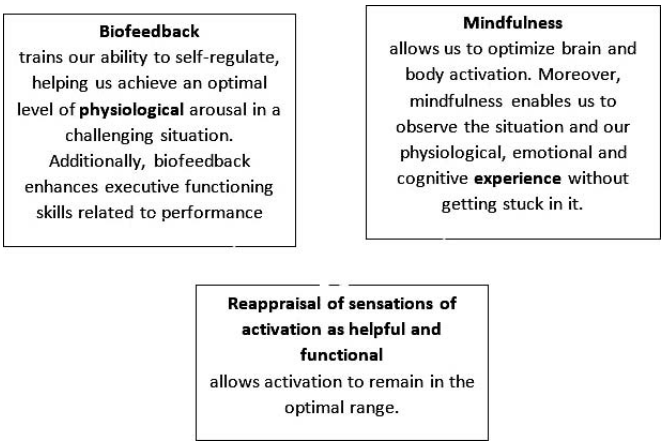

Figure 2. The contributions of biofeedback, mindfulness, and cognitive reappraisal for optimal functioning.

decrease during performance. In fact, this study found that sympathetic activation actually increased for the reappraisal group compared to the controls. This means that interpreting physiological sensations of stress as functional and helpful does not bring relaxation, but rather helps us achieve more optimal activation together with a more helpful way of experiencing it.

Furthermore, research shows that interpreting physiological and emotional sensations of activation as functional and adaptive also leads to healthier underlying physiological responses. Jamieson, Nock, and Mendes (2012) examined cardiovascular and cognitive responses of participants engaging in a stressful public speaking event. One group received education on the adaptive function of the stress response, the second group was asked to ignore the stress, and the third group was not given any instruction at all. The study findings showed that those participants who interpreted their experience of stress as functional and helpful exhibited the most adaptive cardiovascular response to stress, namely increased cardiac efficiency and lower vascular resistance, compared to the other two groups. These participants also reported having access to greater internal resources and showed less attention to potential threats. Again, this study showed that reappraising sensations of performance-related activation does not dampen arousal, but it does "reshape" the way we think about this arousal, which, in turn, aids in performance.

Similar results were reported by Moore, Vine, Wilson, and Freeman (2015), in a study where a group of participants instructed to reappraise arousal as helpful in performing a difficult motor skill in high pressure conditions performed better and exhibited healthier cardiovascular response compared to a control group. Another study by Jamieson, Mendes, Blackstock, & Schmader (2010) showed that reappraisal of arousal as helpful to performance resulted in significant gains in students' performance on the math portion of the GRE in the laboratory, as well as increases in actual math GRE scores.

Despite common belief that stress-related arousal is closely tied with negative emotional states, research described in this section demonstrated that that is not necessarily the case. As Beltzer et al. (2014) point out, an increase in physiological arousal can lead to positive or negative emotional states depending on the context of the situation, the person's knowledge and experience, and as we know now, his or her choice of interpretation of physiological sensations.

While physiological manifestations of arousal are not under our conscious control, the way we interpret those manifestations is. Choosing to interpret physiological sensations of arousal as excitement ("I am excited to perform at the Symphony Hall") or adaptive functioning of the body ("My body is doing what it needs to do to prepare me for this interview") allows us to stay focused on the task at hand without engaging in a futile and detrimental fight with our physiology. This approach allows us to benefit from the mindfulness and biofeedback-based self-regulation training, letting activation rest at the optimal level without becoming overly activated through fighting with normal and natural sensations of activation.

Take-away. Collectively, these findings indicate the need for appraisal of physiological sensations of activation as helpful and adaptive. This skill not only enhances performance, but also produces a healthier physiological response to stress.

Taking It to the Next Level: Combining Mindfulness and Biofeedback

The following diagram (Figure 2) summarizes the conclusions of the previous section.

Based on the above-cited research, it is reasonable to predict that a combination of mindfulness and biofeedback training, when catalyzed by proper appraisal, would produce even stronger benefits.

To date, few published studies have examined the effectiveness of using biofeedback and mindfulness in combination. Several studies investigating the effect of combining biofeedback and mindfulness are in progress at this time. More research is needed to examine the effects of combining the two interventions.

GENERAL GUIDELINES FOR COMBINING BIOFEEDBACK AND MINDFULNESS

Observation: Nonjudgmental observation is the necessary step in differentiating what we can and cannot control. In the case of performance, it is necessary to observe physiological and emotional activation that occurs prior to and during performance, and recognize it as something not under our conscious control. The way we interpret the experience, on the other hand, is under our control.

Labeling: Labeling the experience optimizes activation of the brain, with less activity in the amygdala (the automatic, irrational fight or flight response) and more activity in the prefrontal cortex (problem solving, emotional regulation, and decision making), as shown in studies such as Lieberman et al. (2007) and Creswell et al. (2008). Greater ability to regulate emotions and make decisions regarding the challenge at hand is what we need to optimize performance.

Giving up futile efforts of control: Futile efforts to control what is not under our control at any given moment, such as our thoughts, feelings, and physiological sensations, lead to an exacerbation of these thoughts, feelings, and sensations. Wegner et al. (1987) reported on pioneering research demonstrating that attempts to not think specific thoughts ("white bear" in this case) leads to an increased occurrence of such thoughts. Subsequent research confirmed these findings with thoughts about vehicles (Lavy & Van den Hout, 1990) and green rabbits (Clark et al., 1991, 1993). Roemer and Borkovec (1994) demonstrated that attempts to suppress thoughts regarding personally relevant negative emotions, such as anxiety and depression, also resulted in intensification of these thoughts. Similarly, Cioffi and Holloway (1993) showed that thought suppression resulted in longer recovery time following exposure to painful stimuli, along with higher heart rate and lower feelings of self-efficacy.

The cost of futile efforts to suppress emotions is a waste of resources, as demonstrated by Gailliot et al. (2007). Their study showed that, compared to a control group, participants engaging in an emotional suppression task experience significant reductions in blood sugar levels, leaving insufficient resources for completing challenging cognitive tasks. In performance situations, using up valuable resources on futile efforts to control the uncontrollable may lead to fewer resources available for the task at hand and a decrease in performance. This idea is supported by the Wegner and Erner (1992) study showing that attempts to suppress certain thoughts resulted in longer reaction times in naming words on the Stroop task, a finding directly relevant to performance. This research demonstrates the importance of mindful acceptance of the present experience as it is, not as one wishes it to be. Mindful acceptance allows us to focus on what is under our control (our actions directly related to the performance, such as leading a successful negotiation or releasing muscle tension in parts of the body not needed for the action), while disengaging from futile efforts to control our internal states.

Changing the intention: optimizing performance requires that whatever skills we implement to boost performance at that moment be directed towards tasks under our control, and not wasted on futile efforts to control the uncontrollable. That is, if you are about to go up to the podium to give a speech, HRV breathing practices will be helpful when practiced with the intention of producing optimal autonomic activation and delivering optimal amount of oxygen to the brain, but may actually be detrimental to performance if practiced with the intention of calming down or relaxing. The same skills performed with two different intentions may lead to very different outcomes.

Mindful Language: Mindful language plays a significant role in letting go of control, in changing the intention of skill practice and in promoting self-regulation. Our minds form strong associations between words and certain automatic reactions, including behavior, posture, and physiological processes. Choice of words in our internal self-talk may make the difference between optimal activation ("you've got this, do your best") and over-activation ("You must try harder") of the nervous system, or engaging in habitual unhelpful action instead of the intended action. For instance, using the word "try" followed by the intended action (i.e., "I will try to listen better), often means that we are giving ourselves a way out of completing the action, thereby greatly reducing the chances of following through. The wise words of Yoda are appropriate here: "Do or do not, there is no try".

Value-based action: In order to engage in any challenging action, especially one that produces discomfort, we have to have a good reason. Few people would engage in grueling daily workouts, the way Olympic athletes do, without a good reason. Few people would be willing to experience the discomfort of anxiety prior to a big presentation without a good reason. Therefore, in order to implement mindfulness-based skills in challenging situations, which require us to allow our potentially difficult experience to be as it is, we have to know why we are engaging in that experience. Without that knowledge, the immediate gratification of avoiding difficult experience would be too tempting. Values are what ultimately guide our choices. Knowing our values, what's important to us in life, is what allows us to make a choice to experience the discomfort that may come along the way.

Figure 3. General guidelines for combining biofeedback and mindfulness.

Guidelines for Combining Mindfulness and Biofeedback

In this section, I provide suggestions for combining biofeedback and mindfulness for optimizing performance. First, I provide general guidelines important in combining biofeedback and mindfulness in training. These guidelines are based on those described in a paper by Khazan (2015), here highlighting aspects particularly relevant to performance. Following the general guidelines (see Figure 3), I provide a step-by-step guide for training.

Using these general guidelines, the following specific steps may be used in optimal performance training (see Figure 4). These steps are not meant to be taken sequentially, but rather intertwined together.

The FLARE technique described here (see Figure 5) is an adaptation for optimal performance training of the original technique that was introduced by Khazan (2015) for clinical practice.

- Feel. This is a sensory preverbal step, just awareness of what you are experiencing.
- Label. Giving your experience a short nonjudgmental label, thereby reducing activation of the amygdala and increasing the activation of the prefrontal cortex responsible for executive function. This step gives us the ability to disengage from intense emotion and follow through with the rest of the steps.
- Allow and appraise. Allow your thoughts, feelings and physiological sensations to be there. Whether or not the

STEPS FOR OPTIMAL PERFORMANCE TRAINING
(condensed version)

1. Train the body's ability to self-regulate with HRV biofeedback. See Lehrer et al (2013) and Khazan (2013) for complete guidelines on HRV biofeedback training. The goal of HRV training is to increase a person's HRV as much as possible at rest during normal breathing.
    a. Determine Resonance Frequency (RF) breathing rate.
    b. Train breathing at RF rate.
        i. Be sure to teach breathing without overbreathing. Overbreathing will lead to dysregulation in respiratory chemistry and will be detrimental to performance. See Khazan (2013) and Gilbert (2005) for detailed explanation.
    c. Encourage client to practice 20 minutes each day. This practice will provide the autonomic nervous system "workout" necessary to strengthen the ability of the vagal nerve to regulate activation and recovery. A strong vagal tone is what allows us to find the optimal level of activation necessary for optimal performance.
    d. Encourage client to utilize RF breathing for brief periods of time during more challenging times (perhaps during breaks in performance) and as part of recovery from high activation. These moments of practice allow us to regulate our activation more effectively during performance and speed up recovery.

2. Teach mindfulness meditation skills. There are many excellent texts available on this topic. Christopher Germer's (2009) "The mindful path to self-compassion" and Ronald Siegel's (2010) "The Mindfulness Solution" are two texts you could use. These skills are aimed at training the brain to respond to difficult situations in more helpful ways, much like HRV breathing trains the nervous system to achieve optimal activation.
    a. Teach concentration mindfulness practice, such as the raisin meditation or the breath meditation. In a concentration practice, one's attention is anchored on a single object or sensation, such as the raisin or the breath. Concentration practices train stability and flexibility of attention, the ability to interpret distractions as fleeting, and provide a calming effect in times of over-activation.
    b. Teach open awareness practices, such as attending to one's thoughts, feelings, and physiological sensations. Open awareness practices involve monitoring of whatever predominates in our moment to moment awareness: thoughts, feelings, physiological sensations, sights, sounds, smells, etc. These practices train our ability to experience internal and external events without getting caught up in judgment and interpretation, thereby cultivating equanimity, steadiness of mind under stress, a skill essential to optimizing performance.
    c. Teach self-compassion. Refer to Germer's (2009) book for more detailed information on training self-compassion and the Klich (2015) paper for more information on combining self-compassion training with biofeedback. Self-compassion allows us to treat ourselves with kindness when we've made a mistake, thereby making learning from that mistake easier. If we beat up on ourselves following the mistake, it will be that much harder to think about the mistake again, and the likelihood of making the same mistake will rise. Moreover, attending to difficult experience with kindness allows us not to fight with it, thereby being able to direct our resources to actions under our control.
    d. Encourage mindfulness meditation practice, both formally and informally (see Khazan (2015)), for 20-30 minutes a day.

3. Teach the skill of re-appraisal. Here we are training the ability to choose the way we interpret the signs of physiological and emotional activation. Rather than interpreting our rapidly beating hearts and sweaty palms as indicators of danger, choose to interpret them as indicators of excitement or signs of our bodies preparing us to perform at our best.

4. Teach mindfulness-based skills which may be used in the moment of difficulty, such as the FLARE technique described below. It is beyond the scope of this paper to describe all mindfulness-based skills that may be used. FLARE incorporates several skills in a step-by-step easy to implement protocol.

Figure 4. Steps for optimal performance training.

presence of this experience makes sense to you, it is there for a reason. Thoughts, feelings, and physiological sensations are not under your control, and therefore allowing them is in your best interest. Appraising them as functional and adaptive for the performance you are about to undertake allows you to stop struggling with the experience and direct your resources to the performance itself.

- Respond. Choose a response that is in your best interest at the moment, one that serves the value of that moment. Place the intention of this step on an action that is in your control, such as engaging in resonance frequency breathing in order to maximize your body's self-regulation skills.
- Expand awareness. Once you've chosen your response, take a moment to bring your attention to what is going on and around you—the chair you are sitting in, the floor under your feet, the people around you, the sky and the trees outside the window—as well as internal sensations, such as your heart beating and your body breathing. This step allows you to see the difficult experience as just a part of your experience rather than all of your experience. This step is sometimes taken after

Figure 5. The FLARE technique.

you've completed your chosen response, sometimes prior to implementing the chosen response, and sometimes as part of a longer response.

Example. Let's use the example from the very beginning of the paper to go through a FLARE exercise. You might take a moment to reread the scenario.

- F: Noticing the physical and emotional sensations.
- L: This feeling is "overwhelmed."
- A: It is ok to feel this way. It is ok to feel an intense emotion prior to an important speech. I recognize the physical sensations as my body preparing me to do my best.
- R: When I feel overwhelmed, the most helpful response is to take some mindful resonance frequency breaths, and allow my body to regulate itself, as it knows how to do so well. When the time comes for me to go up on stage, I will focus on my goal of delivering a clear message, engaging with my audience, and doing the best that I can.
- E: As I breathe, I notice the sensations of breathing. As I expand awareness, I notice the chair I am sitting on, the floor under my feet, the people in front on me, trees swaying outside the window. I also notice my heart beating, my belly coming up and down with each breath, and my nose itching.

And now imagine going up on to the stage and delivering a compelling and engaging speech, as the body and mind find the optimal level of activation needed for the performance.

Conclusion

This paper brought together performance-focused research from three distinct areas of study (biofeedback, mindfulness, and reappraisal), and introduced a methodology for harnessing the power of each in a comprehensive training model. Several ongoing studies are currently evaluating the efficacy of combining biofeedback and mindfulness in different settings. This paper can be seen as a strong call to the scientific community for empirical investigation of the efficacy of the presented approach for optimizing performance.

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