

TITLE: STARS-PAC Accelerated Anxiety Reduction: Rationale and Initial Findings

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ABSTRACT:

An anxiety desensitization method is presented which counters over-arousal through strenuous muscle stretch–tense, deep breath, release–relax and positive suggestion sequences; and uses positive adaptive images to replace negative cognitions and to promote confidence. The addition of the stretch–tense and positive images components are expected to expedite and to strengthen the desensitization process. Physiological activity counters physiological tension but is robust and cannot be inhibited by anxiety, thereby enabling the procedure to use a steeper anxiety gradient and to move through the scenes more rapidly. Adaptive images and attitudes are used to provide a more credible counter to anxiety than simple relaxation, and to build confidence toward the stressful situations.

Five exploratory studies were conducted involving 96 intervention subjects and 52 controls. One to two hours of interventions with the exertion plus positive images interventions were found to produce substantial anxiety-reduction benefits comparable to lengthier methods. Methodological limitations are noted for several of the samples.

STARS-PAC Accelerated Anxiety Reduction: Rationale and Initial Findings

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Abstract

An anxiety desensitization method is presented which counters over-arousal through strenuous muscle stretch–tense, deep breath, release–relax and positive suggestion sequences; and uses positive adaptive images to replace negative cognitions and to promote confidence. The addition of the stretch–tense and positive images components are expected to expedite and to strengthen the desensitization process. Physiological activity counters physiological tension but is robust and cannot be inhibited by anxiety, thereby enabling the procedure to use a steeper anxiety gradient and to move through the scenes more rapidly. Adaptive images and attitudes are used to provide a more credible counter to anxiety than simple relaxation, and to build confidence toward the stressful situations.

Five exploratory studies were conducted involving 96 intervention subjects and 52 controls. One to two hours of interventions with the exertion plus positive images interventions were found to produce substantial anxiety-reduction benefits comparable to lengthier methods. Methodological limitations are noted for several of the samples.

Anxiety-reduction protocols produce consistent benefits but often require several hours or more of intervention. In test-anxiety reduction, the 2003 Ergene meta-analysis of finds that interventions taking from three and a half to eight hours produced the better results, while those taking an hour or less were much less effective. The current

inquiry explores the use of physical exertion and positive adaptive images components to expedite the anxiety-reduction process.

Components of Anxiety

Anxiety is understood to involve a combination of physiological over-arousal (termed emotionality) and worrisome cognitions (Liebert & Morris, 1967; Spielberger, 1980), which often result in performance impairments. In testing situations, worry and physiological arousal operate together (Harris & Johnson, 1983; Smith et al., 1990; Sapp, 1994). Physiological arousal produces troublesome cognitions (such as, "I'm failing," or "I'm too stupid") while these same troublesome cognitions in turn increase physiological arousal. Performance failure is a consequence, although poor performance then contributes to additional anxiety.

Selected Intervention Components

Exposure is central in desensitization and extinction approaches. Exposure may be especially therapeutic when the fear response is overcome or, more importantly, when the experience ends in a clear sense of relief and safety. The rationale for using relaxation in systematic inhibition is "reciprocal inhibition," meaning that relaxation and anxiety are agonistic and mutually incompatible and that each acts to suppress its opposite (Wolpe, 1958). The ability of relaxation to inhibit small amounts of anxiety surely contributes to the benefits. Yet the ease with which anxiety surges can overwhelm relaxation necessitates a lengthy hierarchy of scenes and multiple exposures, and so slows the procedure. The reciprocal quality of the inhibition has no apparent advantage, and Wolpe's use of word "reciprocal" might be best understood as descriptive of the relaxation component rather than actually required.

Components which can suppress anxiety quickly and are not themselves compromised by anxiety could anchor a more robust desensitization procedure. We might expect that the more pronounced the sense of relief, the stronger the anxiety-reduction benefit.

Exertion

In an early confirmation, anxiety has been found to be significantly lower after strenuous physical activity (Morgan, 1973). In our collective experience, those who have played active sports know that no matter how anxious you are before a game, the anxiety subsides once you are up and running. Physiological arousal prepares one for physical activity, and the activity itself is the natural usage of that arousal.

Physical activity has been used in desensitization for many years in lieu of relaxation, and as a component of an aggressive response to build confidence. Running has been used in the successful treatment of phobias, including difficult-to-treat hospitalized agoraphobics (Orwin, 1973).

As physical activity is not ordinarily inhibited by high anxiety, it can act as a unidirectional counter to physiological stress and can continue to counter stress even in high anxiety conditions. Its continuing action under high-anxiety conditions should make even highly threatening exposure scenes more manageable, thus allowing a steeper exposure hierarchy and more rapid extinction.

Given the early promise of physical activity, it is perhaps surprising that it has not found its way into mainstream practice. Unfortunately, most forms of physical activity appear to be too awkward and too odd to fit properly in an ordinary psychotherapy office. Aerobic exercise programs are found to benefit a variety of anxiety and mood disorders, including panic disorder (Salmon, 2001), but are ordinarily classified as health and fitness programs rather than as therapy programs.

Positives

Anything can be beneficial which produces a sense of safety, competence, mastery, social approval and social support, interest, peace, joy, or any of the wide variety of positive outlooks and emotions. Positive feelings and positive affect have long been seen as the critical components in counterconditioning. Positive images have been used for many years to replace relaxation in desensitization and also to facilitate relaxation. The use of strengths and optimism to trump fears and failures is now a

central tenet in the popular positive psychology advocated by Seligman (2002), and has broad implications for longer-term adaptation (Fredrickson & Losada, 2005). Positives are essential to the present protocol.

Jogging + Positive Images

An early component analysis suggests that exertion and positive images can be combined to promote especially rapid benefits (Driscoll, 1976). Sixty-four test-anxious students imagined six preparation and exam scenes, each twice, with a pause between the scenes, for a total of nine minutes of conditioning. In a 2 x 2 design, 16 also jogged in place through the sequences; 16 imagined positive images during the pauses; and 16 both jogged and imagined the positives.

The exposure alone contributed a baseline 42% of the change, the positive images added 37%, and the jogging added the remaining 21%. The contribution of each of the three components was statistically significant, and the effect size for the three components together was 2.4 SD (against non-participant controls), and was equivalent to a comparison treatment consisting of four 45-minute sessions of systematic desensitization. See Table 1 for subject numbers and results for all samples.

Table 1
Subjects and Benefits from Five Samples

Sample		Subjects		Sessions		Gain*			Effect Size	<i>p</i> <
		Trt	Ctrl		Min.	Trt	Ctrl	Net		
1	jogging + pos	16	16	2	50	1.3	.0	1.3	2.4	.001
2	pilot	26	0	2	65	1.1	(.2)	.9	1.9	—
3	probation	16	9	2	65	1.2	.4	.8	1.5	.02
4	5th grade	22	12	5	175	0.7	.3	.3	1.0	.15
5	shielding	16	15	2	70	1.2	.0	1.2	1.8	.001
Combined		96	52			1.1	.2	.9	1.8	.001

* Note: All gains are listed as gain per item. The average Time 1 SD = .50

Physiological and cognitive agents are combined here to control these anxiety components. While various anxious students may do well with one or two intervention components (Hiebert, 2000), a composite approach might be expected to benefit a broader range of individuals (Sapp, 1996). The approach here is broadly eclectic, culling what appears useful from various interventions and from commonsense expectations.

Refinements

Few therapists would try to coax clients to jog in place in a practice office, and not every client would go along with it. The following interventions use a stretch–tense, air, suggestion sequences along with positive adaptive images to deliver a more socially conventional intervention.

Stretching & Tensing

Physical stretching is an active component in traditional Eastern relaxation and health practices such as Yoga, Tai Chi, and Qi Gong. It appears again in the Pilates exercises, as a popular way to relieve stress. Stretching also focuses attention, and can help redirect attention away from anxious concerns and reinstate feelings of well-being. It has been suggested as an adjunct to deep breathing to relieve stress (Wilkinson, Buboltz and Seemann, 2001)

Instructions: The present protocol has clients stretch various major body areas, and vigorously tense and tighten their muscles, take a deep breath in, hold it, and then release. Instructions: "Raise your right hand up as high as you can, stretching the whole right side of your body; stretch your left arm down; tighten both of your legs; make them as tight and tense and you can, and take in a full breath of air and hold it for a moment." Tightened muscles fatigue quickly and then, when clients release, relaxation and a sense of relief follow naturally. Then, reversing sides, instructions are to "Raise your left hand up as high as you can, stretching the left side of your body ..."

The next pair of sequences focuses on the back and waist muscles. "Arch your back, gently, slide your waist a couple of inches to the right, stretch your right arm down, tighten your arms, make them as stiff as you can, and take a deep breath in..." Then, we reverse sides: "Arch your back, gently, and slide your waist a couple of inches to the right..."

The next pair focuses on the waist and legs. "Push your right leg out a couple of inches, stretching your hips, and tighten both of your legs, and take in a deep breath, and tighten your stomach muscles, and hold it a moment..." And again, we reverse sides.

The exact sequencing of stretches can vary according to the preferences of the therapist and the needs of the clients. It is important that clients stretch and tighten not just single isolated areas but as many major muscle groups as possible in each sequence, for maximum exertion.

Deep Breaths

Shallow breathing is a symptom of panic attacks, accompanies other high anxiety conditions as well, and lowers proper respiratory functioning (Hendricks, 1995). Having clients take deep breaths counters the shallow breathing associated with high anxiety. Instructions have clients hold their breath for approximately 8–10 seconds.

Positive Expectations

As clients relax, we can provide instructions that suggest benefits and invite clients to accept the suggestions rather than question them.

Instructions. In the current protocol, it is suggested that the clients themselves produce the relaxation through their own suggestion. "Give yourself the suggestion now to relax, and let you air go. And notice how your muscles release and relax, almost as if by themselves, responding to your suggestions, and continue to relax, and continue to relax." The comments progress with each sequence. The second sequence includes: "And as you relax, allow yourself to step toward a peaceful, comfortable meditation, where you can give yourself positive, constructive suggestions, such as the suggestion to relax. And as you do, notice how your muscles let go and relax." The fourth sequence includes: "Now, let yourself step into a peaceful, comfortable meditation..." The next sequence includes: "Imagine now that you are in a peaceful, comfortable meditation, where you can give yourself positive, constructive suggestions, such as the suggestion to relax. ..." The sequence after that includes: "Realize now that you *are* in a peaceful, comfortable meditation, ..." And then: "And as you do, notice some area of your body, where your muscles let go one step further, almost as if automatically, by themselves, responding to your suggestion. And take this as a sign that you are in a peaceful, comfortable meditation, where you can give yourself positive, constructive suggestions, and let yourself go one step more relaxed."

Composite Anxiety Suppressor

The principal sequence thus has clients stretch and tense, take deep breaths of air, release and relax, feel successful, and expect further benefits. Additionally, in the later sequences, we suggest: "Letting go now of all worry and concern," or "Letting go now of all stress and tension," or "Letting go now of all anxieties and fears."

Informal observations. Clients seem comfortable enough with the sequence, and only a few are too self-conscious. Those who are hesitant in the clinical office might still review a recorded session at home.

The sequence appears to reduce tension quickly. Five to six minutes of stretch-tense-air-relax-suggestions sequences were provided in multiple anxiety-reduction seminars, and most participants reported being at least as calm after the brief sequences as they had been during previous, lengthier relaxation experiences.

Individuals experiencing extreme anxiety or panic are often sensitive to signs of physiological arousal such as increased heart rate and shortness of breath, and jogging or other strenuous exercise can intensify these signs. The present stretch-tense sequence appears to consume physiological tension without triggering these anxiety signals. It also refocuses attention on the activity and away from the somatic symptoms.

In anxiety-reduction interventions, clients report that the stretch-tense, air and release sequences reduce their anxiety and reinstate a sense of peace and confidence, even after highly stressful exposure scenes. Thus, the sequence appears to serve their intended function.

Positive Adaptive Images.

The positive suggestions and images used here are mental adaptations to the intimidating situations. Interest in school subjects contributes strongly to school performance, so an interested attitude is a plausible antidote to a fearful attitude. A shield is understood to protect from attack, so an imaginary shield might reasonably protect from a verbal and emotional attack. The adaptive images are meant to promote

counterconditioning, which is the elimination of an unwanted response such as anxiety through the introduction of an incompatible response.

Applications & Findings

Test-Anxiety Reduction

To apply the protocol to test anxiety reduction:

- Use 6–8 minutes of tense-release sequences to reduce stress.
- Instruct students to: "Imagine a favorite interesting activity (such as hiking, or watching a mystery show). Fully experience the sense of curiosity and interest, and capture that sense of interest. (pause) Now, allow that sense of interest to go to the back of your mind, where you can retrieve it as you wish."
- Students imagine a series of eight learning and testing scenes, with instructions to imagine the same sense of interest that they had in their favorite activity.
 1. "In a few minutes you imagine yourself in class, listening to your instructor. You will also imagine that you are finding the subject interesting, and that you enjoy seeing how things fit together."
 2. "Imagine you are listening in class. Imagine you have the same sense of interest in the material as you had in your favorite activity."
 3. "Imagine that you are studying, sometime several weeks ahead of the test. Only now, you find the material interesting."
 4. "Imagine you are studying the night before the test. You realize that you can organize the material however you wish, in whatever way is best for you. You recognize much of the material, and you realize how much of it you already know."
 5. "See yourself walking into your test. Remember that you prepared as well as you could. Imagine now that you actually look forward to providing your information on the test items."
 6. "Imagine that you are taking the test, and that you are actually intrigued by the test questions. You enjoy unloading your answers to the test questions. You

see a question you do not know, and you go on to the next item, and you can see how to work it. " (Skill Building].

7.. "Imagine now that you have finished the easier items, and are going back to one of the harder items. You answer it as best you can, and you recognize that you do not have to get every item correct to do well on the test."

8. "Imagine now that the test is over. Instead of worrying about it, you realize that you have done as well as you could. So you relax, and turn your thoughts to something interesting or fun that you want to do."

- Tense-release sequences follow each scene, to drop the stress and regain confidence before the next exposure scene.

The main positive here is the sense of interest, which is captured from a favorite activity, re-experienced, and then woven into the learning and testing scenes. In an ordinary state, it would be far-fetched to propose that a highly test-anxious student could take pleasure in anything remotely connected with a test. Yet with the special training state produced here, students can and do imagine enjoying learning, organizing, and then showing their mastery on tests. Once they can imagine interest, they are more apt to experience interest in real situations.

The following three samples used a 31-minute recorded version of the above test-anxiety protocol, and the Westside Test Anxiety Scale to assess anxiety (Driscoll, 2004). The scale has six items on performance impairment, similar to the Alpert-Haber Debilitative Anxiety Scale (1960); and four cognitive items assessing worry and fears of failure, which interfere with concentration (Cassady & Johnson, 2002). The scale has been found to identify students who would benefit academically from anxiety-reduction intervention (Driscoll, 2005).

Test-anxiety pilot sample. Anxious students were recruited from two colleges and a high school. Students reviewed a 30 minute recorded protocol, most twice, resulting in 60 minutes of treatment. Students took one or more final exams within the week, and

then repeated the test-anxiety scale. The group showed a 1.9 SD benefit, compared to the average change for the five control samples attained here.

Academic probation sample. The sample combines research results from two consecutive Spring semesters. Anxious academic probation and regular status college students were randomly assigned to Intervention and Control groups (except for two students failing to benefit from tutoring who were added to the Intervention group). Intervention students reviewed the recorded training protocol, usually twice, while the minimal-treatment Controls were asked to review written test-anxiety reduction suggestions. Students took finals, and the Intervention group showed a 1.5 SD benefit compared to the Controls.

Fifth grade sample. All fifth grade students in an intermediate school were screened for test anxiety, and the highly anxious students were randomly assigned to an Intervention or non-participant Control group. Intervention students reviewed the training four times before re-taking the scale. The Intervention benefit was 1.0 SD.

Shielding Against Hostility

Many clients are readily stressed and intimidated by anger, accusation, criticism, and manipulation. Personnel management courses propose that it takes up to five compliments to make up for one insult, suggesting that the average individual is surprisingly thin-skinned and readily unsettled by antagonism.

The following steps are to reduce stress amid antagonism:

- Have client identify an antagonist and several of hurtful statements.
- USE 8–10 minutes of tense–release sequences to reduce stress and induce the training state.
- Have client imagine a protective shield (a battle shield, force field, bulletproof glass, or whatever the client chooses); have the client give the shield protective qualities and note that by suggestion, the shield does indeed acquire protective qualities.

- Have client imagine several antagonistic scenes, beginning with the easiest one first. The client is told:

1.. "In a few minutes, you will imagine your antagonist sitting silently across the room from you. You will feel separate and strongly protected from this person."

2.. "Imagine that your antagonist is across the room, not saying anything. Intensify the strength of your shield, and feel its protection."

3.. "Imagine that your antagonist is sitting several yards away, and is ready to say something angry to you. Realize that your shield will protect you. Intensify the power in your shield."

4.. "Imagine your antagonist making an angry, critical remark. The criticism hurls toward you but hits the shield, disintegrates, and falls harmless. Realize that you have not been hit."

5.. Repeat the last scene with another comment from the same person, or with another antagonist.

- Use tense-release sequences after each scene, with assurances that the client is safe from the hostility. The sequences tend to eliminate the stress and quickly reinstall the sense of safety, regardless of how much anxiety was created in the exposure scene.
- Repeat assurances that the shield will and does protect, that the hostility hits the shield and disintegrates, that the client remains unharmed by it, and that the client feels separate and independent from the hostility.

In an ordinary state, it would be far-fetched to propose that sensitive individuals could feel safe amid hostile accusations. Yet, with the special sequencing here, individuals can and do imagine feeling safe while facing images of anger, criticism, and manipulation.

Shielding sample. Three college classes were screened for high stress in conflict, and volunteers were randomly assigned to a Intervention or to a wait-list Control group

(Driscoll, 1993/2002). The Intervention subjects reviewed a 35 minute recorded protocol, usually twice, and showed a 1.80 SD benefit over the Controls.

Overview

The Hembree (1988) meta-analysis calculates a mean effect size = 1.10 SD for the strongest test anxiety reduction categories—behavioral techniques excluding relaxation (based on 14 studies), and = 1.2 SD for a single category—study skills + behavioral combined (based on 9 studies). The Ergene (2003) meta-analysis calculates effect sizes =0.90 to 1.1 SD for the seven strongest technique categories (based on 45 studies), with an average =1.0 SD. Conducted some fifteen years apart, these two meta-analyses suggest that the stronger available protocols can produce as much as a 1.0 or 1.2 SD benefit, but not much more. How does the present protocol compare?

The effect sizes for the five studies (Table 1) range from 2.4 to 1.0. The overall effect size = 1.8 SD, calculated from the combined samples of 148 subjects, and was statistically significant ($t=7.12, p<.001$). The 1.8 SD benefit here is also significantly higher than the 1.2 SD benefits reported in the meta-analyses cited above ($t=2.39, p<.01$).

Discussion

The five studies tend to be similar in several features. Four protocols used the stretch–tense and release sequence, while one used jogging as the exertion component. The same four protocols also involved positives that were adaptations to the threatening situation, while the jogging sample involved positive images unrelated to the anxiety condition. The four similar interventions are referred to as STARS-PAC protocols, which is an acronym for stretch, tense, air, release-relax, suggestion, along with positive adaptives and counterconditioning.

Four of the samples addressed test anxiety, while one addressed stress in hostile situations. Three samples involved two 30–35 minute sessions; the jogging sample had two sessions totaling 50 minutes; and the fifth grade sample involved five such sessions. Four of the interventions relied on a recorded protocol, while the jogging

procedure was administered by assistants. Three samples had tightly randomized controls, one had approximately randomized controls, and the pilot sample relied on normative controls.

The four college samples showed treatment effect size benefit in 1.5–2.4 SD range, while the fifth grade sample attained a noticeably lower 1.0 SD benefit. While most test-anxiety research is done with college students, the Ergene (2003) meta-analysis found interventions with primary school children attained considerably smaller benefits ($=.27$ SD, based on 5 studies) than with college students. So the more modest benefits with the present fifth grade sample would appear to be in line with prior findings.

Methodological shortcomings should be noted: In the absence of matched controls in the pilot, the Intervention gains were compared against the average controls from the other four samples. While not ideal, the control gains appear similar enough among studies so that the average should be a reasonable estimate.

In the probation sample, two students being tutored but failing to progress were added to the Intervention group. While completely random assignment is the reasonable standard, it seems improbable that two students failing to progress would be expected to show unusual anxiety-reduction benefits without intervention. Thus, their inclusion as Intervention subjects should not have provided an appreciable advantage to that group.

Taken together, the five samples suggest that the relatively brief exertion + positives protocols produce reasonably strong anxiety-reduction benefits across various student samples.

The high 1.8 SD effect size attained here compared to the 1.2 SD test-anxiety intervention standard suggests that the activity plus positive imaging protocol may provide a measurable benefit over other interventions without these components. Yet, this result must be considered clearly exploratory rather than conclusive. A credible comparison requires a head-to-head match up between competing protocols, ideally at a neutral research site, and with subjects selected from a common subject pool. The present research indicates only that the exertion plus positives protocol shows promise,

and that further research is warranted to confirm or negate the outcomes attained in the exploratory investigation.

By curtailing anxiety rapidly, the stretch–tense, deep breath, release and suggestion sequences appear to produce strongly positive experiences after exposure scenes. In classical conditioning, the experience immediately after a stimulus becomes associated with the stimulus itself. In anxiety counterconditioning, the rationale can be expressed metaphorically as "All's well that ends well." The exposure scenes here end well indeed, with substantial good feelings that convey all is well and counter expectations of impending doom.

The rapid transition from stressful exposure to positive feelings is thought to allow the exposure hierarchy to progress more rapidly, expediting the conditioning: The interventions are briefer than many standard protocols, taking only two 30–40 minute sessions with college students.

It remains to be seen whether further research by other investigators will confirm the strength of these outcomes. If the current results withstand replication, the STARS-PAC protocols should produce standard or perhaps even improved benefits for performance anxieties, with briefer interventions and the advantages of administration via recorded instructions. Further research is needed to verify the strength of the benefits and to assess applications to various other anxiety conditions.

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