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The Comparative Effectiveness of Systematic Desensitization and an Integrative Approach in Treating Public Speaking Anxiety: A Literature Review and a Preliminary Investigation

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Abstract

An analysis of the literature related to public speaking anxiety (PSA) and various treatments of it are discussed. PSA is a state or situational type of anxiety which can have tremendous effects on those who suffer from it. Two of the major treatments—systematic desensitization (SD) and the integrative approach (IA)—are reviewed and then experimentally tested to determine which is the more effective in treating PSA. The results are somewhat inclusive, but there is strong evidence to suggest that both SD and IA reduce trait and state anxiety. It was found, however, that IA is more effective in decreasing the symptoms associated with PSA.

Public speaking anxiety or stage fright has been investigated and studied since the mid-1930s [1]. It wasn't until the 1973 release of the Bruskin Report, which indicated that the number one fear of the American people was speaking in public, that researchers and scholars realized how pervasive and powerful was the fear of speaking in public in our society [2].

Public speaking anxiety (PSA) has also been referred to as state or situational type of anxiety. PSA has been described as a transitory emotional reaction triggered by a specific situation, such as performing before an audience [3]. It is therefore, a specific term used to

describe discomfort of people who fear speaking before a group. It occurs when our bodies secrete hormones and adrenaline that eventually overload our physical and emotional responses. These chemical reactions are similar to those individuals might experience when suddenly meeting a growling dog or a person holding a gun. The heart begins to beat faster and blood pressure rises. Consequently, more sugar is pumped into the body's system and often the stomach begins to churn. When people experience these reactions, they often feel as if their bodies are operating in high gear and that there is little or nothing they can do about it.

Speakers who experience public speaking anxiety often display these visible signs:

Voice	Quavering Too soft Monotonous; nonemphatic Too fast
Fluency	Stammering; halting Awkward pauses Hunting for words; speech blocks
Mouth and Throat	Swallowing repeatedly Clearing throat repeatedly Breathing heavily
Facial Expressions	No eye contact; rolling eyes Tense face muscles, grimaces, twitches Deadpan expression
Arms and Hands	Rigid and tense Fidgeting; waving hands about Motionless; stiff
Body Movement	Swaying; pacing; shuffling feet [4]

These behaviors can occur separately or in any combination, depending on the degree of anxiety the speaker is experiencing.

One's level of public speaking anxiety has many serious consequences, some of which have potential impact on the health of the individual. The individual's increased sympathetic arousal, which prepares the human body for the fight or flight response, is one of the most serious consequences of public speaking anxiety [5–7]. The intensity of anxiety and sympathetic arousal is increased further when the situation cannot be avoided or changed [8]. If a high anxiety-provoking situation is experienced frequently by an individual, he or she may develop a variety of stress-related (psychophysiological) disorders, ranging from peptic ulcers [9] to cancer [10–11]. Less severe but more predominant consequences may also be experienced as a result of one's level of speech anxiety. For instance,

past research has reported that individuals who are highly apprehensive in public speaking are perceived to be less intelligent, less credible, and less attractive by their peers and supervisors [12–14].

Consequently, the stress created by fear of making mistakes in front of others may be so great that it produces anxiety and sometimes complete avoidance of a speech situation. Among the most common causes of speech anxiety are:

- Fear of physical unattractiveness
- Fear of social inadequacy
- Fear of criticism
- Fear of the unknown
- Fear of speech anxiety
- Conflicting emotions
- Excitement from anticipation [15]

Note that each of these reactions to a speechmaking situation is learned, and because speech anxiety is a learned behavior, the only solution for its sufferers is to examine the potential reasons for their anxiety and learn how to use this knowledge to manage their discomfort.

A moderate amount of fear and anxiety triggered by the anticipation of or delivery of an oral presentation is not only normal but also desirable as long as the individual feels in control of his or her situation. Research has established that some individuals tend to perform better when they experience some anxiety. This notion has emerged from the “inverted-U” research [16–19]. The “inverted-U” research indicates that too much or too little anxiety can impair performance while an optimal level of stress can enhance performance. When performance is graphed against level of stress, the “inverted-U” or bell-shaped curve is observed for most individuals. As a consequence of too much or too little anxiety, the individual might experience mental block (forgetting the content) or confusion (inability to coordinate a line of thought). In addition, some disruptive physiological responses might be experienced by the highly anxious individual who is requested to give a speech. These responses might include rapid/shallow breathing, vomiting, trembling, cold and sweaty hands, muscle tension, heart pounding, fast heart rate, inappropriate laughing, and even blacking out (fainting) [3, 20, 21].

Because of the severity of these consequences and the constraints that public speaking anxiety places on the individual, a number of treatments to help reduce one’s level of anxiety have emerged. One common problem with applying the different techniques is that most of them require specialized training. Because teachers are seldom qualified to provide such services, professional assistance for them becomes indispensable. The different treatments include goal setting and reality therapy [22–24], assertion training [25, 26], biofeedback [27, 28], counseling [29], hypnosis [30], and sensitivity training [31]. Systematic desensitization (SD) [7, 32–35], cognitive restructuring/rational emotive therapy (CR/RET) [36–38], and skills training (ST) [39–41] are among the most popular and widely used tools to reduce the individual’s level of anxiety. Of these approaches, SD seems to be the most widely and thoroughly tested method for reducing PSA [32–35].

Previous research on PSA has also suggested that choice of therapeutic treatment should be made according to specific individual needs and personal characteristics. The research indicates that while different individuals do benefit somewhat from any specific treatment, results can be significantly increased by using the therapeutic treatment most effective in dealing with the particular needs of each person. Thus, it would seem reasonable to integrate different techniques to realize the best possible treatment for PSA. Further, if an approach were to focus on inducing relaxation, as SD does, and simultaneously facilitate a mental rehearsal process that would allow a reversal of the negative experience into a positive one, it should offer more advantages than any of the other previously used methods to treat PSA. The combining of the different techniques with people's use of their own creative powers of visualization should produce the most effective approach in overcoming PSA.

Although various treatments have been used to reduce PSA, none have been shown to be completely effective. An alternative to the traditional treatments (SD, CR/RET, or ST) for reducing PSA is an integrative approach (IA).

Although therapists and educators have tried visualization and other therapeutic treatments to help people overcome speech anxiety, surprisingly there are no controlled studies in the scientific literature assessing how effective a combination of the most popular and widely used treatment is when compared to an IA in alleviating PSA. Thus, the remainder of this report reviews the literature related to SD and IA and then compares experimentally the most widely used of the existing treatments for reducing PSA with IA.

Systematic Desensitization

The most commonly used approach in helping persons with excessively high public speaking anxiety is systematic desensitization (SD) [32–34, 42].

Scholarly interest in systematic desensitization began in 1966 and has increased steadily to the present day. Basically, however, the technique remains unchanged (43) and seeks to bring about deep muscular relaxation [44] by following a three-step procedure: (1) The client is taught to relax by contracting, maintaining contraction, and releasing contraction of his/her large muscle groups, usually beginning with the feet and progressing upward [45]; (2) the teacher or therapist assists the client in constructing a hierarchy of stimulus situations [43] causing the anxiety (speaking with another person in a hallway, for instance, would be less anxiety producing than giving a speech before a group of strangers); and (3) clients are gradually taught to associate relaxation (step 1) with stimulus situations known to cause anxiety (developed in step 2) [46].

Once the student or client has completed the hierarchy of stimulus situations, the level of apprehension about the situation is expected to be significantly reduced. Many times the individual is advised to go through a series of real-life experiences similar to those listed in the hierarchy [7, 47].

There are several advantages to using SD. First, it works, and it works especially well for those who are only in need of slight or moderate reductions in their PSA. Second, SD is relatively easy to implement. No special equipment is required, although a pleasant en-

vironment would be more aesthetically pleasing and comfortable than a traditional classroom. Third, the person administering SD need not have specialized training beyond what could be afforded in a brief, five- to ten-hour workshop.

Many studies investigating SD have found it to be more effective in reducing interpersonal communication (dyadic relationships) anxiety than other types of speaking anxiety [32, 34, 48]. SD has consistently been found to help most—but not all—individuals with high speaking anxiety [3, 32, 49–51].

Perhaps the most serious drawback of SD is that the procedure is effective only to the extent that it induces relaxation and the very procedure itself may create in some individuals more anxiety than it eliminates. Specifically, complete relaxation is not possible for a person who is concentrating on increasing or maintaining muscle contraction. Thus, while SD is undoubtedly effective in reducing PSA, it may also cause more tension for some people or at least result in less than full relaxation. A preferred procedure would be one that induced relaxation and helped individuals control their anxiety without causing any new or additional anxieties. One other shortcoming of SD is that even if it is effective in reducing PSA, it does not necessarily help the client learn appropriate speaking behaviors. After undergoing SD clients may be no more competent in their speaking abilities than before the treatment. However, they may be more relaxed about their inability to perform effectively. Furthermore, SD leads clients to focus on their anxiety-producing thoughts instead of engaging in a mental rehearsal process that would allow a reversal of those negative experiences into positive ones.

Integrative Approach

The foundation of the integrative approach (IA) is based on two premises. First, the subjects are instructed to engage in a mental rehearsal process that would transform the negative experience into a positive one [51] rather than focusing on a hierarchy of stimulus situations [43, 46] causing the anxiety-producing thoughts. Second, the IA technique adopts a multimodal approach to deal with PSA. Previous research has indicated that while different individuals may benefit somewhat from any treatment, results can be significantly increased by using the therapeutic treatment most effective in dealing with the particular needs of each person [52]. Thus, it would seem reasonable to integrate different techniques to realize a more comprehensive treatment for PSA. The purpose of such a treatment would be to induce relaxation, as systematic desensitization, and simultaneously facilitate a mental rehearsal process that would encourage the individual to transform the negative experience into a positive one.

The IA treatment uses a combination of different techniques, including (1) a passive progressive muscle relaxation, (2) deep breathing, and (3) visualization. The passive progressive muscle relaxation is based upon physiological principles. This relaxation approach has been found to decrease the level of arousal of the sympathetic nervous system which is activated by the anxiety-producing situation [53]. Second, the deep breathing technique is used because breathing usually becomes disrupted when a person is anxious or under stress, thus causing excessive muscle tension and other physiological dysfunc-

tional responses. Third, the visualization technique is a very powerful tool to promote behavioral and cognitive changes. Researchers have identified visualization as a powerful technique because the human brain does not have the ability to distinguish between mental pictures and real-life situations [54] that arouse the sympathetic nervous system which is activated by the anxiety-producing situation (i.e., speaking in public).

Relaxation is considered a passive volitional process, i.e., the individual must: (1) set aside the time for the process, (2) be motivated, and (3) allow the relaxation to occur—not to try too hard to make it occur [55]. Deeper and more lasting changes would be possible because the individual can be aware of the sensation of tension/relaxation of the muscles while letting go of any thoughts and, in consequence, experience a decrease in brain-waves [56]. The lower the brain waves the more significant the changes one is able to make because the mind exercises self-censorship. Finally, the lower the brain waves, the deeper one is able to ground the changes in the mind's eye. Furthermore, if individuals can picture themselves during the visualization process—as many times and as vividly as possible—engaged in doing things they think they cannot do or fear to do, those images tend to be transferred to real-life situations when those individuals face that specific anxiety-provoking event [55]. The following question remains unanswered in the literature: which is more effective—SD or IA—in treating PSA?

Experimental Study

The research in general has concluded that some specific types of treatments may work well in helping to reduce some individuals' PSA [57]. However, little if any comparisons have been made between a specific treatment such as SD and a multimodal treatment such as IA to determine which may be more effective in reducing PSA. Although IA may not be a cure-all for all types of communication problems or for every individual who experiences PSA, it can provide a broader-based treatment, thus helping more individuals to overcome PSA. It offers a combination of different techniques, including a physiological-based treatment that can counteract the sympathetic nervous system arousal. In addition, IA aims to change one's response to a given stimulus (state anxiety) rather than focusing on changing one's personality. The permissive nature of the IA requires less risk taking from the individual than SD. For these reasons, the IA is offered as an alternative to SD, which is widely used by speech communication teachers and therapists to help reduce PSA.

The purpose of the following is to compare the clinical effectiveness of SD to IA in reducing PSA.

Subjects

Subjects were selected from an initial population of 100 undergraduate students enrolled in a junior-level speech communication course at a large midwestern university. Subjects were chosen on the basis of their scores on a self-report trait anxiety—PRCA-24 [58]. Students who scored 80 or higher on the PRCA-24 were selected to participate in the study. A score of 80 or higher has been established by numerous research studies of more than sev-

eral thousand subjects to be representative of a person who is high in trait speaking anxiety. Subjects who scored higher than 80 were then randomly assigned to the SD and IA treatments. The results reported in this study are based on twelve subjects (8 males and 4 females) who completed all phases of the study. The subjects were divided between the two treatments SD ($N = 6$) and IA ($N = 6$).

Measurement

Speech Trait Anxiety

The Personal Report of Communication Apprehension (PRCA-24) was used to assess trait anxiety [58]. The PRCA-24 consists of twenty-four Likert-type items, assessing the individual's level of anxiety in four communication contexts. The four communication contexts have been suggested as the most representative of trait speaking anxiety [59]. The contexts include speaking in small groups, speaking in meetings, speaking in dyads, and public speaking. Each of the four communication contexts features six items, three positive and three reversed to avoid bias. In addition, the PRCA-24 has been determined to have high reliability (.94 or higher) as well as high predictive validity [59, 60].

Speech State Anxiety

The STAI Form Y-I scale was used to measure state anxiety (61). The STAI Form Y-1 consists of twenty items that require individuals to report how they feel at a particular moment in time. Subjects respond to each item by rating the intensity of their feelings on a 4-point scale (not at all, somewhat, moderately so, and very much so). Previous studies have reported the validity and reliability of the state anxiety inventory to be acceptable as a measure of PSA [60–62].

Physiological Measures

Physiological instruments were used to measure various changes in subjects' bodily functioning. The changes in bodily functions were indicators of physiological arousal purportedly linked to anxiety. The physiological measures included skin temperature (ST), galvanic skin response (GSR), electromyograph (EMG), systolic blood pressure (SPB), diastolic blood pressure (DBP), and heart rate (HR).

The first level of the testing required subjects to give a three-minute speech while imagining themselves in comfortable surroundings. During the second level of the testing, subjects were asked to continue their speech for another three minutes while imagining themselves facing a hostile audience. Finally, the third level required subjects to continue speaking for three more minutes while watching themselves on a TV screen. While performing, students were monitored for ST (vasoconstriction and/or cold hands), GSR (electrodermal activity, or sweaty palms), EMG (muscle tension), SPB, DBP, and HR. Clevenger [63] reported that these physiological responses are normally measured with a high degree of reliability. All of the physiological instrumentation was thoroughly checked prior to use to rule out any artifactual interference that may cause the instruments to be unreliable.

The instrument used to measure skin temperature was the J & J skin temperature bio-feedback system. The thermistor was placed on the right hand on the middle finger dorsal

surface. A J & J galvanic skin response biofeedback system was used to measure electrodermal activity. The electrodes were placed on the right hand on the first and third fingers. Each subject was asked to place his or her hand palm down on the arm of the chair. The instrument used to measure muscle tension level was the J & J electromyograph biofeedback system. Bipolar surface electrodes were placed over the frontalis muscle of the forehead spaced at standard positions. Placement on the frontalis muscle has been chosen because it has been considered a good measurement for all kinds of stress-related disorders [64]. All EMG readings were monitored in the 90 Hz to 1000 Hz range and were recorded in microvolts. Subjects were asked to refrain from moving to prevent any false form originated by any stimulus, particularly sound and movement, other than the intended stimulus.

Procedures

First, subjects' perceptions of their trait speaking anxiety was measured by PRCA-24 [58] at the beginning of the term. Students scoring 80 or higher were considered to have high trait speaking anxiety [3]. In addition, the students' perception of their PSA was measured by the STAI Form Y-1 [61] after the delivery of their first speech.

During the pretest and post-test phases, each subject was seated in front of a teacher's desk in a regular classroom. Subjects faced a cart with a TV screen and operating portable camera. The cart was located in front of the subjects in the back of the room. All physiological instrumentation was placed on a table behind the subjects. Therefore, the subjects were not able to see the readings during the testing. For the duration of the four-week meetings, subjects were placed in the same classroom, which had the furniture rearranged to provide more comfort for the group relaxation. Subjects used large pillows under their knees and head during the relaxation training tape.

Contingent on their participation in this study, subjects were required to sign a contract committing themselves to the following procedures: (1) listening to a relaxation tape once a day, (2) keeping a home training log, (3) meeting once a week as a group for four weeks, and (4) attending a concluding meeting after the delivery of the final speech.

Twelve subjects were randomly assigned to one of two experimental treatment groups: $N = 6$ subjects listened to an SD relaxation tape; $N = 6$ listened to an integrative relaxation training tape that combined sensory awareness, breathing, and visualization techniques. Both tapes were recorded using the same female voice and the same background music. All subjects were instructed to listen to the tape once a day, monitor their heart rate and skin temperature with an individual thermometer (which was provided), and complete a training log designed to detail that experience. Subjects logs were then collected to verify that the subject did indeed carry out the assigned instructions. At the end of the four-week program, subjects were asked to complete a follow-up PRCA-24; and after their last speech presentation each subject completed the STAI Form Y-1 state anxiety scale.

Results

The purpose of the study was to compare the therapeutic effectiveness of SD and IA to reduce the factors relevant to PSA. The two methods were applied to two groups of six subject each and the reductions (x and y) were measured in each group. It was assumed x and y are both normally distributed and both variables have the same variance for the purposes of the statistical analysis. The equal variances assumption in this case is reasonable because both groups showed a reduction in the same characteristic, and the variability of pretest data were not significantly different when comparing the subjects in both of the treatment groups.

A t -test was computed to compare the mean reductions between the two treatment groups. The t -test seemed suitable for comparing the two groups because of the small sample size. Table 1 shows the overall PRCA-24 scores and the scores for each communication context before and after the treatment. There was no significant difference in the overall PRCA-24 scores between the SD group and the IA (SD $X = 21.16$ and IA $X = 23$) ($t = .28, p > .05$). Repeated t -test for each of the four contexts of communication interaction in the PRCA-24 indicated no significant difference between the SD and the IA treatments. Results of the STAI Form Y-1 scores are shown in Table 2. As this table illustrates, there was no significant difference in the STAI Y-1 between the two groups, (SD $X = 7.5$ and IA $X = 16$) ($t = 1.02, p > .05$). In testing physiological measurement changes, the EMG biofeedback showed significant difference, (SD $X = 3.1$ and IA $X = 7.9$) ($t = 3.75, p > .01$, with $df = 10$) (Table 3). The other physiological measurements (i.e., skin temperature, galvanic skin response, heart rate, and blood pressure) did not, however, show any significant difference.

Table 1

PRCA-24 Before Four Weeks' Treatment					PRCA-24 After Four Weeks' Treatment				
Overall	Group	Meeting	Dyad	Public Speaking	Overall	Group	Meeting	Dyad	Public Speaking
Integrative Approach					Integrative Approach				
98	24	26	22	26	75	19	23	12	21
93	20	22	27	24	65	16	16	16	17
90	15	24	23	28	71	11	16	17	27
87	23	20	20	24	66	17	13	17	19
85	26	22	11	26	77	24	23	12	18
83	14	25	14	30	44	8	13	10	13
Systematic Desensitization					Systematic Desensitization				
94	25	23	22	24	64	17	15	15	17
93	25	22	20	26	55	17	12	12	14
86	25	23	12	26	82	18	22	21	21
83	18	19	20	26	62	16	13	16	17
82	19	21	16	26	61	13	19	15	14
81	20	21	19	21	68	17	20	13	18

Table 2
STAI FORM Y-1

Before	After
Integrative Approach	
77	31
73	61
56	56
52	47
48	23
39	31
Systematic Desensitization	
60	51
49	43
44	47
44	24
36	30
34	27

Discussion

It was proposed that the IA should produce significant improvement in the treatment of PSA over SD. Although the treatments did not differ in their abilities to reduce PSA as first thought, there was a trend in the present data, however, to favor IA over SD. In general, this study demonstrated a relationship between treatment and PSA level reduction.

The two treatment procedures were associated with significant decreases in the self-report and overt motor components of communication anxiety in general and PSA in particular. In addition, improvements generalized to other areas of performance anxiety as assessed by the PRCA-24. SD and IA did significantly reduce trait and state anxiety as measured by the PRCA-24 and the STAI Form Y-1, even though there was no significant difference between the two treatments.

Although no significant differences emerged between the SD and IA in treating PSA involving self-report instruments, differences did emerge when analyzing the data obtained from the physiological measurements. Blanchard and Young have noted the fallacy of equating clinical significance with statistical significance [65]. Though this study did not find statistical significance on all aspects of the data analysis, there was clearly clinical significance which may be ultimately more important for those suffering from PSA. The groups differed significantly in their ability to reduce the EMG biofeedback readings. Subjects treated with the IA using a visualization technique appeared to have achieved the desired fear-reduction effects in order to control their level of muscle tension. This suggested that, for those students in which physiological reactivity is a dominant component of their anxiety response, biofeedback may be useful as an adjunctive treatment to be used with other anxiety reduction methods [66]. In conclusion, even though the overall results were not statistically significant among the two groups, they supported the overall trend

Table 3
Physiological Measurements Before and After Four Weeks' Treatment

EMG				ST ^a				GSR				HR				BP			
Before		After		Before		After		Before		After		Before		After		Before		After	
H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
Integrative Approach																			
13.2	7.6	7.8	3.2	93.0	89.8	91.1	87.0	12.3	3.6	11.2	4.6	82	65	86	70	142/99	98/61	113/81	102/56
12.2	8.2	4.2	2.6	90.1	86.7	91.0	89.7	9.8	5.0	3.5	1.9	87	69	77	61	161/102	144/82	135/84	122/65
11.2	8.6	7.2	4.2	84.3	79.3	84.6	78.9	3.2	1.3	2.7	1.1	124	95	94	75	140/95	112/75	143/95	121/74
16.2	6.4	7.2	2.0	87.0	83.2	90.1	84.3	37.9	25.4	19.9	6.6	94	76	117	80	164/91	133/88	171/76	136/66
18.4	6.2	9.2	3.2	71.4	69.6	89.5	83.3	6.8	4.6	5.2	4.1	106	67	105	69	166/86	138/72	174/88	133/61
20.2	6.8	8.4	3.2	82.7	81.3	91.7	89.8	3.9	0.8	3.0	1.2	95	79	96	79	133/87	107/71	149/89	109/72
Systematic Desensitization																			
11.2	8.2	6.8	2.8	76.1	74.8	91.7	90.0	0.8	0.4	1.1	0.4	87	54	86	61	167/102	103/70	117/68	106/64
10.6	6.8	7.2	1.6	77.2	76.9	89.2	85.3	1.8	1.1	1.6	0.6	95	69	89	61	170/88	137/63	163/76	147/55
9.8	6.8	8.2	4.2	92.5	90.8	88.5	84.5	10.2	3.9	11.4	6.5	122	96	96	64	136/91	116/72	148/74	104/60
10.8	6.4	7.4	3.2	86.0	84.4	90.5	89.2	35.2	22.9	13.8	9.7	86	64	93	65	142/96	122/88	133/90	120/82
10.6	6.2	5.6	2.2	89.7	84.4	91.8	90.1	6.0	4.0	3.9	2.5	83	63	75	65	124/88	109/69	122/77	112/66
10.8	6.4	9.8	3.6	69.2	68.7	93.2	88.2	2.9	1.9	5.9	4.6	101	87	92	74	178/101	116/71	151/87	127/66

EMG =muscle tension, ST =skin temperature, GSR =galvanic skin response, BP =blood pressure, HR =heart rate

a. Ideally, all readings should *decrease* except for the ST. ST should be as high as possible.

that the IA was more effective in decreasing the symptoms associated with PSA. The results seem to be consistent with the existing literature dealing with test anxiety reduction [67] and improvement in athletic performance [68–69]. Clark [69], for example, found that mental rehearsal using visualization was as effective as physical practice—the same appears to be true for the IA technique in reducing PSA. Finally, although this study suggested some differences in the SD and the IA, the small samples and variability within treatments possibly prevented the differences from reaching statistically significant levels.

Based on this preliminary research three questions arose. First, is the difference between the two treatments due to the creative powers of the mind utilized during the visualization process? During the visualization step in the IA, subjects were instructed to reverse the negative experience [51] while in the SD treatment subjects focused on the anxiety-producing thought [43, 46]. While both treatments are similar in the use of visualization techniques, they greatly differ in that the SD concentrated on the anxiety-producing thoughts while the IA focused on the successful accomplishment of the task. In addition, with the publicity surrounding the use of visualization to enhance performance, Rosenthal and Jacobson suggest that it could create a “self-fulfilling prophecy” demand on the subject [70]. Such demand could be sufficiently strong in itself to create the performance difference [71]. Second, is the difference between the IA and the SD groups due to the integration of different treatments as found in the IA [52]? Finally, does the active form of relaxation used in the SD prevent subjects from achieving a total state of rest? The SD treatment utilizes a progressive muscle relaxation as a means for reducing stress. This procedure requires the subject to be actively involved in the relaxation process by contracting, holding, and releasing all major muscle groups in the body. Due to the general belief that relaxation is a passive volitional process, it would be logical to conclude that a procedure that allows for complete rest would be more effective in promoting lifestyle changes. The deeper and therefore more permanent changes would be possible because the individual would not have to focus on the sensation of tension/relaxation of the muscles which generates thoughts but rather to let go of any thoughts and, in consequence, experience a decrease in brain waves. Further research is needed to replicate these results with larger samples. Also, further studies should continue utilizing all three types of anxiety measures (self-report, overt motor, and physiological) in an attempt to account for the lack of covariance among these measures [72]. Finally, future research should also use a control group to determine if other factors may have contributed to the results of this study and to determine whether indeed the treatment did actually contribute to the differences.

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