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A Controlled Evaluation of Devotional Meditation and Progressive Muscle Relaxation

A Controlled Evaluation of Devotional Meditation and Progressive Relaxation

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The present study was conducted to determine the effects of devotional meditation (DM), defined as a period of prayer and quiet reading and pondering of biblical material, on physiological and psychological variables related to stress. It was hypothesized that religious persons engaging in DM experience physiological and psychological changes similar to those reported for persons using progressive relaxation (PR) exercises. Thirty-six participants, equally divided by sex into 3 groups: DM, PR, and a Wait List Control, underwent extensive psychophysiological assessment prior to and following a systematic introduction to either DM or PR. The hypothesis that DM could generate positive physiological and psychological effects similar to PR was partially confirmed. The results of the study are discussed in terms of the unique spiritual resources inherent among a Christian population that might foster physiological and psychological relaxation.

The use of relaxation training as a therapeutic intervention within psychology and medicine has a history dating back to nearly the turn of the century (Jacobson, 1938). Review of this literature indicates that reductions in clinical symptoms are reliably obtained by persons carefully trained in the use of these methods (Borkovec & Sides, 1979). Progressive relaxation techniques have been found to be an effective means for controlling anxiety and fear, reducing insomnia, and regulating physiological processes.

Systematic investigations of muscular relaxation training have also been accompanied by careful evaluation of other forms of relaxation. Persons interested in meditation and

related practices have demonstrated the similarities between muscle relaxation and meditation exercises (Cauthen & Praymak, 1977; Goldman & Schwartz, 1976). Wallace and Benson (1972) have noted, for example, that meditation produces decreases in skin resistance, metabolism, and brain activity. Raskin, Bali, and Peeke (1980) performed a controlled study comparing transcendental meditation (TM), general relaxation training, and muscle relaxation via EMG biofeedback. They found that TM can be an effective relaxation technique, but that it is not superior to either general relaxation training or EMG biofeedback in reducing both self-reported anxiety and frontalis muscle activity. Furthermore, they suggested that the use of any of these techniques as a sole intervention in the treatment of anxiety is unwise because of the limited likelihood of success using only one treatment strategy.

Meditation has been defined as "an exercise which usually involves the individual in turning

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attention or awareness to dwell upon a single object, concept, sound or experience" (West, 1980, p. 265). Geographically speaking, meditation techniques are identified in almost every culture of the world. Although the traditional use of meditation has been for religious or spiritual goals, in Western society meditation is used not only for religious but also for therapeutic reasons. For instance, Benson and colleagues (Benson, 1975; Wallace & Benson, 1972) have employed meditation in the treatment of stress disorders.

There has also been an emphasis on meditation within the historical traditions of the Christian church. This is best seen in the practices or disciplines of quiet reflection on selected passages of Scripture and prayer. The activity of reflecting upon scriptural material and praying can be defined as a method for communion with God.

Prayer is a means of communication between persons and God, in which individuals express praise, adoration, thanksgiving, intercession and petition. One example of a recent study exploring the effects of prayer was conducted by Elkins, Anchor, and Sandler (1979). In this study 42 adults from a homogenous religious and sociocultural background participated in a 10-day prayer training experiment. There were three groups to which subjects were randomly assigned. The first group underwent general relaxation training; the second group was engaged in daily prayer for themselves and others; the third group was a control group that essentially experienced no experimental manipulation. Elkins et al. found that muscle tension as measured by EMG levels of the frontalis muscle was significantly reduced for the relaxation group only, even though there was a trend in that direction for the prayer group, too. Reports of anxiety/tension levels suggested that there were significant subjective reductions of such levels for both experimental groups. In sum, the overall results showed modest effects for relaxation training and minimal effects for the prayer training group.

Finney and Malony (1985) described the preceding type of prayer as verbal prayer. They distinguished verbal prayer from contemplative prayer, which is understood to be an attempt to relate to God in a quiet, nonverbal and open manner. Contemplative forms of prayer are more accurately characterized as "ways of being" as opposed to performances of some series of prescribed religious behaviors.

In the Christian community, meditation or

"quiet time" has come to mean a variety of different activities. In order to clarify matters, devotional meditation (DM) will be operationally defined in this study as a period of (a) quietly reading and reflecting on a passage of Scripture emphasizing God's care and concern and (b) praying about development of Christian virtues using prepared liturgical materials. The purpose of this study is to determine if DM, a religious discipline considered historically as an effective means to achieve peace and calmness produces psychological outcomes similar to PR.

The experimental literature suggests that PR and TM may have common underlying processes that account for their utility as a clinical intervention. One possibility is that these psychological methods are a "naturalization" of a common religious discipline that attempts to address the human desire for achieving peace and calmness. For the Christian, there may be spiritual resources that function similarly. Because the purpose of DM transcends the merely pragmatic gains of increased relaxation, this is not a competitive evaluation of DM and PR wherein DM stands to be judged as "ineffectual." Whatever the outcome, DM is not merely PR with a religious veneer. It is hypothesized, however, that the person undertaking DM will undergo physiological and psychological changes similar to progressive relaxation. These changes would include reduced muscle tension, anxiety and negative emotionality. It should also be pointed out that there has been concern within the Christian community regarding mysticism and the potential for the misuse of spiritual disciplines (McLemore, 1982). Care was taken in this study to insure that the participants used these procedures within the context of familiar Christian devotional strategies.

Method

Research Participants

Three experimental groups comprised the present study. Each condition consisted of 12 persons equally divided by sex. The experimental conditions were (a) devotional meditation group (DM), (b) a progressive relaxation group (PR), and (c) a wait-list control (WL).

The participants were undergraduates enrolled in a Christian liberal arts college in the Chicago area and ranged in age from 17 to 25 years. They represented diverse Christian backgrounds and were recruited primarily through advertisement in the weekly college

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newsletter and announcements in selected classrooms. The announcement offered participants an opportunity to participate in a study evaluating relaxation techniques. Participants were randomly assigned to one of the three experimental groups and were seen individually.

Apparatus

The study was conducted at the Behavioral Psychophysiology Laboratory of Wheaton College, which offered a moderately lighted and sound-attenuated environment. The experimenter was in communication with the participants through a one-way mirror and intercom system during the experimental procedure. Subjects were seated on a reclining chair throughout the experiment.

Physiological Measures

A Coulbourn Physiograph recorded the physiological measurements. Four major EMG sites were monitored using silver-silver chloride miniature surface electrodes. The muscles examined were the frontalis, right masseter, right trapezius, and right brachioradialis. Each muscle surface was prepared using standard laboratory procedures. The electrical resistance for each set of electrodes was measured to be 10,000 Ohms or less. Besides monitoring EMG, heart rate and skin temperature from the middle finger of the dominant hand were also recorded. After the surface sensors were connected to the physiograph, the experimenter would leave the experimental room and allow 10 minutes for the participant to adjust to the surroundings.

Procedure Overview

The members of each experimental group were required to come for an assessment procedure during an initial interview session. Subjects were screened so that no person had a medical diagnosis which would account for excessive muscle activity or restrict their practicing relaxation techniques. Additionally, subjects agreed to not be involved during the study in any form of treatment for muscle tension that would involve medication.

After meeting the necessary criteria, the subjects were given a brief overview of the study and were asked to complete a consent form. Afterward, they answered several questionnaires in the following order: The SCL-90-R (Derogatis, 1975), Spielberger's State Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, & Lushene, 1970), the Emotion Assessment Scale (EAS) (Carlson, Collins,

Parzelius, Stewart, Nitz, & Lind, 1987), and the Tension Mannikin (TM) (Webster, Ahles, Thompson, & Raczynski, 1984). After completion of the questionnaires and the attachment of the surface sensors for physiological recording, the participants were exposed to an audiotaped psychophysiological assessment. The instructions for this were as follows:

1. Please sit quietly for the next 10 minutes in order for the physiograph to adjust to you.
2. Now, please relax the muscles of your body as best as you can. (2 minute period)
3. Please stop relaxing now and sit quietly until the next step. (2 minutes)
4. Recall a stressful event that has happened to you. Think of that event and your reaction to it. (2 minutes)
5. Stop thinking of the stressful event and sit quietly until further instructions. (2 minutes)
6. Recall a pleasant event that has happened to you. Think of that event and your reaction to it. (2 minutes)
7. Stop thinking of the pleasant event and sit quietly until further instructions. (2 minutes)
8. Relax the muscles of your body as best as you can. (2 minutes)
9. Stop relaxing and sit quietly. (10 minutes)
10. That concludes the psychophysiological assessment procedure. The experimenter will be in momentarily to remove the sensors and continue the assessment.

Physiological recordings were taken at the 8th and 9th minute of the first baseline period, immediately after the instructions (a) to relax, (b) think of a stressful event, (c) think of a pleasant event, (d) to relax, and (e) during the 8th and 9th minute of the second baseline period.

After completion of the audiotaped instructions, the experimenter entered the laboratory room and removed the surface sensors. Subsequently, the participants answered another set of questionnaires. These included the STAI-S (state form), EAS and TM. Following this, the individual left the laboratory after setting an appointment to return a week later. During this one-week baseline period, the participants were requested to record on an hourly basis their daily muscle tension using a 10 cm visual analog scale.

Following the first assessment, subjects in the PR group were requested to come for six additional sessions, three times a week over a 2-week period. Having the subjects come every other day was done to control for practice effects. At the beginning of each session the participants were asked to answer the STAI

(state-form), EAS, and the TM. In the meantime the experimenter placed the physiological sensors in the manner already described. The individuals were then asked to sit quietly for the first 10 minutes for the adjustment of the physiograph. During the 8th and 9th minute, baseline measurements were obtained and then the subjects listened and participated actively in the relaxation instructions prescribed via audiotape taken directly from Bernstein & Borkovec (1973). The PR lasted 20 minutes, or approximated the same amount of time as the DM. When the procedure was completed the participants were asked to fill out the same set of questionnaires as at the beginning of the session. Before leaving, the subjects were given additional daily muscle tension assessment forms to record their muscle tension until the following session. The same procedure was repeated throughout all the sessions with the exception that upon completion of the 6th session the individual underwent the psycho-physiological assessment procedure that was performed at the first session. When the post-assessment was finished, subjects also completed the Intrinsic-Extrinsic Spirituality Inventory (Robinson & Shaver, 1973). This questionnaire was given at the end of the study to evaluate the equivalency of groups on a standard scale of religiosity.

The members of the DM group underwent exactly the same procedure for the initial interview and assessment session as did the PR group. However, for the next six sessions the participants listened to audiotaped passages of Scripture, devotional thoughts and prayers while being monitored both physiologically and psychologically. Six different scripts, one for each session, were prepared. Also, a written script of the devotional material was available to help the participants follow along. The accompanying sample of devotional material illustrates the biblical material and prayers used. The materials developed the main theme of peace and tranquility and lasted approximately 20 minutes. One example is as follows:

1. Please sit quietly for the next 10 minutes in order for the physiograph to adjust to you.
2. Scriptural Material – Psalm 23, New International Version.
3. Questions: (a) What is the meaning of the passage? (2 minutes of silence) (b) What does it mean personally to you? (2 minutes of silence) (c) What does the passage promise? (2 minutes) (d) What is the applicability of the passage in your life today? (2 minutes of silence)

4. Liturgical Prayer.

5. Quiet Time for Reflection.

6. Summary. That concludes today's session. Thank you very much. The experimenter will be in momentarily to remove the surface electrodes.

The postbaseline period lasted 10 minutes, and physiological measurements were taken during the 8th and 9th minutes.

The control group was a waiting-list control. They underwent the initial interview and preassessment session exactly the same way as the other two experimental groups. However, for the 2 week period following assessment they received no instruction, what the exception of monitoring their muscle tension daily. At the end of the 2 weeks they returned for the post-assessment session and the completion of the additional questionnaires.

Results

In order to determine that all experimental groups were equivalent on the measured physiological and psychological dimensions, data from the baseline assessment period were analyzed using one-way analysis of variance (ANOVA), in which there were three levels representing the three experimental conditions. This analysis strategy was chosen in order to assess carefully subjects' initial ability to change within a session. The psychological variables were SCL-90-R, STAI (S and T), EAS, TM, Daily Muscle Tension (MT), and the Intrinsic-Extrinsic religiosity questionnaire (this was given in the last session only). With the exception of the SCL-90-R and STAI Trait form, pre-post change scores were obtained for all the psychological variables across the first experimental session. The ANOVAs revealed no significant differences (each $F < 1$), on any of these dependent variables, except for the paranoia scale of the SCL-90-R, $F(2, 33) = 4.39, p < .02$. Duncan's multiple range test for pairwise comparisons revealed that the relaxation group scored significantly higher on the paranoia scale than the control group which in turn scored higher on the paranoia scale than the DM group ($p < .05$). However, upon closer inspection of the group means for that scale score there was no interpretable clinical difference, and the result might best represent a spurious finding given the equivalence of the conditions on all other psychological dimensions.

The physiological dependent variables were EMG change scores from the four muscle sites

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(frontalis, masseter, trapezius, and brachioradialis), heart rate and skin temperature. Analyses performed on these variables also indicated no significant differences among the groups during the baseline assessment. Therefore, given the results from both psychological and physiological dimensions, it was concluded that the experimental groups were approximately equivalent.

Data from the 2nd and 6th treatment sessions were selected for statistical analysis because they represented beginning and ending skill levels. Two (groups) by two (sessions) MANOVA procedures in which the second baseline score in each session was adjusted by the first baseline score in that session were used for these analyses. There were no differences between groups on measures of self-reported muscle tension (TM) and emotionality (EAS and STAI-S). There were also no significant differences between groups on heart rate or skin temperature. There was a significant group by session interaction for EMG activity, $F(4, 36) = 3.18, p < .02$. Follow-up univariate analyses indicated significant differences between groups for two of the four muscle sites. Frontalis activity in the DM condition decreased from 5.34 μ volts (μ v) to 3.44 μ v across treatment while it increased from 2.94 μ v to 4.94 μ v for the PR group, $F(4, 36) = 5.04, p < .03$. EMG activity in the brachioradialis muscle showed similar results with activity in the DM group decreasing from 3.08 μ v in Session 2 to 1.74 μ v in Session 6 while for the PR there was an increase from .92 μ v volts in Session 2 to 2.25 μ v volts at Session 6, $F(4, 36) = 11.1, p < .001$.

ANOVAs were conducted for the post-assessment session across the three experimental groups (DM, PR, Control). The analysis indicated significant differences among the groups at the postbaseline period for only two psychological variables. For the anger scale of the EAS, significant differences were found among the three group means $F(2, 33) = 3.50, p < .04$. Duncan's multiple range test for pairwise comparisons revealed that the DM group was significantly lower than the PR group which in turn was significantly lower than the control group. For the anxiety scale of the SCL-90-R, significant differences were also found ($F[2, 33] = 6.15, p < .005$). The Duncan's multiple range test revealed that the DM group was significantly lower than PR, which in turn was lower than the control group. At the post-assessment there were no significant differences among groups on other physiological variables

or on the scale of religiosity.

Discussion

The results of the present study demonstrated the usefulness of a DM approach in changing several psychological and physiological variables in a population of Christian students. Following a 2-week program where subjects individually were exposed to DM, it was found that they reported less anger and anxiety than persons who underwent 2 weeks of PR training or who were assigned to a wait-list control group. Furthermore, persons experiencing DM also displayed less muscle tension, as measured by reduced EMG activity, at two different body sites than did persons who performed PR. While the overall results were not uniformly supportive of the superiority of the DM approach over PR, the present results offer strong support for continued exploration of the efficacy of DM strategies for reducing clinically relevant symptoms among persons with a Christian background.

Numerous studies of meditation (e.g., Goleman & Schwartz, 1976; West, 1980) have shown that such procedures reliably reduce physiological arousal and self-reports of anxiety. It is not surprising, therefore, that the present results also would be effective in reducing muscle activity or reports of negative emotionality. The DM strategy encouraged persons in the practice of quiet reflection as is consistent with other meditation practices; what was different is that the subject matter for the periods of reflection was drawn from *biblical* material, requiring active engagement of mental processes, and not the passive "shutting down" of mental activity more characteristic of traditional meditation procedures. This raises an important theoretical question regarding the mechanisms of meditation-induced relaxation. Focus of attention appears to be one important component of relaxation. However, it is not clear how the contents upon which one focuses influence resulting levels of psychological and physiological variables. A future study could begin to address this issue if it were to include devoutly religious persons from faiths other than the Christian faith who used DM-like material drawn from their own traditions. Moreover, such a study should also include both Christian and non-Christian groups exposed to nonreligious but potentially relaxing material as a means to identify whether or not results are due to some inherent quality of DM or to the process of quiet reflection itself. The fact that

active concentration on material important to one's faith system is relaxing would be potentially useful for clinicians seeking to ameliorate problems related to anxiety and physiological arousal in their patients.

A strong experimental literature exploring the role of distinctly religious practices in reducing selected clinically relevant variables has not been readily available for the Christian therapist. Studies that are accessible (cf. Finney & Malony, 1985) either lacked adequate control groups, random assignment to treatment conditions, or valid dependent variables. The current study was an attempt to identify through the application of experimental methodology whether or not Scripture reading, quiet reflection, and prayer would be reliably effective "in the long run" for a distinctly Christian population.

The present results regarding the reduction of negative emotionality are encouraging, especially with recent evidence focusing on the adverse health effects of hostility (Williams et al., 1980) and anxiety. For the population under study, at least, the use of DM resulted in lower levels of both anger and anxiety. In light of these findings, it might be well for structured programs aimed at modification of Type A behavior patterns among Christians to explore the role of a DM component as a part of the treatment strategy for reducing levels of hostility and anxiety.

The experimental methods developed for this study might have adversely affected the results. It is notable that the PR group showed no enhanced ability to decrease actual EMG activity relative to controls. This was predictable from the literature since taped instructions have not been shown to be effective (Borkovec & Sides, 1979). The physiological assessment instructions may have also influenced the pre-post comparisons among the three experimental groups. Since subjects were not specifically told to use the relaxation strategies they had been taught, it was difficult for differences among the participants' abilities to relax to emerge. In further explorations of this nature, a revised assessment procedure is strongly suggested. Such a procedure should include a postbaseline period after the subject is specifically encouraged to *employ* the learned relaxation technique.

The time during which the experiment was conducted is another factor which potentially influenced the results. Although the participants were a homogeneous population from the same

academic setting, the necessity of scheduling some of them during final exams week did not ensure that they were all experiencing the same levels of anxiety when the data were collected. However, random assignment of the participants into the three experimental groups should have largely controlled the major influence of this factor. It is quite likely that using persons with clinically elevated levels of anxiety or muscle tension rather than college students would allow for differences across conditions to emerge more clearly.

Although PR techniques are standardized and accepted as bonafide therapeutic interventions, the DM materials were developed recently for use in the present study. Anecdotal observations of the physiological recordings indicated that the questioning procedure in the middle of the DM sessions may not have served as a relaxing agent for everyone. For example, some subjects reported upon inquiry that when a question was asked during the DM there were occasional moments of physiological arousal.

Additional treatment groups comprising *both* DM and PR techniques, in varying sequential order, should be considered in order to replicate the findings of this study. The present study indeed revealed encouraging results which suggest that meditating on scriptural readings and praying can be beneficial in both physical and psychological terms. However, it needs to be pointed out that the Bible itself does not necessarily promise states of peace and tranquility for the reader (e.g., Heb. 4:12). DM should not be viewed as a "safe" practice with guaranteed outcomes. This would presume that God's workings are always controlled and predictable. Such a mindset would not be consistent with a biblical world view suggesting the power of God to act in ways that are beyond human understanding.

Further inspection of the DM data indicated that the experience caused physiological arousal such as heart rate increases for some participants. This raises the possibility that Christians experience feelings of excitement upon awareness of God's unconditional love and constant provision (e.g., Ps. 39:3). Alternatively, DM could create feelings of conviction or a need for personal response. Even though there are potentially real outcomes for some people, the present results suggest that meditation through scriptural material and prayer exerts a positive influence on certain psychological and physiological parameters.

In conclusion, this study hypothesized that

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DM could generate positive physiological and psychological effects. The results revealed that this was true for several psychological and physiological parameters and suggests that the unique spiritual resources inherent in a Christian's life-style are potentially important factors in the therapeutic process. Further experimental research is warranted to replicate and extend these findings.

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