

Yoga and Meditation-based Interventions for

Workplace Stress, Anxiety and Health

James Dewar

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Professor Yost

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The Current Situation

With the amount of money invested in work place mental and physical health conditions, an investigation into the potential causes of the major groups of disorders and the potential steps that can be taken to help reduce absenteeism and other costs corporations are absorbing right now. In a 2000 study by Druss et al., they found at a major US corporation with 23,000 employees that of employees that filed claims for the year, 2368 of the employee disorders fell under the categories of depressive disorder, diabetes, heart disease, hypertension, and back problems. The total annual cost per person in this group to the US Corporation studied was \$3980.60 as compared to the \$949.00 annual cost for all other disorder claims file (Druss, 2000). This group of disorders is interesting because all of these disorders can be caused by or exacerbated by stress and anxiety (Sullivan, 2000). What research showed was that patients with anxiety or depression tended to report ‘somatic’ symptoms rather than emotion-related issues (Lecrubier, 2001). This means that a portion of claims categorized as ‘other disorder’ might be ‘somatic’ treatments not categorized properly. One survey of 146 employees showed depression as the number one influence of employee health and productivity as well as a negative impact on the work community (Riotto, 2001). The impact of extended computer usage on the body has been well documented and carpal tunnel syndrome is listed as one of the top workplace injuries by the Center for Disease Control and Prevention (CDC website, 2005). Several lines of research suggest that Yoga and

Mediation-based Interventions can reduce the impact of stress, anxiety, and workplace related health-conditions.

What the Research Shows

One study showed that Psychological Job Demands had significantly greater impact on Job Burnout than other factors including job conflicts, job control, work of superior, organization of the work and the monotony of the job. Burnout was measured by emotional exhaustion from the Maslach Burnout Inventory with a Cronbach's α of .88. Burnout can lead to employee absenteeism, lowered performance and job turnover resulting in higher training dollars. Psychological demands of the job which are intertwined with stress and anxiety had a Cronbach's α of .72. The employee sample was made up of (N=1164) employees in the retail trade and the metal industry (N=1536). According to the results of all the measures, Psychological demands explained 25% of the variance in burnout with a $p < .01$ using regression for both industries. This implies that reducing the impact of job demand might also reduce burnout. The external validity is somewhat questionable and there were no details about the sample across companies and regionally which could impact the variance in job demand. However, garnering similar results for both the metal industry and the retail industry is interesting in light of the dissimilarity of both industries to each other. Multiple searches did not produce any research on the impact of yoga or meditation on job demand, so this might be a potential area for future exploration.

A meta-analysis of the research on stress showed a small, but significant overall effect of interventions on work-related stress. Van der Klink et al. used 4 databases spanning four decades. They used 26 specific search terms in total to conduct their

searches for relevant literature. To be included in the analysis, the articles had to meet several criteria; including an intervention directed at stress reduction, experimental or quasi-experimental design, and sample from working population and well defined outcome variables with good reliability. Forty-eight studies met the criteria. The researchers concluded that cognitive behavioral approaches were more effective than other approaches including relaxation techniques on individual interventions with a $P < .01$. The studies covered revealed heterogeneous population effects that had a divergent impact on the results (van der Klink & Roland, 2001). Some interventions worked and some did not. It was not clear from the paper what specific relaxation techniques were used in the different studies; however the results also revealed that programs that included a relaxation component were most effective. The authors noted that although many organizations report successful interventions at the organizational level, the research did not show any effect. Overall, the meta-analysis is encouraging in that interventions seem to be working on job stress.

Since relaxation seems to enhance regular interventions which appear to be working on stress and anxiety, looking into research on the impact of meditation on stress and anxiety in the workplace makes sense. Two meditation techniques dominate the literature. Both mindfulness-based stress reduction (MBSR) and Transcendental Meditation (TM) focus on one's bodily sensations and one's breath while allowing thoughts to come and go.

A meta-analysis of MBSR found that both controlled and un-controlled studies showed effect sizes of .5 ($P < .001$) with homogeneity of distribution indicating that MBSR can help many individuals with a variety of psychological issues in a variety of

settings (Grossman, 2004). Sixty-four studies were found, but only twenty met the criteria. Five databases were searched and five terms used. Studies were recent, provided post intervention data, scales validated, and length of time of intervention.

Comprehensive statistical analysis was used including the Cohen's *d* calculation, standard error and confidence intervals. One study by Astin found that one-year relapses of major depressive episodes to be halved when combined with MBSR treatment which is consistent with what Van der Klink et al (2001) discovered in their meta-analysis of the impact of interventions on stress that included a relaxation component; improving the reliability of the meta-analysis. Although the sample size of studies is small the statistical results are encouraging for using techniques similar to MBSR to combat stress in the workplace.

In contrast, Bishop (2002) suggested that much of the current research on MBSR is weak (although Grossman was only able to use 1/3 of MBSR studies he found). This article was written at the same time as the meta-analysis suggesting the authors all had access to the same material. The crux of this study is an attack on the construct validity of MBSR studies. For one the criteria for what is mindfulness-based and what is not are loosely defined. According to the author, because one cannot operationalize mindfulness, it is difficult to test the impact of mindfulness. The author points that because attention regulating and attention switching are two characteristics of MBSR, tests showing enhanced performance in these areas might reinforce the construct validity of MBSR. In addition, the author found no evidence to suggest that MBSR actually produced mindfulness. Since construct validity was not measured, it is difficult to say whether

Bishop is right or not. Nevertheless, he does bring up some thoughtful ways of finding out.

In one study, groups using spiritually-based meditation techniques outperformed groups using non-spiritually based meditation techniques in measures of pain, anxiety, mood, and spiritual health (Wacholtz and Pagament, 2005). Subjects were taught a mediation or relaxation technique for two weeks. In the lab, subjects would practice their technique for 20 minutes. Subjects then stuck their hand in 2 degree Celsius water. The time the hand was in the water was measured. Psychological measures included both the Negative Affect Scale, the State-Trait Anxiety Inventory, the Multi-dimensional Measurement of Spirituality scale, the Spiritual Well being scale, the Daily Spiritual Experience Scale and the Mysticism Scale. Using ANOVA, the authors compared the effects across the groups and found that the spirituality group demonstrated the greatest tolerance to pain, decreased anxiety, positive mood and stronger spiritual health. The range of Cronbach's Alphas for all measures was .77-.94, and variance was significant with a $P \leq .05$. In addition to the limited sample of 84 university students, there is also an issue with definition of the word 'spiritual' and the context of its use with the word meditation. Transcendental Meditation techniques are described as non-denominational, but participants insist that it is the spiritual component of the techniques that lead to more positive results. But what constitutes spiritual meditation? Would other forms of meditation have spiritual effects? More studies are required to see if spirituality can enhance the effect of meditation. And even if it did, either employers would have to be comfortable with introducing spiritual practices into the workplace in a non-threatening

or non-discriminatory way or researchers will need to determine how to isolate spirituality from God.

In evaluating the potential of meditation-based interventions, one needs to take a look at the multiplying implications of meditation. Studies have shown a link between reductions in anxiety and depression through serotonin increases and Cortisol reductions in the brain. Presumably this is why serotonin reuptake inhibitors have been a popular form of treatment for depression. In one study using dynamic regression analysis, Walton et al. (2005) discovered that a change in the daily size of the TM group was a significant predictor of reduced Cortisol excretions and increased serotonin excretions in non-meditators living 20 miles away (Walton, 2005). The authors used urine samples to test for metabolites and calculations using the Box-Jenkins time series measure to strengthen the construct validity. The reliability is somewhat weakened by the fact that there are very few studies that have measured the biochemical impacts of meditation. However, in a study from India, researchers found that in a sample of severely depressed university students, only 36% of severely depressed cases remained after thirty days of meditation-based treatment. More than 1/3 became normal (Khumar, 1993) after the thirty-day intervention which seems consistent with what we now know about the relationship between meditation and changes in serotonin output. Unfortunately, the sample is made up of university students and the non-meditators did have interactions with the meditation group. What was the impact of coming into contact with the group on the changes in biochemical levels of non-meditators? Can the predicted impact of a 10% change in biochemical levels translate to other populations? Apparently, it already had in other ways.

According to Hagelin et al (1998) a group of 4000 meditators using TM technique were assembled in Washington D. C. for a mass meditation. It was hypothesized that violent crime would fall substantially as a result of the mediation sessions conducted over a two month period in the District of Columbia. The overall results showed a 15.6% decrease ($P < .0008$) in crime over the previous five years while taking into account the impact of hot weather conditions and additional police staffing. The maximum decrease of crime of 23.3% ($P < .000000009$) occurred during the time of greatest attendance at the meditation sessions in the final weeks. The authors used Box-Jenkins methods to estimate the outside effects on the amount of violent crime. A surprising implication is that a permanent group of steady meditators could have a long-term impact of reducing crime by 48% (Hagelin et al, 1998). A longer time study might yield insight into any effects of diminishing returns over time, reversion back to previous crime levels and perhaps even greater crime levels than before if there is a 'rubber band' effect. The overall implications seem to be from both of the Hagelin et al. study and the Walton study that meditators may not only reduce the stress and anxiety in their own world, but that of the workers around them as well.

Because of the impact of meditation on the environment, testing meditation methodologies along with other methodologies is difficult due to the impact of meditators on non-meditators in an environment. Indeed, a study of worksite stress reduction through TM revealed decreases in both blood pressure and psychological stress that were greater than either Progressive Muscle Relaxation (PMR) or the off-site controls that received business skills training (Broome et al, 2005). The research team used an African company with a frantic corporate culture to conduct the study. One group was TM, one

was PMR, one was an on-site control, and two groups consisted of active off-site controls that were learning business skills training. The results revealed significant declines in both the TM group and the PMR group. For TM, 67% of the changes occurred during the first two weeks of the five and a half month study, showing the rapid impact of a meditation intervention. In addition, other effects were notable. For one, the on-site control group had nearly significant reductions in stress and greater reductions than the active off-site controls receiving the business skills training implying that it would be better to have workers work around meditators rather than receive business skills training. The authors discuss the possibility of a Hawthorne effect, but the fact that the outside controls received training almost negates the possibility. The researchers also measured productivity as it correlated to stress and blood pressure decreases and found that as stress and blood pressure decreased, productivity increased. In fact the company found sales growth doubled. Staff grew 44%, as well as a major new business opportunity resulting in 15% of sales for two years. The external validity of the study is limited since this was a South African company; however, it made a good test subject based upon high pre-intervention test scores for stress. Authors measured blood pressure, heart rate and blood rate. Stress was measured using the Stress Symptoms Check List. For the TM group, ANOVA revealed significance in both psychological and physiological factors with a $P < .05$. Blood pressure and psychological conditions had the highest correlation at .83, strengthening the internal validity of the study. Having compared their physiological results with earlier studies using TM, the reliability of the research in this study is sound. This study may have some powerful implications for corporations on the bottom-line.

More studies will be needed to develop a consistently reliable pattern of results from meditation on the bottom-line.

Another study used a schedule of yoga postures in addition to meditation and chanting as a part of the stress reduction intervention for caregivers of dementia patients (Waelde et al, 2004). Each session was followed up with a thirty minute session on how to apply what they learned in the intervention. Six sessions were taught to a group of 12 older female caregivers. Measures were taken on the Center for Epidemiological Studies Depression Scale, The Self-Efficacy for Controlling Upsetting Thoughts about Caregiving scale, the State Trait Anxiety Inventory, the revised Memory and Behavior Problem Checklist, the Weekly Practice Log and a follow up questionnaire written for the intervention. State anxiety and self-efficacy improved with a $p < .05$ and depression levels improved with a $p < .01$. Six weekly sessions, 30 minutes per session resulted on average of 90 minutes of yoga per week per person for a month. The external reliability of these findings is questionable since the subjects were all female and 60% Latina. The small sample was not randomized, although the treatments were. It was not clear if they were able to tell what aspect of the program had the most impact. Would yoga postures or meditation alone have had the same effect as the entire program? Were the follow up application sessions necessary to solidify the results? Further study might yield some valuable insight as to how we can most efficiently use yoga and meditation based interventions. The significant results over the short period of time are consistent with the short timelines observed in the Broome et al study (67% of variance in first two weeks), the Khumar study (30% of severely depressed rated normal after 30 days), and the Wacholtz study on spirituality that yielded significant results in two weeks.

Another study by found significant levels of reduction in depression in 25 Indian adults with $P < .05$ within 15 days (Mishra, M. and Sinha, R. K., 2001) using an intervention where individuals lived in an ashram environment and participated in ashram activities. But again, the intervention involved, yoga, meditation, rest, prepared meals, plenty of sleep, and journaling. The change in environment (from hectic work world into ashram environment) might have had an impact on the internal validity of the study. Also, the small sample lends questions to the external validity of the study. Usually smaller samples require more comprehensive statistical analysis, but that was not done in this study. The scale used for depression was from Derogatis Stress Profile and has been found to be valid and reliable in other studies. In addition, the scale got favorable reviews in the Mental Measurements Handbook. The construct validity of this study is probably adequate. It is possible that interventions involving meditation may have a quicker impact on stress, anxiety and depression than interventions without meditation; lowering the overall cost while increasing the effectiveness of the intervention for the client.

Much of the research into meditation focuses on the psychological changes that occur, although the physical characteristics associated with meditation are interesting to note as well. In a recent study by Lazar et al.(2005), the researchers used MRI (Medical Resonant Imaging) to compare brain scans of twenty meditators and twenty matched non-meditator controls. The results indicated physical differences in the right anterior insula and the right middle and superior frontal sulci (Broadmann's areas 9 and 10) showed significantly thicker cortical areas in meditators than non-meditators. Another difference was found in the left temporal gyrus (auditory cortex) and a small region in the fundus of the central sulcus (the somatosensory cortex). In addition, researchers found that the

cortical thickness of Brodmann's areas 9 and 10 in the 40-50 year old meditators was similar to that of the 20-30 year meditators and controls suggesting age-defying properties as a result of meditation (Lazar, 2005). All of the findings had significance of $P < .001$. The sample was small, but the comprehensive statistical analysis is reassuring for external validity. Certainly, the backgrounds of the meditators and non-meditators may have had an impact on the internal validity of the study. The two groups of subjects were matched based upon age, race, years of education and sex. MRI technology has been well-established the construct validity seems pretty sound. The physical changes that occur in meditators in terms of cortical thickness are consistent with the changes secretion levels of serotonin and cortisol (Bloome et al, 2005). Could meditators cause changes in cortical thickening in non-meditators just as changes in serotonin and cortisol levels was observed?

Although the research into yoga is just getting under way, many have known about the benefits of yoga since it has been around for thousands of years. One study did attempt a yoga posture-based intervention in subjects with carpal tunnel syndrome (CTS). Garfinkel et al. (1998) compared yoga, wrist splinting and a no treatment group on effectiveness of treatments for CTS. Four hundred subjects were recruited and interviewed, but only 51 met the study's criteria. Measures of grip strength using asphygmomanometer cuff, pain reduction using a visual analog scale of 1 to 10, Phalen sign, sleep disturbance with number hours slept, Tinel sign and median nerve motor and sensory conduction time which were measure with an electoneurometer. The trial was conducted over an 8 week period using bi weekly 1.5 hour long yoga classes taught by one person. Using paired difference T tests, and a repeated-measures analysis of variance

for within-group differences to increase reliability of the measures. The results showed both grip strength and pain reduction showed significant improvements with $P < .009$. Again, the short improvement time is consistent with other studies that have had significant results in a short period of time using yoga or meditation based interventions.

Conclusion

Yoga and Meditation based interventions are slowly making their way into workplace settings. While there is little research that has been done to conclusively demonstrate the impact of yoga in the workplace, enough research into areas related to yoga have been done to warrant further investigation. Different yoga styles have different emphasis. Testing different yoga styles while varying meditation time might offer a clue as to the impact of meditation on exercise in general. A 2003 study revealed significantly higher impact of exercise with a mindful-based component verses aerobic exercise without mindfulness with a $P < .01$ (Netz and Lidor, 2003). The sample of 147 female physical fitness students at a college was a narrow sample, but when viewed in terms of the greater research that has been done, this study does offer some insight and basis for future research into the impact of meditation or mindfulness on both yoga and exercise in general. Current studies should make stronger efforts at randomizing samples to strengthen the external validity of their findings so that potential clients will be more open to using yoga and meditation-based intervention techniques. Another helpful contribution future studies could make is breaking down the different components of yoga practice and studying the impact of each: yoga postures, meditation, mantra chanting, breathing exercises and diet. In all, there is much reason to be excited about and

open to the possibility of effective yoga and meditation-based interventions for stress and anxiety in the workplace that is costing employers billions of dollars every year.

References

- Bishop, Scott R. (2002) What Do We Really Know About Mindfulness-Based Stress Reduction? *Psychosomatic Medicine*, 64(1), pp. 71-83. Retrieved November 2 , 2005, from EBSCO database.
- Broome, J. R. N., Orme-Johnson, D. W., & Schmidt-Wilk, J. (2005) Worksite Stress Reduction Through the Transcendental Meditation Program. *Journal of Social Behavior and Personality*, 17, 235-273.
- Center for Disease control website. Center for Disease control website.
<http://www.cdc.gov/node.do/id/0900f3ec8000ebff>, retrieved December 6, 2005.
- Druss, B. G., Rosenheck, R. A. & Sledge, W. H. (2000) Health and Disability Costs of Depressive Illness in a Major U.S. Corporation. *American Journal of Psychiatry* 157(8), 1274-1278. Retrieved November , 2005, from EBSCO database.
- Garfinkel et al. (1998) Yoga-Based Intervention for Carpal Tunnel Syndrome. *Journal of the American Medical Association*. 280(18), 1601-1604. Retrieved November 2 , 2005, from EBSCO database.
- Gebhardt, D. L. & Crump, C.E. (1990) Employee Fitness and Wellness Programs in the Workplace. *American Psychologist*, 45(2), 262-272. Retrieved November 2 , 2005, from EBSCO database.
- Grossman, P., Niemann, L., & Schmidt, S. (2004) Mindfulness-Based Stress Reduction And Health Benefits: A Meta-Analysis. *Journal of Psychosomatic Research*, 57(1), pp. 35-43.
- Hagelin, J. S. et al. (1998) Effects Of Group Practice Of The Transcendental Meditation

- Program on Preventing Violent Crime in Washington, D.C.:Results of The National Demonstration Project, June–July 1993. *Social Indicators Research* 47: 153–201. Retrieved November 2 , 2005, from EBSCO database.
- Khumar, S. S., Paramjit K., & Kaur, S. (1993) Effectiveness of Shavasana on Depression Among University Students. *Indian Journal of Clinical Psychology*, 20, 82-87.
- Langlieb, A. M. & Kahn, J. P. (Nov., 2005) How Much Does Quality Mental Health Care Profit Employers? *Journal of Occupational and Environmental Medicine*, 47(11), 1099-1109. Retrieved November 2 , 2005, from Wiley and Sons database.
- Lazar, S et al. (Nov., 2005) Meditation Experience is Associated with Increased Cortical Thickness. *NeuroReport*, 16(17), 1893-1897. Retrieved November 2 , 2005, from Wiley and Sons database.
- Mishra, M. and Sinha, R. K. (2001) Effect of Yogic Practices on Depression and Anxiety. *Journal of Project Psychology and Mental Health*. 8, 23-27.
- Netz, Y. & Lidor, R. (2003) Mood Alterations in Mindful Versus Aerobic Exercise Modes. *Journal of Psychology*. 137(5), 405-419.
- Perrewe, P. L.& Ganster, D. C.; (1989) The Impact of Job Demands and Behavioral Control on Experienced Job Stress. *Journal of Organizational Behavior*, 10(3), pp. 213-229. Retrieved November 2 , 2005, from EBSCO database.
- Riotto M. (2001) Depression In The Workplace:Negative Effects, Perspective On Drug Costs And Benefit Solutions. *Benefits Q*.17, 37– 48. Retrieved November 2 , 2005, from EBSCO database.
- Shirley, M & Werner. P. (2002). Reviews of Daily Stress Inventory. *Mental Measurements Yearbook*: 13th edition.

- Sullivan MD, LaCroix AZ, Spertus JA, & Hecht J. (2000) Five-Year Prospective Study Of The Effects Of Anxiety And Depression Inpatients With Coronary Artery Disease. *American Journal Cardiology*. 86:1135–118. Retrieved Novemeber 2 , 2005, from EBSCO database.
- Tuuli, P., Karisalmi, S. (1999) Impact of working life quality on burnout. *Experimental Aging Research*, 25(4), pp. 441-449. Retrieved Novemeber 2 , 2005, from EBSCO database.
- Van der Klink, J. J. L., Blonk, R. W. B., & Schene, A. H. (2001) The Benefits Of Interventions For Work-Related Stress. *American Journal of Public Health*, 91(2), pp. 270-276.
- Wachholtz, A. B. & Pargament, K. I. (2005) Is Spirituality a Critical Ingredient of Meditation? Comparing the Effects of Spiritual Meditation, Secular Mediation, and Relaxation on Sprititual, Psychological, Cardiac and Pain Outcomes. *Journal of Behavioral Medicine* 28(4), pp. 369-383.
- Waelde, L. C., Thompson, L., & Gallagher-Thomson, D. G. (2004) A Pilot Study of a Yoga and Mediation Intervention for Dementia Caregiver Stress. *Journal of Clinical Psychology*, 60(6), 677-687.
- Walton, K. G., Cavanaugh, K. L., Nirmal, D. P. (2005) Effect of Group Practice of the Transcendental Medication Program on Biochemical Indicators of Stress in Non-Meditators: A Prospective Time Series Study. *Journal of Social Behavior and Personality*, 17, 339-373.