
Lifestyle Interventions: Reasons for Therapeutic Outcome

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ABSTRACT

Self-efficacy is proposed as a mediating factor underlying positive outcome as observed in lifestyle and exercise programs. Studies are reviewed which indicate that lifestyle education and exercise programs improve quality of life, health, and wellness. However, improved physiological fitness is equivocally related to ability to cope with stressors and psychological well being. The mixed results seem to indicate that something other than physical fitness is significantly contributing to the improved psychosocial functioning observed subsequent to lifestyle counselling and exercise training. It is postulated in accordance with social learning theory that cognitive factors such as improved self-confidence and self-efficacy may be mediating the effect of fitness on stress.

RÉSUMÉ

L'auteur présente l'autoefficacité comme un facteur médiateur fondamental à des résultats positifs des programmes d'exercices et de styles de vie. Cet article examine plusieurs études concluant qu'une éducation sur le style de vie et des programmes d'exercices améliorent la qualité de vie, la santé et le bien-être. Cependant, une forme physiologique améliorée est liée d'une manière équivoque à la faculté de résister aux facteurs de stress ainsi qu'à une bonne santé psychologique. Les résultats variables semblent indiquer qu'un élément autre que la bonne forme physique contribue de façon significative à l'amélioration du fonctionnement psychosocial constatée après du counseling sur le style de vie et après un programme d'exercice. Il est suggéré, conformément à la théorie de l'apprentissage social, que les déterminants cognitifs tels que la confiance en soi et l'autoefficacité peuvent influencer l'effet de la bonne forme physique sur le stress.

Lifestyle and exercise interventions that aim at educating people about healthy, physically active lifestyle or that provide opportunities for people to participate in physical activity, have generally been found to improve quality of life, health, and wellness (Godbey & Courage, 1994; McClary, Pyeritz, Bruce, & Henshaw, 1992; Pelletier & Lutz, 1991). It has been assumed that improved physical fitness and the implementation of health practices are the factors which

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effect the positive outcome. However, in this paper the proposition is put forward that self-efficacy may be an underlying mediating factor contributing to outcome and that the construct of self-efficacy might more comprehensively account for the positive therapeutic outcomes observed with healthy lifestyle and exercise programs.

Positive Outcomes of Health and Fitness Programs

Lifestyle education and exercise programs are reported to produce many positive outcomes in participants' workplace and general quality of life. The provision of an exercise program in the work place seems to improve physical well-being and job satisfaction as well as being financially beneficial for both employer and employee. A Canadian report from the International Conference on Exercise (1988) found that industrial benefits from appropriate type of physical fitness programs affected enhancement of corporate image, increases in worker satisfaction and productivity, decreases in absenteeism and personnel turnover, and in some instances, decreases in industrial injuries. A 1983 study indicated direct annual savings to provincial health insurance of \$130 for every program participant (Fitness Canada, 1988). In another report, workplace physical activity programs were found to improve employee health and wellness, increase productivity, and correlate with greater job satisfaction in more than half of the companies surveyed (Craig, 1993). Shephard, Cox, and Corey (1987) reported that participation in workplace fitness programs increased employee satisfaction as well as quality and quantity of employee output. In Saskatchewan, it was found that for every \$1.00 spent on employee wellness, there was a \$1.82 return on investment in terms of reduced absenteeism (Vance, 1991). Finally, a ten-year follow-up study of the Canada Life corporate fitness program reported an average 9.6% decrease in absenteeism per year among the employees in the program (Canada Life, 1991).

In the United States, workplace fitness programs were also found to improve job satisfaction and physical well-being. Disability days reported in a large American corporation were reduced by more than 12% at work sites where a comprehensive workplace health promotion program, including physical activity, had been implemented for two years (Betera, 1990). In Texas, a five-year workplace fitness and health education program at the Prudential Insurance Company demonstrated a 47.5% reduction in major medical expenses, a 20.1% decrease in absenteeism, and a reduction of 31.7% in costs directly related to health problems (Bowne, Russell, Morgan, Optenberg, & Clarke, 1984; Rosenstein, 1987). A study of employee turnover during a four-year period in a corporate health and fitness program in a medium-sized corporation in the U.S. (Tsai, Baun, & Bernacki, 1987) reported that the probability of continued employment was significantly greater among exercisers than non-exercisers implying an increase in job satisfaction.

Research on lifestyle education programs indicates that healthy lifestyle variables are not only related to, but actually influence well-being. A campus health

promotion program consisting of stress management techniques, aerobic exercise, interpersonal relationship skills, and nutrition was reported to have had a lasting positive impact on participants' lives at two-year follow-up (McClary et al., 1992). In a six-week stress management program, delivered one-on-one to people in crisis, participants identified personal stress reactions as they learned coping strategies related to nutrition, exercise, progressive relaxation, cognitive control, and time management. They applied the skills and received personal feedback regarding the application of their new skills. Participants in the program reported a statistically significant increase in self-esteem and decrease in depression and anxiety (Godbey & Courage, 1994).

Fitness or Active Participation: Accounting for Outcomes

Although generally positive, there are some mixed results of the effects of exercise on perceived stress and psychosocial well-being. For example, Stern and Cleary (1982) studied 651 men who suffered from myocardial infarction and were randomly assigned to an exercise program or a control group. No significant differences were found between exercise and control groups on psychosocial variables. Many studies, however, demonstrate that some aspect of participation in physical activity has positive effects on mood, although the effect may not be the result of physical fitness per se. Aganoff and Boyle (1994), in a study of self-selected female exercisers and non-exercisers aged 15-48 years old, found that women who exercise regularly, regardless of fitness level, report less negative affect, increased positive affect, and lower levels of physical symptoms throughout the menstrual cycle. Berger and Owen (1983) conducted a fourteen-week self-selection exercise program for women and men aged 17-50 years old. They found that the psychological effects of swimming were not more pronounced for those performing strenuous exercise compared to those swimming at a more leisurely pace. In both cases swimmers reported significantly less tension, dejection, confusion, and hostility, as well as more vigor after exercising. Furthermore, it did not appear to be necessary for participants to engage in long-term physical training to receive some of the stress reducing benefits of exercise (Crocker & Grozelle, 1991). In fact, Moses, Steptoe, Mathews, and Edwards (1989), in a controlled trial, found that moderate levels of physical activity were more effective in enhancing mental well-being than high-intensity aerobic training.

A physiological change in fitness does not invariably imply a concomitant change in the subjective experience of stress. Long (1983) found that changes on measures of stress do not appear to be due to increases in aerobic power, nor are higher initial levels of fitness associated with less self-reported stress. There were no significant differences between exercise and control groups on psychosocial variables. Long suggests that the psychosocial aspect of fitness programs may be the active ingredient of treatment and that participation per se, and not increased fitness levels, reduces self-reported stress. Roy and Steptoe (1991) found that cardiovascular reactivity to stressors was suppressed in subjects who had recently exercised, however none of the self-report measures of tension under pressure

differed across groups; therefore, the subjective experience of stress was not altered even when there was physiological evidence that reactivity to stressors had changed due to recent exercise. Results of a study by Steptoe, Moses, Edwards, and Matthews (1993) found reduced cardiovascular reactivity to stress following exercise, but no accompanying modifications in subjective experience. Holmes and Roth (1985) looked at the association between high- and low-fit female undergraduate students and response to stress. They found that a high level of aerobic fitness was associated with reduced physiological reactivity to psychological stress. The high-fit subjects had a smaller pulse rate response to stress than did the low-fit subjects which was explained in terms of a heart rate response with greater stroke volume rather than more strokes. However, high- and low-fit subjects did not differ in their subjective responses to stress.

A review of 12 randomized controlled studies (Hughes, 1984) indicated that habitual aerobic exercise produced mixed results on anxiety, but reliably improved self-concept. In an experimental study by the same author (Hughes, Casal, & Leon, 1986) it was found that exercise did not result in change to anger, anxiety, confusion, fatigue, vigor, or total mood disturbance. Fitness in this study was not found to be significantly related to psychological well-being when the exercise training occurred individually for each participant, while other participants were not present, and there was no opportunity for social contact. De Geus, Van Doornen, and Orlebeke (1993) found that psychological make-up did not change as a consequence of exercise training, although the training did reduce heart rate level during stressors. Roth (1989) found that mood was significantly altered by a single bout of aerobic activity even in the absence of changes in physiological reactivity. Differential physiological condition was not sufficient to influence psychological well-being. In a non-experimental, 13-week program of aerobic exercise involving women aged 17-20 years old, Holmes and McGilley (1987) also found that although training decreased subjects' heart rates when experiencing stressors, there was not a concomitant decrease reported in subjective arousal.

A series of studies was recently conducted to investigate the connection between exercise, lifestyle education, fitness, and stress (Baydala, 1997; Baydala, Hiebert, & Malec, 1998; Malec, 1997; Malec & Hiebert, 1997). The first study tracked stress and fitness variables with people aged 17-77 years who participated in a 12-week lifestyle education program or the same lifestyle education program in combination with a moderate aerobic exercise program. The educational program consisted of one-hour weekly seminars covering nutrition, weight loss, general health practices, and essential skills, behaviours, and knowledge needed to modify lifestyle for general well being. The exercise program consisted of bi-weekly 30-minute low impact aerobic exercise along with 10-minute warm-up and cool-down periods. Fitness improved and stress levels dropped significantly in the two treatment groups compared to a wait-list control. The participants in the combined program showed the greatest improvements in fitness and stress reduction. The results suggested that improved fitness may have influenced participants ability to cope with stressors.

A replication study (Baydala, 1997; Baydala, et al., 1998) expanded the above design to include a fourth group consisting of exercise only. Middle-aged sedentary community residents participating in lifestyle education only, exercise only, combined lifestyle and education, and a wait-list control group were compared on measures of stress and fitness. It was found that although the treatment programs did not significantly improve fitness, all three treatment programs were effective in reducing stress; whereas, the no contact wait-list group showed no significant change. It seems that something other than fitness influenced the participants' ability to cope with stress. Furthermore, unlike the single modality treatments, the combined lifestyle and fitness training reduced stress at each four-week test point. Therefore, continuous stress reduction was observed in those participants who had the most time for interpersonal contact.

It is difficult to make simple comparisons across the studies reviewed. Inadequate methodological description makes it difficult to compare outcomes. Many different measures of physiological and psychological constructs are used and many of the exercise studies do not report enough detail to ascertain whether or how much interpersonal contact is experienced by participants in the programs, the potential effect of expectancy biases, nor what aspects of participation may be significant factors contributing to outcome. However, the weight and trend of the evidence seems to indicate that when people participate in lifestyle and exercise training programs, changes in psychological well-being can occur without significant physiological changes in fitness. Changes in stress, anxiety, and subjective experience of arousal can be observed even though significant changes in fitness may not be detected. Something about people being active and engaging in the programs and not fitness per se must be affecting stress, anxiety, and subjective arousal. To influence psychological well-being, perhaps the important active ingredients needed in a lifestyle or exercise program include psychosocial factors; such as, social contact, shared meaning, community support, social learning, pleasant diversion, success experiences, and self-efficacy.

Understanding the Results in the Context of Social Learning Theory

The repeated and somewhat surprising finding that fitness does not seem to be directly related to the subjective experience of stress could be understood within the context of social learning and self-efficacy theory. According to social learning theory (Bandura, 1977, 1982, 1984, 1989, 1991, 1997), a highly influential determinant of human agency is perceived self-efficacy. Self-efficacy is defined as a belief in one's ability to mobilize motivation, cognitive resources, and necessary action to meet situational demands (Bandura, 1991; Bandura, Cioffi, Barr Taylor, & Brouillard, 1988). Self-efficacy is not a discrete act, but rather a general attitude. Pervasive feelings of competence and efficacy develop when one's efforts are seen to effect the environment to produce consequences for given purposes. Stress, anxiety, and negative affect are not fixed properties of situational events. Stress is experienced when demands are perceived to exceed one's sense of competence. Perceived efficacy may regulate stress and anxiety through beliefs

about personal control. Expectations of personal ability influence whether coping will be initiated as well as whether there will be persistence of coping behaviour.

When people believe in their ability and have evidence that they can regulate their behaviour in the face of demanding situations to produce specified outcomes, they are likely to develop a sense of personal control. Exercising control over potential threats has been found to diminish stress (Averill, 1973; Geer, Davison, & Gatchel, 1970; Glass, Singer, Leonard, Krantz, Cohen, & Cummings, 1973; Gunnar-Vongnechten, 1978; Miller, 1980). Furthermore, the effect seems to generalize across domains. For example, Mineka, Gunnar, and Champoux (1986) found that monkeys raised under conditions where they could exercise control over their environment were less fearful of novel threats than monkeys raised in environments where they had little personal control. Similarly, social learning theory proposes that when people believe they cannot control threatening situations they dwell on personal deficiencies, and thereby constrain and impair their general level of functioning. The stronger a person's sense of self-efficacy the more vigorous and persistent will be his or her efforts in demanding situations. Self-efficacy is theoretically and empirically linked to sustained effort, strong goal commitment, and superior performance all of which could be significantly altered by health-promoting programs.

Self-efficacy can be instilled through vicarious experience, success or mastery experiences, social persuasion, and physiological feedback. When people of varying characteristics are observed succeeding at various activities, there is an increase in the observer's belief in being able to perform a similar task and attain similar goals. Witnessing people similar to oneself achieve success through effort and perseverance increases beliefs about one's own capabilities. Further vicarious experience is gained when people learn from each other through comparison and may thereby pick up effective coping strategies.

Mastery experiences are experiences of success through the achievement of goals. The goals, however, need not be monumental, but more modest sub-goal achievements along the way are sufficient to instill a sense of self-efficacy. Social persuasion is also an effective way of instilling a sense of self-efficacy. Convincing people they possess the capabilities needed to cope and succeed in demanding situations, if not unrealistic, will lead people to exert greater effort and thereby meet the demands of the situation. Finally, self-efficacy can be modified by altering autonomic arousal or at least the interpretation of autonomic arousal. When judging capabilities, people interpret their physiological reactions to situations. Racing heart, rapid breathing, and adrenaline rushes can be reduced, or perhaps more importantly, be given a positive interpretation so as to enhance one's sense of self-efficacy.

Lifestyle and exercise programs give participants opportunities to alter their perceived self-efficacy in several ways. There are opportunities for vicarious experience, mastery experiences, social persuasion, altering the interpretation of physiological arousal, and even the possibility of directly altering physiological

reactivity to demanding situations. Such experiences could presumably alter beliefs that one can overcome obstacles and achieve goals in daily living. As such, if self-efficacy was significantly increased by lifestyle and exercise programs, one would expect a decrease in self-reported stress and negative affect, as well as improved job satisfaction and productivity.

The stress-reducing effects of exercise and lifestyle education appear to be primarily due to cognitively based changes which accompany participation in health promoting programs. Physical activity and participation in lifestyle education programs, but not improved fitness conditioning, appears to be required in order to effectively reduce stress. The positive psychological effects of healthy lifestyle and exercise programs might be more comprehensively attributed to the positive psychosocial influence involved when one joins a program with other individuals with shared values, where there are opportunities to experience respite and diversion from daily routine, social support, feelings of mastery and competence, and increased self-esteem. By the skillful use of perceptual, intellectual, and motor techniques, participants are empowered to control or alter a piece of their environment toward a desired end. These perceptible changes could instill a sense of personal effectiveness and act to reinforce people's belief that they have what it takes to succeed thereby lowering stress in other realms of experience. As one participant indicated in an anecdotal report (Baydala, 1997):

For me the main effect of the program was that it made me realize that change is possible for me to make; and that even a small effort can bring significant benefits. When I joined the program, I thought that only a super human effort would result in any positive benefits; and that thought itself was a barrier to making a behavioural change. Now I know that 'I can do it' and that knowledge itself is half the battle.

Future Direction

Speculation that change of self-efficacy is an important operative mechanism responsible for changes in perceived stress and psychological well-being is not contradicted by the results of the studies reviewed here nor do the results provide explicit evidence to support the speculation. Exercise and lifestyle education programs appear to have a significant effect on health and well-being; however, controlled research investigating the differential effects of program components on salutary outcomes is lacking. There is a paucity of research in this area. Bandura (1997) has suggested that research on anxiety focuses on pathology and tends to neglect those factors which promote success and effect reductions in stress. More research is needed that investigates protective factors that are shown to prevent and alleviate stress, anxiety, and psychological disturbance.

With the growing popularity of primary prevention medicine and corporate-funded fitness programs, it becomes more important to collect evidence under controlled conditions validating the effective components of lifestyle education and exercise training programs. It would be both interesting and important to investigate the hypothesis that lifestyle education and exercise programs effect changes in perceived self-efficacy which in turn affects perceived ability to cope.

Clarifying the active ingredients of lifestyle and exercise programs is important to ensure that the most effective components are included and emphasized in the delivery of health and wellness programs. If increased self-efficacy, rather than increased fitness, is the crucial factor improving ability to cope and psychological well-being, then the social and cognitive components of the programs need to be encouraged or even cultivated. Furthermore, instructors will need to be vigilant to highlight opportunities for observational learning. Although social interaction and self-concept are perhaps important there may be a balance point where reducing the focus on exercise begins to detach from the positive gains. Future research could provide informed opinion on this topic.

References

- Aganoff, J. A., & Boyle, G. J. (1994). Aerobic exercise, mood states and menstrual cycle symptoms. *Journal of Psychosomatic Research*, 38, 183-192.
- Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological Bulletin*, 80, 286-303.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of psychological change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122-147.
- Bandura, A. (1984). Recycling misconceptions of perceived self-efficacy. *Cognitive Therapy and Research*, 8, 231-255.
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44, 1175-1184.
- Bandura, A. (1991). Self-efficacy mechanism in physiological activation and health promoting behavior. In J. Madden (Ed.), *Neurobiology of learning, emotion, and affect* (pp. 229-269).
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman and Co.
- Bandura, A., Cioffi, D., Barr Taylor, C., & Brouillard, M. E. (1988). Perceived self-efficacy in coping with cognitive stressors and opioid activation. *Journal of Personality and Social Psychology*, 55, 479-488.
- Baydala, A. (1997). *Lifestyle interventions, stress, and fitness*. Unpublished master's thesis, University of Calgary, Calgary, Alberta, Canada.
- Baydala, A., Hiebert, B., & Malec, C. (1998, June). *Self-efficacy effects of lifestyle education and exercise on stress*. Paper presented at the meeting of the Canadian Guidance and Counselling Association National Conference, Montreal, Quebec, Canada.
- Berger, B. G., & Owen, D. R. (1983). Mood alteration in swimming - swimmers really do "feel better." *Psychosomatic Medicine*, 45, 425-433.
- Betera, R. L. (1990). The effects of workplace health promotion on absenteeism and employment costs in a large industrial population. *American Journal of Public Health*, 80, 1101-1105.
- Bowne, D., Russell, M., Morgan, J., Optenberg, S., & Clarke, A. (1984). Reduced disability and health care costs in an industrial fitness program. *Journal of Occupational medicine*, 26, 809-816.
- Canada Life. (1991). *Corporate fitness ten years after: A summary of the final report*. Toronto, ON: Canada Life.
- Craig, C. L. (1993). *Active living in the workplace: Results of the 1992 national workplace survey*. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute.
- Crocker, P. R., & Grozelle, C. (1991). Reducing induced state anxiety: Effects of acute aerobic exercise and autogenic relaxation. *The Journal of Sports Medicine and Physical Fitness*, 31, 277-282.

- DeGeus, E., Van Doornen, L., & Orlebeke, J. (1993). Regular exercise and aerobic fitness in relation to psychological make-up and physiological stress reactivity. *Psychosomatic Medicine*, *55*, 347-363.
- Fitness Canada. (1988). *Fitness and lifestyle at the workplace*. Ottawa, ON: Minister of supply and services, Government of Canada.
- Geer, J. H., Davison, G. C., & Gatchel, R. I. (1970). Reduction of stress in humans through nonveridical perceived control of aversive stimulation. *Journal of Personality and Social Psychology*, *16*, 731-738.
- Glass, D. C., Singer, J. E., Leonard, H. S., Krantz, D., Cohen, S. & Cummings, H. (1973). Perceived control of aversive stimulation and reduction of stress responses. *Journal of Personality*, *41*, 577-595.
- Godbey, K. L., & Courage, M. M. (1994). Stress management program: Intervention in nursing student performance anxiety. *Archives of Psychiatric Nursing*, *8*, 190-199.
- Gunnar-Vongnechten, M. R. (1978). Changing a frightening toy into a pleasant toy by allowing the infant to control its actions. *Developmental Psychology*, *14*, 147-162.
- Holmes, D. S., & McGilley, B. M. (1987). Influence of a brief aerobic training program on heart rate and subjective response to a psychologic stressor. *Psychosomatic Medicine*, *48*, 366-374.
- Holmes, D. S., & Roth, D. L. (1985). Association of aerobic fitness with pulse rate and subjective responses to psychological stress. *Psychophysiology*, *22*, 525-529.
- Hughes, J. R. (1984). Psychological effects of habitual aerobic exercise: A critical review. *Preventive Medicine*, *13*, 66-78.
- Hughes, J. R., Casal, D. C., & Leon A. C. (1986). Psychological effects of exercise: A randomized cross-over trial. *Journal of Psychosomatic Research*, *30*, 355-360.
- International Conference on Exercise, Fitness and Health. (1988). *Policy seminar summary report*. Toronto, ON: The Canadian Association of Sports Sciences.
- Long, B. C. (1983). Aerobic conditioning and stress reduction: Participation or conditioning? *Human Movement Science*, *2*, 171-186.
- Malec, C. (1997). *Stress and fitness*. Unpublished master's thesis, University of Calgary, Calgary, Alberta, Canada.
- Malec, C., & Hiebert, B. (1997, June). *The relationship between aerobic exercise and stress*. Poster session presented at the Annual Convention of the Canadian Psychological Association, Toronto, Ontario, Canada.
- Malec, C., & Hiebert, B. (1997). Exercise and stress: Two benefits for the price of one. *WellSpring*, *8*(2), 1.
- McClary, C., Pyeritz, E., Bruce, W., & Henshaw, E. (1992). A liberal arts health promotion course. *Journal of American College Health*, *41*, 71-72.
- Miller, S. M. (1980). Why having control reduces stress: If I can stop the rollercoaster I don't want to get off. In J. Garber & M. E. P. Seligman (Eds.), *Human helplessness theory and research* (pp. 71-95). New York, NY: Academic Press.
- Mineka, S., Gunnar, M., & Champoux, M. (1986). Control and early socioemotional development: Infant rhesus monkeys reared in controllable versus uncontrollable environments. *Child Development*, *57*, 1241-1256.
- Moses, J., Steptoe, A., Mathews, A., & Edwards, S. (1989). The effects of exercise training on mental well-being in the normal population: A controlled trial. *Journal of Psychosomatic research*, *33*, 47-61.
- Pelletier, K., & Lutz, R. (1991). Healthy people - healthy business: A critical review of stress management programs in the workplace. In A. Monat & R. S. Lazarus (Eds.), *Stress and coping*, (pp. 483-498). New York, NY: Columbia University Press.
- Rosenstein, A. H. (1987). The benefits of health maintenance. *Physician and Sports Medicine*, *15*(4) 57-68.
- Roth, D. L. (1989). Acute emotional and psychophysiological effects of aerobic exercise. *Psychophysiology*, *26*, 593-602.
- Roy, M., & Steptoe, A. (1991). The inhibition of cardiovascular responses to mental stress following aerobic exercise. *Psychophysiology*, *28*, 689-700.

- Shephard, R. J., Cox, M. H., & Corey, P. (1987). Physical activity and alienation in the workplace. *Journal of Sports Medicine and Physical Fitness*, 27, 429-436.
- Stepptoe, A., Moses, J., Edwards, S., & Matthews, A. (1993). Exercise and responsivity to mental stress: Discrepancies between the subjective and physiological effects of aerobic training. *International Journal of Sport Psychology*, 24, 110-129.
- Stern, M. J., & Cleary, P. (1982). The national exercise and heart disease project: Long-term psychosocial outcome. *Archives of Internal Medicine*, 142, 1093-1097.
- Tsai, S. P., Baun, W. B., & Bernacki, E. J. (1987). Relationship of employee turnover to exercise adherence in a corporate fitness program. *Journal of Occupational Medicine*, 29, 572-575.
- Vance, C. (1991). The office ecosystem. *Saskatchewan Report Magazine*, August, 10-12.

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