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THE CONTRIBUTION OF SELF-EFFICACY AND OUTCOME EXPECTATIONS IN THE PREDICTION OF EXERCISE ADHERENCE

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ABSTRACT

The positive contribution of physical activity and exercise to physical and mental health is widely acknowledged. However, participation in sport and exercise is not as high as would be expected. In addition to this, people who start exercising often do not adhere to their exercise programme. This study examined the effectiveness of Bandura's self-efficacy theory to predict exercise adherence. A sample of new members at a gymnasium was assessed on a Physical Self-Efficacy Scale, an Adherence Efficacy Scale and an Outcome Expectancy Scale. The dependent variable, exercise adherence, was assessed by monitoring the intended and actual frequency of visits to the gymnasium. Multiple regression analysis was conducted to test the hypotheses. Results indicated that physical self-efficacy was a significant predictor of exercise adherence for the total group as well as for the females seperately. For the males adherence efficacy was a significant predictor. The results partly confirm the self-efficacy theory of Bandura and underline the importance of assessing different dimensions of self-efficacy in adherence research.

Keywords: Self-efficacy; Outcome expectations; Exercise adherence.

INTRODUCTION

The contribution of physical activity and exercise to physical and mental health is widely acknowledged. Many studies have shown the positive effects of exercise on depression, anxiety, neuroticism, self-consciousness and self-esteem (Moses *et al.*, 1989; Stein & Motta, 1992; Smoll *et al.*, 1993; Berger, 1994; Kasser & Stuart, 2001).

Participation in sport and exercise is despite these benefits not as high as would be expected. Roberts (quoted in Steyn *et al.*, 1991) suggested that up to 80% of youth between the ages of 12 and 17 years quit their participation in sport. Regarding drop-out in exercise programmes, the overall trend is that 50% of participants in a specific programme will discontinue their exercising within six months of starting or renewing a programme (Dishman, 1982, Dishman, 1988). Although regular exercise is a known effective primary and secondary treatment for cardiovascular disease, cardiac rehabilitation programme participation and adherence is low (Gregory, 1998).

Various research studies in the area of exercise adherence and the prediction of exercise behaviour have been undertaken (Theodorakis *et al.*, 1991; Courneya & McAuley, 1994; Douthitt, 1994; Theodorakis, 1994). Factors that have been explored as possible predictors of exercise behaviour are personal and situational factors (Sallis *et al.*, 1989), attitudes (Merriman, 1993), enjoyment (Wankel, 1993), perceived romantic appeal and perceived athletic competency (Douthitt, 1994), as well as skill development and excitement (Chambers,

1991). Researchers have also focused on cognitive and social-cognitive approaches to predict exercise behaviour (Roberts, 1992; Biddle, 1997). Constructs like self-efficacy (Bandura, 1977, Bandura, 1982), reasoned action (Fishbein & Ajzen, 1975; Smith & Biddle, 1999), planned behaviour and perceived behavioural control (Ajzen, 1991) have been investigated.

The concept of self-efficacy is defined by Bandura (1977) as the conviction of a person that he or she can successfully perform a desired behaviour. According to the model, this conviction has an effect on the initiation, persistence and success of the task behaviour. Although there is no single variable that comes to the fore as the only predictor of exercise behaviour, the self-efficacy model of Bandura is theoretically sound and its superiority over other models of prediction has already been shown (Dzewaltowski *et al.*, 1990; Duncan & McAuley, 1993; Dishman, 1994b). According to O'Leary (1985) this theory has been used to explain a wide variety of health behaviours such as weight control, cessation of smoking and adherence to preventive health programmes.

Previous research on self-efficacy and exercise behaviour shows a few shortcomings in certain areas. Firstly, the research studies usually focus on achievement rather than adherence to exercise (Feltz, 1992). The current tendency in sport psychology is to diversify, adding to the traditional focus of elite participation, that of health-promoting exercise, lifestyle development and leisure participation. To keep in step with this trend, self-efficacy should be studied as a tool to improve healthy behaviour. The focus should be on the influence of self-efficacy on motivation rather than skill.

A trend in recent adherence research has been to design instruments measuring self-efficacy in such a way that they assess a person's judgement of whether he or she will continue exercising, even with the prospect of certain barriers (Desharnais *et al.*, 1986; Dzewaltowski *et al.*, 1990; Steenkamp, 1994). The instruments actually measure expectations of adherence self-efficacy. As far as could be ascertained no research in exercise adherence thus far has examined the influence of self-efficacy as a function of the person's physical self-efficacy. A person's belief that he or she has the physical ability to be successful in the demands of his or her exercise programme is an unknown factor in adherence research. Ryckman *et al.* (1982) stressed the importance of assessing each aspect of self-efficacy independently. Furthermore, if efficacy is measured according to the types of subskills required to complete the task, the ability of self-efficacy to predict adherence will most likely be considerably stronger (McAuley, 1992). In view of this and Bandura's (1977; 1982) and McAuley's (1992) plea for micro-analysis of self-efficacy, research in this area is needed.

An important aspect of Bandura's theory is the differentiation of self-efficacy and outcome expectancy. Bandura defines outcome expectancy as a person's expectation that a specific behaviour will lead to a certain outcome (Bandura, 1977). The difference between the two constructs is explained by the fact that a person can believe that what he or she does will lead to certain outcomes (outcome expectancy), but he or she may doubt his or her ability to successfully execute the behaviour (self-efficacy).

According to Bandura (1997) both self-efficacy beliefs and outcome expectations can be determinants of behaviour. Desharnais *et al.* (1986) and Rodgers and Brawley (1996) have however shown that the contribution of outcome expectations is independent of the contribution of self-efficacy.

Rodgers and Brawley (1991) proposed a methodological model to measure outcome expectations in participation motivation. This approach takes into account both outcome value and outcome likelihood to determine outcome expectancy. According to them, outcome likelihood and outcome value are two distinct and measurable variables in assessing outcome expectancy. The concept of outcome expectancy is largely unexamined and the above mentioned approach allows for a way in which this concept can be examined.

There is conflicting evidence of the influence of outcome expectations on exercise adherence. Dzewaltowski *et al*. (1990) reported that although self-efficacy significantly predicted adherence, outcome expectations did not add significantly towards predicting adherence. On the other hand, Desharnais *et al*. (1986) found that both outcome expectancy and self-efficacy have predictive value, but that low rather than high outcome expectancy determined adherence. Desharnais *et al*. (1986) concluded that continued participation in exercise will improve when participants' outcome expectations are lowered and their self-efficacy is raised. There is however a need for empirical evidence.

Traditional research in sport psychology has focused on performance, structured types of exercise or team related sports. The importance of psychology in non-competitive physical activity, exercise and other health-related behaviour, has led to the acceptance of a more comprehensive term, namely sport and exercise psychology (Biddle, 1997). More research is needed in the area of personal fitness and the development of a healthy lifestyle.

Factors that may be present in structured and team sport exercise programmes may influence adherence efficacy (Duncan & McAuley; 1993). It is therefore necessary to investigate adherence to exercise behaviour in the area of personal fitness. This will to some extent lessen the effect of social support, motivation and instructional factors. Oldridge (1981) believes that a critical sign of adherence is continuing with exercise in an unsupervised situation.

Researchers in the exercise domain have used Ajzen's theory of planned behaviour, which proposes that a person's intention to perform a behaviour is an important determinant of adherence to that behaviour (Ajzen, 1991). More research in this regard is needed in the area of exercise adherence.

The most common index of adherence to exercise has been attendance or frequency. Intensity and duration have also been used to assess exercise adherence (Dzewaltowski *et al*., 1990). There is however growing support for the health benefits of moderate intensity exercise (Moses *et al*., 1989; Dishman, 1994a). A focus on personal fitness and health behaviour, rather than on performance, implies that the assessment of adherence to the exercise programme should be done by measuring continued, regular participation and not intensity or duration.

PROBLEM STATEMENT

The aim of the present study was to determine the contribution of physical self-efficacy, adherence self-efficacy and outcome expectations towards the prediction of continued participation in exercise behaviour.

METHODOLOGY

Participants

The target group comprised new members of the University of Stellenbosch (US) gymnasium. The criterion that was used to define new members was persons who joined the gymnasium for the first time during the month prior to the experimental phase of the study. Participants who were previously members of this or another gymnasium, or who previously took part in supervised exercise programmes, were excluded from the sample used for data analysis. The final sample consisted of 84 participants (43 male, 41 female) and all were current students at the university. The mean age of the males was 20.65 and that of the females was 20.41.

Measurements

Physical self-efficacy scale (PSE)

The PSE was developed by Ryckman *et al*. (1982) and measures a person's perceived physical competence and confidence that the person can display the physical skill to others. The instrument is based on the assumption that people's expectations of their own efficacy have an influence on their cognitive, affective, and behavioural patterns (Corcoran & Fisher, 1994).

The PSE contains 22 items with two subscales, perceived physical ability (PPA) and physical self-presentation confidence (PSPC), which combine to form the global physical self-efficacy scale. The PSE is presented in the form of a six point Likert scale.

The reliability of the PSE is high with alpha-coefficients for internal consistency of 0.84 for the PPA, 0.74 for the PSPC and 0.81 for the global PSE. Test-retest reliabilities over six weeks of 0.85 for the PPA, 0.69 for the PSPC and 0.80 for the PSE were also reported (Ryckman *et al*., 1982).

The construct validity, concurrent validity and discriminant validity of the PSE were investigated by Ryckman *et al*. (1982) and found satisfactory.

Adherence self-efficacy scale (AES)

The AES was developed by Garcia and King (1991) for a study of long-term exercise behaviour. The instrument consists of 15 items pertaining to exercise adherence. Participants rate their confidence that they would exercise under certain potential conflicting situations such as when tired and when the schedule is hectic on a six point Likert scale. Garcia and King (1991) reported a Cronbach alpha of 0.90 for internal consistency and a test-retest reliability coefficient of 0.67. No evidence of empirical validity is given, although construct validity is assumed as the instrument was constructed according to recommendations by self-efficacy theorists.

Outcome expectancy scale (OES)

The OES was developed specifically for the present study. No known instrument exists that measures outcome expectations for exercise participation. The items of the OES that were used in the present study were derived from selected outcomes that Rodgers and Brawley (1991) identified in a pilot study. Each outcome is first evaluated on the value that the

participant attaches to it and then on the likelihood that it would be reached. The likelihood scale is measured on a response continuum of 0% (very unlikely) to 100% (very likely), and the value scale on a 1 (little value) to 6 (great value) point Likert scale. In this study, the internal consistency of the OES was good, with a Cronbach alpha of 0.73. Unfortunately, no evidence regarding validity is available.

Measurement of exercise adherence

Exercise frequency was assessed by using the gymnasium's computer access system. The number of sessions that a member visited the gymnasium was checked on a weekly basis for six weeks to ascertain exercise frequency. To incorporate a person's intended behaviour, a scale to measure intended exercise frequency was included in the questionnaire. The frequency of exercise sessions at the gymnasium was then compared to the actual exercise frequency and expressed as a percentage of adherence. A follow-up questionnaire was completed with participants who did not keep up with their intended exercise frequency. This identified and eliminated confounding variables such as illness and other factors, besides the predictor variables under investigation, that might have had an influence on exercise adherence.

Procedure

Voluntary participants received a questionnaire that included information on the research, instructions, the three scales PSE, AES and OES as well as the scale to measure intended exercise. The participants completed the measurement instruments and handed them back at the gymnasium. Participants who responded to the questionnaire took part in the study without further direct contact with the researcher. Adherence was monitored for the following six weeks. A follow-up on participants who did not exercise at all in any one week was done to identify possible confounding variables like illness, work commitments and examinations. No such confounding variables were found and all the participants were included in the final analyses.

RESULTS

Multiple regression analyses, with physical self-efficacy, adherence efficacy and outcome expectancy entered as predictors, and exercise adherence as criterion, were conducted for the total group as well as for males and females separately. All the tolerance statistics were well below 0.2, a criterion suggested by Menard (1995). The assumption of no multicollinearity between predictors could therefore be accepted.

The results of the regression analysis for the total group are reported in Table 1.

TABLE 1. **RESULTS OF THE STEPWISE MULTIPLE REGRESSION ANALYSIS FOR THE TOTAL GROUP**

Model summary	
R	0.364
R square	0.133
Adjusted R square	0.122
Std. Error of estimate	0.4008

ANOVA					
Source of variation	df	Sum of squares	Mean square	F	p
Regression	1	2.013	2.013	12.528	0.001
Residual	82	13.175	0.161		

Coefficients					
	Unstandardized coefficients		Std. coefficients	t	p
	B	Std. Error	Beta		
Constant	-0.624	0.332		-1.881	0.064
Physical self-efficacy	0.013	0.004	0.364	3.539	0.001

Variable	Beta in	t	Sig. of t	Collinearity statistics Tolerance
Adherence efficacy	0.126	1.044	0.300	0.721
Outcome expectancy	-0.032	-0.279	0.781	0.821

For the total group, the overall regression model was significant ($F[1, 82] = 12.53$, $p=0.001$), with the three predictors accounting for 13% of the variance in exercise adherence. However, only physical self-efficacy ($\beta=0.36$) emerged as a significant predictor of exercise adherence, with $t=3.539$, $p=0.001$.

TABLE 2. **RESULTS OF STEPWISE MULTIPLE REGRESSION ANALYSIS FOR MALES**

Model summary	
R	0.453
R square	0.205
Adjusted R square	0.186
Std. Error of estimate	0.3809

ANOVA					
Source of variation	df	Sum of squares	Mean square	F	p
Regression	1	1.533	1.533	10.566	0.002
Residual	41	5.948	0.145		

Coefficients					
	Unstandardized coefficients		Std. coefficients	t	p
	B	Std. Error	Beta		
(Constant)	-0.489	0.334		1.466	0.150
Adherence efficacy	0.016	0.005	0.453	3.251	0.002

Variable	Beta in	t	Sig. Of t	Collinearity statistics Tolerance
Physical self-efficacy	0.238	1.442	0.157	0.695
Outcome expectancy	-0.096	-0.624	0.536	0.831

For males separately (see Table 2), the overall regression model was significant ($F[1, 41] = 10.566$, $p=0.002$), with the predictors accounting for 20% of the variance in exercise adherence. Adherence efficacy ($\beta=0.453$) emerged as the only significant predictor of exercise adherence with $t=3.251$, $p=0.002$.

TABLE 3. **RESULTS OF STEPWISE MULTIPLE REGRESSION ANALYSIS FOR FEMALES**

Model summary	
R	0.320
R square	0.103
Adjusted R square	0.080
Std. Error of estimate	0.4176

ANOVA					
Source of variation	df	Sum of squares	Mean square	F	p
Regression	1	0.778	0.778	4.459	0.041
Residual	39	6.800	0.174		

Coefficients					
	Unstandardized coefficients		Std. coefficients	t	p
	B	Std. Error	Beta		
(Constant)	-0.395	0.429		0.921	0.363
Physical self-efficacy	0.010	0.005	0.320	2.112	0.041

Variable	Beta in	t	Sig. of t	Collinearity statistics Tolerance
Adherence efficacy	-0.109	-0.602	0.551	0.712
Outcome expectancy	0.038	0.229	0.820	0.862

The results for females (see Table 3) showed that the overall regression model was significant ($F[1, 39] = 4.459$, $p=0.041$), accounting for 10% of the variance in exercise adherence. As in the analysis for the total group, physical self-efficacy ($\beta=0.320$) emerged as the only significant predictor of exercise adherence, with $t=2.112$, $p=0.041$.

DISCUSSION

The results of this study partly confirm Bandura's (1977) theory regarding self-efficacy and is also consistent with research findings that have found efficacy beliefs to significantly influence exercise behaviour (Boykin, 1996; Rodgers & Gauvin, 1998; Martin & Sinden, 2001). Outcome expectations as an individual predictor did not reveal any significant results, which corresponds with research findings of Desharnais *et al*. (1986) that self-efficacy is a more central determinant of adherence than outcome expectations. These results differ from the results found by Boykin (1996) that outcome expectancy correlated significantly with exercise adherence. Resnick (2001) also found that outcome expectations contribute to engagement in physical activity, but his sample consisted of older participants and cannot be compared to a student sample.

Rodgers and Brawley (1991) made a distinction between proximal (primary) and distal (secondary) outcomes when outcome expectations were assessed. They suggested that there is a clear difference in motivational value between proximal and distal outcomes. One explanation for the current study failing to find any contribution from outcome expectations could be that no methodological distinction was made between proximal and distal outcomes. Illustrating this is the fact that a single item in the Outcome Expectancy Scale ("Attaining a sense of accomplishment"), did show a significant correlation with exercise adherence. "Attaining a sense of accomplishment" is a secondary or distal outcome and it could be true that for this sample a secondary rather than primary outcome or outcomes may have influenced adherence.

There is no standardised instrument to assess outcome expectations in adherence research. This makes comparisons between adherence research difficult. In this regard Dzewaltowski *et al*. (1990) suggested that different methods of assessing outcome expectations should be compared in the future to determine whether the inconsistent results are due to a measurement problem. One such problem could be the fact that expectations should be realistic rather than strong to have a positive influence on adherence. This study and research by Desharnais *et al*. (1986) made provision for this measurement problem by hypothesising that a low rather than high outcome expectation would predict adherence. However, it does not account for persons who for a given outcome, attached a low or moderate value but felt that the outcome is very likely. This casts some doubt on the traditional value-likelihood or expectancy-value model for assessing outcome expectations as proposed by Rodgers and Brawley (1991).

The prediction of exercise adherence has been explored in a number of ways, including using self-efficacy and outcome expectations. Up to now however, researchers have used adherence efficacy as the only dimension of self-efficacy beliefs to explain exercise behaviour. Part of the aim of this study was to investigate the predictive value of physical self-efficacy compared to the currently used adherence efficacy. It was hypothesised that physical self-efficacy would have a greater predictive power than adherence efficacy. This hypothesis was supported when the total group was taken into account, with physical self-efficacy the only significant predictor of exercise adherence.

Ryckman *et al*. (1982) found that persons with higher perceived physical self-efficacy had a higher self-esteem, were less self-conscious and anxious, had an internal locus of control, were more sensation-seeking, and showed a tendency to engage in adventurous physical activities. Furthermore, these persons saw themselves as physically competent and reported more varied and extensive sports experience. It could be concluded from these results that for this sample, physical self-efficacy was a better predictor of adherence than adherence efficacy. At the very least it gives a new dimension to the prediction of exercise adherence through self-efficacy.

Regarding the differences between males and females, there was a different significant predictor for each gender. For men adherence efficacy was the only significant predictor, while physical self-efficacy was the only significant predictor for females. Vandeventer (1996) also found that physical self-efficacy was positively correlated for women, but in contrast to the present study, she found this positive correlation for men also. Support for the finding that adherence efficacy did not play a significant role in the prediction of adherence for women, is found in research by Poag and McAuley (1992). They examined the relationship between

goals, efficacy, importance and exercise behaviour and found that although adherence efficacy predicted intensity of exercise, it was not related to the frequency of participation.

Gender-related socialization could also explain why adherence efficacy predicted adherence for men and not women. Men who scored high on adherence efficacy could have seen adhering to an intended exercise programme as a demonstration of their masculinity.

Although only physical self-efficacy (for the total group and for females) and adherence efficacy (for males) were significant individual predictors of exercise adherence, the overall regression models, with physical self-efficacy, adherence efficacy and outcome expectancy included as predictors, were all significant and explained between 10% and 20% of the variance in exercise adherence. Research is needed to develop a standardized instrument for assessing outcome expectations based on the self-efficacy theory. Conflicting results regarding the role of outcome extectations in exercise adherence could be attributed to the lack of such an instrument.

The results of this study could have implications for the exercise and fitness industry. If self-efficacy beliefs are consistently shown as positive contributors towards exercise adherence, then exercise programmes must incorporate elements that will enhance efficacy beliefs, for instance, by altering participants' expectations and self-efficacy at the start of an exercise programme.

It is important to keep in mind that the results of this study cannot be generalized beyond a student population. More research is needed for different populations, especially regarding previously disadvantaged communities where adherence to exercise regimes could promote the general quality of life and possibly contribute to a drop in crime rates in these communities.

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