Assessing Potential Barriers to Exercise Adoption in Middle-Aged Men: Over-Stressed, Under-Controlled, or Just Too Unwell?

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The stages of exercise adoption model was used to investigate exercise adoption and maintenance in a sample of 72 middle-aged men. The concepts of exercise self-efficacy, decisional balance, self-rated health, perceived stress, and health locus of control were evaluated in terms of their impact upon exercise adoption. One-way ANOVA's revealed that only exercise self-efficacy, the cons of exercise, and self-rated health were significantly associated with stage of exercise adoption. Participants in the first stage of exercise adoption rated the cons of exercise more influential, had lower levels of self-efficacy, and had worse self-rated health than participants in other stages. Results also revealed a high degree of relatedness between self-rated health, perceived stress, health locus of control, and the concepts of decisional balance and self-efficacy. Findings suggest that self-rated health is a significant barrier to exercise and that the antecedents of inactivity could be included in an expanded stages of exercise adoption model.

Keywords: middle-aged men, exercise adoption, self-rated health, locus of control, stress

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> Members of our Western societies continue to eat as though our bulging waistlines will never bring on the many varied and crippling coronary and related diseases, we smoke as though our blackening lungs will not spawn neoplasms, we alter the chemistry of our brains as though our neurological systems are endlessly forgiving of our excesses, and we avoid activity like the plague as though to lull our resting hearts into premature eternal rest (Cormier, Prefontaine, MacDonald, & Stuart, 1980, p. 224).

Numerous studies document the potential physical and psychological benefits of regular physical exercise. Benefits include a decreased risk of illnesses such as cardiovascular diseases, osteoporosis, and diabetes and a reduction in reported hypertension and depression (Bouchard, Shepard, Stephens, Sutton, & McPherson, 1990; Fox, 2003; Powell, Thompson, Casperson, & Kendrick, 1987). Despite these potential health benefits, only a small minority of adults actually maintain regular exercise routines of enough intensity to acquire these health benefits. Indeed, statistics indicate that approximately 24% of the American adult population lead a completely sedentary lifestyle and 54%, while active, are not physically active enough to receive any exercise-related benefits (American Heart Association, 2003; Dunn & Blair, 1997). Furthermore, this pattern is not restricted to the U.S.A.; exercise statistics in other Western countries correspond to the same general trend (Australian Bureau of Statistics, 2002; European Commission, 2002; Sport and Recreation New Zealand, 2002).

While there have been attempts to target the physical activity patterns of specific populations (e.g., women or indigenous populations) there is rising concern that little is being done to target the lack of activity in men globally. The amount of literature devoted specifically to women's health in the past two decades far exceeds that devoted to men's health despite the fact that men have a higher mortality rate throughout the life span than women, consistently die younger than women, and are more susceptible to sedentary-lifestyle related conditions (Courtenay, 2000; Goodyear-Smith & Birks, 2003). Global statistics show that the leading cause of death for men is cardiovascular disease, such as ischaemic heart disease (American Heart Association, 2003; British Heart Foundation, 2004; European Commission, 2002; World Health Organization, 2003), and current medical literature promotes regular exercise as paramount in the treatment and prevention of such conditions.

Men constitute one of our largest demographic groups, whose health is most at risk from inactivity and whose health behaviours remain the least understood. There is therefore a need to investigate the potential motivators and barriers to exercise behaviours in men. The current study seeks to investigate whether current psychological theories of exercise motivation and uptake are applicable to men's exercise behaviours and whether exercise uptake is also influenced by perceived psychological barriers to exercise. The current study utilises the stages of exercise adoption model as a basis from which to study motivators and barriers to exercise behaviour change.

THE TRANSTHEORETICAL MODEL OF EXERCISE BEHAVIOUR CHANGE

The transtheoretical model, developed initially by Prochaska & DiClemente (1982, 1983), has successfully been employed as a stage-of-exercise-adoption model and provides a clear framework for investigating intentional exercise behaviour change (Marcus, Banspack, et al., 1992; Marcus, Eaton, Rossi, & Harlow, 1994; Marcus & Owen, 1992; Marcus, Rakowski, & Rossi, 1992). Rather than conceptualising exercise behaviour change as an "all-or-nothing" contract, the model considers behaviour change as residing on a continuum between a state of no exercise and a state of successful exercise routine maintenance. This continuum includes the specific stages of: precontemplation (not intending to exercise), contemplation (considering exercise), preparation (initiating some exercise behaviour), action (actively engaging in the new exercise), and maintenance (sustaining the exercise behaviour over time). Stage adoption is not necessarily linear but may actually be cyclical in pattern; individuals may remain focused at certain stages or relapse into earlier ones. An individual's position on the stages of exercise adoption model is reflective of their perceived cons (costs or negative aspects) and pros (benefits or positive aspects) of exercise that, when considered together, constitute an individual's *decisional balance*. In addition, stage membership is also reflective of individuals' self-efficacy evaluations concerning their ability to undertake the exercise behaviour.

The concept of decisional balance involves weighing the pros and cons of behaviour change. Pros refer to perceived positive aspects of the behaviour change (e.g., having more energy or feeling less stressed) whereas cons refer to perceived negative aspect of the behaviour change (e.g., feeling uncomfortable exercising or having less time for family). In terms of exercise adoption, people in the first two stages (precontemplation and contemplation) generally perceive the cons of exercise to outweigh the pros, whereas people in the last two stages (action and maintenance) perceive the pros of exercise to outweigh the cons (Gorely & Gordon, 1995; Marcus, Pinto, Simkin, Audrain, & Taylor, 1994; Prochaska et al., 1994). The concept of self-efficacy relates to the degree of confidence an individual has that he can perform the behaviours in question to an adequate degree (Bandura, 1977). Consequently, self-efficacy may influence how long someone chooses to exercise, or how much effort to invest in an exercise routine. Self-efficacy evaluations have been previously utilised to assess influences on exercise behaviour change, exercise motivation, and exercise adherence (Duncan & McAuley, 1993; Dzewaltowski, 1989; Gorely & Gordon, 1995; Marcus, Eaton et al., 1994; Marcus, Pinto et al., 1994; McAuley, 1992; McAuley, Courneya, Rudolph, & Lox, 1994). Despite the effectiveness of this model in predicting initiation and maintenance of regular exercise routines, few studies have explored the existence of factors that may have additional predictive value in relation to this model, such as psychological barriers, since most have been content with further validation of the model on various populations.

POTENTIAL PSYCHOLOGICAL BARRIERS TO EXERCISE

While the stages of change model emphasises *motivation* as the key to exercise uptake, theory suggests that evaluations of the psychological *barriers* to exercise

uptake may also provide valuable insight into patterns of exercise adoption. Anderson's (1995) behavioural model of health services use suggests that one of the key factors determining utilisation of health services (such as gyms) is the psychological enabling/impeding factors unique to that individual. In a similar vein, the health belief model postulates that the decision to undertake a given health behaviour is dependent upon several variables relating to the perceived barriers to health services use, such as psychological factors (Conner & Norman, 1994). Both models of healthcare utilisation highlight the role perceived psychological barriers might play in exercise adoption. However, little research investigates whether individuals at different stages of exercise adoption actually show variation in levels of perceived psychological barriers. It seems logical that if the decision to adopt an exercise regime were influenced by psychological barriers, then this would show as a differential pattern across the stages of exercise adoption. Individuals in the lower stages of exercise adoption should show greater levels of psychological barriers than individuals in the latter stages. The following research will investigate whether such a differential pattern exists for three concepts that can be conceived of as psychological barriers to exercise uptake: self-rated health, life stress, and health locus of control.

Research shows that subjective ratings of health are positively related to exercise and healthcare practices (Holahan & Suzuki, 2004; Norman, Bellocco, Vaida, & Wolk, 2002). However, while greater levels of self-rated health may lead to regular exercise, it is possible that *lower* levels of perceived health may actually act as a *barrier* to the uptake of exercise. First, the transition from unfit to fit requires a much greater effort than the task of maintaining one's health, and therefore the enormity of the task may act as a deterrent to an unhealthy individual. Second, low levels of health generally coincide with greater estimates of the barriers to exercise such as the potential for physical injury or exhaustion (Harrison & Liska, 1994). Therefore, individuals claiming low health levels may tend not to exercise due to the perceived enormity of the task and the potential for physical harm that strenuous exercise may pose for them.

Investigations into the impact of life stress on health reveal an important link between stress and preventive behaviour. Specifically, people who perceive themselves as living under conditions of high stress engage in fewer health-seeking behaviours than less-stressed individuals (Bausell & Damrosch, 1989). Similarly, individuals who obtain higher perceived stress scores are *less* likely to reduce or quit unhealthy behaviours, such as smoking, and perceived stress scores are associated with less frequent physical exercise (Cohen & Williamson, 1988). Thus, perceived stress not only acts as a potential barrier to health-seeking behaviour but also serves to decrease an individual's ability to take effective actions to avoid contracting illnesses.

Health locus of control (HLOC) has direct relevance to the context of health behaviour since it relates to the degree to which individuals will take responsibility for their own health behaviours and outcomes. Individuals with an internal locus typically feel that they have direct control over and responsibility for the influence of any event that impacts upon their lives. Those with an external locus consider the result of any life-shaping event to be beyond their control and essentially governed by external forces (Carlson & Petti, 1989). Studies using a health locus of control

(HLOC) measure found that there is a significant relationship between HLOC and smoking cessation (Calnan, 1989), medical treatment adherence (Barlow, Macey, & Struthers, 1993), and participation in physical activity and exercise (Carlson & Petti, 1989; Norman, Bennett, Smith, & Murphy, 1997). A lower score on internal health locus is related to poorer perceived behavioural control over exercise behaviours (Armitage, 2003). This perceived lack of control over health acts as a barrier to effective health decision making, whereby despite the evidence of exercise-related health benefits individuals still feel powerless to control their exercise behaviours and may not undertake regular exercise.

It is evident that few studies have specifically addressed the factors underlying men's health behaviour. Furthermore, the focus of the majority of the research using the stages of exercise adoption model has been upon the concepts of decisional balance and self-efficacy and their influence upon exercise motivation. Very few studies have sought to explore whether there are psychological barriers that might be highly related to the stages of exercise adoption. It is highly plausible that such concepts may be of vital importance in the expansion of this model of exercise adoption.

The current study proposes that if self-rated health, stress, and health locus of control act as effective barriers to exercise in men, then levels of all three will differ across the stages of exercise adoption. Specifically it is predicted that men in the lowest stage of exercise adoption (precontemplation) should report lower levels of self-rated health, lower health locus of control scores, and greater levels of perceived stress than men at the highest stage (maintenance).

METHOD

PARTICIPANTS

The study sample was made up of 72 middle-aged men with a mean age of 54 years (SD = 9.1). Participants were contacted through an established service organisation, known as the Rotary club, since their membership consists of a broad range of middle-aged men. Rotary clubs from both urban and rural areas were sampled. The majority (93%) of the participants were of European ancestry, while 5% were Maori and 1% Asian. Seventy-nine percent were married, 92% had children, 75% worked full-time and more than 50% had at least an undergraduate education.

MEASURES

Stages of Exercise Adoption. The stages of exercise adoption were measured using a nine-point scale, presented pictorially in the shape of a ladder. Each rung of the ladder was numbered (0 through 8), and five of these rungs also had written labels to serve as anchor points. These five rungs corresponded to the five stages of exercise behaviour change, from precontemplation to maintenance. For example, the first rung was labelled "*I currently do not exercise, and I do not intend to start in the next six months*" (precontemplation), and the last rung was labelled "*I currently exercise regularly and have done so for longer than six months*" (maintenance). Each anchor represented the minimum requirement for membership at each stage. Thus, a partici-

pant responding with a "three" on the ladder was classified as a contemplator (equal to rung two) because the minimum requirements for membership in the preparation stage (rung four) had not been met. Exercise was defined as "*activities that increase your heart rate, such as walking, jogging, cycling, swimming, aerobics, rowing … etc*." The term "regular exercise" was operationalised as exercising three or more times a week for at least 20 minutes each time (American College of Sports Medicine, 1990).

Self-Efficacy. A 12-item exercise-specific measure of self-efficacy was used in the present study (Fuchs, Schwarzer, & Wegner, 1993). Respondents were required to indicate how confident they were that they could perform a planned exercise even if, for example, they were tired or the weather was bad. A seven-point scale was used to rate each item ranging from *not very confident* (1) to *very confident* (7). Higher scores indicated greater self-efficacy for exercise. Fuchs and Schwarzer (1994) report an alpha reliability coefficient of .89 for this measure.

Decisional Balance. The decisional balance measure was taken from the study by Marcus, Eaton, et al. (1994) and consisted of a 10-item pros scale and a six-item cons scale of exercise behaviour. One additional pro item (*I would feel more comfortable exercising with other family members or relatives*) and an additional con item (*I would feel shy/embarrassed exercising in front of others*) were added, so as to incorporate a measure of the individual's attitude towards exercising with others. Each item required the participant to rate, on a six-point scale from *strongly agree* (1) to *strongly disagree* (6), how much they agreed or disagreed that the statement would influence their decision to exercise. Decisional balance scores were computed by deducting the total cons score from the total pros score.

Self-Rated Health. Self-rated health was measured using a simple seven-point Likert scale, ranging from *terrible* (1) to *excellent* (7). Participants were asked to indicate which level of the scale corresponded to what they believed to be their current level of physical health.

Perceived Stress. The *Perceived Stress Scale* (PSS; Cohen, Kamarck, & Mermelstein, 1983) was used as an appraisal of how stressful an individual perceives situations in his life to be. While there are a number of variations in the PSS, both Cohen and Williamson (1988) and Monroe and Kelly (1995) promote the use of the 10-item PSS scale as being superior in terms of psychometric properties. The items focussed on perceived stress over the past month, such as "*In the last month, how often have you felt nervous and 'stressed'*" and "*In the last month, how often have you felt that things were going your way*." Participants were required to respond on a five-point scale from *never* (0) to *very often* (4).

Internal Health Locus of Control. The *Internal Health Locus of Control* (IHLC) subscale of the *Multidimensional Health Locus of Control* scale (MHLOC; Wallston, Wallston, & De Vellis, 1978) was used to evaluate the extent to which individuals

felt they had control over their health behaviours. Participants responded to six statements concerning their personal role in maintaining their health and physical well-being, for example, "*I can pretty much stay healthy by taking good care of myself*." Responses were measured on a six-point scale ranging from *strongly disagree* (1) to *strongly agree* (6). Higher scores indicated a higher internal locus of control. The IHLC scale has adequate internal and test-retest reliability (Hubley & Wagner, 2004; Nada Raja, Williams, & McGee, 1994; Wallston et al., 1978).

PROCEDURE

The principal researcher recruited participants at general meetings of their local Rotary association. After indicating the nature and purpose of the research to the members, questionnaires were handed out with postage-prepaid return envelopes so participants could complete and return questionnaires in their own time. This research was conducted in accordance with Massey University guidelines on the conduct of research with human participants and was subject to the appropriate process of ethical review.

RESULTS

Due to the unusual participant distribution patterns between each of the stages (see Table 1) the original five-stage model was reduced to a three-stage model for the purposes of data analysis. The precontemplation and contemplation stages were grouped together as were the action and maintenance stages.

Table 1
Participant Distribution Pattern Across the Five Stages of Change

Stage of change	Number of respondents
Precontemplation	4 (4.6%)
Contemplation	6 (6.9%)
Preparation	25 (28.7%)
Action	7 (8.1%)
Maintenance	30 (34.5%)

In order to maximise scale reliabilities, one item from the pros scale and one from the PSS were removed. The readjusted scale reliabilities for the pros scale and the PSS in addition to the other scale reliabilities are presented in Table 2. A one-way analysis of variance (ANOVA) was performed in order to assess differences between the three groups on potential barriers to exercise (see Table 2). Scheffe's post-hoc analyses of between-group differences indicated that participants in the action/maintenance stage were found to report higher self-rated health, higher self-

efficacy, and fewer cons to exercise than participants in both the Preparation and precontemplation/contemplation stages. No differences between groups existed for scores on the pros scale.

Table 2
Means and Standard Deviations for Self-Report Scale Scores by Stage, Scale Reliability Alpha Coefficients, and ANOVA Statistics

	Stage 1: Precontemplation and contemplation	Stage 2: Preparation	Stage 3: Action and maintenance	Total sample	Univariate
Measure	(n = 10)	(n = 25)	(n = 37)	α	F
Age	53.2 ± 9	54.3 ± 9.8	54.3 ± 9.1	—	—
SRH	4.8 ± 1.2	5.0 ± 0.7	5.9 ± 0.9	—	10.8*
SE	4.3 ± 1.5	4.4 ± 1.0	5.6 ± 0.8	.92	12.4**
Pros	4.4 ± 1.1	4.2 ± 0.9	4.6 ± 0.9	.90	—
Cons	3.0 ± 0.8	3.0 ± 0.8	2.3 ± 0.7	.64	9.3*
DB	1.4 ± 1.5	1.2 ± 1.4	2.3 ± 1.2	—	—
PSS	1.6 ± 1	1.5 ± 0.5	1.2 ± 0.5	.87	—
IHLOC	4.2 ± 1.2	4.1 ± 0.7	4.3 ± 0.8	.79	—

Note. SRH = Self-rated health; SE = Self-efficacy; Pros = Pros of exercise; Cons = Cons of exercise; DB = Decisional balance; PSS = Perceived stress scale; IHLOC = Internal health locus of control.
*$p < 0.01$; **$p < 0.001$. All p values two-tailed.

Table 3 presents the simple correlations between the self-report measures used in the present study. The direction of significant relationships indicates that the respondents who report greater concerns over the cons of exercise tend to have higher levels of perceived stress, perceive less control over their health, and report lower levels of exercise-related self-efficacy. Furthermore, participants reporting lower levels of exercise-related self-efficacy experienced lower levels of self-rated health and greater levels of perceived stress. Finally, scores on the pros scale were not significantly related to any of the other measures in the study.

DISCUSSION

The current study found that men in the first two stages of change had lower self-rated health, lower exercise-related self-efficacy, and greater perceived cons of exercise than those in the third stage, but no significant differences between groups on measures of the pros of exercise, perceived stress, or internal health locus of control were evident. These results only partially support the hypothesis that men in the lowest stage of exercise adoption would exhibit lower self-rated health, lower internal control, and higher stress than individuals in the highest stage.

Table 3
Simple Correlations between Self-Rated Health, Self-Efficacy, Pros, Cons, Decisional Balance, Perceived Stress, and Internal Health Locus of Control Scores

Measure	1.	2.	3.	4.	5.	6.
1. SRH	—	—	—	—	—	—
2. SE	.40**	—	—	—	—	—
3. Pros	-.03	.15	—	—	—	—
4. Cons	-.25	-.56**	-.26	—	—	—
5. DB	.13	.43**	.83**	-.75**	—	—
6. PSS	-.47**	-.49**	.02	.36**	-.19	—
7. IHLOC	.11	.35**	.23	-.30*	.33*	-.37**

Note: SRH = Self-rated health; SE = Self-efficacy; Pros = Pros of exercise; Cons = Cons of exercise; DB = Decisional balance; PSS = Perceived stress scale; IHLOC = Internal health locus of control. *$p < 0.01$; **$p < 0.001$. All p values two-tailed.

Besides the concepts of self-efficacy and decisional balance, which are already incorporated in the transtheoretical model, the current findings suggest self-rated health is a key influence on the uptake of exercise in men. The difference in self-rated health scores across stages of exercise adoption is supported by research suggesting that lower self-rated health is very strongly associated with decreased physical activity in older adults irrespective of physical strength, age, body composition, and functional status (Gregg, Kriska, Fox, & Cauley, 1996). The results of the current study and that of Gregg and colleagues (1996) suggest that low self-rated health is a significant barrier to exercise behaviour change rather than a potential motivator to initiate exercise behaviours. The perception that one has poor health may enhance wariness of the risks of exercise, such as a potentially serious injury or exhaustion. Indeed, rather than poor health acting as a motivator, men rating their health as poor may not believe their bodies can withstand the rigours of physical activity and as a consequence will refrain from exercise.

While no significant differences in perceived stress and internal health locus of control existed between the three stages of exercise adoption, the pattern of correlations between these concepts and others in the study suggests they are still important for exercise decision making. High stress levels in the current study were linked to greater assessment of the cons of exercise and perceptions of poor health. High levels of stress are also linked to reduced health-seeking behaviour (Bausell & Damrosch, 1989), less frequent exertion, and an unwillingness to reduce unhealthy behaviours (Cohen & Williamson, 1988). It is plausible then that high stress levels may induce men with low levels of self-rated health to become *exercise defiant*. If highly stressed men show a general unwillingness to reduce unhealthy behaviour and a focus on the cons of exercise, then those also in poor health may perceive a greater potential risk to their mortality that strenuous activity poses. The result is a man who feels increasingly reluctant to exercise (exercise defiant) based upon an established pattern of inactivity and a fear of exercise-related harm.

While internal health locus of control was not linked to self-rated health in the current study, high levels of internal health locus of control did correspond to higher levels of self-efficacy and a reduction in the cons of exercise. Therefore, health locus of control levels may act as a secondary motivator to exercise, in that they provide the initial impetus to exercise but do not directly influence the final decision to exercise. Men with a high internal health locus of control show a reduction in the emphasis they place on barriers to exercise (such as the cons to exercise), and these heightened control perceptions also lead to greater awareness of a personal ability to execute health behaviour change. Past research has deemed this heightened self-efficacy and the lack of perceived exercise cons essential for exercise adoption (Fahrenwald & Walker, 2003; Marcus, Eaton et al., 1994; Plotnikoff, Blanchard, Hotz, & Rhodes, 2001).

It is interesting that, while exercise self-efficacy and cons scale scores differed across the three groups in this study, perceptions of the third aspect of the transtheoretical model (pros of exercise) did not. This finding conflicts with research specifically assessing women's exercise adoption patterns (Cox, Gorely, Puddey, Burke, & Beilin, 2003; Farhenwald & Noble Walker, 2003) and research using mixed-sex samples (Callaghan, Eves, Norman, Chang, & Yuk Lung, 2002; Dannecker, Hausenblas, Connaughton, & Lovins, 2003; Young-Ho, 2004), which show that scores on the pros scale typically increase across stages of exercise adoption. This indicates that middle-aged men may not be as receptive to the benefits of exercise as the rest of the population. Two reasons for this finding are possible. The first is that, despite statistics to the contrary, men still believe that they are far less likely than women to be at risk for physical illnesses (Courtenay, 2000), and therefore the benefits of exercise may not be seen as applicable. Understanding the potential benefits of exercise does not necessarily indicate intent to exercise, since men may feel they do not have to. The second reason for a lack of influence may be that the pros scale itself concerns benefits not considered currently relevant to the participants. None of the items on the pros scale used in the current study explicitly address benefits such as the opportunity for competition, social interaction, or enhanced physical appearance that men have previously proposed as the perceived benefits of exercise (De Bourdeaudhuij & Sallis, 2002).

Despite the potential value of the present findings, caution should be used in the generalisation of these results given the use of a three-stage rather than the original five-stage model of exercise adoption. However, the nature of the current research was not to focus on the participant distribution across the model but rather to assess whether specific psychological barriers could be seen to asymmetrically influence exercise behaviours across the groups in question. We believe that this was convincingly shown despite the reliance on a three-stage model, and a relatively small sample size. However, it is still unclear whether significant differences in the influence of barriers to exercise exist between the first two stages of exercise adoption (precontemplation and contemplation) and the last two stages (action and maintenance). Further investigations into the influence of self-rated health levels need to examine the role that psychological barriers play across the entire five-stage model of exercise adoption. Another concern is that the current study used mostly white, well-edu-

cated participants, which may not accurately reflect the greater population of middle-aged men, and therefore limits the generalisability of these results. Also, exercise behaviour in this study was measured with a self-report scale (as used in many stages of change studies), but this poses problems of validity given that self-report measures do not necessarily reflect actual behaviour (Harrison, McLaughlin, & Coalter, 1996).

Given the link between self-rated health, the cons of exercise, and perceived stress, further research needs to be undertaken to assess the role that self-rated health plays in triggering the appraisal of other perceived barriers to exercise. It is still unclear whether self-rated health acts independently of perceived exercise cons and stress to reduce exercise uptake or whether these three concepts interact to promote *exercise defiance*. Also, the potential barrier posed by self-rated health and the theoretical function of internal health locus of control in providing impetus for subsequent exercise decision making need to be addressed in future research since they provide for a potential expansion to the transtheoretical model as applied to exercise adoption in men. The current model can be characterised as a direct-affects model, whereby the concepts currently measured (decisional balance, pros, cons) are directly linked to progression through the stages of exercise adoption. However, the findings of the current study suggest that the stages of exercise adoption model may be reconceptualised as a mediating model, including antecedent variables (perceived stress, internal health locus of control) whose influence upon stage progression may be conducted through the current direct-effect variables (pros, cons, decisional balance, self-rated health). In such an expanded model, the influence of all variables on stage progression could be understood within a more complex system of exercise behaviour change that charts *both* direct and indirect influences on exercise behaviour. These findings also provide information of some practical worth to the families and family physicians of middle-aged men. If poor self-rated health acts as a barrier to exercise, it seems likely that men in poor health who are cautioned to adopt exercise may not in fact undertake such exercise. In this case, results from this study suggest that families and physicians will need to become involved in motivating the patient, planning exercise regimes, and reducing the potential cons of exercise to ensure that exercise adoption and adherence does indeed take place.

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