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Reasons for not exercising and exercise intentions: A study of middle-aged sedentary adults

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The aims of this study were to assess why people do not participate in exercise and physical activity, and what might lead them to become active. More specifically, we focused on the hindrances to entering the phase of transition from a sedentary to a more active lifestyle by analysing the reasons 265 middle-aged Belgian adults gave for their inactivity. Their justifications were examined in relation to the conditions which they say would be needed for them to become more involved in regular physical activity. Factor analysis revealed that the reasons for inactivity referred to the adults' self-concept, to cognitive cost-benefit based processes and to negative emotions associated with exercise. The conditions reported to be necessary to begin exercising referred to a perceived decrease in health and to the appropriateness of the exercise offered. Discriminant analysis showed that 'never-exercisers' differed from 'ex-exercisers', and that within the subgroup of 'ex-exercisers' the long-term drop-outs differed from the recent drop-outs. Cluster analysis revealed three types of sedentary adults: the unconcerned, the opposed and the approachable.

Keywords: Middle-aged adults, non-exercisers, sedentary behaviour.

Introduction

In the USA and Australia, the prevalence of vigorous or frequent physical activity is estimated at 10% of the adult population. Scandinavian and Canadian prevalence figures appear to exceed those of the USA, which are themselves higher than UK figures (Sallis and Hovell, 1990; Dishman, 1993). A study of a representative sample of adult residents of Gent, Belgium, in 1992 (De Bourdeaudhuij and Van Oost, 1993) measured physical activity in kcal day^{-1} and showed that just 11% of the sample performed vigorous activity. In a 1993 study of a representative sample of the Belgian population, the prevalence of frequent physical activity (minimum 3 h per week) of individuals between 35 and 64 years of age was estimated at 12% (age 35–44, 15.8%; 45–55, 11.5%; 55–64, 9.1%; Sport en gezondheid, 1993).

Although there is a problem comparing these prevalence figures because of the variety of definitions of levels of physical activity (Dishman, 1993), it can be concluded that the prevalence of vigorous and frequent physical activity is very low. Physical activity at that level is not a standard component of the adult lifestyle.

In the context of public health issues, one could argue that, since even moderate leisure-time and occupational physical activities are associated with increased health and fitness, figures concerning organized involvement in vigorous physical activity during leisure time are less relevant than figures regarding the other end of the spectrum: sedentariness (Berger and McInman, 1993).

Some reports suggest that leisure-time physical activity has increased over the past 20 years. However, most researchers estimate the proportion of sedentary individuals at between 30 and 60% of the general population (Dishman, 1993). The degree of sedentariness in Belgium appears to be in line with these estimates. In the Belgian Olympic and Interfederal Committee (BOIC) survey (Sport en gezondheid, 1993), 59.3% of adults aged 35–44 years, 69.8% of those aged 45–54

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years, and 79.7% of those aged 55–64 years reported not being physically active at all in their free time. To summarize, it would appear that, although in the last decade or so some individuals have been encouraged to become more physically active, far too many have remained sedentary.

There would be no reason to treat these figures with alarm, nor to examine the reasoning behind them, if the health benefits of physical activity were not so widely understood and accepted, by both professionals and the public (Sallis and Hovell, 1990; Biddle and Mutrie, 1991). Many well-documented studies show that exercise has clear benefits, both physiological and psychological, for middle-aged and older individuals (Smith and Serfass, 1981; Duda and Tappe, 1988; Berger and Hecht, 1989; Ostrow, 1989; Tucker, 1990; Berger and McInman, 1993).

This study attempts to understand why people do not participate in exercise and physical activity and to determine what might lead them to become active. More specifically, we focus on the hindrances to entering the phase of transition from a sedentary to a more active lifestyle (Sallis and Hovell, 1990), changing from 'precontemplation' (not exercising and not intending to do so) to 'preparation' (not exercising but intending to start) (Marcus *et al.*, 1992; Armstrong *et al.*, 1993; Lee, 1993). This was done by questioning sedentary adults about how they justified their inactivity and about what conditions they believed were necessary for them to be willing, encouraged or compelled to change.

In the literature (e.g. Biddle and Mutrie, 1991; Willis and Campbell, 1992; Dishman, 1993), empirical studies have revealed that the most frequently cited reasons for inactivity are lack of time, fatigue, inadequate facilities, lack of knowledge about fitness and lack of willpower. Complementing these empirical studies, many theoretical models have been described to explain the determinants of physical activity. These models add focus to the empirical studies, and from these models a set of causal relations between selected variables can be drawn to test whether the model adequately fits a set of empirical data. Dishman (1993) gave an overview of the state of the art of such model-testing.

In this paper, we begin with empirical data on middle-aged adults' reasons for inactivity and their conditions for change, and then we try to generalize their functional meaning on a more abstract level. The specific questions addressed were:

1. What important reasons do adults give for not exercising?
2. What are the most important conditions sedentary adults believe are needed to provoke a change in their intentions or behaviours regarding physical activity?
3. Do the stated reasons and conditions differ between those who have never exercised compared to those who have discontinued a programme of exercise; between those who stopped exercising recently and those who stopped a long time ago; between groups based on sex, age or occupational status? Available sociological data (McPherson *et al.*, 1989) indicate that patterns of physical activity vary substantially with sex, age and exercise history. Thus it is reasonable to hypothesize that these sub-groups also differ in the reasons they give for their sedentary behaviour and their conditions for change.
4. Are there different types of sedentary men and women that one can discern on the basis of their pattern of responses (reasons and conditions)? This question deals with a typology of sedentariness independent of any sociological characteristics.

Methods

Questionnaire

The questionnaire was developed from a series of in-depth interviews with sedentary individuals ($n = 15$, age 35–65 years) about why they did not participate in any leisure-time physical activities and what might change that. The open-ended interviews, which took 1–2 h, were conducted by two final-year physical education students. To minimize interviewer contamination, as few questions were posed as possible, and those only to stimulate the interviewee or clarify information. No compensation was given for participation.

From the interview data, 70 different statements relating to individuals' reasons for not participating in physical activities, and the conditions under which that would change, were identified and assembled into a questionnaire format. The questionnaire began with a brief series of questions about age, sex, residence and history of leisure-time physical activity (if any), followed by two open-ended questions, which were asked to allow people to explain in their own words their reasons for inactivity and why they would become active. This procedure is recommended to enhance the validity of a related closed questionnaire (De Boeck, 1981). The bulk of the questionnaire consisted of two sections: 37 reasons for not participating in leisure-time physical activities and 33 conditions under which one would be encouraged or compelled to become involved (or reinvolved). Each sentence of the first section began with the statement 'I do not participate in sport or leisure-time exercise (any more) because:', followed by the list

of reasons. The second section began with the phrase 'I would start (resume) sport or leisure-time exercise activities if:', followed by a list of conditions. The respondents were required to score each item on a scale of 0–3, anchored by the terms 'Not applicable' and 'Very highly applicable to me'. (Copies of the original questionnaire in Dutch and an English translation are available from the first author.)

Subjects

Altogether, 500 questionnaires were distributed by 120 university physical education students, residing in each of the five Flemish-speaking provinces. Strict instructions regarding data-gathering were given in the psychology class. Students were instructed to look among their neighbours and relatives for clear-cut sedentary subjects. Three criteria were used to make the distinction between sedentary and physically active adults: 'common knowledge' among family and neighbours, self-report of inactivity, and acceptance of classification as sedentary. The students had to determine if the respondents participated, even occasionally, in any kind of physical exercise or sport during their leisure time, whether organized or not. Activities related to performing one's work or travelling to work by bicycle or on foot were not considered leisure-time physical activity. If the respondents reported any physical activity at all, they were provided with a survey on participation motivation, which will be reported elsewhere. Most importantly, the subjects had to consent to having the label 'sedentary' applied to them. It was assumed that individuals who walked or cycled any distance to work, or whose work required them to be physically active, would not agree to being labelled 'sedentary'.

To increase the response rate, the students were asked to deliver the questionnaire in person, to encourage its completion even if there was some reluctance to do so, and to personally collect the questionnaire in a sealed envelope 1 week later. From the 320 questionnaires collected, 28 were eliminated from the analysis because of unreliable information and another 27 because they fell outside the target group, the respondents were too young or there were doubts about their sedentariness. Questionnaires from 265 sedentary adult residents (133 males, 132 females) of Flanders, Belgium, aged 35–60 years (mean 48.5 years) were used for further analysis.

Data concerning the subjects' sex, age, occupation and exercise history are shown in Table 1, together with data on the Flemish population. The sample was evenly divided between males and females. More than half (58%) were aged 45–54 years. The sex and age groupings, as well as the number of individuals from each of the five provinces, were reasonably representative of the population at large (National Instituut voor de Statistiek, 1986). Although women and men were asked the same questions, the responses of the women did not allow a breakdown of their employment status. The majority of the women were housewives and less than 20% of the men identified themselves as working at a middle level job (see Cliquet, 1963). There were three groups: high, middle and low. The middle level classification excluded jobs requiring university training (high) or no special schooling at all (low). The middle group included low-level administrators, book-keepers and teachers, support personnel, including the police, and independent small business people, such as carpenters, plumbers and farmers.

Sixty-three individuals were classified as having never exercised ('never exercisers') and 202 as being currently inactive, although they had previously been exercisers ('ex-exercisers'). The mean number of years since they had been active was 15.1, and ranged from less than a year to 52 years. Of this latter group, 86 had

Table 1 Characteristics of the respondents

		Sex		Age (years)			Occupation					Exercise history	
							Male ($n = 130$)			Female ($n = 132$)			
	Total	Male	Female	35-44	45-54	56-60	High	Middle	Low	Working	Housewife	Never-exercisers	Ex-exercisers
N	265	133	132	64	165	36	50	23	57	51	81	63	202
%	100	50	50	24	62	14	39	18	43	39	61	24	76
% Flemish population (35-60 years) in 1981	100	49	51	39	41	20				39	61		

Note: Not all categories contain complete data on all subjects. Flemish data from National Instituut voor de Statistiek (1986).

discontinued their exercise activities within the last 10 years and 11 in the last 2 years.

Results and discussion

Dimensions of reasons for not exercising and conditions for change

To answer the first two research questions concerning the reasons for not exercising and the conditions required to provoke a change in intentions or behaviours regarding physical exercise, two separate intercorrelation matrices were constructed and subjected to exploratory factor analyses. The first of these, on the 37 reasons for not exercising, yielded a five-factor solution which explained 37% of the total variance (see Table 2).

Factor R1, which consisted of nine items, had an internal consistency α of 0.80, an eigen value of 3.37 and explained 25% of the common variance, was labelled 'irrelevance'. It covered reasons related to the lack of significant exercise in one's life and revealed that exercise was neither a part of the individual's nor of the age group's self-concept. Exercise was not believed to be an efficient means of achieving important goals, such as relaxation, leisure and social contact. The items grouped in factor R2 ($n = 8$, $\alpha = 0.74$, eigen value = 2.80, common variance = 22%) acknowledged the value of physical exercise as a means of achieving health goals. However, exercise was, at least at that moment, felt to be unnecessary, because the individuals believed they were healthy enough and thought their current routine would maintain their health status. Factor R2 was labelled 'unnecessary'. Factor R3 ($n = 6$, $\alpha = 0.71$, eigen value = 2.2, common variance = 19%) reflected individuals' emotional response to anticipated negative side-effects of exercise. Exercise was associated with negative feelings, such as shame, stress and feeling ridiculous, so this factor was labelled 'negative feelings'. In factor R4 ($n = 5$, $\alpha = 0.77$, eigen value = 2.53, common variance = 18%), exercise and sport were seen as being 'too risky'. This evaluation of risk arises from the idea that exercise is inappropriate for middle-aged adults (age role beliefs), or from personal normative beliefs ('I am no longer able to . . .'). Factor R4 was called 'too risky'. In factor R5 ($n = 4$, $\alpha = 0.56$, eigen value = 2.20, common variance = 16%), the costs of doing exercise, in terms of energy, effort, stress and time, and the benefits, in terms of relaxation, were weighed against each other, with the conclusion that exercise required more effort than one could summon. Factor R5 was labelled 'too much effort'.

Factor analysis of the 33 condition items yielded two factors which explained 38% of the total variance (see Table 3). Factor C1 ($n = 16$, $\alpha = 0.90$, eigen value = 6.58, common variance = 53%) expressed that one would consider taking up or resuming exercise if there was an unacceptable decrease in physical or psychological health status, if there was an expectation of positive outcome (belief that there is an association between exercise and a decrease in physical complaints), or if the exercise-health association was brought sharply and emphatically to one's attention. Factor C2 ($n = 14$, $\alpha = 0.87$, eigen value = 5.84, common variance = 0.47%) referred to conditions about the appropriateness of the offer in comparison to one's expectations. The proposed sport or exercise offer should meet some of the respondents' requirements concerning social contact, level of exercise, sport type, time and place. Table 4 shows the means and standard deviations of the scores on the reason and condition factors.

The low mean scores for the group as a whole on all reason and condition factors suggested that most of the sedentary adults did not find most items really applicable, or were rather indifferent to the topic. However, a content analysis of the open-ended questions on reasons and conditions revealed no new reasons or conditions, a finding which does not support the former suggestion (De Grave, 1986). We might more plausibly hypothesize a generally high level of indifference to the topic. Factor R5 ('too much effort') had the highest mean score. However, a mean score of 1.41 and a standard deviation of 0.72 indicate that two-thirds of the respondents thought these reasons were 'slightly' to 'moderately' applicable to why they did not exercise.

The reasons collected together in factor R5 allowed a cost-benefit analysis of why middle-aged sedentary individuals were inactive. Factor R5 included the item 'lack of time', which is the most frequently cited reason for not exercising (Willis and Campbell, 1992). It is not clear whether this factor was related to the perceived mental fatigue owing to the demands of everyday life, or to the perceived physical fatigue owing to the poor physical condition of the sedentary individual. It may also be the most socially acceptable answer, a rationalization for the lack of motivation to exercise, or an indication of poor time management (Dishman, 1993).

Factor R3 ('negative feelings') was the least stressed reason, showing the aversive emotional connotation exercise and sport had for some adults. This emotional response may be related to a history of negative experiences. Several of the items in this factor suggest low self-efficacy or the decisional balance constructs approval/disapproval of self and others.

Factor R1 ('irrelevance') and factor R4 ('too risky') referred to adults' self-concept as well as to certain

beliefs about the appropriateness of exercise at some age. This suggests that developmental psychology data and concepts must be considered in any examination of this area (Marcoen, 1988).

Factor R2 ('unnecessary') suggested that adults with a sedentary lifestyle have alternative ways of dealing with their health concerns and that preventive health-related behaviour was not seriously considered if there

Table 2 Factor analysis on the reasons for not exercising

	Factor				
Items	R1	R2	R3	R4	R5
I do not play sport or exercise (any more) because . . .					
I am not interested in exercise	0.67				
I do not have the aptitude	0.61				
Other activities are more enjoyable and relaxing	0.53				
One does not start exercising at middle age	0.50				
I am not interested in a well-shaped body	0.48				
One does not start with something one never did before at my age	0.48				
Physical activity does not prevent ageing	0.45				
I prefer quieter, more enjoyable leisure activities	0.43				0.36
I do not need sport or exercise to have interesting social contacts	0.35				
With a healthy, active lifestyle, exercise is unnecessary		0.68			
My daily activities contain sufficient physical activity		0.61			
My leisure activities (like gardening) are active enough		0.55			
According to my own standards, my physical condition is good enough		0.49			
Spontaneous physical activity (like walking, gardening, etc.) is more relaxing than organized activities		0.47			
Diet is more important to preserve one's physical condition or figure		0.36			
As long as I feel healthy there is no need to strain myself		0.34			
A good figure does not depend on physical activity		0.34			
I think I would look silly and feel ridiculous			0.76		
It is difficult for me to join a new group			0.63		
I have a complex about my obesity			0.53		
Exercise often stresses me and makes me nervous			0.46		
Exercise is too bothersome (changing, getting wet, etc.)			0.39		
I am ashamed because I cannot swim			0.33		
At my age I couldn't cope and risk isn't challenging				0.68	
At my age, exhausting and forcing myself with exercise cannot be healthy				0.67	
I try to avoid all risks				0.63	
I am no longer physically able to handle exercise				0.60	
At my age exercise requires so much effort that I no longer enjoy it				0.41	0.33
Exercise requires too much effort after a working day					0.69
I need the evening hours to recover					0.60
The regularity of exercise needed to get benefits requires too much dedication					0.47
I have no leisure time left					0.33
Exercise/sports leads to competition, which makes you strain yourself					
After having exercised I would be tired at work					
I do not want to strain myself in my leisure time	0.44				0.40
In too many sports clubs, sports practice is of secondary importance					

Note: Items with loadings lower than 0.30 on each factor have been removed from the table. Items loading on two factors have also been removed if the difference between the loadings was less than 0.07.
R1, 'Not relevant'; R2, 'Unnecessary'; R3, 'Negative feelings'; R4, 'Too risky'; R5, 'Too much effort'.

was no 'health threat'. To summarize, the reasons for inactivity were associated with the adult's self-concept (R1, R4), with cognitive cost–benefit based processes (R2, R5) and with an aversive emotional connotation associated with exercise (R3).

Of the conditions reported to be necessary to take up exercise or sport, factor C1 referred to a personal issue: that one's health status deviates unacceptably, in combination with a subjective appreciation of the effectiveness of exercise as a means to deal with the health problem, and to specific cues to action (e.g. advice from one's doctor). This factor provides still more examples of balances being made. Most of the statements suggested that current health status was good enough to rule out any need for physical activity. But if things became too bad, the respondents would take up exercise, especially if it were of proven effectiveness or efficiency. This ambivalence towards taking up exercise would appear to be the result of viewing the pros and cons as almost equal. The people who thought like this,

Table 3 Factor analysis on the conditions for change

	Factor	
Items	C1	C2
I would start (or resume) exercising or sport if . . .		
I felt stiff and stark	0.73	
I felt my physical condition got worse	0.73	
I had physical complaints that made me anxious or panicky	0.67	
I was certain exercise would guarantee health at a certain age	0.66	0.33
I was really worried because of specific complaints	0.69	
I felt too nervous	0.66	
I felt I was in bad condition	0.65	
I was positive I could prevent physical complaints and ageing ailments by exercising	0.63	0.30
I gained weight	0.61	
I was really convinced of its efficiency	0.56	0.32
I saw people my age suffering from degeneration	0.52	0.32
I could be really convinced of the fact that physical ailments would diminish	0.58	
The doctor would explicitly urge me to do so	0.48	
I became depressed, because exercise can be therapeutic in such cases	0.49	
I was certain that the time would be used for exercising and not games	0.43	0.32
My daily activities were not so tiring	0.30	
There was the right sports organization where I could feel comfortable		0.81
I knew there would be acquaintances in the sports club		0.74
I could practise sports comfortably and recreationally at a club		0.68
All participants were on the same level		0.67
I could practise sports together with family or friends		0.65
There was a sports club which offered the kind of sports I am good at		0.65
I knew somebody who could motivate me or who came to fetch me		0.64
It was organized but non-compulsory		0.53
Discomforts like going there, undressing, getting wet, etc., could be elimininated		0.41
I was not limited to the specific opening hours of a swimming pool or sports hall		0.39
I was younger		0.34
I could exercise without fear of embarrassment		0.32
I was good at some sports activities	0.33	0.45
My private/family life made it possible		
I was single and didn't have to consider any others		
All activities were without risk or stress to someone of my age	0.36	0.37
I could cope physically with the exercises	0.35	0.41

Note: Items with loadings lower than 0.30 on each factor have been removed from the table. Items loading on two factors have also been removed if the difference between the loadings was less than 0.07.
C1, 'Health threat'; C2, 'Appropriate offer'.

but who had been sedentary for many years, can be termed 'chronic contemplators' (Prochaska *et al.*, 1994).

Finally, factor C2 referred to an environmental factor, an offer which meets sedentary adults' multiple other expectations and demands (e.g. socialization, perception of competence) and reduced the perceived barriers to participation (e.g. showers, changing clothes, age, strangers).

Differences in reasons for not exercising and conditions for change

Exercise history and sex. A canonical discriminant analysis, with reasons for not exercising and exercise intentions as dependent variables, and exercise history and sex as independent variables, was carried out to look for an optimal combination of reasons and intentions, differentiating between the subjects in four groups combining exercise history and sex: male and female 'never exercisers', male and female 'ex-exercisers'. The means for each group on the new combined reasons-intentions variable indicates in which way the groups differed from each other. The discriminant function coefficient indicates the weight with which each factor enters into the combination. A negative mean score is associated with the factors with a high negative discriminant function coefficient and vice versa. The canonical correlation indicates the importance of the differences.

Two weighted combinations of reasons and intentions yielded significant differences between the four subgroups (see Table 5). The first discriminant function showed differences (canonical correlation 0.42, $P < 0.0001$) between the male 'ex-exercisers' ($\bar{x} = -0.55$) and the other three groups: male ($\bar{x} = 0.34$) and female ($\bar{x} = 0.46$) 'never exercisers' and female 'ex-exercisers' ($\bar{x} = 0.38$). The differences were due mostly to the factors with the highest discriminant function coefficients (i.e. factors R1 and R3).

Male and female 'never exercisers', as well as female 'ex-exercisers', were more likely to say that sport and exercise were 'irrelevant' to them (R1) and that sport and exercise aroused 'negative feelings' (R3). The second discriminant function showed differences (canonical correlation = 0.36, $P < 0.0001$) between the male and female 'never exercisers' and the female 'ex-exercisers'. 'Never exercisers' were more likely ($\bar{x} = -0.71$ and -0.53) to say that sport and exercise were 'irrelevant' (R1), 'not necessary' (R2) and 'too risky' (R4). The female 'ex-exercisers' were more likely ($\bar{x} = 0.43$) to choose the condition 'appropriate offer' (C2).

Male and female 'never exercisers' did not differ dramatically. Sex was an important variable only in differentiating the 'ex-exercisers'. Although exercise was

Table 4 Means (– S.D.) of the scores on the reason and condition factors for all subjects ($n = 265$)[a]

Reasons factors	
R1 Irrelevance	1.00 –0.66
R2 Unnecessary	0.97 –0.60
R3 Negative feelings	0.59 –0.57
R4 Too risky	1.04 –0.76
R5 Too much effort	1.41 –0.72
Conditions factors	
C1 Health threat	1.31 –0.66
C2 Appropriate offer	1.15 –0.66

[a]Scores: 0 = not applicable; 1 = slightly applicable; 2 = moderately applicable; 3 = highly applicable.

Table 5 Discriminant analyses of reasons for non-participation and conditions for participation: Sex × exercise history (never-exercisers and ex-exercisers)

	Discriminant function coefficient		Groups[b]	Class means	
	First	Second		First	Second
Reasons for non-participation					
R1 Irrelevance	0.66[a]	-0.64[a]	Male never ($n = 21$)	0.34	-0.71
R2 Not necessary	0.10	-0.66[a]	Female never ($n = 24$)	0.46	-0.53
R3 Negative feelings	0.63[a]	-0.01			
R4 Too risky	0.11	-0.42[a]	Female ex. ($n = 90$)	0.38	0.43
R5 Too much effort	0.24	-0.13	Male ex. ($n = 112$)	-0.55	-0.01
Conditions					
C1 Health threat	0.37	0.25	Canonical correlation: first, 0.42; second, 0.36		
C2 Appropriate offer	0.33	0.46[a]	P : first, < 0.0001; second, < 0.0001		

[a] Only coefficients above 0.40 have been interpreted, as these contributed the most to the strength of the canonical correlations.
[b] 'never', never exercised; 'ex', ex-exerciser.

seen by female 'ex-exercisers' as less appropriate (R1), and although more negative emotions were expressed by female (R3) than by male 'ex-exercisers', women were more likely to leave open the possibility of taking up some type of physical activity if the right conditions were met (C2).

'Never-exercisers' can be considered more deeply sedentary than 'ex-exercisers'. The fact that the reason 'irrelevant' (R1), which expresses that one is basically not an 'exercise person', was stressed more by 'never exercisers', may be interpreted as an indication of a more intransigent attitude towards sport and physical exercise.

Profession and sex. The results of discriminant analyses with profession and sex as independent variables (see Table 6) showed that housewives ($\bar{x} = 0.42$) differed from working women (canonical correlation = 0.47, $P < 0.0001$) in saying that physical activity may be valuable but was, at that time, 'unnecessary' (R2). In contrast, working women ($\bar{x} = -0.67$) were more likely than housewives to say that they were physically inactive because physical exercise requires 'too much effort' (R5) after a hard day at work.

Age. Results of the multiple regression analysis with reasons and conditions as the independent variables, and age as the dependent variable, showed that the older the individuals were, the more likely they were to view risk (R4) (regression coefficient = 0.34, $P < 0.0006$) as a reason for their inactivity (see Table 7). Conversely, the younger the sedentary individuals were, the more likely they were to view the costs in terms of energy, effort and stress as outweighing the benefits (R5) (regression coefficient = -0.34, $P < 0.001$). These results fit with what is described as role-appropriate behaviour for individuals in their respective age groups. Older adults perceived themselves as vulnerable, while younger adults were more preoccupied by, and involved in, their career (Levinson, 1986; Marcoen, 1988).

Length of sedentariness of 'ex-exercisers'. Results of the multiple regression analyses with the length of sedentariness as the dependent variable showed that the longer the subjects had been sedentary, the more they gave the reason 'not necessary' (R2) (regression coefficient = 0.66, $P < 0.001$) and, to a lesser degree, the reason 'irrelevant' (R1) (regression coefficient = 0.42, $P < 0.02$) (see Table 7). This gives support to the interpretation that adults who have dropped out of physical activity, progressively build up alternative ways to deal with their health concerns, and that physical activity becomes progressively less relevant to them. We could hypothesize that the longer adults are inactive, the more they will have built up such alternative behaviours and the more they will endorse items from the factor 'unnecessary' (R2). In contrast, the shorter the self-reported sedentariness, the more the 'appropriate offer' (C2) (regression coefficient = 0.27, $P < 0.001$) was important. This might imply that a sedentary lifestyle is less irreversible and that these adults were more willing to change.

Typology of sedentariness

By means of a cluster analysis and a discriminant analysis, the fourth research question was addressed. The subjects were first grouped according to their response patterns, independent of any sociological variable. In a

Table 6 Discriminant analysis of reasons for non-participation and conditions for participation: Working women *vs* housewives

	Discriminant function coefficient	Groups	Class means
Reasons for non-participation		Working women	-0.67
R1 Irrelevance	0.16	Housewives	0.42
R2 Not necessary	0.66[a]		
R3 Negative feelings	-0.04		
R4 Too risky	0.14		
R5 Too much effort	-0.50 [a]		
Conditions		Canonical correlation: 0.47	
C1 Health threat	0.14	$P \leq 0.0001$	
C2 Appropriate offer	0.13		

[a] Only coefficients above 0.40 have been interpreted, as these contributed the most to the strength of the canonical correlations.

Table 7 Two multiple regression analyses of association between a combination of the reasons and conditions with (a) age and (b) length of sedentariness

	Age ($n = 265$)		Length of sedentariness ($n = 202$)	
Factors	Regression coefficient	P	Regression coefficient	P
Reasons for non-participation				
R1 Irrelevance	-0.04	N.S.	0.42	< 0.02
R2 Not necessary	0.09	N.S.	0.66	< 0.0008
R3 Negative feelings	-0.04	N.S.	-0.10	N.S.
R4 Too risky	0.34	< 0.0006	0.21	N.S.
R5 Too much effort	-0.33	< 0.0097	-0.07	N.S.
Conditions				
C1 Health threat	0.07	N.S.	-0.10	N.S.
C2 Appropriate offer	-0.06	N.S.	-0.27	< 0.0009
R^2	0.08		0.15	
R	0.29		0.40	
P	< 0.002		< 0.0001	

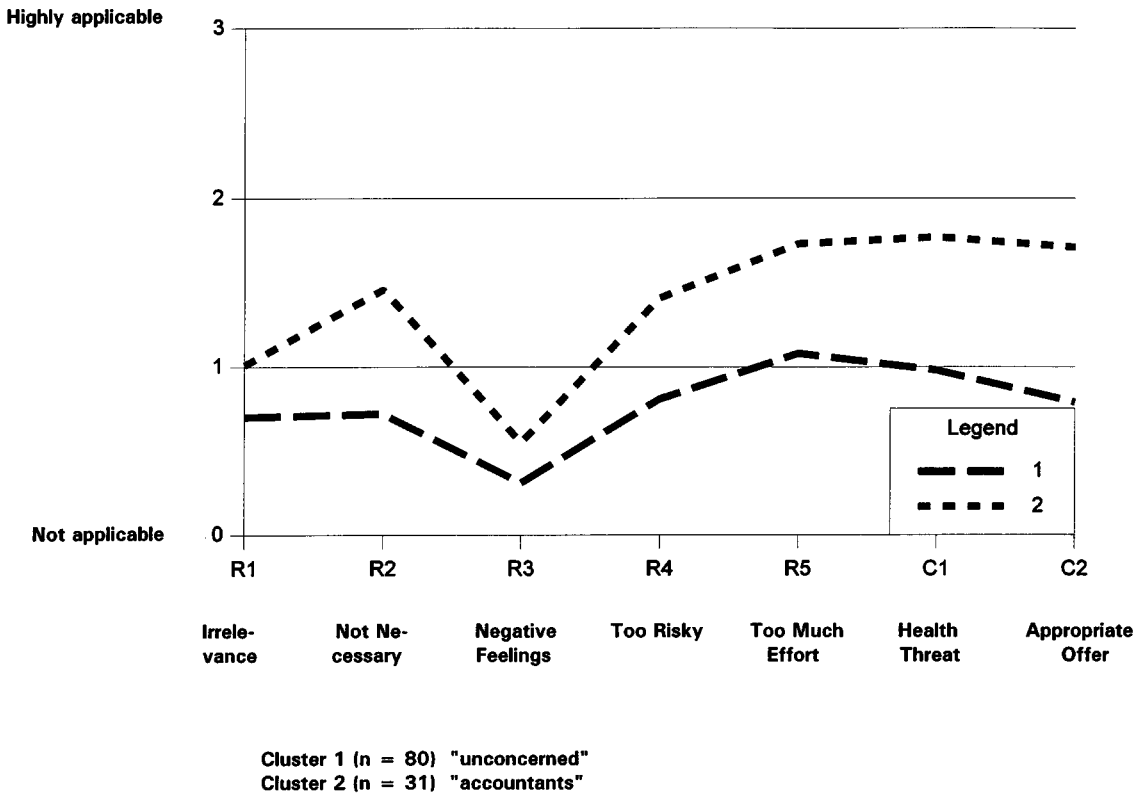

Figure 1 Mean scores for men ($n = 111$) on the reasons for sedentariness and conditions for change grouped according to their response pattern (clusters).

Table 8 Results of discriminant analysis on males' ($n = 111$) reasons for sedentariness and conditions for change grouped by cluster analysis according to their response pattern (clusters) (mean – S.D.)

Clusters	Reasons/conditions							Class means on the combined variables
	R1	R2	R3	R4	R5	C1	C2	
Cluster 1 ($n = 80$): 'unconcerned'	0.70 –0.52	0.72 –0.46	0.31 –0.32	0.81 –0.61	1.08 –0.62	0.98 –0.56	0.79 –0.52	-0.78
Cluster 2 ($n = 31$) 'accountants'	1.01 –0.40	1.46 –0.47	0.55 –0.46	1.41 –0.68	1.73 –0.61	1.77 –0.41	1.71 –0.40	2.03
Discriminant function coefficient	0.34	0.74[a]	0.35	0.50[a]	0.54[a]	0.71[a]	0.82[a]	Canonical correlation = 0.78; $P < 0.0001$

Note: 0, does not apply; 1, slightly applicable; 2, moderately applicable; 3, highly applicable.

[a] Only discriminant function coefficients above 0.40 have been interpreted, as these contributed the most to the strength of the canonical correlations.

R1, 'irrelevance'; R2, 'not necessary'; R3, 'negative feelings'; R4, 'too risky'; R5, 'too much effort'; C1, 'health threat'; C2, 'appropriate offer'.

second step, by means of a discriminant analysis, we looked for differences between group scale means on reasons and conditions.

Two cluster analyses were conducted to reveal response patterns, one for the males and one for the females, using average linkage as the clustering technique. The hierarchical construction of clusters progressively built up was inspected by means of a tree diagram and a two-cluster solution was selected for the males and a three-cluster solution for the females. Small clusters grouping less than six subjects were excluded. The selected clusters tended to be sufficiently robust (i.e. the clusters were built up clearly and quite homogeneously) and distinct (i.e. not all subjects belonged to the same cluster).

The two male clusters, grouping 111 (84%) of the men, were described in terms of means and standard deviations on the seven factors separately (Fig. 1) and were compared on their response patterns by means of discriminant analysis (see Table 8). No differences were found between the two male clusters regarding age or sports history. But response patterns showed two different types of sedentary men. The first cluster, grouping 60% of the male respondents ($n = 80$), may be characterized as unconcerned or indifferent towards physical exercise, since their mean scores on all factors were low (score < 1). This indicates that all reasons and conditions, except factor R5 ('too much effort'), were less than 'slightly applicable' to them.

Cluster 2, which grouped 25% of the male respondents ($n = 51$), was made up of individuals who had clear views of what was important to them, and exercise was not. They differed significantly from the 'unconcerned' cluster (canonical correlation = 0.78, $P < 0.0001$) by having a higher score on a combination of reasons – exercise was 'not necessary' (R2), 'too risky' (R4) and required 'too much effort' (R5) – and conditions – if there were a 'health threat' (C1) and an appropriate offer' (C2).

The first cluster reveals a sedentary individual who gives little thought to the idea of being active and therefore has few clear ideas about why he is inactive. The conditions under which he might change also were not considered applicable to him, perhaps because they were too hypothetical. The existence of a large indifferent group of sedentary adults with an attitude of passive rejection is supported by the Belgian BOIC survey (Sport en gezondheid, 1993). In that survey, in which males were asked why they were inactive, 46% of sedentary individuals could give no specific reason. We conclude that the majority of sedentary males exhibit this unconcerned profile and that it is quite unlikely that they would consider changing their sedentary lifestyle on their own. Physical exercise was not one of the major concerns of this group of middle-aged sedentary men.

The specific combination of reasons and conditions which differentiated between the first and second cluster suggests that the latter individuals may have been making a cognitive cost–benefit analysis with regard to exercise activities. The relatively low mean scores for factor R3 ('negative emotions'; $\bar{x} = 0.55$) and factor R1 ('irrelevance'; $\bar{x} = 1.01$) indicate that they were not held back by bad feelings related to exercise, nor by personal normative beliefs about the appropriateness of exercise. These males appeared to be calculating 'accountant-type' individuals who did not perceive any 'health threat'. They did not see an urgent need for, nor any other benefit from, initiating exercise – they could only see disadvantages.

There was a small difference between the three female clusters according to their age ($F_{2,11} = 3.83$, $P < 0.03$). The mean age of the women in cluster 1 was 46.9 (S.D. = 5.8) years, in cluster 2 it was 50.7 (S.D. = 3.9) years and in cluster 3 it was 49.0 (S.D. = 5.8) years. The significant difference was between clusters 1 and 2 (Tukey's *a posteriori* test, $P < 0.05$). There were no differences between the three clusters in terms of their sports history. As with the men, the three female clusters, grouping 114 (85%) of the women, were described in terms of means and standard deviations on the factors separately (Fig. 2) and were compared on their response pattern by means of discriminant analysis (see Table 9).

Two weighted combinations of reasons and intentions were found to differentiate between the three clusters. Clusters 1 ($n = 78$) and 3 ($n = 22$) were very similar (i.e. relatively low scores) regarding the reasons given for not exercising, with the difference being the stress put on the conditions for possible change (first function, canonical correlation = 0.77, $P < 0.0001$; condition 1 discriminant function coefficient = 0.93; condition 2 discriminant function coefficient = 0.68).

Cluster 2 had relatively high scores on all factors (Fig. 2). They differed from the other two clusters (second function, canonical correlation = 0.55, $P < 0.0001$) on the reasons 'not necessary' (R2) (discriminant function coefficient = 0.60), 'negative feelings' (R3) (discriminant function coefficient = 0.78) and 'too risky' (R4) (discriminant function coefficient = 0.75).

The response pattern of the first cluster, representing 60% of the women in total, was very similar to the largest cluster of men. The only difference was that all reasons and conditions, especially R5 ('too much effort'), in the first cluster had a slightly higher score. These women were, just as their male equivalents, indifferent to the idea of being active and of changing their lifestyles. The slightly higher score on 'too much

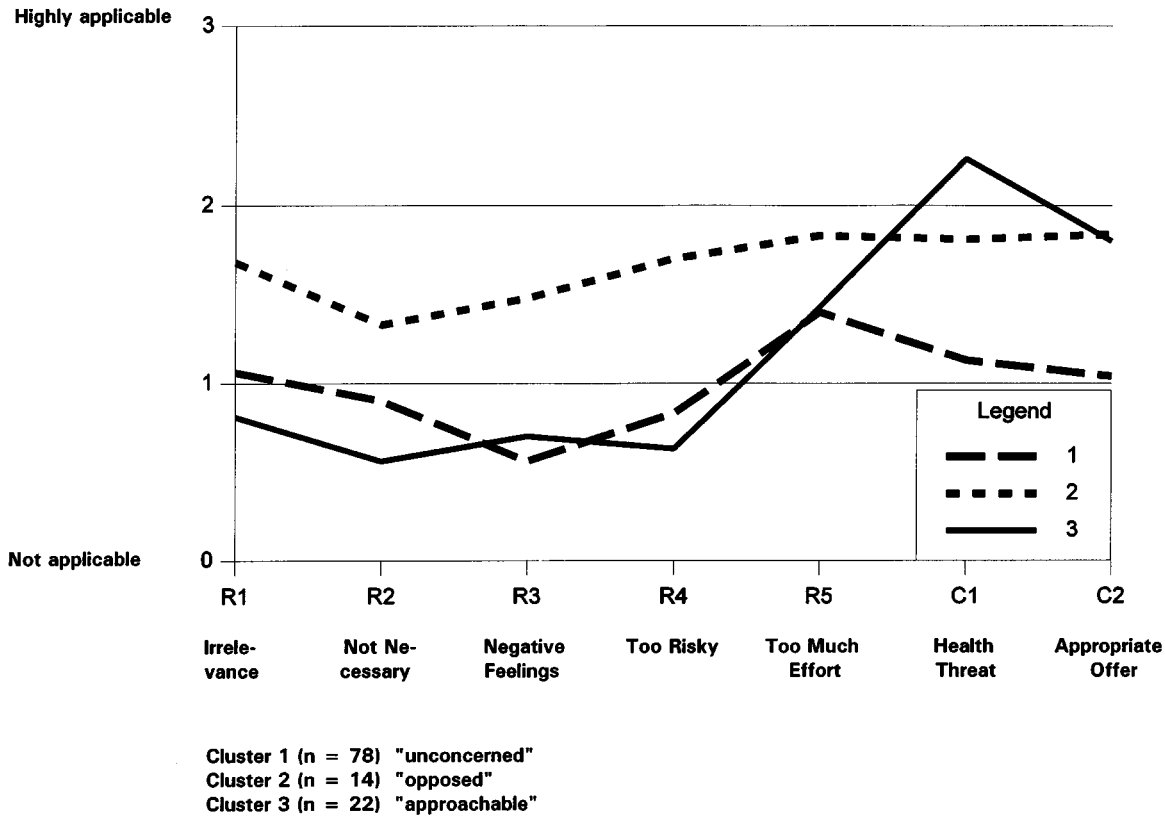

Figure 2 Mean scores for women ($n = 114$) on the reasons for sedentariness and conditions for change grouped according to their response pattern (clusters).

effort' may have been because it was considered the easiest expression of a lack of motivation (Dishman, 1993).

Cluster 2, representing 17% of the female respondents, was slightly older than the other groups, which may explain the stress on the factor 'too risky' (R4). Their overall response pattern indicates that, on average, every reason and condition was 'slightly' to 'moderately' applicable to them. This may reflect a decisive and clear self-concept that excludes or is opposed to exercise, or is perhaps even hostile to it.

The third cluster, representing 17% of the female respondents, showed a pattern of relatively low scores on all reasons and high scores on both conditions. This suggests that these women were more approachable regarding the idea of leisure-time sport and exercise, since they were more likely to change than the unconcerned type.

General discussion

The various reasons sedentary adults gave for not exercising, and the conditions they suggest are needed to provoke a change in their intentions regarding leisure-time exercise, were reduced to seven factors. Reasons for inactivity referred to adults' self-concept (i.e. to personal, sex-role and age-role normative beliefs). In the present study, such beliefs were that exercise was 'irrelevant' (R1) or 'too risky at my age' (R4). The adults referred also to some cognitive decision-based (cost-benefit) processes: exercise was valuable but 'unnecessary' (R2) and required 'too much effort' in terms of energy and time (R5). Finally, there was a clear reference to negative emotions associated with exercise (R3). Conditions given referred to personal factors – a perceived health threat and perceived efficacy of exercise (C1) – and to an environmental factor – the appropriateness of the exercise offer and the convenience of the exercise setting (C2).

Reference to concepts of the self and identity of the adult suggests the consideration of developmental psychological concepts and theories about adulthood in research on exercise psychology. Exercise adoption and adherence must not only be studied in a health psychological context, but also in the context of the whole range of age-related preoccupations, needs and goals.

The reason 'too much effort' (in terms of energy, fatigue and time) was the most frequently given reason

Table 9 Results of discriminant analysis on females' ($n = 114$) reasons for sedentariness and conditions for change grouped by cluster analysis according to their response pattern (clusters) (mean – S.D.)

	Reasons/conditions							Class means on combined variables	
Clusters	R1	R2	R3	R4	R5	C1	C2	Function 1	Function 2
Cluster 1 ($n = 78$): 'unconcerned'	1.06 –0.68	0.90 –0.59	0.56 –0.53	0.83 –0.69	1.40 –0.64	1.13 –0.48	1.04 –0.59	-0.80	-1.06
Cluster 2 ($n = 14$): 'opposed'	1.68 –0.57	1.33 –0.51	1.48 –0.46	1.70 –0.69	1.83 –0.71	1.84 –0.41	1.84 –0.42	1.09	1.66
Cluster 3 ($n = 22$): 'approachable'	0.81 –0.56	0.56 –0.41	0.70 –0.43	0.63 –0.55	1.43 –0.73	2.26 –0.43	1.80 –0.61	2.14	-0.67
Discriminant function coeffficient:								Cannonical correlation:	
function 1	-0.02	-0.16	0.32	0.05	0.40	0.93 [a]	0.68[a]	F1 = 0.77,	
function 2	0.02	0.60[a]	0.78[a]	0.75[a]	0.33	-0.009	0.28	F2 = 0.55;	
								$P < 0.0001$	

Note: 0, does not apply; 1, slightly applicable; 2, moderately applicable; 3, highly applicable.

[a]Only discriminant function coefficients above 0.40 have been interpreted, as these contributed the most to the strength of the canonical correlations.

R1, 'irrelevance'; R2, 'not necessary'; R3, 'negative feelings'; R4, 'too risky'; R5, 'too much effort'; C1, 'health threat'; C2, 'appropriate offer'.

for not exercising; this result is in line with the literature (Dishman, 1993). Some support for the construct validity of that factor may be seen in its being related to occupational status and age. Working women and young adults building their careers had higher scores on that reason.

Regarding differences in reasons and conditions, we can conclude that exercise history and sex are the most important determinants and, to a lesser degree, age and occupation (see also Sutton, 1994). Male and female 'never exercisers' did not differ from each other, but they did differ from male and female 'ex-exercisers' on various reasons and conditions. The focus of 'never exercisers' on the reasons 'irrelevance' and 'unnecessary' may indicate an intransigent attitude towards exercise. Conversely, the condition 'appropriate offer' desired by the recent drop-outs may be an indication of an approachable attitude.

In line with what one might expect, and therefore supporting the validity of the questionnaire, the women put more stress on the reason 'negative feelings' and on the condition 'appropriate offer' than men. Working women offered the reason 'too much effort' more than housewives. Older people were more likely to say the reason 'too risky' was applicable.

Clustered by their response patterns, one type of male was unconcerned and indifferent towards exercise, unable to offer a specific reason for remaining inactive. Another male cluster suggests there are 'accountant-type' individuals who see only disadvantages and no benefits to exercising (see Prochaska *et al.*, 1994). Sixty percent of the female respondents were indifferent to the idea of being active and of changing their lifestyles. Ten percent were clearly opposed to the idea and 17% may have been approachable, since they did not clearly justify their inactivity and seemed to have been willing to consider a change in their lifestyles.

In the transtheoretical model of change proposed initially by Prochaska and DiClimente (1983, 1984) precontemplators are individuals who are currently sedentary and not planning to begin exercising. Several of the descriptors of this stage used by Prochaska and Marcus (1994) apply to all or some of our respondents, namely: they are unchanging, uninformed, and they rate the disadvantages of exercise higher than the advantages. Of our sedentary individuals, 24% reported having never exercised, and for those who had exercised, it had been more than 15 years on average since they had been active. Only 4.2% ($n = 11$) of our total sample had undertaken exercise in the previous 2 years. Our respondents endorsed a number of uninformed statements about exercise, including that their current leisure activities were active enough and that exercise is unnecessary if one feels healthy. Factors including statements rating the costs and benefits of changing one's ways were rated highest by the women whom we labelled 'opposed to exercise' and by the men whom we labelled 'accountants'. However, we note also here that the largest clusters of males and of females were indifferent. They gave low ratings to all items and so they seemed not even to be weighing costs and benefits. Perhaps such indifference is rather far from contemplation and making the balance closer. This possibility deserves further investigation.

Regarding the probability of adults initiating exercise, we are aware that we are dealing with correlations between self-description items. We are on less firm ground when we try to explain or predict overt behaviour on that basis, and thus are going beyond the identification of some determinants and covariants of the verbalizations of reasons and conditions. Bearing this restriction in mind, we suggest that there is little ground for optimism. Exercise and physical activity were not major concerns for 60% of sedentary adult men and women, which helps to explain the low mean scores on all factors. They did not have clear ideas about why they were inactive, nor did they suggest any conditions under which they might change. It is very unlikely that these adults would voluntarily change their lifestyles.

There is some evidence to underline the importance of integrating the idea of physical activity into the self-concept or self-identity of the individual. The more sedentary the lifestyle ('never exercisers' *vs* 'ex-exercisers'), the more the factor 'irrelevance' shows up. The strength of that factor is a barrier to individuals taking any conditions for change into consideration.

In adult life, a lifestyle has usually been developed in which individuals judge themselves to be capable of coping with life's stresses. Daily routines are not easily changed but would be if needed. The stress on the reason 'unnecessary' could reveal an attitude highly resistant to physical activity. Moreover, the longer the individual has been sedentary, the stronger that factor.

There is some support for interpreting high scores on one or both conditions as an indication of a willingness to change. Condition C2 ('appropriate offer') was stressed more by 'ex-exercisers' than by 'never exercisers', and within the group of 'ex-exercisers' more by women and by recent drop-outs than by men and long-term drop-outs. According to these data, females who were recent 'ex-exercisers' should be most approachable and most willing to change. However, the results of the cluster analyses suggest a different interpretation of the stress on conditions. These interpretations depend on the pattern of reasons for not exercising in combination with the stress on conditions: a willingness

to change for some (cluster 3), but also as an indication of resistance (cluster 2).

Any health promotion policy interested in educating and motivating adults to change their behaviour and to adjust their priorities must take into account adults' beliefs, attitudes and interests as co-determinants of their actual behaviour. It seems that the general indifference towards physical activity we have identified in the majority of sedentary Belgian men and women is the greatest barrier to overcome.

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