
Adolescent's physical activity: perspectives for active lifestyles of a school population in Oeiras

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Introduction

Inactivity is a major risk factor for some of the most common causes of death (e.g. being inactive doubles one's risk of a coronary heart death). Physical inactivity should be considered one of the most important health problems, worthy the same level of concern as smoking, blood cholesterol and obesity. In turn, the practice of regular physical activity adds years to life, reduces the risk of multiple diseases and has benefits to many body systems [1].

Concerning children and adolescents, it has been recognized that physical activity is an important factor during their growing years to maintain normal growth and development (Bar-Or, 1993). Children are generally thought to be naturally physically active, but in recent years their activity levels have been object of great concern to health professionals. Until a generations ago, physical activity was a natural part of life for most youngsters. However, this is no longer so, and professionals are asking whether children and adolescents now get the physical activity required for their health development [2].

Bourdeaudhuij and Oost (1999) suggested that physical activity, when compared with other health behaviours, is the only distinctive factor among groups of individuals with healthy and non-healthy behaviours. Hence the interest in this area [3].

The theory of planned behaviour suggests that a person's intention to perform a behaviour is the main determinant of that behaviour because it reflects the person's level of motivation and the willingness to exert effort [4,5]. The intention, on the other hand, is determined by one's attitude, by the subjective norm and by the perceived behaviour control. Those components are also held to have determinants. The attitude is determined both by a person's salient beliefs about a particular behaviour (behavioural beliefs or belief about outcomes) – and by a person's perceived consequences of that

behaviour (evaluation of outcomes) [6,7]. The subjective norm is determined by normative beliefs, which represent perceptions of specific significant other's preferences about whether one should or should not engage in a behaviour. The perceived behaviour control is influenced by beliefs concerning whether one has access to the necessary resources and opportunities to perform the behaviour successfully, after weighting the perceived power of each factor [5]. Perceived behaviour control is viewed as both an indirect and direct predictor of behaviour. It is hypothesized that there is a direct link between perceived behaviour control and behaviour for nonvolitional behaviour, such as exercise, where the individual may face real or perceived limitations to carrying out the physical activity [7,8].

The research on the application of the theory of planned behaviour within the field of physical activity has been the object of some theoretical revision, which has since the 1980s reinforced the useful approach of such a theory [8,9]. According to Conner e Armitage (1998), several modifications and extensions to this theory have been proposed, namely the procedures to improve the assessment of salient beliefs, precedent behaviour (or habit), moral norms, self-identity, affection and others [10].

The purpose of this study was to characterize the teenagers' physical activity level and to identify the predictors of change to an active lifestyle through the theory of planned behaviour.

Methods

Participants and procedures

Participants were 364 students from Oeiras' middle and high schools (school year 2002-2003). This number represents 10 % of the general population (N=3269) of these two school grades, after a random selection of classes. The average age of the sample was 12.2 of 7th grade (51,4% of students) and 15.2 of 10th grade (48,6% of students), 53.3% boys and 46.7% girls.

Instruments

Subjective physical activity data was obtained via self-report of current level of practice according to the Portuguese version of the questionnaire model "The current state of physical activity", borrowed from the transtheoretical model of Prochaska and DiClemente [11, 12, 13]. It contains 7 items that measure the level of physical activity related to the 3 stages of change: pre-contemplation, contemplation, action and maintenance. Participants were required to select only one item that would best describe their current physical activity pattern.

The predictor variables were borrowed from the theory of planned behaviour. These variables, namely the attitude (measured by two predictor factors - evaluation of outcomes and belief about outcomes), the intention, the subjective norm and the perceived behaviour control were measured by five distinctive factors [14]. The psychometric study revealed that the former factors account for 56% of the variance explained with items saturation higher than .40, Cronbach alpha higher than .60 [15] and total variance explained higher than 45%. The Cronbach indices were: evaluation of consequences ($\alpha=.80$) with 24% variance explained, subjective norm ($\alpha =.78$) with 11.8% variance explained, perceived behaviour control ($\alpha =.66$) 9.3% variance explained, intention ($\alpha =.80$) 6.1% variance explained, behavioural beliefs ($\alpha =.63$) 5.5% variance explained. The evaluation of outcomes was measured using 5-point bipolar adjective scales as suggested by Ajzen and Fishbein [16]. We assessed both instrumental (useful-useless, harmful-beneficial, bad-good) and affective (enjoyable-non-enjoyable, stressful-relaxing, boring-interesting) components of attitude. All variables, except for the evaluation of outcomes, were rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree).

Results

Physical activity level

In relation to the physical activity level, we found 29.3% subjects on the contemplation stage (we call them a less active group) and 70.7% subjects on the action and maintenance stages (we call them an active group). Some group characteristics are shown in table 1 and 2.

Table 1. Group distribution by gender

	Gender *	
	% Boys	% Girls
Less active group (n=104)	45.2	54.8
Active group (n=251)	56.2	43.8

*(χ^2 (1)= 3.560; p=.059)

There are no significant differences between boys and girls. However, because significance levels are tangential ($p=.50$), we could suggest that girls (43.8%) seem to be less active than boys (56. %). The difference between the two groups in relation to school grades is not statistically significant.

Table 2. Group distribution by school grades

	Grade*	
	% of 7 th grade	% of 10 th grade
Less active group (n=104)	56.7	43.3
Active group (n=251)	49.8	50.2

*(χ^2 (1)= 1.414; p=.234)

Differences between groups

In order to analyze the differences in the less active and active groups we used an analysis of variance (Anova-One Way).

Table 3. Differences between the less active and active groups

	Less active group (n=104)		Active group (n=251)		F	p
	M	SD	M	SD		
Age	13.52	1.70	13.67	1.62	.646	.422
Evaluation of outcomes	20.85	8.97	23.72	8.07	8.489	.004
Behavioural beliefs	13.43	1.94	13.91	1.49	5.972	.015
Subjective norm	17.79	3.87	19.02	4.45	5.632	.018
Perceived behavioural control	22.85	4.02	25.07	3.76	23.648	.000
Intention	10.14	3.10	12.63	2.83	53.523	.000

The statistical differences between groups show that the less active group has evaluation of outcomes [F(1,345)=8.489; p=.004], behavioural beliefs [F(1,342)=5.972; p=.015], subjective norm [F(1,333)=5.632; p=.018], perceived behavioural control [F(1,340)=23.648; p=.000] and behavioural intention [F(1,353)=53.523; p=.000] less favourable than the active group. The Intentions and the perceived behavioural control are the most significant differences between the two groups.

Predictors of physical activity level

In order to analyze the contribution of all variables of the theory of planned behaviour we used the structural equation model. The fit indices we used were: *Bentler-Bonnet Nonnormed Fit Index* (NNFI), *Comparative Fit Index* (CFI), *Standardized Root Mean Square Residual* (SRMR), *Root Mean Square Error Approximation* (RMSEA). HU and Bentler (1999), suggest that a good fitness of indices are values higher than .95 in NNFI and CFI indices [17], and lower than .05 in SRMR and RMSEA indices

[18]. In relation to RMSEA indices, Browne and Cudeck (1993) suggest values lower than .80 for a good fitness [19]. The Qui-Squared (χ^2) represents good indices when the number of sample is not too large [20], as in this study. All the indices shown (except for SRMS indices) were obtained through the *Robust method (Satorra-Bentler Scaled)*. This method is used when the multivariate curtosis values suggest that the sample does not have a normal distribution. In such cases, this method allows for most valid results compared to usual methods such as the *Maximum Likelihood* [21]. Figure 1 shows the relation between the variables of the theory of planned behaviour and the significant beta values.

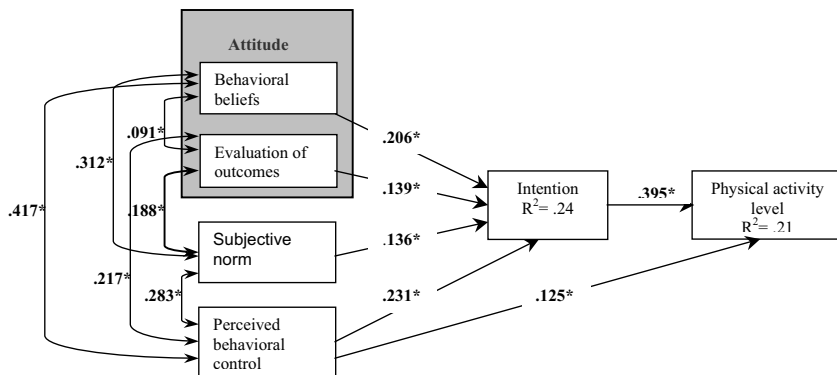


Figure 1. Structural equation model of the theory of planned behaviour ($p < .05$)

For intention, 24% of variance was explained with behavioural beliefs and evaluation of outcomes (both attitude), subjective norm and perceived behavioural control. The physical activity level had 21% of its variance explained by intention and perceived behavioural control. The perceived behavioural control is the best predictor of intention ($\beta = .231$) and intention is the best predictor of physical activity level ($\beta = .395$). The correlation among behavioural beliefs, evaluation of outcomes, subjective norm and perceived behavioural control was positive and significant.

All the indexes showed good fitness: CFI is higher than .95, SRMR and RMSEA both are lower than .05. The Qui-squared is not significant, which is a good index. These results show the fitness of the model.

Table 4. Fit indexes

	χ^2	gl	p	RMSEA (90% I.C.)	SRMR	CFI	NNFI
Model of planned behavior	3.58	3	.31	.025 (.000; .101)	.21	.997	.984

Method Robust (Yuan-Bentler Correction): RMSEA= Root Mean Square Error Approximation; CFI= Comparative Fit Index; NNFI= Bentler-Bonnet Nonnormed Fit Index.

Method Maximum Likelihood Solution: SRMR= Standardized Root Mean Square Residual

Discussion

Our results support the adequacy of the predictor variables to the theory of planned behaviour in order to explain the practice of physical activity by adolescents.

The data gathered in the research on the levels of physical activity practised by the adolescents of our sample stood far from literature, bearing demographic variables in mind. Concerning gender, on the other hand, one should expect that the boys would present levels of physical activity significantly higher than those of the girls. Even if the level of significance, close enough to .05, may allow us to accept the trend of a higher level in boys, we sought for a plausible reason to such a tangential level besides the reasons already suggested in previous studies. According to Telama and Yang (2000), only from the age of 9 to 12 are boys more active than girls, while to Verschuur and Kemper (1985) they are only active at the age of 14 to 15, and such activity diminishes with age [22]. A study comparing gender and age differences through objective levels of physical activity in youngsters concluded that the difference of activity levels was rather smaller when referring to physical activity in general, even though boys were more active than girls [23]. The fact is that, in our research, the assessment of the levels of daily physical activity was done by the subjects according to a set of definitions of regular physical activity which aimed at including the activity performed all day long, whether strong or moderate (except for the activity practised in physical education classes), so to speak, the overall physical activity. Therefore, the absence of gender differences in our research might be due to the fact that we asked our subjects to assess physical activity in its broader sense; accordingly, the difference between boys and girls isn't as deep as we had envisaged.

Concerning age and school levels, the absence of a significant relation between younger and older subjects, or between subjects of the 7th and 10th grades, concerning the level of physical activity, does not confirm the theoretical data. Eventually this result may be accounted for through age proximity, once the average age of

the whole sample is 13.7 (with a SD=1.6) and the average ages of the 7th to the 10th grades are 12.2 and 15.2, respectively. In fact, the distance between these latter values and the total average is rather small (especially if we consider the variation pattern). According to the international HBSC report of 2001/2002, Portugal presents a decrease with age [24], like other countries. Considering previous Portuguese studies conducted with large adolescent populations, only among more distant or extreme groups are significant differences of age groups noticeable, namely from 11 to 15 years or 11 to 16 years or older age groups [25].

Another Portuguese research, which included 5949 students of the 2nd and 3rd circles of elementary (compulsory) education, aged between 10 and 19, of the North region of Portugal and the Terceira Island (in the Azores), found a decrease only in the age groups of 18 and 19, with a higher level among girls [22]. In this study, boys see their physical activity increase from the ages of 10 to 13 and then stabilize up to the age of 18; girls increase up to the age of 16 and stabilize at the age of 18. This general increase can be explained by the increase of the number of physical education lessons in the 2nd and 3rd circles, by the increment of sports at school and the easier access to sports clubs. On their turn, girls seem to be more concerned with their body shape. Stabilization may derive from the difficulty in incrementing too high an average at the age of 13, from girls' early family responsibilities, from new learning or professional demands or even from sedentary behaviour [22].

The study of the difference between less active and active subjects was significant to all variants of the theory of planned behaviour, and it proved that active subjects are more prompt to the practice of any physical activity, because of their attitudes (assessment of the consequences and beliefs), subjective norms, perceived behaviour control and intentions, than less active subjects. We can further say that both the intentions and the perceived behaviour control, given their higher statistical significance ($p=.000$), are the two most relevant factors showing the differences between the two groups. This result is compatible with the theory on inferential studies to test in a more direct way the model of planned behaviour within the context of physical activity [5, 6, 8, 26, 27, 28].

The results obtained through the analysis of structural equations suggest the adequacy of the theory of planned behaviour to the study of adolescents' physical activity. That is, not only the attitude (beliefs and assessment of the consequences), but also the subjective norm and the perceived behaviour control are predictors of intention. The perceived behavioural control seems to be the best predictor of intention and though it might also play a direct role on the level of physical activity, the intentions are the best predictor of the level of physical activity. The positive correlations found among the predictor variables of intention seem to show that all these factors vary towards the same direction.

These results confirm the theory on the model of planned behaviour, according to which one's intention to perform any kind of behaviour is a key determinant, once it reflects one's motivation level and his or her readiness to develop efforts aiming at a given performance [5, 27]. On the other hand, the intention is determined by the attitude, the subjective norm and the perceived behavioural control. Consequently, to the study sample, the more favourable the attitudes (beliefs and personal assessment) towards physical practice, the more adolescents believe that the significant others approve of such a practice (subjective norm); the more they believe they have resources or the opportunity to practise any physical activity (perceived behaviour control), the stronger their intention to practise any physical activity. Concerning the perceived behaviour control, the model foresees both a direct and indirect effect on behaviour through intention. Nevertheless, Aizen [7] claims that such an effect will never occur unless the perceived behaviour control reflects with precision the real control over behaviour outcomes.

Then, if adolescents do not believe to be resourcefully fit to practise a given physical activity, they are less likely to develop an intention to such a practice, whether or not they keep their favourable, subjective attitudes and norms. Revision undertaken on studies of the planned behaviour model within the context of physical activity and exercise has led to the conclusion that the variables attitude, subjective norm and perceived behaviour control explain on average 40 to 60% of the variance of behaviour intentions, and 20 to 40% of the variance of behaviour [8]. However, in this revision, only the attitudes and the perceived behaviour control did receive a larger support of this domain, despite the fact that some authors foresaw some limitations resulting from context, participants, target behaviour or nature of variables [8].

We could still analyse the fact that the perceived behaviour control is the strongest predictor of the intentions followed by the behaviour beliefs, whereas the subjective norm is the weakest predictor. In what concerns attitude, behaviour beliefs are a far greater contribution to a favourable attitude than the assessment of consequences. That is, the belief adolescents hold in the positive consequences of physical activity (for example, health, physical outlook and condition) explains the intention of practice rather than the occasional value they might attribute to such outcomes. Probably because there are other interests they value more at this stage of their lives, or because their perception of the capacity to perform physical activity is so large that the effect of the other variables in intention is slightly diminished. In what concerns the subjective norm, it seems frequently considered the weakest predictor within the field of physical activity [8]. For example, Dziewaltowsky, Noble and Shaw (1990) proved that the attitude and the perceived behaviour control were the two only predictors of intentions for physical practice, and thus excluded the subjective norm [5]. Bearing in mind the im-

portance of constituting pairs at this age, as well as the influence those pairs might have on adolescents, the result around the subjective norm doesn't sound much reliable. We may advance with the hypothesis that particularly among adolescents the subjective norms (that is, beliefs and a wish to fulfil other people's expectations regarding our active behaviour) are less liable of influencing the intention to practise physical activity than social support (that is, support and appraisal which give us a sense of confidence that motivate us to the practice of physical activity). In a study which aims at exploring the importance of pair-making in the search of a physical activity, Scalan, Stein and Ravizza (1989) claim that pair-relations are the key factor of young people's experience with sports, because both social acceptance and social affiliation come along as fun sources; on the other hand, and according to Evans and Robert (1987) and Weiss and Duncan (1992), pair-relations have also been associated to the perception of current physical competence [29], which calls our attention to the vast unexplored field of pair-relation within physical activity. We should add that some methodological limitations might have contributed to the low assessment of the subjective norm, namely the methodology through which it was measured in our study: this methodology did not assess the explanatory power of the variable, given that only one item mentioned pair-influence.

Conclusion

In short, we may conclude that the theory of planned behaviour is of relevance to the study of adolescents' physical activity, in so far as it defends that interventions in this age group should focus, above all, on the change of behaviour intentions and on the promotion of perceived behaviour control, that is, young people's self-efficiency to practise regular physical activity.

Regarding the level of physical activity practised by adolescents, and according to all data shown in our study, we can only say that there are 30% of adolescents whose attitudes (beliefs and assessment of consequences), subjective norms, perceived behaviour control and intentions towards physical activity, are inferior to the group of the so-called Active, which is a motif of concern within the general objective of promoting active lifestyles in this population.

Limitations and future recommendations

The limitations of this study are basically methodological, and trace their origin back to the use of self-report techniques based on the memory ability of the subjects.

However, the choice of the best method to measure physical activity seems surrounded by contention, once the objective methods also raise problems. According to Trost, Saunders and Ward [23], when adolescents' physical activity is measured objectively, the theory of planned behaviour contributes no more than 6% to the variance of moderate and strong physical activity.

Regarding the promotion of physical activity, and despite the relevance of the object model of our study, we should from now on pay more attention to the physical and psycho-social environment where our choices whether as active or sedentary subjects occur. We should therefore follow the ecologic models of environmental psychology to prepare our intervention. Though a simplistic example of such an approach, we have the role played by the community, school, neighbourhood, family and friends. These must guarantee the practice of exercise and physical activity. However, and according to Sallis, Bauman and Pratt (1998), any environmental change requires family change, school change, change in the workplace, in organisations and communities. It also requires the use of models and strategies which may not be familiar to psychologists specialized in individual clinical methods [30].

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