

Predicting Exercise Behaviour in the context of the Health Action Process
Approach Extended with Past Behaviour Frequency and Habit:
An Examination of Volitional Variables

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Master Thesis
Master of Philosophy in Psychology
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May 2007

We would like to thank our supervisor Jostein Rise for guidance and support throughout the process. We also owe great thanks to Agathe Backer-Grøndahl for giving good support, being an excellent discussion partner and for sharing her knowledge. We also would like to thank fellow students for making the daily life as a master student enjoyable.

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Abstract

The aim of the present study was to investigate the prediction of exercise behaviour in a sample of healthy students (N = 148) in the context of the Health Action Process Approach (HAPA). The HAPA distinguishes between a motivational phase and a volitional phase, and the attention of the present study was paid especially to the volitional variables action planning, coping planning and action control serving as mediators between intentions and behaviour. In addition the inclusion of past behaviour frequency and habit in the model was tested. The HAPA was found useful in predicting exercise behaviour explaining 47% of the variance in exercise behaviour. In the volitional phase action control and self-efficacy emerged as the most proximal predictors of exercise behaviour. The inclusion of past behaviour frequency increased the explained variance in exercise behaviour significantly from 47% to 65% and emerged as the strongest predictor of exercise. The results highlight the importance of post-intentional variables in health behaviour change models. The findings from the present study are discussed in relation to development of the HAPA and consequences for interventions promoting exercise behaviour.

INTRODUCTION

In today's western world people have a more sedentary lifestyle than they had in earlier decades and this inactive life style has been found to have a negative impact on people's health. According to the World Health Organization (WHO, 2005a) sedentary lifestyle is a major underlying cause of death, disease, and disability, and data gathered on health surveys from around the world is consistent and shows that the proportion of adults who are sedentary ranges from 60 to 85% (WHO, 2005).

The negative health consequences associated with a sedentary lifestyle can, however, be prevented by doing exercise on a regular basis. There is strong evidence that regular exercise has positive influence both on people's health and their well-being. The risk of hypertension, cardiovascular disease, colon cancer, non-insulin dependent diabetes, mellitus, and mortality from all causes are shown to decrease by regular exercise (Stroebe, 2000). Exercise also affects psychological health, there is empirical evidence from correlational and intervention studies that exercise relieves symptoms of depression and anxiety (Stroebe, 2000). According to WHO (2005b) a minimum of 30 minutes of moderate physical activity (e.g. brisk walking) is enough to bring many of these effects. By increasing the level of activity, the benefits will also increase (WHO, 2005b). On a social level, increased physical activity can benefit the communities by reduced health care costs, increased productivity, better performing schools, lower worker absenteeism and turnover, increased participation in sports, and recreational activities (WHO, 2005a). For these reasons interventions that focus on increasing the level of physical activity are of great importance. However, to be able to design good intervention, one need better understanding of the psychological processes underlying exercise. Special attention should be paid to the understanding of how intentions to exercise are translated into actual behaviour.

A number of theoretical models have been used to explain and predict a verity of health behaviours with various degrees of success. Social Cognition Models examine various aspects of an individual's cognitions in order to predict future health-related behaviours and outcomes (Conner & Norman, 2005).

Social Cognition Models provide knowledge that is useful for planning and designing intervention programs for health behaviour change (Conner & Norman, 2005). E.g. Theory of Planned Behaviour (TPB) and Protection Motivation Theory (PMT) propose that the most immediate and powerful predictor of a person's behaviour is his/her intention to perform it. The assumption is that people do what they intend to do, and not what they do not intend. However, good intentions do not guarantee corresponding actions. Therefore the concept of behavioural intentions alone, are insufficient to understand lifestyle changes resulting in a phenomenon termed "the intention-behaviour gap" (Sheeran, 2002). By exploring this gap one may become more able to help people make health promoting behaviour changes. Knowledge about what make people act on their intentions, will contribute to better interventions that can help people become more physically active which again will lead to better health.

The Health Action Process Approach (HAPA)

The HAPA has divided the change process in two main stages; a motivational phase and a volitional phase. The HAPA incorporates the motivational elements of prior social cognition models including the Health Beliefs Model (HBM), the Theory of Reasoned Action (TRA), and the TPB, but extends these models with a volitional phase. The main feature of the HAPA lies in this explicit distinction between a motivation stage and a volitional stage (Schwarzer, 1992; Conner & Norman, 2005).

In a study by Garcia & Mann (2003) several social cognitive models were tested for their ability to predict intentions to engage in two different health behaviours. The HAPA was the best predictor of intentions to engage in both behaviours tested. The first behaviour tested was resisting dieting to reduce risk for eating disorders. This is a behaviour that individuals do not control completely and that is performed partly in public. Garcia & Mann (2003) predicted that the models that included perceived behavioural control (TPB) and self-efficacy (the HAPA and the HBM with self-efficacy) were better to predict intentions to resist dieting than the models without these constructs (TRA and HBM), and this hypothesis was supported. The HAPA explained more variance to resist dieting than the TPB. The other behaviour tested was performing breast self-exam and perceived behavioural control and self-efficacy added significantly to the ability of the models to predict intentions for performing breast self-exam (Garcia & Mann, 2003).

The HAPA should provide a useful frame to investigate the gap between intentions and behaviour because it incorporates a volitional phase. Therefore the present study applies HAPA to predict exercise behaviour, extended with past behaviour and habit (which will be described more thoroughly in the following), explore the underlying psychological processes; motivation, self-regulation and automatic processes. Further the present study investigates the relationship between the volitional variables in the HAPA.

As a stage-model the HAPA provides a description of the process of changing behaviour. The expectations, attitudes, and cognitions that are important in the motivational phase become non-significant when a person moves to the next stage, the volitional phase. The HAPA is simpler than the other stage models of health behaviour change and therefore it facilitates application. The HAPA (Schwarzer, 1992) provides a theoretical framework to study the motivational and the volitional processes in health behaviour change (Sniehotta, Scholz & Schwarzer, 2005). In the motivational phase a person develops an intention to change. Three variables are considered to play a major role in this process: (a) risk perception, (b) outcome expectancies, and (c) self-efficacy. The process of forming an intention often starts with some level of risk awareness. (e.g. "If I don't start exercising, my chance of getting overweight will increase"). Although risk awareness is not a powerful predictor of behaviour (Schwarzer & Renner, 2000) it can lead to deliberations about health behaviour change. It seems like people's risk perception put them on track for developing a motivation to change, but later other factors are more important (Luszczynska & Schwarzer, 2003). People not only have to be aware of the health threat, they also have to understand the contingencies between their actions and subsequent outcomes (e.g. "If I start exercising, I will become more fit" (Luszczynska & Schwarzer, 2003), which according to the HAPA model will be reflected in people's outcome expectancies. If the pros expectancies outweigh the cons expectancies, one prerequisite for an intention is accomplished (Sniehotta, Scholz & Schwarzer, 2005). Both risk perceptions and outcome expectancies are chiefly seen as being important in the motivation phase, and lose their predictive power after a decision to change has been made (Schwarzer & Renner, 2000). Perceived self-efficacy is the third factor assumed to influence intentions; it refers to beliefs about one's own capability to accomplish a certain task by one's own actions and resources even in the face of obstacles or barriers (Bandura, 1997). These beliefs are critical when approaching novel or difficult situations or trying to adopt strenuous self-regimens (e.g. I am certain that I can exercise regularly, even if there are time constraints). Opposite to the other two predictors, self-efficacy is thought to have a direct

effect on the post-intentional variables as well as a direct effect on action (e.g. exercise). There is convincing evidence showing that risk awareness, outcome expectancies, and self-efficacy is powerful predictors of intentions (Garcia & Mann, 2003).

The motivational phase is closed when the person has formed an explicit goal or behavioural intention. Empirical analysis of the intention-behaviour relationship has shown that on average 20-30% of the variance in behaviour can be accounted for by intentions (Conner and Armitage, 1998; Sheeran, 2002). The gap between intentions and behaviour can mainly be attributed to persons who intend to act, but fail to go through with their intentions (Orbell & Sheeran, 1998). To better understand why and how people change their behaviour, further post-intentional processes must be examined. Abraham, Sheeran & Johnston (1998) have argued that these failures can be attributed to a lack of appropriate self-regulatory strategies, and that one such strategy is planning. In the HAPA model intentions do not affect behaviour directly, but is fully mediated by planning. The volitional phase is initiated when the intention is transformed into concrete plans. The planning phase is divided into two subconstructs that serve different purposes (Sniehotta, Schwarzer, Scholz & Schüz, 2005) Action planning specifies when, where and how to act, while coping planning can help a person to overcome obstacles and to cope with difficulties by anticipating personal risk situations and planning coping responses in detail.

Action planning can be considered synonymous with implementation intentions (Gollwitzer, 1999). Situational cues can trigger the initiation of action without conscious intent because the person then is perceptually ready to encounter the situational cues specified in the plan, and because these cues evoke the specified response swiftly and without the need for conscious awareness or effort. This again means that good opportunities to initiate a behaviour that leads to goal achievement are recognized precisely and swiftly, rather than missed. The need to consciously deliberate over a suitable course of action is removed and the intended action can be executed with less effort and in a relatively automatic fashion (Webb & Sheeran, 2007).

Empirical studies have found that people who form action plans are more likely to act in the intended way, than those who do not form action plans (Luszczynska & Schwarzer, 2003; Verplanken & Faes, 1999; Sniehotta, Scholz and Schwarzer, 2005). Action plans are believed to be most important in the initiation of the new behaviour, while coping planning is assumed to be more important in the maintenance of the behaviour. Coping planning is a barrier-

focused self-regulation strategy that prepares the person for successful coping with situations in which strong cues invite both unintended responses (e.g. habits) and intentional responses (e.g. exercise). It involves imagining potentially difficult situations, and making plans for how to handle these situations. For example, 'If I want to go running, but I'm tired, I won't let myself sit down, but start running at once'. Coping plans can protect good intentions from distraction because concrete coping procedures are easily contained. It is found that the combination of action and coping plans are most effective (Sniehotta, Scholz & Schwarzer, 2005).

Action Control

The volition phase also includes action control, which is thought to partly mediate the effect of planning. Action control can be understood as negative feedback control, aimed at comparing incoming information with individual standards, and trying to reduce the possible difference. After a behavioural intention is formed, action controlling routines become important. For behavioural self-regulation, three cognitive processes are important; a) awareness of standards, b) self-monitoring, and c) self-regulatory effort. In the following study, we will refer to these three conceptually distinct actions in the course of self-regulatory processes as action control. This is in line with Sniehotta, Nagy, Scholz & Schwarzer (2006) recommendation; studies applying action-control at only one point in time should use an aggregated score. Analysis from their study gave support for three separate dimensions of action control, but at the same time the findings indicated substantial interrelations between the three factors.

Self-regulation-failure can occur in any of the three processes (Baumeister, Heatherton & Tice, 1994). When a goal is set, one needs to specify criteria or standards for action. (e.g. "I want to exercise three times a week at the gym".) Awareness of those standards is an active process, and the basis for self-guided behaviour. Further, awareness of standards implies an active prospective memory of the specific intention to be acted upon, keeping it more salient than competing intentions that require less action control. Self monitoring is essential in action control and individuals must constantly monitor themselves according to their standards to evaluate whether they are on track or if further effort is needed (e.g. "I have only exercised two times this week".) If there is a discrepancy between one's standards and actions, discrepancy reducing means must be applied. Previously formed action and coping plans can function as such means, by specifying where, when and how to exercise, and how to

cope with barriers and difficulties. Self-regulatory effort is required to adhere to one's plans. (Sniehotta, Nagy, Scholz & Schwarzer, 2006.)

Unstable intentions have been found to be one of the reasons why people fail to act on their intentions (Bagozzi & Yi, 1989; Conner, Sheeran, Norman & Armitage, 2000). Action control contributes to the maintenance of intentions through both a mnemonic and a motivational mechanism. Mnemonic in the sense that awareness of standards implies an active memory of the intention one wants to act upon, and in that way keeping the intention more salient than other competing intentions (McDaniel & Einstein, 2000). The experience of control should also facilitate the maintenance of intention as a motivation, because it confirms the person's belief in own ability to control the action (Bandura, 1997). Further action control is assumed to mediate the influence of other volitional measures, such as action planning, coping planning and self-efficacy (Sniehotta, Scholz & Schwarzer, 2005).

Exercise Behaviour in a HAPA-context

The problem of initiating and adhering to exercise behaviour has been addressed in several studies where the HAPA model has been used as a framework to predict exercise behaviour (e.g. Lippke, Ziegelmann & Schwarzer, 2004; Sniehotta, Scholz & Schwarzer, 2005, 2006; Sniehotta, Schwarzer, Scholz, & Schuz, 2005; Sniehotta, Nagy, Scholz & Schwarzer, 2006; Ziegelmann, Lippke, & Schwarzer, 2004). These studies have investigated the effect of the volitional variables intention, action planning, coping planning, and action control in samples of cardiac rehabilitation and orthopaedic patients. Lippke, Ziegelmann & Schwarzer (2004) tested an intervention combining action and coping planning in 560 orthopaedic patients. Compared with a no-intervention control condition, the planning intervention led to a significant increase in action planning and also significantly increased the percentage of participants who reported exercising at the recommended level six weeks after discharge, but this planning intervention showed no effect on intentions. The planning intervention in this study consisted of two different experimental conditions: interviewer-assisted and self-administered. In a comparison of these two conditions it was found that the interviewer-assisted intervention led to more detailed action plans and to a significantly higher duration of physical exercise two weeks after discharge, but not at six weeks (Ziegelmann, Lippke, & Schwarzer, 2004). In 2005 Sniehotta, Scholz & Schwarzer conducted the study "Action plans and coping plans for physical exercise: A longitudinal intervention study in cardiac rehabilitation". The aim of the study was to test two planning interventions designed to

encourage cardiac patients to engage in regular physical activity following discharge from rehabilitation. The study examined the long-term effectiveness of two planning interventions, based on a) action planning and b) action planning combined with coping planning. There was found a significant effect for combined planning but not for action planning alone two months after discharge. Further, Sniehotta, Scholz & Schwarzer (2005) explored the mediating function of detailed action-planning, perceived self-efficacy and action control between intentions and behaviour in a longitudinal sample of 307 cardiac rehabilitation patients. It was shown that the predictive power of intentions was weakened when post-intentional volitional processes were taken into consideration and the interplay of volitional variables corresponded with the theoretical assumptions of the HAPA. Maintenance self-efficacy and action planning were partly mediated by action control which was the most proximal predictor of behaviour in the model. In addition, both maintenance self-efficacy and action planning predicted exercise behaviour independently.

Past Behaviour Frequency and Habit

Ouellette & Wood (1998) showed in their meta-analysis that for behaviours performed frequently in stable contexts, past behaviour predicts future behaviour better than intentions do, and vice versa; infrequent behaviours were found more under the control of intentions than frequent behaviours. These findings by Ouellette & Wood (1998) suggest that there may be two ways by which past experiences influence future behaviour. The first is through deliberate thinking and decision making, which occur in infrequent behaviours, and the other is through automatic cue-response mechanisms. Such automatic responses are important in habitual behaviour (Verplanken & Faes, 1999).

Verplanken & Aarts (1999) defined habits “as learned sequences of acts that have become automatic responses to specific cues, and are functional obtaining certain goals or end states.” In other words a habit most often occurs without awareness, it can be difficult to control and is mentally efficient. Habitual behaviour differs from first time-experiences, where we act in a much more deliberate and conscious way. In first time experiences we search out information and plan how to perform the behaviour. We are careful when doing it and may act a bit clumsily. Moreover, we have to use more energy on the act than we do in habitual behaviour. The three features of a habit- frequency, automaticity and functionality make habits strong and durable constructs (Kerr, Weikunat, Moretti, 2005). Habits are functional and effective because they help us in our daily life, we save a lot of energy when we do not need to think

consciously about every single act e.g. in our morning routines. But because habits are automatic acts, they are hard to change. This is a well-known problem when it comes to quit an unwanted habit like smoking or eating unhealthy food.

Despite the predictive power of past behaviour and the reference to habit, few models of behaviour change have attempted to incorporate habit as a predictive variable. Triandis (1977) is an exception and states that behaviour is a function of intention, facilitating conditions and habit. He argues that when a behaviour is repeated and becomes more habitual, the performance of the behaviour is less likely to depend upon a rational statement of intentions. This means that the predictive value of intentions should decrease as the frequency of past behaviour increases and a habit is formed (Norman, Conner & Bell, 2000).

According to several TPB studies (e.g. Conner & Armitage 1998, Oulette & Wood 1998)) and some HAPA studies (e.g. Murgraff, McDermott & Walsh 2001; Ziegelmann, Lippke & Schwarzer 2005) past behaviour frequency adds significant amounts of explained variance in the prediction of future behaviour. This challenges the assumption that the TPB and the HAPA are complete theories of behaviour predictions. In line with Ajzen (2002), Norman and Conner (2006) argue that rather than using a measure of past frequency of behaviour as a measure of habit strength like Triandis suggests, an independent measure of habit is required. This is because past behaviour frequency does not capture all of the defining features of a habitual response. Habitual behaviours are performed frequently, but also automatically, efficiently and with little effort or conscious awareness. A number of alternative self-report measures of habit have been reported in the literature, and these measures have been found to be predictive of intentions and behaviour (e.g. Conner & McMillan 1999; Trafimow 2000, Verplanken, 2006).

Verplanken & Orbell (2003) has developed a self-report measure of habit strength (SRHI) which has multiple items, good psychometric properties and is based on current notions of automaticity. This is a 12 item scale that breaks down the habit construct into a number of features, i.e. perceptions of frequency, automaticity and self-identity. Automaticity is further broken down into lack of awareness, difficulty to control and mental efficiency. One of the advantages of this scale is that the measure is not based on behavioural frequency estimates and may be used to measure habit strength independently of the actual behavioural frequency. This is important because as mentioned above, all repeated behaviours are not habits. Some

repeated behaviour is done consciously every single time, while automaticity is one of the main features of a habit. (Kerr, Witkunat & Moretti, 2005.)

The Present Study

The present study investigated exercise behaviour among healthy students. This was done to see if the HAPA variables would have the same effect in a study of healthy people as it has been found to have in samples of cardiac rehabilitation patients and orthopaedic patients. It was also assumed that a sample of healthy students would be relatively motivated to exercise, and thus interesting to study.

The present study applied the HAPA model to examine and identify predictors of exercise behaviour among students. It is hypothesised that (1) the present study will replicate the hypothesised HAPA model and further (2) that action planning and coping planning mediates the relationship between intention and exercise. Further that (3) action control add explanatory power to the model by mediating the effect of planning on behaviour and (4) that it in line with Verplanken (2006) is hypothesized that habit has a predictive value over and above past behaviour frequency and that habit will mediate the relationship between previous and later behaviour. Finally (5) it is hypothesised that intentions, past behaviour frequency and habit will function as moderators between the HAPA-variables and exercise.

METHOD

Sample and Procedure

Participation in the study was voluntary, 318 persons answered the first survey and 200 persons completed the second survey (62,89 % response rate). To ensure anonymity the second survey was sent to both those who had answered the first questionnaire and those who had not answered the first time. Some of the participants had answered only the second questionnaire and were skipped from the sample, and some had not logged in with the same code on both questionnaires, leaving 148 respondents (N = 148). In contrast to other studies of exercise behaviour within the HAPA, the sample in the present study consists mainly of university students. Earlier studies have been investigating samples consisting of coronary heart-disease patients. Because the participants in the present study are healthy and relatively young people, rather than patients, one may expect that it can bring further knowledge about the usefulness of the HAPA as a model for predicting both intentions and exercise behaviour.

There were a total of 44 men and 104 women, aged between 16 and 69 ($M=25,29$, $SD= 7,53$). All but 2 participants reported having finished high school or having a university-level degree. 12 of the participants were recruited at Elixia (fitness-club), and the other 136 at the University of Oslo. Various methods of recruiting were used such as sending out invitations to participate in the study using student mailing lists from seminar groups, inviting people at lectures, and inviting random people in student cafeterias. Lottery tickets (flaxlodd) were promised to those participants who completed both questionnaires in order to limit the number of participants lost between the first and the second dispatch of questionnaires. E-mail with reminders was also used in order to maximize response rate. The data was collected through questionnaires that were sent out by email. A personalized code allowed the identification of those participants who had replied to both questionnaires, thus allowing comparisons of the ratings at T1 and T2.

Measures

The participants were given 10 days to respond from the day they received the mail with the first questionnaire. They then received the second questionnaire 8 weeks after they received the first one, also given 10 days to respond. Task self efficacy, outcome expectancies, risk awareness, and intentions reflecting the motivational phase, while action planning and coping planning reflecting the planning phase, were assessed at Time 1. In addition we measured previous exercise frequency and exercise habit. Task self-efficacy, action planning, coping planning and exercise habits were again measured at Time 2. In addition questionnaire 2 measured maintaining self-efficacy, action-control, and exercise frequency the last 8 weeks.

Time 1

First the participants were asked about demographic information, like age, sex and level of education. Exercise was defined as “Physical activity that gives you increased heart rate and/or makes you exhausted/sweat, in at least 30 minutes” in both questionnaires.

The HAPA-measures

Risk awareness was measured by four items with the stem “How do you estimate the likelihood that you will ever suffer from ..” followed by four statements (1) “...coronary heart disease if you don’t exercise”, (2) “... obesity if you don’t exercise”, (3) “... high blood-pressure if you don’t exercise”, (4) “...diabetes if you don’t exercise”. The responses were

given on Likert scales, ranging from (1) *very unlikely* to (7) *very likely*. Reliability was acceptable ($\alpha = .68$).

Outcome expectancies were assessed by seven items consisting of statements such as “If I exercise regularly, I will get more energy” and “If I exercise regularly I will improve my health”. The responses were given on Likert scales, ranging from (1) *very unlikely* to (7) *very likely*. Reliability was good ($\alpha = .73$).

Self-efficacy was measured by eight items considering both general self-efficacy and task-self-efficacy. The item “I am able to exercise at least two times a week for a minimum of 30 minutes” measures general self-efficacy. Task self-efficacy refers to the perceived capability of a person to implement a specific behaviour despite specific barriers, and was assessed by 7 items. Both the item for general self-efficacy and the 7 items for task self-efficacy had a response range from 1= not at all true to 7= exactly true. The item stem “I am able to go through with my plans regarding exercising regularly even if...” was followed by the statements: a) “..I have problems and concerns,” b) “.. I feel depressed,” c) “.. I feel tensed/stressed,” d) “..I am tired,” e) “..I am busy,” f) “..it requires detailed planning,” and g) “.. it requires that I think completely new about exercising”. Both the general statement and the task self-efficacy statements was included in the final measure of self-efficacy. Reliability was good ($\alpha = .85$).

Intentions were assessed by three statements (1) “I intend to exercise at least two times a week for a minimum of 30 minutes,” (2) “I will try to exercise at least two times a week for a minimum of 30 minutes,” and (3) “I am going to exercise at least two times a week for a minimum of 30 minutes”. The participants responded to the statements on a scale from 1-7 anchored by (1) “disagree completely” and (7) “agree completely”. Reliability was acceptable ($\alpha = .68$).

The next set of questions asked about action planning and coping planning using the same techniques as Sniehotta, Schwarzer, Scholz & Schüz (2005). The item stem, “I have made a detailed plan regarding...” was followed by the items (1) “...when to do my exercise,” (2) “...where to exercise,” (3) “...how to do my exercise (type of activity),” (4) “...how often to do my exercise,” (5) “...who I am going to exercise with” (6) “...what to do if something interferes with my plans,” (7) “...how to cope with possible setbacks,” (8) “...what to do in

difficult situations in order to act according to my intentions,” (9) “..which good opportunities for action to take,” and (10) “...when I have to pay extra attention to prevent lapses”. The five first items measure action planning while the five last ones measure coping planning. Each item was scored on a 4-point scale from (1) “completely disagree”, (2) “disagree”, (3) “agree” and (4) “completely agree”. Reliability for both for action planning ($\alpha = .87$) and coping planning ($\alpha = .86$) was good.

Past frequency of exercise behaviour was measured by one question; “How often do you usually exercise during a month?”

Habit strength was assessed by Verplanken & Orbell (2003)’s Self-Reported Habit Index (SRHI) which was adapted to exercise behaviour. This scale consists of 12 items following the stem “Exercising is something...” which the participants replied to on a scale from 1-7 anchored by (1) “disagree completely” and (7) “agree completely” (e.g. “...I do frequently, ...that makes me feel weird if I do not do it, ...that is typically me”. The complete SHRI as used in the current study can be found in appendix A). High scores were interpreted as an indication of strong exercise habits. Reliability was very good ($\alpha = .96$).

Time 2

Action control was assessed by 6 items starting with the stem “During the last 8 weeks I have...” which was replied to on an four –point scale (totally disagree, disagree, agree, totally agree.) in line with Sniehotta, Nagy, Scholz & Schwarzer (2005). The stem was followed by a) ..often had my exercise intention in mind. b) ..always been aware of my planned exercise c) ..consistently monitored myself whether I exercise frequently enough. d) ..taken care to exercise for at least 30 minutes at the planned strain level per unit. e) ..really tried hard to exercise regularly. f) ..done my best to act according to my exercise-intentions. Reliability was good ($\alpha = .87$).

Exercise behaviour was measured by an open question “How many times have you exercised during the last 8 weeks”.

Statistical Analyses

Statistical analyses were conducted by means of SPSS 12.0 for Windows. Descriptive statistics were used to investigate the demographics and the general trends of mean scores as well as the distribution on the most important variables. The HAPA measures as well as the Action control and SRHI were calculated averaged scores of the various items intended to measure that specific variable. The internal reliabilities of these were determined through calculation of Cronbach's alpha scores where the indexes that scores above 0.7 were considered to have acceptable reliability. Correlation analyses were applied to investigate bivariate relationships among the various variables. In order to determine the relations between the different variables in the hypothesized model, path analyses were performed. Hierarchical regression analyses were used in order to determine predictability of behaviour from the various variables included in the study. Mediation effects were investigated and Sobel test was conducted to test whether a mediator carries the influence of an independent variable to a dependent variable (Baron & Kenny, 1986). Further moderator effects of habit, past frequency behaviour and self-efficacy were tested

RESULTS

Descriptive Findings

Cronbach's alpha coefficients, means, standard deviations and bivariate correlations for all variables are reported in Table 1. All variables significantly correlated with exercise, except risk perception and outcome expectations. The correlations with exercise ranged from .31 to .67, and the predictors that correlated strongest with exercise behaviour were action control ($r = .63, p < .01$) and habit ($r = .67, p < .01$). In general the participants had a high level of intentions to exercise with a mean score 6.45 on a scale ranging from 1 to 7. The study population showed low variance with a $SD = .74$ on intentions. Further the participants had a high level of self-efficacy with a mean score 5.99 and $SD = .80$. Past behaviour frequency had a $M = 9,76$ and a $SD = 6,66$ and exercise measured at T2 had $M = 14,73$ and $SD = 11,05$. Even though these two variables are not to be compared directly, it is shown that the study population had relatively high levels of exercise behaviour at both T1 and T2. The SD for past behaviour frequency and for exercise indicates high variance.

Table 1
Correlations, reliability coefficients and descriptive statistics between relevant variables (N=148).

	RP	OE	SE	I	AP	CP	AC	PBF	H	E
1.Risk Perception	-									
2.Outcome Expectations	.09	-								
3.Self-Efficacy	-.11	.16	-							
4.Intentions	-.06	.11	.50**	-						
5.Action Planning	.03	.18*	.27**	.19*	-					
6.Coping Planning	-.13	.22**	.35**	.21*	.55**	-				
7.Action Control	-.09	.30**	.40**	.24**	.61**	.51**	-			
8. Past behaviour frequency	-.53	.11	.50**	.28**	.34**	.42**	.48**	-		
9.Habit	-.13	.20*	.53**	.32**	.52**	.58**	.53**	.71**	-	
10.Exercise	-.16	.13	.49**	.31**	.39**	.38**	.63**	.73**	.67**	-
^a M	5.52	6.47	5.99	6.45	2.61	2.08	2.56	9.76	4.00	14.73
SD	.69	.49	.80	.74	.73	.64	.71	6.66	1.69	11.05
α	.68	.73	.85	.80	.87	.86	.87		.96	

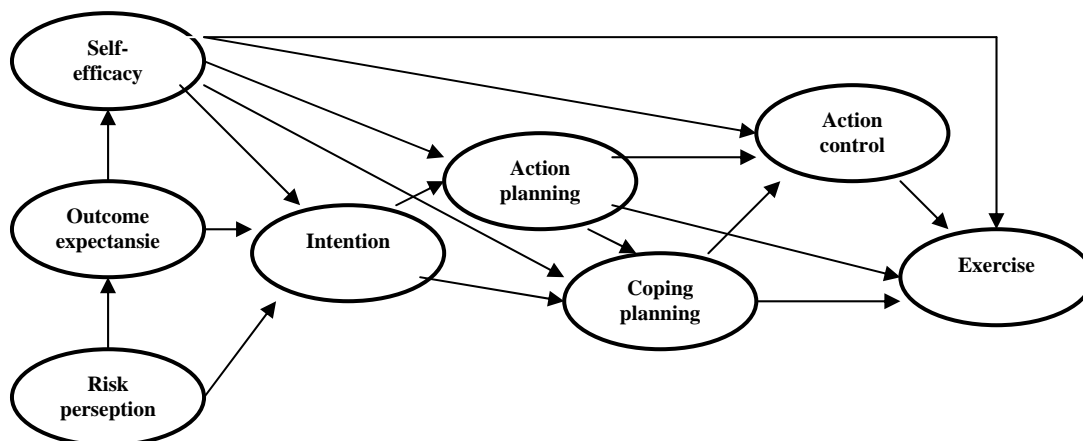
* = $p < .05$; ** = $p < .01$; *** = $p < .001$, (2-tailed)

^a

Mean scores are reported; Range 1-7 for RP, OE, SE, I and H, Range 1-4 for AP, CP and AC.

Exercise was measured by an open question "How many times have you exercised during the last 8 weeks"

The HAPA model was analysed in a sequential manner in which the different variables acted as dependent variables in multiple regression analysis (Table 2). The hypothesised model that these analyses are based on, are presented in figure 1. In the hypothesised model intentions are predicted by the three variables risk perception, outcome expectancies, and self-efficacy. In the volitional phase intentions are mediated through the planning variables and action control, which further predict exercise behaviour together with self-efficacy.



SE: Self-efficacy, OE: Outcome expectancies, RP: Risk perception, I: Intentions, AP: Action planning, CP: Coping planning and AC: Action control

Figure 1.

The hypothesised HAPA –model showing the relation between the predictor

First we tested the effect of risk perception, outcome expectancies and self-efficacy on intentions ($R^2 = .25$). Only self-efficacy ($\beta = .50, p < .001$) accounted for a significant variance in intentions, whereas risk perception and outcome expectancies did not predict intentions significantly (see Table 2, Analysis 1). This suggests that the HAPA model has little to say about the formation of intentions to exercise.

Second, we examined the effect of self-efficacy and intentions on action planning ($R^2 = .08$), with only self-efficacy ($\beta = .22, p < .05$) predicting action planning significantly (see Analysis 2). When examining the effect of self-efficacy, intentions and action planning on coping planning ($R^2 = .34$), only action planning ($\beta = .49, p < .001$) and self-efficacy ($\beta = .22, p < .01$) significantly predicted coping planning (see Analysis 3). This does not support the hypothesized model, which postulates that the effect of intentions on exercise are mediated through planning.

The next analysis considered the relation between self-efficacy, intentions, action planning, coping planning and action control, with action control as dependent variable ($R^2 = .45$). All independent variables except intentions predicted significant variation in action control, with action planning being the strongest predictor ($\beta = .46, p < .001$), followed by self-efficacy ($\beta = .20, p < .01$) and coping planning ($\beta = .18, p < .05$) (see Analysis 4). Finally, testing the effects

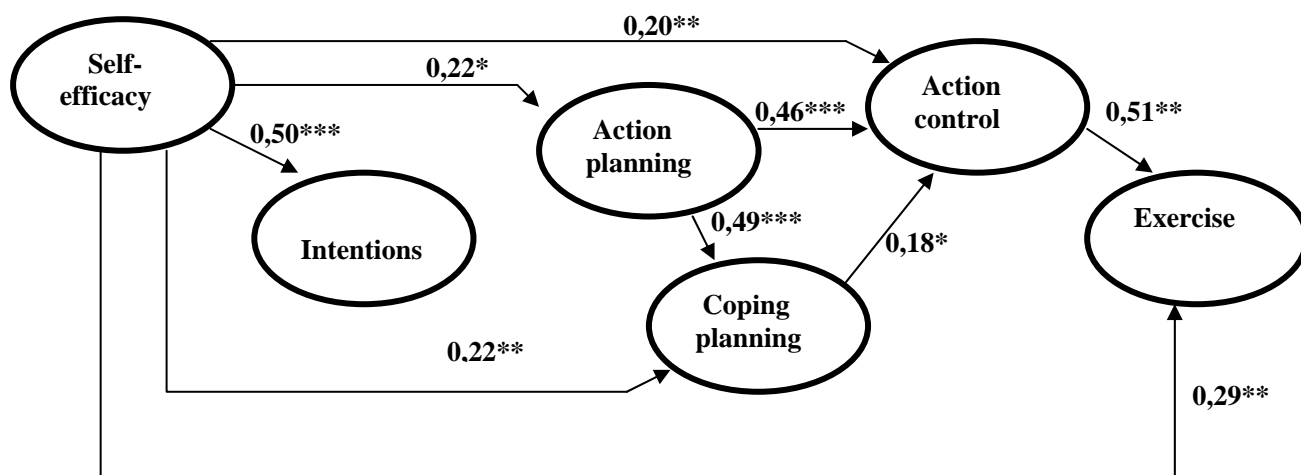
of self-efficacy, intentions, action planning, coping planning and action control on exercise, only action control ($\beta = .51, p < .01$) and self-efficacy ($\beta = .29, p < .01$) were found to have a significant direct effect on exercise (see Analysis 5).

The model shows potential indirect effects of both action planning and coping planning through action control on exercise. These potential mediating effects were tested in a hierarchical regression analysis. When action control was included in the analysis in step two, it led to a significant increment in the amount of variance explained in exercise behaviour ($\Delta R^2 = .14, \Delta F = 38.30, p < .001$). Furthermore it reduced the predictive power of action planning from, $\beta = .21, p < .01$ to $\beta = -.02, p < ns$. The reduction in the size of beta weight for action planning when action control was added to the regression equation was tested and found to be significant (*Sobel test* = 5.23, $p < .001$), indicating that action planning is fully mediated through action control. Further the predictive power of coping planning was reduced from ($\beta = .51, p < .01$) to ($\beta = .081, p < ns$) when action control was included. The reduction in the size of beta weight for coping planning when action control was added to the regression equation was tested, and found to be significant (*Sobel test* = 5.27, $p < .001$), indicating that the effect of coping planning on exercise, in the same way as action planning, is fully mediated through action control.

Table 2
Sequential multiple regression analyses.

	Independent variables	Dependent Variable	β	R ²
Analysis 1		Intentions		,25
	1. Risk Perception		-,01	
	2. Outcome Expectations		,03	
	3. Self-Efficacy		,50***	
Analysis 2		Action Planning		,08
	1. Self-Efficacy		,22*	
	2. Intentions		,08	
Analysis 3		Coping Planning		,34
	1. Self-Efficacy		,22**	
	2. Intentions		-,001	
	3. Action Planning		,49***	
Analysis 4		Action Control		,45
	1. Self- Efficacy		,19**	
	2. Intention		,02	
	3. Action Planning		,46***	
	4. Coping Planning		,18*	
Analysis 5		Exercise		,47
	1. Self-Efficacy		,26 **	
	2. Intentions		,05	
	3. Action Planning		-,02	
	4. Coping Planning		,03	
	5. Action Control		,51 ***	

* = $p < .05$; ** = $p < .01$; *** = $p < .001$, (2-tailed)



* = $p < .05$; ** = $p < .01$; *** = $p < .001$

Figure 2. The hypothesised HAPA model with direct and indirect effects as found in the path analysis. The left part of the model represent the motivational phase and the right part the volitional phase.

Past Behaviour Frequency and Habit

To explore whether Past Behaviour Frequency and Habit accounted for additional variance beyond the HAPA predictors further hierarchical regression analyses was conducted (Table 3). Predictor variables were entered in three blocks: self-efficacy, intentions, action planning, coping planning and action control (step 1), past behaviour frequency (step 2) and habit (step 3). The HAPA –variables in step 1 explained 47 % of the variance in exercise behaviour, with only self-efficacy and action control contributing significantly to the regression equation. The addition of past behaviour frequency increased the amount of variance explained significantly ($\Delta R^2 = .18$, $\Delta F = 70,94$). Moreover, the inclusion of habit increased the amount of variance explained significantly from to $R^2 = .65$ to $R^2 = .67$. When habit was included in step 3, the beta weight of past behaviour decreased significantly, suggesting that habit partly mediate the relationship between past behaviour frequency (T1) and exercise (T2) (*Sobel test* = 3,72, $p < .001$). This is in line with Verplanken's (2006) study which gives support to the assumption that habit should not be equated with frequency of occurrence, but rather be considered as a mental construct involving features of automaticity.

Table 3
Hierarchical Regression analysis with HAPA- predictors, past behaviour frequency and habit.

Step	Predictor variables	β	R ²	ΔR^2	ΔF
1	<i>Self-Efficacy</i>	,05	,47		25,02***
	<i>Intentions</i>	,04			
	<i>Action Planning</i>	-,06			
	<i>Coping Planning</i>	-,11			
	<i>Action Control</i>	,37***			
2	<i>Past Behaviour Frequency</i>	,42***	,65	,18	70,94***
	<i>Habit</i>	,23**	,67	,02	7,98**

* = $p < .05$; ** = $p < .01$; *** = $p < .001$

The Betas reported are from the third step in the analysis.

Interaction Effects

In order to examine the potential interaction effect between intention and the other independent variables in the model, interaction terms were constructed between each of the variables and intention and entered into the regression analysis in order to predict exercise. Further the potential interaction effect between habit and the HAPA-variables on exercise, and between past behaviour frequency and the HAPA variables on exercise, were tested. All variables were transformed to Z-scores (i.e., standardized), in order to be able to interpret the interaction term and compare regression coefficients (Aiken & West, 1991)¹. The inclusion of the interaction terms did not increase the explained variance significantly. However, this may be due to several factors such as sample size, intercorrelations between the predictors, and measurement error (Norman and Conner, 2006). Because the sample in the present study is small and we have relatively high correlations between predictors, the potential interactions were examined using smaller models including only the variables related to the specific interaction effect tested. This led to a significant finding of the moderating role of self-efficacy on intention. The moderator of the intentions-self-efficacy relationship was examined in a hierarchical analysis including only intentions, self-efficacy and the intention-self-efficacy interaction term (see Table 4).

¹ In a computer analysis, computation of the beta (standardized regression coefficient) of the interaction term XZ involves a standardization of XZ per se, i.e. Z_{XZ} . The proper solution, which is utilized in the present study, should, however be a multiplication of the standardized X (Z_X) with the standardized Z (Z_Z), i.e., $Z_X Z_Z$ (Aiken & West, 1991)

The nature of the interaction effect of self-efficacy and intention on exercise was explored using simple slope analysis (Aiken & West, 1991). Regression lines were examined at three levels of self-efficacy (i.e., the mean level and one standard deviation above and below the mean). Figure 2 shows how the relationship between intention and exercise varied as a function of self-efficacy. The effect of intention on behaviour at high and medium values of self-efficacy were statistically significant ($b = 4.63, t = 3.02, p < .01$; $b = 2.282, t = 2.27, p < .05$, respectively). However, the effect of intention at a low level of self-efficacy was not significant ($b = -.07, t = -.07, ns.$). Thus, intentions predicted exercise behaviour, however stronger for those who scored high on self-efficacy.

Table 4
Interaction effects between intentions and self-efficacy.

Step	Predictor Variables	b ^a	R ²
1	Self-Efficacy	4,97 ***	,25
	Intentions	9,30	
2	Self-Efficacy	4,90***	,29
	Intentions	2,28*	
	Self-EfficacyXIntention	2,35**	

^a Due to the transformation of all variables to z-scores before running the regression analysis, reported b 's are the standardized regression coefficients (equivalent to betas in regression analysis with unstandardised variables), and thus comparable (Aiken & West, 1991).

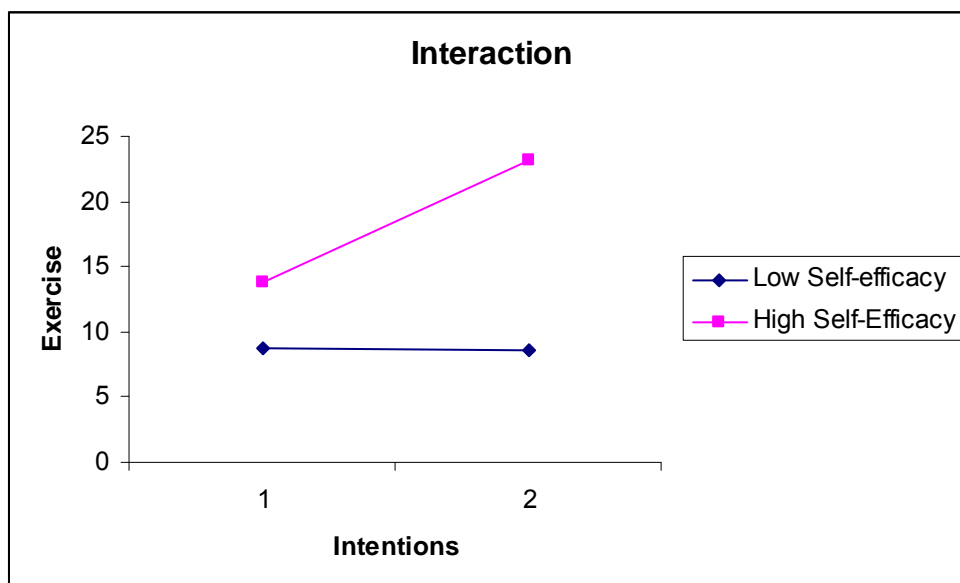


Figure 3. *Simple slope analysis of Intentions on Exercise for High and Low self-efficacy*

DISCUSSION

The primary aim of the present study was to investigate the psychological processes underlying exercise behaviour in the context of the Health Action Process Approach. In particular the usefulness of a model that distinguishes between a motivational phase and a volitional phase. In addition, we explored how the inclusion of past behaviour frequency and habit influenced the explained variance in exercise, and whether habit added any explanatory power over and above past behaviour frequency. Thus, investigating three psychological processes in relation to exercise behaviour; motivation, self-regulation, and automatic or habitual processes.

Predicting Exercise Behaviour

The HAPA model accounted for 47 % of the explained variance in exercise behaviour, with action control and self-efficacy emerging as significant predictors of exercise. These results are broadly in line with recent studies applying the HAPA model (Sniehotta, Scholz & Schwarzer, 2005; Scholz, Sniehotta & Schwarzer, 2005), and confirm the predictive power of the HAPA model in relation to exercise behaviour. Action control emerged as the most proximal predictor of exercise, suggesting that without active control and self-regulation strategies behaviour change are likely to fail. Sniehotta et al. (2005) have argued that the process of changing habitual lifestyle patterns depends on active self-regulation because the habit to be changed is strongly elicited by situational cues. Without active control the person will automatically act on these cues and fall back into a sedentary behaviour (Sutton, 1994). In a study by Sniehotta, Scholz, Schwarzer, Fuhrmann, Kiwus & Völler (2005) it is shown that people who make detailed action plans, barrier focused strategies and in addition keep a diary to enhance action control show a more stable level of intentions than people without such self-regulatory strategies, the control group which had not used self-regulatory strategies actually showed a decrease in intentions over a six week period. The findings from Sniehotta et al (2005) suggest that personal action control leads to conservation and stability of one's intentions which is essential for goal pursuit. Several studies have found that the inclusion of action control mediates the effect of intentions, and partly mediate the influence of other more distant volitional measures like action planning and coping planning (Sniehotta et al. 2005; Sniehotta et al 2006). The fact that both action control and exercise behaviour were assessed at the same point of time, could be an explanation for the strong effect of action control on exercise. Bem's theory of self-perception has suggested that individuals by observing their

behaviour, may draw information for assessing their beliefs about themselves (Bem 1967,1972). One could therefore expect that people's actual level of exercise behaviour at the given point of time would influence their responses on the action control scale, and that this might be an explanation to why action control was the strongest predictor of exercise behaviour. In the present study action control fully mediated the effect of action planning and coping planning. These findings suggest that action planning and coping planning have a beneficial effects on exercise, by providing an action standard and good coping mechanisms as a precondition for successful self-regulation.

Self-efficacy was also found to have a significant direct effect on exercise. This is in line with the theoretical assumption of the HAPA model and congruent with previous research (Schwarzer, 1992; e.g Scholz, Sniehotta & Schwarzer, 2005), and shows the benefits of perceived self-efficacy in health behaviour change processes (Bandura, 1992). Several theories (e.g. the HBM; the TPB) have incorporated self-efficacy in their models, but in these models self-efficacy is only measured in relation to the target behaviour (e.g. exercise). The HAPA model has extended the effect of self-efficacy in relation to enactment processes (e.g., action and coping planning and action control), and Schwarzer (1992) has argued that self-efficacy might have a potential role to play in the development and implementation of action plans. The significant relation found between self-efficacy and action planning in the present study support this claim. A similar relationship was found between self-efficacy and coping planning suggesting that this goes for coping planning as well. Further, the present study shows a direct effect of self-efficacy on action control. In line with Sniehotta et al (2005) the effect of self-efficacy on action control suggests that the perceived capability to maintain one's behaviour change mirrors one's optimistic belief in competent self-regulation. Thus, the results from the present study support the inclusion of self-efficacy in relation to enactment processes.

The results from the present study also support the inclusion of past behaviour frequency in predicting exercise behaviour. Past behaviour increased the explained variance in exercise behaviour significantly from 47% to 65%, and was found to be the strongest predictor of exercise. These results are in line with previous HAPA studies which have included past behaviour frequency (Luszczynska & Schwarzer, 2003; Ziegelmann, Lippke & Schwarzer, 2006; Murgraff, McDermott & Walsh, 2001). However, the fact that a variable predicts behaviour does not necessarily mean that it is the cause of the behaviour (Sculz, Sniehotta,

Schüz & Oeberst, 2006). Ajzen (2002) argued that past behaviour frequency can not be seen as a cause of later behaviour; a person will not exercise tomorrow because he exercised last week. The effect of past behaviour frequency is rather considered to be caused by some level of automaticity and habitual behaviour. In the present study it was demonstrated that the inclusion of habit contributed significantly to the prediction of later behaviour over and above a measure of past behaviour frequency, while controlling for the variables of the HAPA. Because intentions, self-efficacy, action planning, coping planning and action control were controlled, the effect of habit cannot be attributed to any of these variables. This is in line with Verplanken (2006) who claims that habit should not be equated with frequency of occurrence, but rather be considered as a mental construct. Habit as a mental construct involves features of automaticity such as lack of awareness, difficulty to control and mental efficacy (Verplanken, 2006).

Habit partly mediated the relationship between previous and later behaviour. This effect remained when the items that included measures of frequency in the SHRI (Exercise is something I do frequently” and “exercise is something I have been doing for a long time”) were excluded in the analysis. This result suggests that habit can be a viable explanation of the residual variance problem (Ajzen, 2002) in the HAPA. The residual variance problem refers to the question why previous behaviour is such a strong predictor of future behaviour, even when controlling for the variables in the theory of planned behaviour (TPB). The main difference between the TPB and the HAPA lies in the volitional phase of the HAPA model; and the residual variance problem should thus be considered according to the HAPA as well as the TPB. Thus, habit as a construct should be included in behaviour change models like the HAPA to increase the variance explained in the model.

These results suggest that behaviour can be generated in one of two ways; by conscious deliberation and active self-regulation, or by automatic reliance on well-established routines. This indicates that intentions and self-regulatory strategies like planning should be unnecessary for people having developed the habit of exercising. Therefore habit should function as a moderator, showing that those with high degree of habit should be less affected by the HAPA- variables than those with low habit. However, no such moderator effect of habit or past behaviour frequency was found. One possible explanation to this can be attributed to small sample, measurement error and high correlations between the predictors (Norman & Conner, 2006). Another possible explanation could be that exercise behaviour is

regulated not just through automaticity, but also through deliberate thinking. Most types of exercise behaviour require that one change both location and one's clothes, thus some level of awareness is necessary to initiate the action. Ajzen (2002) describes this type of behaviour as a semiautomatic response pattern indicating that it involves both autonomous and controlled phases. While the intention to exercise may be triggered by situational context, it requires deliberation to initiate the behaviour in question.

The Intention –Behaviour Gap

The present study shows that the HAPA variables action control and self-efficacy are strong predictors of exercise, but it did not perfectly replicate the hypothesised HAPA model. The present study failed to find the hypothesized indirect effect of intention through the volitional variables. As seen from the path analysis (see figure 2), it seems like intention is unrelated to the volitional phase. However, intentions are significantly correlated with action planning, coping planning, action control and exercise, showing a link between intention and the volitional processes. The finding that intentions at T1 did not significantly contribute to the prediction of exercise at T2, is also in line with previous studies (Johnston, Johnston, Pollard, Kinmonth & Mant 2004; Scholz et al. 2005; Murgraff & Mcdermott, 2003; Orbell, Hodgkins & Sheeran, 1997) and lend support to the importance of the inclusion of post-intentional variables. Sniehotta and colleagues (2005) have shown that the inclusion of volitional variables weakens the predictive power of intention, and argues that once enactment processes are considered the effects of intention on behaviour are either reduced or disappear, as in the present study. Murgraff, White & Philips (1996) showed that goal achievement strategies are effective regardless of the initial intention reported. This has important implications, suggesting that interventions should move away from motivation campaigns, and focus on more proximal determinants of behaviour like action control and planning.

In the present study, the effect of action planning and coping planning were, as already mentioned, found to be mediated through action control. Thus, action planning and coping planning are important in the process of adopting and maintaining changes in exercise behaviours. Action planning was found to have the strongest indirect effect, being the strongest predictor of action control, and indicating that plans for when, where and how to exercise function as a precondition for successful self-regulation. Coping planning was also a significant predictor of action control, but this association is much weaker than with action planning. This might reflect the fact that the sample is relatively young, and studies have

shown that you need much personal knowledge and experience within the field of behaviour, to make use of coping planning (Sniehotta et al., 2005). Another possible explanation is that people need professional help to make and make use of coping plans. Sniehotta, Scholz & Schwarzer (2006) provided strong evidence for the effect of coping planning on exercise in their intervention study. The participants in their study got 30 minutes of consultation, and the study took place on the background of an intensive 3 week rehabilitation program. We might therefore expect to find stronger relation between coping planning and exercise, than shown in the present study, in interventional studies.

The volitional variables in the present study are conceptualised as mediators. However, the notion of volition in itself suggests these factors as being moderators instead. Thus, volitional processes should only be effective for intenders, and be without relevance for non-intenders (Gollwitzer, 1999). These moderating effects were not identified in the present study, which could be attributed to a high level of intentions and restricted variance, and in these cases moderating effects are hard to detect (McClelland & Judd, 1993). Because of the fact that so few in the present study reported low intentions, this study tells us little about how volitional processes work for people with low motivation, but it gives strong support for the effect of volitional processes in motivated individuals.

However, one interaction effect was found between self efficacy and intention, when the analysis only included the predictor variables related to the specific interaction effect tested. Intentions were found to be a stronger predictor of exercise for those with high self-efficacy than for people with low self-efficacy. A new health-behaviour like exercising might turn out to be more difficult to adhere to than expected. But the higher the perceived self-efficacy a person has the more effort and persistence the person will show to overcome the barriers. People with an optimistic sense of self-efficacy are visualizing success in achieving their goals and this will help them to be persistent when they meet barriers. People who call their own strength and abilities in question on the other hand are more likely to visualize failure in achieving their goals, and to give up their intentions prematurely (Murgraff, McDermott & Walsh, 2001).

Predicting Intentions

Intentions are according to the HAPA –model predicted by three variables; risk perception, outcome expectancies and self-efficacy. In the present study only self-efficacy turned out to

be a significant predictor of intentions, indicating that in a population of healthy students other motivational variables than risk perception and outcome expectancies might predict intention better. Risk perception has been found to be a weak predictor of intention in other studies as well, but it has been argued that this not necessarily means that risk perception is without importance in health behaviour change (Luszczynska & Schwarzer, 2003). They further suggest that when risk perception emerges as unrelated to other constructs in a cross-sectional design, it could mean that risk perception no longer is related, but it might have been at an earlier stage. According to the Precaution Adoption Model people need to move from a stage of unawareness to awareness of a health threat before being able to change their unhealthy behaviour, and risk perception might be the most influential variable at this stage (Weinstein, 2000). However, when a person is aware of the health threat, the predictive power of risk perception might disappear. Longitudinal studies like the present one might not capture these processes, because it does not take into consideration where in the process the participant is. This argumentation can also be used in relation to outcome expectancies, but this predictor has in earlier studies been found to predict intention well (Luszczynska and Schwarzer, 2003; Sniehotta et al. 2005;). However, these studies have used samples of cardiac rehabilitation patients and orthopaedic patients, and contrary to this the present study has used a sample of healthy students. There might, as indicated earlier, be other predictors of intentions in a population of healthy students than in populations of cardiac rehabilitation and orthopaedic patients.

Limitations

Before considering implications and directions for future research, some methodological limitations of the present study should be addressed. Firstly, the measurement of exercise behaviour is based on self-report only and thus might be biased. Self-reports are the most widespread and practical method used in exercise studies, but future research may benefit from adding more objective measures of exercise like frequency, duration and intensity of exercise behaviour. Secondly, the sample was self-selecting in that the participants responded to an e-mail with an invitation to participate in the study. This may have resulted in a sample with higher levels of motivation and low variability in motivation to exercise, and might not be representative for the general population. Generalizations from the presented study should therefore be made with caution and future studies would benefit from using a larger and more diverse sample. Thirdly, the analysis in the current study only contains correlated results, making it difficult to infer casual effects.

Implications and Future Directions

Despite the above limitations, the present findings have important practical implications for theory-based interventions to promote exercise behaviour. It is by and large an established fact that scientific inquiry on health behaviours has an applied value in that it has implications for the development of health education programs (Ajzen, 2004). The present study implies that in order to help people become more physically active, interventions should aim at making people better at self-regulating and improving self-efficacy. To improve self-regulative strategies the focus of exercise campaigns should be on how to make good plans for where, when and what to exercise, and how to cope with anticipated barriers. For example, keeping a diary on one's performance of planned exercise fosters self-monitoring and awareness of standards (Muraven, Baumeister & Tice, 1999). It might also be useful to distinguish between people in the intention-formation phase and people that have formed an intention and are entering the volitional phase as target groups. Interventions focusing on people without intentions to start exercising, should rather than the traditional approach in intention-enhancing interventions, which has focused on the negative consequences of not exercising, focus on making people more confidence in their abilities to start exercising.

Self-efficacy has proven to be a strong predictor both for intentions and exercise behaviour and interventions to facilitate exercise behaviour should therefore focus on improving the individual's level of self-efficacy. There are four primary sources of self-efficacy information; enactive mastery experiences, vicarious experience, verbal persuasion or social influence, and physiological and affective states which can be addressed in order to improve self-efficacy (Bandura, 1997). Both modelling and social influence could be addressed in interventions by exercising in groups rather than alone. Further interventions where the participants get assisted and getting verbal feedback would enhance self-efficacy.

The results from the present study also have theoretical implications. The fact that both the inclusion of past behaviour frequency and habit in the HAPA model increased the amount of explained variance in exercise behaviour, implies that both past behaviour and habit should be considered to be included in models of health behaviour change like the HAPA and the TPB. The inclusion of past behaviour frequency or habit will probably make the HAPA able to better predict the targeted health behaviour. In addition the strong effect of past behaviour frequency and habit on exercise implicates that interventions should promote exercise

behaviour at an early age. In this way one could expect to establish an exercise habit which according to the present study will help the person keep on exercising.

In conclusion, by incorporating volitional variables in a health change model this study has contributed to bridging the gap between intentions and behaviour. Self-regulatory strategies like action control and planning in addition to self efficacy and past behaviour frequency have proven to predict exercise behaviour. In future research the role of past behaviour frequency and habit in the HAPA should be investigated more thoroughly, and alternative predictors of exercise intentions for a population of healthy people should be considered.

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APPENDICES

Past Behaviour Frequency

- 1) Hvor mange ganger i måneden trener du vanligvis?

Risk Awareness

Velg fra 1-Svært sannsynlig til 7-Svært usannsynlig

- 1) Hvordan vurderer du risikoen din for å få hjerte- og karsykdommer hvis du ikke trener
- 2) Hvordan vurderer du risikoen din for å bli overvektig hvis du ikke trener
- 3) Hvordan vurderer du risikoen din for å få høyt blodtrykk hvis du ikke trener
- 4) Hvordan vurderer du risikoen for at du skal få diabetes hvis du ikke trener

Outcome Expectancies

Velg fra 1-Svært sannsynlig til 7- Svært usannsynlig

- 1) Hvis jeg trener regelmessig, vil det øke velværet mitt
- 2) Hvis jeg trener regelmessig, vil det være godt for blodtrykket mitt
- 3) Hvis jeg trener regelmessig, vil jeg bli slankere
- 4) Hvis jeg trener regelmessig, vil det bedre helsen min
- 5) Hvis jeg trener regelmessig, vil jeg få mer energi
- 6) Hvis jeg trener regelmessig, vil jeg bli i bedre form
- 7) Hvis jeg trener regelmessig, vil det gjøre meg bedre istand til å takle hverdagslivet

Self-efficacy

Kryss av det svaralternativet som passer best, fra 1-Svært sikker til 7-Svært usikker

- 1) Jeg kan klare å trene minst to ganger i uken i minimum 30 minutter
- 2) Jeg kan klare å gjennomføre mine planer om å trene selv om jeg har problemer/
bekymringer
- 3) Jeg kan klare å gjennomføre mine planer om å trene selv om jeg føler meg
nedstemt/deprimert
- 4) Jeg kan klare å gjennomføre mine planer om å trene selv om jeg føler meg
anspent/stresset
- 5) Jeg kan klare å gjennomføre mine planer om å trene selv om jeg er sliten
- 6) Jeg kan klare å gjennomføre mine planer om å trene selv om jeg har det travelt
- 7) Jeg kan klare å gjennomføre planene mine om å trene selv om det krever detaljert
planlegging
- 8) Jeg kan klare å gjennomføre planene mine om å trene selv om det krever at jeg tenker
helt nytt om trening

Intentions

Kryss av det svaralternativet som passer best, fra 1-Svært sikker til 7-Svært usikker

- 1) Jeg har til hensikt å trene minst 2 ganger i uken i minimum 30 minutter de neste 8
ukene
- 2) Jeg vil prøve å trene minst 2 ganger i uken i minimum 30 minutter de neste 8 ukene
- 3) Jeg vil komme til å trene minst 2 ganger i uka i minimum 30 minutter de neste 8 ukene

Action Planning

Svarskala: 1) Svært uenig, 2) Uenig, 3) Enig, 4) Svært enig

- 1) Jeg har lagt detaljerte planer for når jeg skal trene.
- 2) Jeg har lagt detaljerte planer for hvor jeg skal trene
- 3) Jeg har lagt detaljerte planer for hvordan jeg skal trene (type aktivitet)
- 4) Jeg har lagt detaljerte planer for hvor ofte jeg skal trene
- 5) Jeg har lagt detaljerte planer for hvem jeg skal trene sammen med

Coping Planning (4pkt)

Svarskala: 1) Svært uenig, 2) Uenig, 3) Enig, 4) Svært enig

- 1) Jeg har tenkt nøye gjennom hva jeg skal gjøre hvis noe kræsjer med treningsplanene mine.
- 2) Jeg har tenkt nøye igjennom hvordan jeg skal takle tilbakeslag
- 3) Jeg har tenkt nøye igjennom hvordan jeg best mulig skal utnytte de mulighetene som er til daglig fysisk aktivitet.
- 4) Jeg har tenkt nøye igjennom når jeg må være ekstra oppmerksom for å unngå å droppe den planlagte treningen
- 5) Jeg har tenkt nøye gjennom hva jeg skal gjøre i situasjoner hvor det er vanskelig å følge mine intensjoner om å trene

Habit (SRHI)

Kryss av det svaralternativet som passer best, fra 1-Svært uenig til 7-Svært enig.

- 1) Trening er noe jeg gjør regelmessig
- 2) Trening er noe jeg gjør uten å tenke over det
- 3) Det er typisk meg å trene
- 4) Trening er en del av min daglige/ukentlige rutine
- 5) Trening er noe jeg gjør automatisk
- 6) Trening er ikke noe jeg må gå bevisst inn for å huske
- 7) Det vil kreve en innsats av meg å ikke trene
- 8) Trening er noe jeg gjør før jeg er klar over at jeg gjør det
- 9) Trening er noe jeg synes er vanskelig å la være å gjøre
- 10) Jeg har ikke noe behov for å tenke på å få gjort treningen min
- 11) Trening er noe jeg har drevet med i lang tid
- 12) Hvis jeg ikke får trent føler jeg meg rar.

Action Control

Svarskala: 1) Svært uenig, 2) Uenig, 3) Enig, 4) Svært enig

- 1) I løpet av de siste 8 ukene har jeg ofte tenkt på mine intensjoner om å trene
- 2) I løpet av de siste 8 ukene har jeg hele tiden vært klar over den planlagte treningen min
- 3) I løpet av de siste 8 ukene har jeg hele tiden overvåket meg selv i forhold til om jeg trener ofte nok
- 4) I løpet av de siste 8 ukene har jeg sørget for å trene så hardt som jeg hadde planlagt i minimum 30 minutter pr økt
- 5) I løpet av de siste 8 ukene har jeg virkelig prøvd hardt å trene regelmessig
- 6) I løpet av de siste 8 ukene har jeg gjort mitt beste for å følge intensjonene mine om å trene

Exercise Behaviour

- 1) Hvor mange ganger i uka har du gjennomsnittlig trent de siste 8 ukene?

