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Behaviour
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Jan Middelkamp

The transtheoretical model of behaviour change and exercise behaviour in fitness clubs

Radboud University

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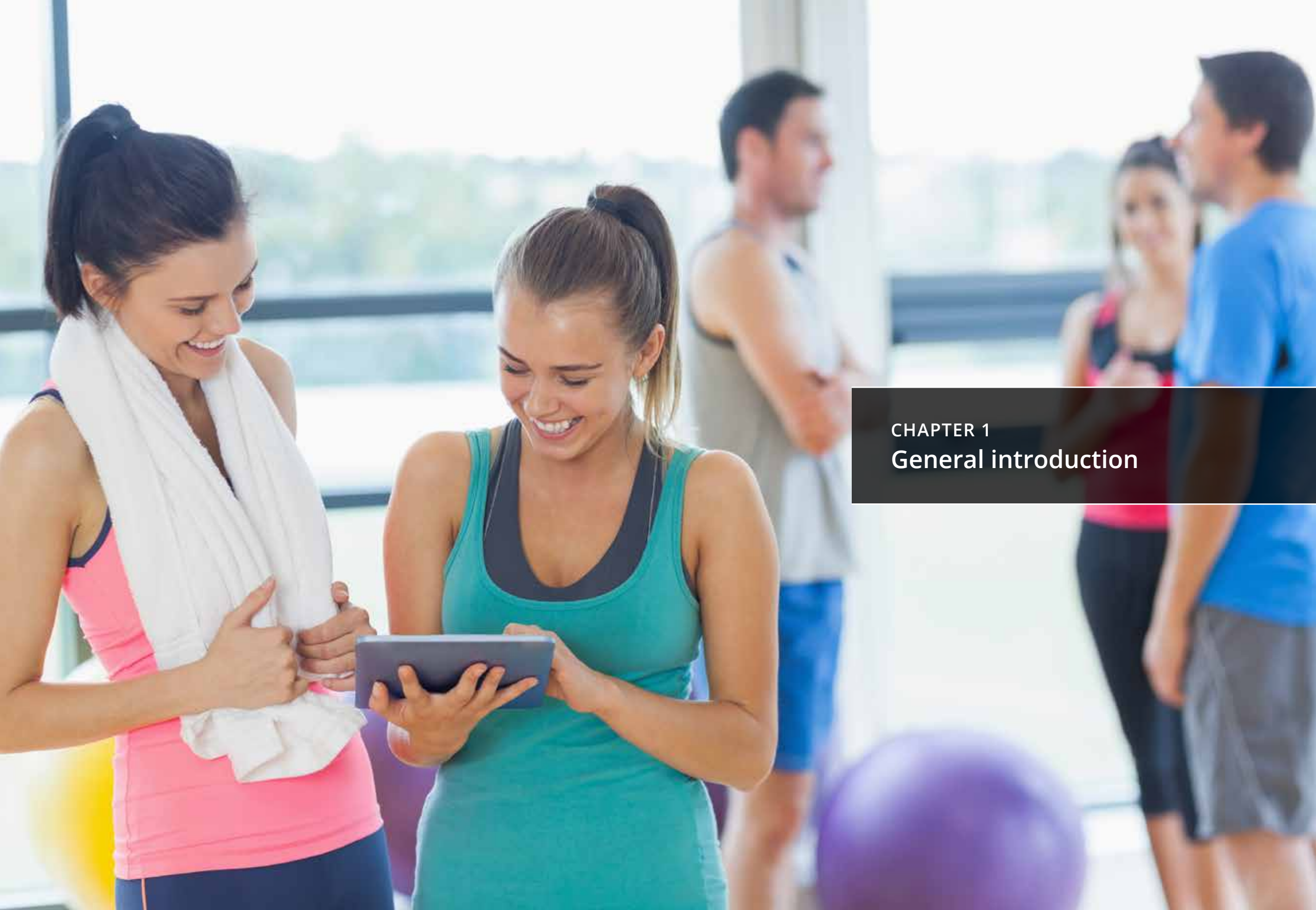


CHAPTER 1

General introduction

Exercise

An overwhelming number of studies demonstrated that physical activity and exercise are beneficial for health (American College of Sports Medicine, 2014; Dishman, Heath and Lee, 2013; Lavie et al., 2013; Lee et al., 2011; Ross et al., 2016). Physical activity includes all bodily movements produced by skeletal muscles resulting in energy expenditure (Buckworth, Dishman, O'Conner and Tomporowski, 2013). This thesis focusses on exercise (behaviour) which contains planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health (Buckworth et al., 2013). In the past decades, considerable knowledge has also been accumulated about the significance of physical activity and exercise in the treatment of several diseases. A growing body of epidemiological and clinical evidence demonstrated not only that cardiorespiratory fitness through exercise is a potentially stronger predictor of mortality than established risk factors such as smoking, hypertension, high cholesterol, and type 2 diabetes mellitus, but that the addition of cardiorespiratory fitness to traditional risk factors significantly improves the reclassification of risk for adverse outcomes (Lavie et al., 2013; Lee et al., 2011; Ross et al., 2016). Lee et al. (2011) examined the independent and combined associations of changes in fitness and BMI with all-cause and cardiovascular disease mortality in 14,345 men with at least 2 medical examinations in a longitudinal study. Fitness, in metabolic equivalents was estimated from a maximal treadmill test. Every 1-MET improvement was associated with 15% and 19% lower risk of all-cause and cardiovascular disease mortality, respectively. In the combined analyses, men who lost fitness had higher all-cause and cardiovascular disease mortality risks. It concluded that maintaining or improving fitness is associated with a lower risk of all-cause and cardiovascular disease mortality in men. Preventing age-associated fitness loss is important for longevity. Ross et al. (2016) concluded that there is mounting evidence that low levels of cardiorespiratory fitness are associated with a high risk of cardiovascular disease, all-cause mortality, and mortality rates attributable to various cancers.

An overwhelming number of studies demonstrated that physical activity and exercise are beneficial for health.

A review of meta-analyses was published by Naci and Ioannidis (2013) in which the authors assessed the comparative effectiveness of exercise versus drug interventions on mortality outcomes. The study included 16 meta-analyses, comprising 305 randomized controlled trials, of which 57 trials concerned exercise interventions. Secondary prevention of coronary heart disease, rehabilitation of stroke, treatment of heart failure, and the prevention of diabetes were considered as mortality outcomes. In the case of coronary heart disease, the authors observed that none of the drug interventions was significantly better in reducing mortality compared to exercise. Among patients with stroke, only exercise was significantly more effective than the control intervention in reducing the odds of mortality. None of the drug interventions for stroke were significantly effective in reducing mortality from stroke.

Exercise is indicated in the treatment of many medical disorders by the American College of Sports Medicine (ACSM, 2014), with a global advocacy and resources programme called “exercise is medicine” (www.exerciseismedicine.org). In the medical world, it is traditional to prescribe evidence-based treatment that is known to be the most effective and entailing the fewest side effects or risks. Evidence suggests that in selected cases exercise (therapy) is just as effective as medical treatment, and in special situations it can be more effective, or adds to the effect (Pedersen and Saltin, 2006). To conclude; exercise, exercise behaviour and exercise behaviour in fitness clubs, can have a significant effect on health. Although this is a positive relationship, many factors are at stake and are required to establish health-benefits, like the dosage (intensity, frequency and duration) and the maintenance of the behaviour itself.

Exercise dose-response

With physical activity, exercise and health, the dose-response relationship has been heavily discussed for decades (Haskell, 2012). More recently multiple publications and studies (ACSM, 2014; Haskell, 2012; Woodcock, Franco, Orsini, and Roberts, 2011; Ross et al., 2016) demonstrated that even limited loads of physical activity and low packages of exercise (intensity, duration and frequency) display measurable health-effects. In the meantime, the health risks of exercise for healthy adults are very low in light and moderate intensity exercise; for vigorous intensities, the risks increase (ACSM, 2014). Woodcock et al. (2011) conducted a systematic review and meta-analysis quantifying the dose-response relationship of non-vigorous physical activity and all-cause mortality, including 22 prospective studies with more

than 10,000 participants at the start of the study, resulting in an inclusion of nearly one million participants of different continents. Non-vigorous activity included both light intensity (<3 METs) and moderate intensity physical activity (<6 METs). The study observed that compared with inactive individuals, approximately 2.5 hours of moderate physical activity per week of moderate intensity was associated with a 19% reduction in mortality rate. People who engaged in light intensity physical activity, and people who were moderately active for approximately 7 hours per week, had a 22% and 24% lower mortality rate, respectively. Compared without any walking per week, 2.5 hours of brisk walking was associated with an 11% lower all-cause mortality. It was concluded that non-vigorous physical activity had a dose-response protective effect against all-cause mortality. This effect was found for both moving from sedentary behaviour to becoming more active, and additional benefits at higher levels of physical activity or exercise. It should be noted that people who are not active or who are insufficiently active will gain a larger benefit from low amounts of physical activity compared to people who already meet physical activity guidelines and increase their physical activity levels even more. Additionally, both vigorous and non-vigorous physical activity are associated with decreased mortality risks. Haskell (2012) concluded that it is currently well established that most individuals who perform moderate-intensity physical activity for at least 150 minutes per week in addition to daily activities significant reduce their risks of various chronic diseases. Vuori, Lavie and Blair (2013) concluded that physical activity and exercise training have great potential in the prevention, management, and rehabilitation of a variety of diseases. It can be concluded that there is no one-dimensional answer on the dose-response question on exercise and health. There are strong indications that even small amounts of exercise (or physical activity) are beneficial for health, but the effects increase when exercise loads also increase. This decelerates when participants have higher levels of fitness. In this thesis, exercise is studied from a behavioural perspective, supporting lower or moderate loads because a larger population can absorb this kind of exercise, compared to vigorous amounts of exercise.

There are strong indications that even small amounts of exercise or physical activity are beneficial for health.

Exercise and health behaviour

When reviewing motives to exercise, the health "component" is frequently reported (Buckworth et al., 2013; Dishman, 1994). Exercise appears to be a kind of health behaviour. Mosby's Medical Dictionary (2009) defined health behaviour as "an action taken by a person to maintain, attain, or regain good health and to prevent illness". Health behaviour reflects a person's health beliefs. Some common health behaviours are typically exercising regularly, eating a balanced diet, and for example obtaining necessary inoculations. So, when considering that health behaviour

is any activity undertaken by an individual, regardless of actual or perceived health status, for promoting, protecting or maintaining health, whether such behaviour is objectively effective towards that end, it is possible to argue that almost every behaviour or activity by an individual has an impact on health status. In this context, it will be very useful to differentiate between behaviours which are purposefully adopted to promote or protect health (as regular physical activity and/or exercise), and those which may be adopted regardless of the consequences to health. Health promotion is fundamentally concerned with action and advocacy to address the full range of potentially modifiable determinants of health. These include not only those which are related to the actions of individuals, such as health behaviours and lifestyles, but also factors such as income and social status, education, employment and working conditions, access to appropriate health services, and the physical environments. In combination, they create different living conditions which impact on the health of individuals. Achieving change in these lifestyles and living conditions which determine health status are intermediate health outcomes. In the broadest sense, health behaviour refers to the actions of individuals, groups, and organisations, as well as the determinants, the correlation, and consequences, of these actions which can include social change, policy development and implementation, improved coping skills, and an enhanced quality of life. Kasl and Cobb (1996) distinguish three categories of health behaviour. 1. *Preventive health behaviour* involves any activity undertaken by individuals who believe themselves to be healthy for preventing or detecting illness in an asymptomatic state. This can include self-protective behaviour, which is an action intended to

confer protection from potential harm, such as wearing a helmet when riding a bicycle, using seat belts, or wearing a condom during sexual activity. Self-protective behaviour is also known as cautious behaviour. 2. *Illness behaviour* is any activity undertaken by individuals who perceive themselves to be ill for defining their state of health, and discovering a suitable remedy. 3. *Sick-role behaviour* involves any activity undertaken by those who consider themselves to be ill for getting well. It includes receiving treatment from medical providers, generally involves a whole range of dependent behaviours, and leads to some degree of exemption from one's usual responsibilities. In this thesis, the focus is on preventative types of health behaviour. Conner and Norman (1996) provided a list of health-related behaviours including smoking, diet, exercise, health screening, sexual behaviour and alcohol use. In this section, some of these behaviours will be discussed to provide a broader perspective on exercise behaviour and health behaviour in general. Smoking is negatively associated to health as one of the unhealthiest behaviours; there are strong associations between smoking and mortality (Doll et al., 1994). The transtheoretical model of behaviour change (TTM), the main subject of this thesis, was developed by observing smokers who wanted to quit without professional assistance (Prochaska and DiClemente, 1983). Regarding diet (eating behaviour), obesity among EU citizens is rising at an alarming rate. This phenomenon is linked with potentially fatal health problems, including cardiovascular diseases and certain types of cancers. The World Health Organisation (WHO) states that poor nutrition, physical inactivity and obesity account for nearly 10% of disability adjusted life

years lost, which is greater than the loss resulting from smoking (WHO, 2003). Nutrition plays an important role in the prevention of many diseases and health conditions including heart disease, stroke, cancer, obesity, diabetes, and osteoporosis. Healthy eating is essential in treating diseases such as diabetes, heart disease or cancer. Whether for prevention or treatment, eating a healthy diet is good "medicine" (Carpenter and Finley, 2005). Another type of health behaviour concerns sleeping behaviour. It is commonly believed that human beings need approximately seven to eight hours of sleep every night and that sleep serves as a restorative function. Research (Spiegel, Tasali, Leproult and Van Cauter, 2009) reported that overall, the health consequences of total, partial, or selective sleep deprivation appeared to be much smaller than might have been anticipated from the overwhelming sense of sleepiness, tiredness, and sluggishness that it can cause. An extensive report concluded that the only substantial and potentially serious effect of sleep deprivation was a reduction in the quality of life as defined by a person's feeling of well-being, willingness to work hard, and feeling of being efficient, wide awake, fresh, and in control (Naitoh, Kelly and Englund, 1990).

Studies showed that the adoption and maintenance of health-related behaviour is problematic.

A health behaviour that recently gained attention is sitting behaviour. Sitting for long periods increases the risk of diabetes, heart disease and early death, based on a systematic review and meta-analysis (Wilmot et al., 2012). According to a poll of nearly 6,300 people undertaken by the Institute for Medicine and Public Health in the US, people spend a stunning 56 hours a week sitting in front of a computer screen, behind a steering wheel, or watching TV (Jimenez, Beedie and Ligouri, 2015). Interestingly, it seems that women may be more sedentary than men, since they tend to play fewer sports and hold less active jobs. Jimenez et al. (2015) reported a recent study comparing adults who spent less than two hours a day in front of the TV or other screen-based entertainment with those who logged more than four hours a day of recreational screen time. Those with greater screen time had nearly a 50% increased risk of death from any cause, and about a 125% increased risk of events associated with cardiovascular disease, such as chest pain (angina) or heart attack. The increased risk was separate from other traditional risk factors for cardiovascular disease, such as smoking or high blood pressure (Jimenez et al., 2015).

Studies showed that the adoption and maintenance of health-related behaviour is problematic (Cavill, Kahlmeier and Racioppi, 2006; Garber et al., 2011). For example, on smoking behaviour, even after 12 months of continuous abstinence, 37% of chronic smokers return to regular smoking, but after five years, the risk drops to 7% (Prochaska and Marcus, 1994). Exercise demonstrated low levels of adherence with approximately 50% of all people dropping out in the first six months after starting an exercise programme (Berger, Pargman and Weinberg, 2002). Adherence

was defined as faithfully following a standard of behaviour that has been established as part of a negotiated agreement, that is a person's continuation in a type of programme. In the medical scene, this is often labelled as (patient) compliance who is following a prescribed standard of behaviour, that is usually related to immediate and short-term health advice to alleviate symptoms, such as taking a specific regimen of medications (Buckworth et al., 2013). When discussing health behaviour change, this automatically means the adoption and maintenance of behaviour. Exercise behaviour is complex with many factors at stake. Buckworth et al. (2013) provide an extended overview of factors, categorised in the following groups; demographic and biological factors; psychological factors; behavioural attributes and skills; social and cultural factors; physical environment factors; physical activity characteristics. They summarise 66 associations or correlates with physical activity and exercise in adults in total, comparing supervised programmes, and overall physical activity. The associations are expressed in:

++	= repeatedly documented positive associations;
+	= weak or mixed evidence of positive associations;
00	= repeatedly documented lack of associations;
0	= weak or mixed evidence of no association;
--	= repeatedly documented negative associations;
-	= weak or mixed evidence of negative association;
ND	= no data available.

TABLE 1

Overview of 66 associations on the adoption and maintenance of physical activity and exercise in adults (supervised programmes and overall PA) (Buckworth et al., 2013).

Determinant	Supervised programmes	Overall physical activity
Demographic and biological factors		
Age	00	--
Blue-collar occupation	--	-
Education	+	++
Sex (male)	ND	++
Genetic influences	ND	++
High risk of heart disease	0	-
Injury history	ND	+
Income/socioeconomic status	ND	++
Overweight/obesity	0	00
Race/ethnicity (non-white)	ND	--
Psychological factors		
Attitudes	0	00
Perceived barriers to exercise	-	--
Enjoyment of exercise	+	++
Outcome expectancy values	+	++
Health locus of control	0	0
Intention to exercise	+	++
Knowledge of health and exercise	0	00
Perceived lack of time	--	-
Perceived health or fitness	ND	++
Poor body image	ND	-
Mood disturbance	-	--
Normative beliefs	0	00
Self-efficacy	++	++
Self-motivation	++	++
Self-schemata for exercise	ND	++
Stage of change	++	++
Stress	ND	0
Value of exercise outcomes	ND	0
Physical activity characteristics		
Intensity	--	-
Perceived exertion	--	--
Behavioural attributes and skills		
Activity history childhood/youth	ND	+
Activity history during adulthood	++	++
Dietary habits (quality)	00	++
Past exercise programme	++	++
Processes of change	ND	++
School sports	0	0
Skills for coping with barriers	ND	+
Smoking	--	-
Sports media use	ND	+
Decision balance sheet	+	+
Social and cultural factors		
Class size	-	ND
Exercise models	ND	0
Group cohesion	+	ND
Past family influences	ND	0
Physician influence	ND	++
Social support friends/peers	+	++
Social support spouse/family	++	++
Social support staff/instructor	+	ND
Physical environment factors		
Access to facilities, actual	+	+
Access to facilities, perceived	+	+
Climate/season	-	--
Cost of programme	0	0
Disruptions in routine	-	ND
Home equipment	+	+
Enjoyable scenery	ND	+
Observations others exercising	ND	+
Adequate lighting	ND	+
Heavy traffic	ND	0
High crime rates in the region	ND	0
Hilly terrain	ND	+
Neighbourhood safety	ND	+
Presence of sidewalks	ND	0
Satisfaction with facilities	ND	+
Unattended dogs	ND	0
Dog ownership	ND	++
Urban location	ND	--

Exercise behaviour in fitness clubs

When reviewing motives to exercise in fitness clubs, the health component is most often reported (Baart de la Faille, Middelkamp and Steenbergen, 2012; TNO, 2009). The International Health, Racquet and Sportsclub Association (IHRSA, 2016), estimated that 151 million individuals exercise in 187,000 fitness clubs worldwide. The number of individuals that exercise in a fitness club, as well as the number of clubs, has grown constantly. In 2008, IHRSA reports 106 million global members (IHRSA, 2008), which has grown to 131 million in 2013 and 144 million in 2015 (IHRSA, 2013, 2015). The number of fitness clubs has increased from 108,000 in 2008 to 187,000 in 2016 (IHRSA, 2016). IHRSA (2010) uses the concepts fitness club and health club simultaneously. A fitness club is described as a facility that contains a health and fitness room with resistance training and (optional) cardiovascular equipment and the facility must be open to the public on either a pay-and-play or membership basis. In the number of clubs, IHRSA includes public and private facilities. IHRSA (2010) defines a member as a person that has paid a membership of a fitness club.

The number of individuals that exercise in a fitness club has grown constantly towards 151 million in 2016 worldwide.

This definition has an important implication because if a member only pays but never visits the club and never exercises, the individual is still considered as a member and will not be regarded as a drop-out, but as a result will not gain any health-effects from the membership. In fitness clubs, members predominantly exercise for health benefits (Baart de la Faille et al., 2012). In a Dutch study, TNO (2009) surveyed 622 fitness club members on their main motives to exercise with over 80% reporting health and fitness incentives.

Towards exercising in a fitness club, different studies (Annesi et al., 2011; Annesi, 2003; DellaVigna and Malmendier, 2006) mention different kinds of behaviour: attendance behaviour, this occurs when an individual enters the facility; programme attendance, this is when an individual attends a specific programme; and finally exercise behaviour, the individual needs to exercise towards certain standards or minimums in terms of frequency, duration and intensity. Studies reported low frequencies and exercise figures, which will limit the impact on health (ACSM, 2014; Dishman, Heath and Lee, 2013). To conclude, it seems that exercise behaviour in fitness clubs has similar behavioural patterns and challenges as health behaviour in general.

Models to understand exercise behaviour

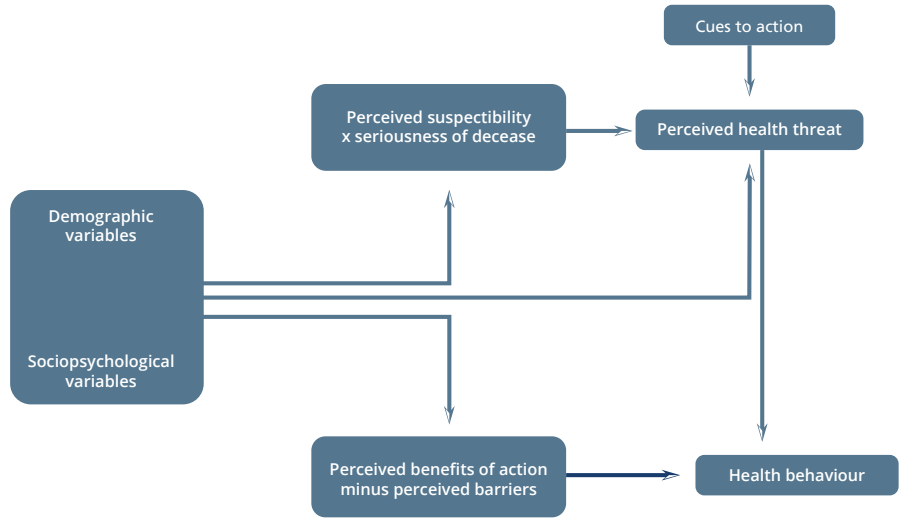
For decades, models have been developed to describe, understand, and predict health and exercise behaviour change (Godin, 1994; Buckworth et al., 2013). Most of the models are of a social-cognitive kind, meaning that human beings are understood as social and rational characters. Multiple models are tested for

different kinds of health behaviours like non-smoking, healthy eating, physical activity and exercise. In the following, the most relevant and used models for exercise will be described briefly, including the health-belief model (HBM) (Becker and Maiman, 1975), the self-efficacy theory (Bandura, 1997), the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980), the theory of planned behaviour (TPB) (Ajzen, 1991), the self-determination theory (SDT) (Deci and Ryan, 2002), and the transtheoretical model (TTM) (Prochaska and DiClemente, 1983).

The Health-Belief Model (HBM) (Becker and Maiman, 1975) attempts to understand and predict participation in preventive and health-promoting behaviours. The HBM assumes that the likelihood that a person will adopt certain behaviour (e.g., exercising) to prevent illness depends on the perception of the threat to personal health, and the conviction that certain behaviour will reduce this threat. The perception of the health threat is determined by the individual's perceived susceptibility to a disease and by the potential severity of the impact of that disease on the individual's life (individual perceptions). These perceptions can be increased or decreased by several covariates, such as demographics, sociophychological variables, advice from others, illness of friend of family member, and mass media campaigns. The likelihood of performing certain health-improving behaviour (e.g., exercising) depends on the perceived benefits of this behaviour minus the perceived barriers to this behaviour. In sum, with respect to exercise behaviour, the HBM assumes that exercise behaviour in healthy persons is the result of that a sedentary lifestyle is perceived as a threat to some aspect of health, and regular exercise is perceived to decrease this risk. Research demonstrated that the

HBM is effective in explaining and predicting health-related behaviour, such as physical activity in clinical populations (Mirotznik, Stein and Feldman, 1995; Polly, 1992; Robertson and Keller, 1992; Seze-Eesoh, 1999; Woodridge, Wallston, Graber, Brown and Davidson, 1992), weight control behaviour (Kang, Jin and Lee, 1998; Lee, 2004; O'Connell, Price, Roberts, Jurs and McKinley, 1985), screening behaviour (Becker, Kaback and Rosenstock, 1975; Hallal, 1982) and taking vaccine (Lai, Hamid and Cheng, 2000). However, less support has been found for the HBM to explain regular exercise behaviour in healthy people. Slenker, Price, Roberts and Jurs (1984) showed that perceived susceptibility to health problems was a weak factor in discriminating between joggers and sedentary adults: both groups believed that jogging would decrease susceptibility to health problems and both groups believed that health problems would have a major impact on their future. Several studies found no significant association between HBM variables and exercise behaviour (Mullen, Hersey and Iverson, 1987; O'Connell et al., 1985). Morgan, Shephard, Finucane Shimmelfing and Jazmaji (1984) even found that the individuals that perceive themselves as healthy were more likely to maintain regular exercise behaviour compared to individuals that did not perceive themselves as healthy. The abovementioned studies indicate that the HBM appears to be a weak model in predicting and explaining exercise behaviour.

FIGURE 1
Schematic overview of the health-belief model (HBM).



In 1977 Bandura proposed the self-efficacy theory (Bandura, 1977) (SET) for understanding behavioural change. This theory assumes that all behavioural changes are meditated by self-efficacy and the belief that one can successfully achieve desired outcomes. Self-efficacy is a person's belief in their capabilities to overcome personal, social and environmental barriers to exercise (or other health behaviours). Self-efficacy involves the degree of confidence a person has so that he or she will not engage in negative behaviour in tempting situations, and the confidence that a person will engage in positive behaviour in challenging situations. There are two aspects that will influence their level of confidence. One is

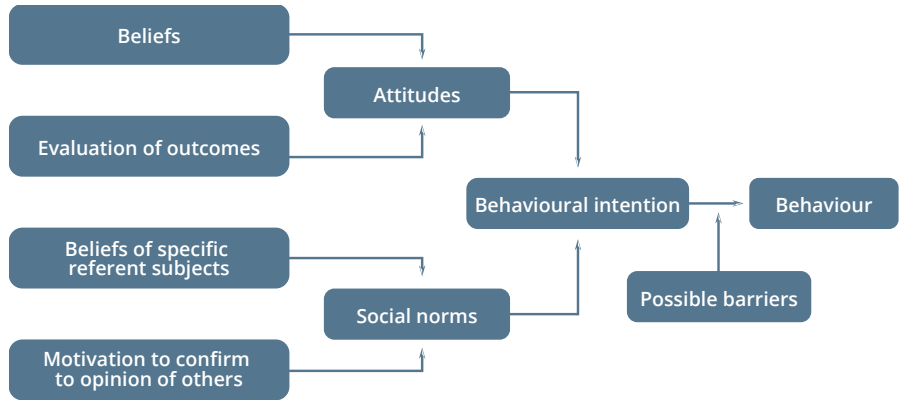
efficacy expectations which in short means one's belief about their own competence. The second is outcome expectations where there is belief in one's perceived result or outcomes of a type of health behaviour. With respect to exercise behaviour, a person with high self-efficacy in relation to exercise feels that he or she has the skills to be successful in exercise-related activities. Self-efficacy can affect performance in different manners, usually by choice of activities, such as how much effort a person will extend and persistence when encountering difficulties. Over decades, several studies (McAuley, 1992; McAuley and Mihalko, 1998; DuCharme and Brawley, 1995; Sallis et al., 1989) have provided evidence for self-efficacy to be a significant predictor of the adoption and maintenance of regular exercise behaviour. McAuley, Wraith and Duncan have showed that intrinsic motivation for an aerobic dance programme was partly explained by self-efficacy. Even when multiple studies demonstrated that self-efficacy plays an important role as a predictor for exercise, the amount of intervention studies in the field of exercise is small. In a meta-analysis (Williams and French, 2011) only three studies were reported that investigated self-efficacy interventions in an aerobics class or fitness club sessions. In the nineties, SET has been incorporated in the transtheoretical model of behaviour change (TTM), which will be discussed later in this thesis (Velicer et al., 1990).

The Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen 1975) has been used in various studies to explain and predict exercise behaviour. The model assumes that intention is the best predictor for behaviour. In the TRA intention is determined by an individual's attitude towards the behaviour and social normative perceptions regarding it, for instance perceived beliefs of a relative. The relationship between behaviour, intentions, the individual's attitude and the

subjective norm can represent symbolically as $B \approx I = (Aact)w_1 + (SN)w_2$ where *B* is the behaviour, *I* is the intention, *Aact* is the individual's attitude towards the behaviour, and *SN* expresses the individual's perception of whether relevant others think he should or should not perform the behaviour. w_1 and w_2 are the empirically determined weighting coefficients, which should show inter-individual and inter-situational differences. It should be noted that some behaviours are mainly determined by the attitudinal component (*Aact*) of the intention, whereas for other behaviours the normative component (*SN*) might be dominant (Ajzen and Fishbein, 1980; Fishbein and Ajzen 1975). An individual's attitude towards a behaviour (*Aact*) is a function of their beliefs that certain behaviour leads to certain outcomes (i.e., behaviour) and personal evaluation of the outcomes. For instance, a person might believe that regular exercise in fitness clubs leads to better health and will approve appearance. On the other hand, he will have less time to spend with friends. His attitude towards the behaviour (*Aact*) will be determined by the evaluation (*e*) of the consequences attached to all of these beliefs (*b*), that is $Aact = \sum b \times e$. The other component, the subjective norm, is the product of the individual's perceived expectation that relevant others (e.g., family, spouse, fitness instructor) think he should or should not perform the behaviour (the normative belief, *NB*) and the individual's motivation to comply with this expectation (*MC*). For example, a friend might suggest that the individual should exercise more often (*NB*), but might or might not be motivated by the belief of his friend (*MC*). The subjective norm will be determined by the summed (i.e., all relevant others) product of normative belief and motivation to comply, that is $SN = \Sigma\ NB \times MC$. As expected, the TRA is only appropriate when behaviour performed under volitional control

(e.g., exercising, smoking, etc.) is studied (Ajzen, 1988; Ajzen and Fishbein, 1980). Furthermore, Ajzen and Fishbein (1980) supposed that external variables are related to behaviour and intentions only through impact on the behavioural and normative beliefs. That is, the behaviour is under some degree of volitional control and as such, variables such as personality traits, demographic characteristics and other socio-cultural variables will influence behaviour only by influencing the behavioural and normative beliefs.

FIGURE 2
Schematic overview of the theory of reasoned action (TRA).



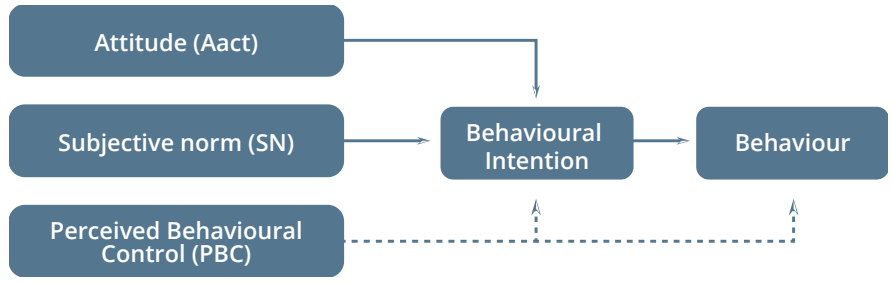
The TPB was proposed by Ajzen (1985, 1988, 1991) as an extension to the TRA. The TPB considers that most behaviours are not under total volitional control. As such, in the TPB a third component that determines intention is incorporated which is perceived behavioural control. This construct is defined as the

person's belief in how easy or difficult it will be to adopt behaviour. Contrary to attitude and subjective norm, perceived behavioural control could also predict behaviour directly. The TPB can be described symbolically as $B \sim I = (Aact)w_1 + (SN)w_2 + (PBC)w_3$. In this formula, the first two components are defined precisely as in the TRA. PBC was defined by Ajzen (1991) as the weighted sum of control beliefs (*c*), that is the presence or absence of facilitating or obstructing factors, and the perceived power (*p*) of a control factor to obstruct or facilitate the planned behaviour. More simply explained, the inclusion of PBC provides information about the potential constraints on action as perceived by the actor, and is held why intentions do not always predict exercise behaviour. Examples for exercise behaviour might be the availability of time and money and weather conditions. Symbolically PBC can be expressed as PBC = $\Sigma\, c \times p$. Up until now, the TPB has been used extensively to predict health-related behaviours, such as seat belt use, safe sex, cigarette smoking, and alcohol consumption. Overall, it has shown to be an adequate tool when it comes to predicting intention and behaviour, explaining 40-49% of the variance in intention and 26-36% of the variance in behaviour (Armitage and Conner, 2001; Hagger, Chatzisarantis and Biddle, 2002; McEachan, Conner, Taylor and Lawton, 2011; Schulze and Whittmann, 2003; Trafimow, Sheeran, Conner and Finlay, 2002). Two early reviews with respect to exercise behaviour (Blue, 1995; Godin, 1994) found attitude to be the most important variable. They also concluded that exercise intention was merely influenced by perceived social norms. Godin (1994) found an average correlation of 0.54 between intention and actual exercise behaviour. He argues that this data clearly demonstrated that intention is an important variable in predicting exercise behaviour. This is supported by results of a

meta-analysis of Hausenblas, Carron and Mack (1997). They found that intention has a large effect on exercise behaviour. However, although it gained great popularity, the TPB also suffered from much criticism and debate. One of the main points of criticism is that the predictive validity of the model is limited. Especially the intention-behaviour correlation was widely targeted. For instance, this correlation can vary substantially with varying temporal distance between intention and observation of behaviour (Conner, Sheeran, Norman and Armitage, 2000; McEachan et al., 2011). Moreover, in some studies (Sheeran, 2002; Webb and Sheeran, 2006) intentions have shown to be poor predictors for behaviour. Another point of criticism is that the TPB neglects affect and emotions (Conner and Armitage, 1998; Rapaport and Orbell, 2000; Richard, De Vries and Van der Pligt, 1998; Wolff, Nordin, Brun, Berglund and Kvale, 2011). An example is the influence of anticipated regret on behavioural outcomes. It is argued that if an individual anticipates feeling regret for performing or not performing certain behaviour (e.g., exercising), this will influence the decision to perform or not perform that behaviour (Richard et al., 1998; Richard et al., 1996). For instance, Abraham and Sheeran (2003) showed that anticipated regret predicts exercise intention independent of TPB variables and past behaviour. Therefore, they suggest that anticipated regret should be included in the model as a predictor of intention. Finally, the TPB has been targeted for neglecting past behaviour, as well as habit. For instance, several studies showed that a measure of past behaviour contributes to the prediction of future behaviour when considered the predictors of the TPB (Abraham and Sheeran, 2003; Ajzen, 1991; Conner and Armitage, 1998). The study of Abraham and Sheeran (2003) on exercise behaviour found a significant increase of variance

explained when past physical activity was added to the model. Overall, the TRA and the TPB have shown to be useful to explain and predict the adoption of exercise behaviour, but is limited when it comes to the maintenance of behaviour.

FIGURE 3
Schematic overview of the theory of planned behaviour (TPB).



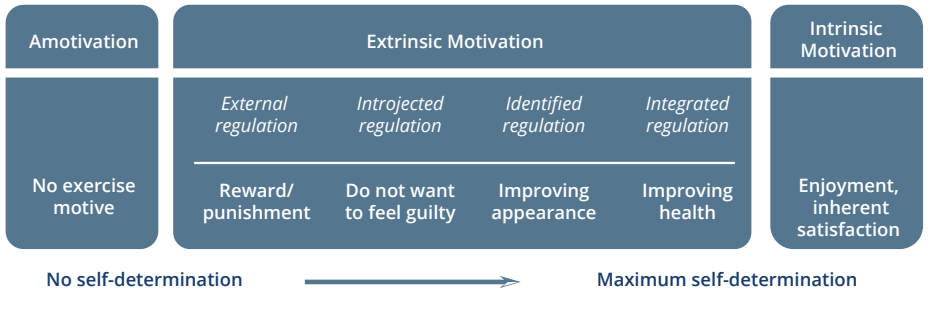
The self-determination theory (SDT) (Deci and Ryan, 1985) begins with the assumption that all individuals have natural, innate and constructive tendencies to develop an ever more elaborated and unified sense of one's self. The SDT points at three fundamental psychological needs of; 1) competence, this refers to feeling effective in one's on-going interactions with the social environment and experiencing opportunities to exercise and express one's capacities; 2) relatedness, this refers to feeling connected to others, to caring for and being cared for by those others, to having a sense of belongingness both with other individuals and with one's community, and 3) autonomy, which refers to being perceived origin or source of one's own behaviour.

The SDT assumes that the more intrinsic and autonomous the motivation, the higher the individual is motivated (Deci and Ryan, 1985). One of the key concepts of the STD is the distinction of three categories of motivation: 1) amotivation, 2) intrinsic motivation and, 3) extrinsic motivation. Amotivation is defined as the lack of motivation to engage in certain behaviour (e.g., no motivation to exercise). Intrinsic motivation is defined as engaging in behaviour because of inherent satisfaction (e.g., exercise enjoyment). Four types of regulation define extrinsic motivation which are external (least autonomous), introjected, identified and integrated (most autonomous). External regulated behaviour is performed because of possible rewards or to avoid punishment. Individuals engage in introjected regulated behaviour because of inside pressure (e.g., feeling guilty when not going to a fitness club) (Deci and Ryan, 2000). People guided by identified regulation engage in certain behaviour because the outcome of the behaviour is important to them (e.g., exercising because it is healthy and will improve appearance). Finally, integrated regulation reflects full assimilation of the regulations into the self (e.g., individual exercises because he wants to improve his health). They are included in the individual's other values and needs. A review by Teixeira, Carraça, Markland, Silva and Ryan (2012) showed that the current literature provides evidence for the usability of the SDT for understanding and predicting exercise behaviour. Consistent results were found for a relationship between autonomous forms of motivation and exercise behaviour (Teixeira et al., 2012). Two important conclusions were that (a) having more intrinsic participation goals associated with exercise leads to increased exercise behaviour and, (b) perceived competence for exercise is positively related to adaptive exercise behavioural outcomes. Thøgergsen-Ntoumani and Ntoumanis (2006) suggested that

intrinsic motivation and identified regulation play an important role when it comes to exercise behaviour in fitness clubs, because activities are not always inherently enjoyable, but people are aware of the importance of the outcome. In addition, Koestner and Losier (2002) argue that intrinsic motivation helps focusing on short-term goals and enjoyment, whereas identified regulation helps focusing on long-term goals. Two intervention studies (Edmunds, Ntoumanis and Duda, 2008; Moustaka, Vlachopoulos, Kabitsis and Theodorakis, 2012) focused on fitness club members. Edmunds et al. (2008) found that attendance rates of female exercise class participants were higher in a group exposed to a STD-based teaching style (autonomy supportive, well-structured and interpersonally involving) compared to a group exposed to a "typical" teaching style. Additionally, Moustaka et al. (2012) found that a well-structured exercise class with a SDT teaching style leads to greater persistence to exercise in women. Unfortunately, no intervention studies were found focusing on (a) healthy males; (b) long-term exercise adherence and; (c) individual fitness training. Although empirical evidence supports the applicability of the SDT to the exercise domain, the theory also suffers from several shortcomings. Firstly, several studies (Hagger and Chatzisarantis 2008; Wilson, Mack and Grattan, 2008) point out that there are measurement issues within the exercise science. For example, some of the instruments for measuring the constructs of the SDT, such as the BREQ-2 (Markland & Tobin, 2004) are not (widely) validated. Furthermore, the usability of the STD to change or sustain exercise behaviour is unclear (Hagger and Chatzisarantis, 2008), especially when it comes to fitness club members. As discussed above, the amount of intervention studies is limited and in fitness club settings mainly women attending exercise classes were studied.

Finally, it should be noted that people rarely exercise in fitness clubs for intrinsic reasons alone (Baart de la Faille et al., 2012).

FIGURE 4
Schematic overview of the self-determination theory (SDT).



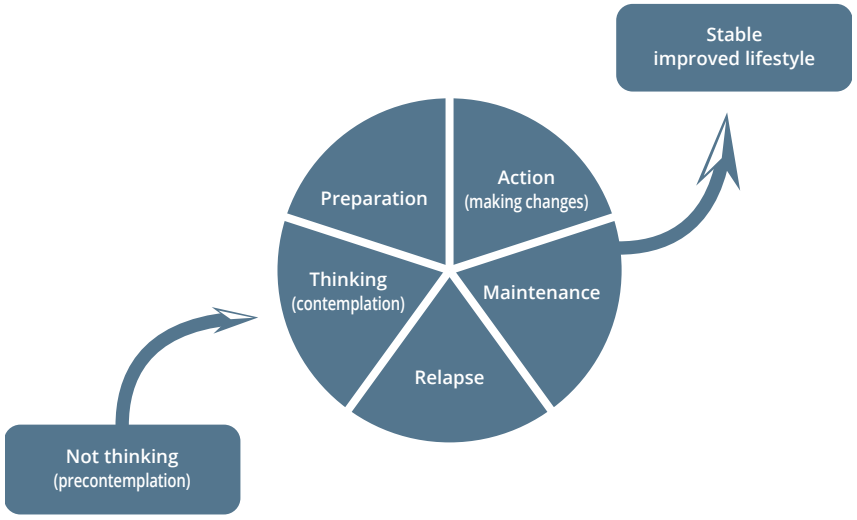
The transtheoretical model (TTM) (Prochaska and DiClemente, 1983) was initially developed by studying smokers who were attempting to change their behaviour without professional help. One of main findings was that the process used by these so-called 'self-changers' went through specific stages when trying to reduce or remove their behaviour pattern. Although the TTM originally focused on cessation of negative behaviours, in the last decades it has also been applied to help facilitate positive behaviours, such as exercising. The current model describes four key constructs of stages of change, decisional balance, self-efficacy, and processes of change. The stages of change are the organizing construct of the TTM and hypothesize that individuals move cyclically through the stages with periods of progression and relapse. The stages of change contain five main stages (Dishman,

Vandenberg, Motl and Nigg, 2010) to cease an unhealthy or adopt a healthy behaviour (like exercise), or six stages if the termination/ relapse stage is also included (Cardinal, 1998; Fallon, et al. 2005; Prochaska and Marcus, 1994;). The stages are summarised in Table 2 and the cyclic character is presented in Figure 5.

TABLE 2
The stages of change.

Stage	Name	Description
1	Pre-contemplation	People who aren't currently thinking of changing their behaviour. In short: I WON'T and I CAN'T stage.
2	Contemplation	People who aren't currently changing their behaviour, but do intent to change in the next six months. In short: I MIGHT stage.
3	Preparation	People who are preparing to change their behaviour within the next 30 days. In short: I WILL stage.
4	Action	People who made a change in their behaviour, but have changed recently (up to six months but no longer). In short: I AM stage.
5	Maintenance	People who have changed for some time, at least six months. The behaviour has become a reasonably stable characteristic. In short: I HAVE stage.
6	Relapse	On the one hand, people can maintain their behaviour, on the other hand, they can relapse into the previous behaviour and return to the earlier stages.

FIGURE 5
Schematic representation of the stages of change.



Decisional balance is the second construct of the TTM and contains two main scales of pros and cons for changing behaviour (Janis and Mann, 1977). There are four dimensions for pros which are useful benefits for the self, useful benefits for others, self-approval, and approval of others. There are also four dimensions for cons being useful losses for the self, useful losses for others, self-disapproval, and disapproval of others. The pros and cons are important for influencing people in an early stage (pre-contemplation – preparation) to the action stage (Velicer, Prochaska, Fava, Norman and Redding, 1998). The third construct is self-efficacy (Bandura, 1997), as discussed above, which is in short, a person's belief in capabilities to overcome personal, social and environmental barriers to exercise. Based on self-efficacy theory, human behaviour is strongly influenced by self-regulation, for example by options to self-set (choose) activities and self-set goals (Bandura, 1991). A high level of (perceived) self-efficacy makes it more likely that an individual will initiate or maintain the behaviour. There are four sources for an individual's self-efficacy; past experiences in performing specific behaviours, vicarious experiences (watching others successfully perform behaviours), verbal persuasion (being told that one is capable), and experiences of physiological arousal. Temptation to not exercise describes urges to engage in a specific habit for example remain sedentary and is conceptually related to self-efficacy.

> The transtheoretical model was initially developed by studying smokers who were attempting to change their behaviour without professional help.

Dishman et al. (2010) reported that construct validity of temptation has been supported by significantly lower levels of temptation in the later stages but question whether temptation predicts physical activity independently of barrier self-efficacy. The fourth construct measures ten processes of change, which can be divided in five experimental or cognitive processes and five behavioural processes. The five cognitive processes are:

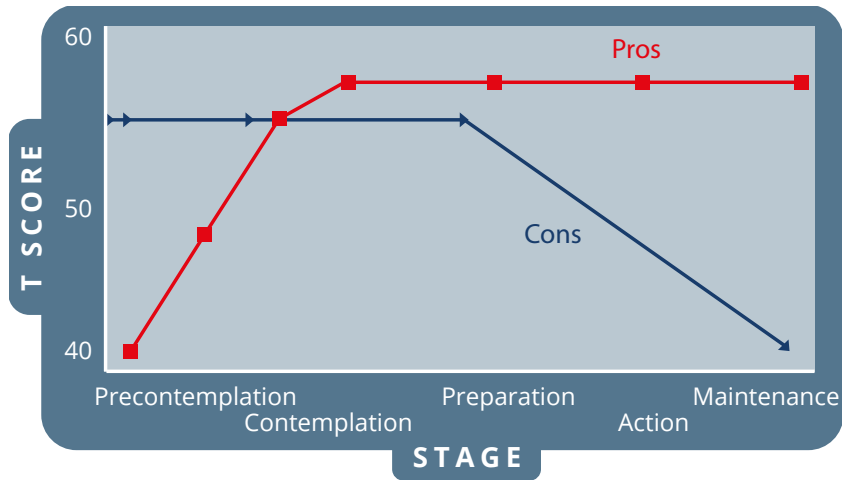
consciousness raising (e.g. looking for information), dramatic relief (e.g. emotional aspects of change), environmental re-evaluation (e.g. assessment of how inactivity affects society), self-re-evaluation (e.g. assessment of personal values) and social liberation (e.g. awareness, availability and acceptance of active lifestyles in society). The five behavioural processes are: counter conditioning (e.g. substituting physical activity for sedentary leisure choices), helping relationship (e.g. using social support during change), reinforcement management (e.g. self-reward for change), self-liberation (e.g. commitment and self-efficacy beliefs about change), and stimulus control (e.g. managing situations that prompt inactivity or activity) (Dishman, Jackson, and Bray, 2010; Reed, 2001).

> The TTM supposes to be an integrative model meaning that individual constructs are related.

The TTM supposes to be an integrative model (Velicer, Prochaska, Fava, Norman and Redding, 1998) meaning that individual constructs are related. This contains primarily the relationship of decisional balance, self-efficacy, temptation and processes of change with the stages of change. Increasing exercise behaviour change ultimately means that exercisers move upwards in the stages of change. The constructs of self-efficacy, decisional

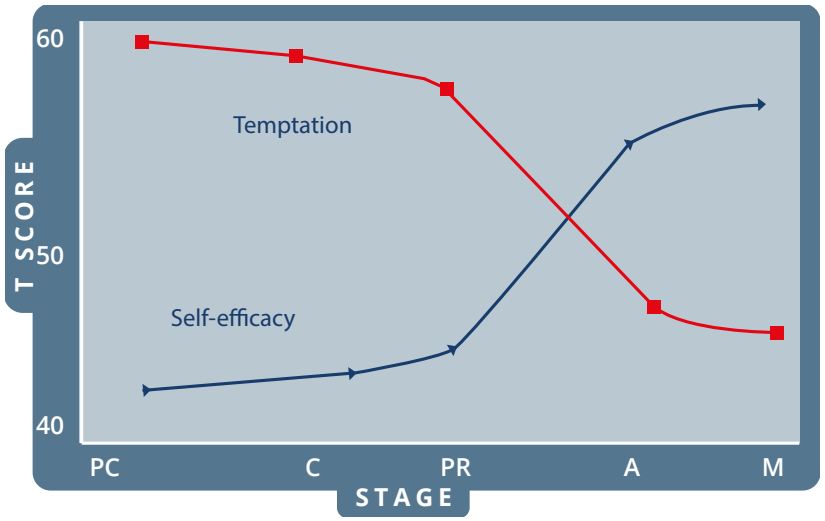
balance and processes of change support this progression. Figure 6 presents how the pros and cons of decisional balance develop according to theory over the stages of change. Pros and cons play an important role in the early stages, meaning that pros increase and cons decrease.

FIGURE 6
Development of pros and cons over the stages of change.



For self-efficacy, the same kind of pattern of development is theoretically proposed for barrier self-efficacy and the temptation not to exercise. The last should decrease over the stages of change, this first should increase because exericers gain more and more strategies to overcome barriers.

FIGURE 7
Development of self-efficacy over the stages of change.



Fallon et al. (2005) reported several differences between men and women where women reported significantly less barriers-efficacy, greater pros of exercise, and greater use of behavioural and experiential processes of change. For men, affect temptation was the only significant correlate of action/maintenance, while barriers efficacy, environmental evaluation, and affect temptation were associated with maintenance/termination. For women, environmental reevaluation and social liberation were associated with action/maintenance, while barriers-efficacy was the only construct correlated with maintenance/termination. The TTM implicates that behaviour change strategies should address the specific stage of an individual like a member of a fitness club. It is of no use to provide a pre-contemplator with self-efficacy driven exercise goals. Defining the stages of change of a single person should

be done per type of health behaviour. In Figure 8, health related behaviours as physical activity, exercise, smoking and sitting, are summarized and by example connected to a stage of change for an imaginairy person. For this person, lets name him Jan, it is clear that he is preparing to start an exercise programme (p=preparation). So strategies to support Jan's exercise behaviour sould be related to this stage. When it comes to his sitting behaviour, he is not considering any change, which can be damaging for his health if he is sitting for many hours a day. The result is that a different approach is needed to change this type of health behaviour.

FIGURE 8
Combinations between type of health behaviour and stages of change.

Type of health behaviour	PC	C	P	A	M	R
Physical activity	x					
Exercise			x			
Smoking	x					
Sitting	x					
Nutrition		X				
Etc						

The effectiveness of the TTM is reviewed frequently and demonstrated mixed outcomes. In a systematic review on multiple health behaviours (smoking, physical activity, dietary change, multiple lifestyle changes) (Bridle, Riemsma, Pattenden, Sowden, Mather, Watt and Walker, 2005) in total 516 papers were reviewed on the effectiveness of health behaviour interventions in general

based on the TTM. Thirty-seven randomized controlled trials, targeting seven health-related behaviours, satisfied the inclusion criteria, of which seven were on promoting physical activity. Overall, the methodological quality of trials was variable, and there was limited evidence for the effectiveness of stage-based interventions as a basis for behaviour change or for facilitating stage progression. The authors concluded that limited support for the TTM was available. More specific reviews on the TTM and exercise behaviour tend to be more in favour of the model. For example, Spencer et al. (2006) reviewed studies applying the TTM on exercise of which 25 studies were shown to be successful in motivating participants towards higher stages and increased amounts of exercise. To conclude; although the current state of literature towards the TTM is inconclusive, the applicability of the TTM to exercise behaviour seems promising. Compared to other models, the TTM explains the adoption of exercise behaviour as well as the maintenance of it, which makes it usable towards cyclic and dynamic types of behaviours such as exercise.

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Guiding research questions and hypothesis

As concluded in exercise behaviour literature (Berger et al., 2002; Dishman, 1994), exercise demonstrated low attendance rates and irregular behaviour. This resulted in the current thesis and research series organised by a set of research questions. The first guided the systematic review (chapter 2) of what is the quantity and quality of studies on exercise behaviour of members in fitness clubs applying the TTM and which implications for future research can be found? A follow-up study contained the following question (chapter 3) to what extend do (ex) members of fitness clubs adopt and maintain attendance behaviour within the later stages of change? A preliminary survey study was conducted on fitness professionals to investigate the following (chapter 4) to ask what strategies within the TTM do European fitness professionals currently use to support clients in changing health-related behaviour? Two real-life interventions (chapter 5 and 6), were guided by another research question and four hypotheses on what is the effect of self-set activities and a coaching protocol on self-set goals on self-efficacy and group exercise behaviour of members in fitness clubs in 4, 8, 12, 26 and 52 weeks? These questions will be answered and presented in the coming five chapters, followed by a chapter with general conclusions.

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CHAPTER 2

The transtheoretical model and exercise behaviour in fitness clubs: Systematic review

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ABSTRACT

Introduction: The transtheoretical model of behaviour change (TTM) is often used to understand changes in health related behaviour, like exercise. The applicability of this model to exercise behaviour of the 140 million members in fitness clubs worldwide has never been systematically reviewed. The purpose of this paper is to review current TTM studies on exercise behaviour of this specific population.

Method: A systematic literature review was performed using three kinds of databases. In total 285 studies were found. On these studies, specific inclusion and exclusion criteria were applied. The methodological quality of the studies was reviewed by using the CASP checklist.

Results: Applying the inclusion and exclusion criteria yielded 33 studies on exercise behaviour of members in fitness clubs. 8 studies were based on one or more constructs of the TTM. The reviewed research demonstrated promising results. In multiple studies exercise behaviour was significantly increased by factors related to self-efficacy, decisional balance and processes of change. The overall quantity of studies was low and the overall quality was limited; for example randomised controlled trails are lacking.

Discussion: It is evident that research on exercise behaviour of members in fitness clubs using constructs of the TTM is limited. Future research should lead to the development of tailor-made strategies and programmes to improve exercise behaviour to promote long term health and fitness levels of members in fitness clubs.

Key words – Stages of change, adherence, attendance, health.

Introduction

It is well documented that physical activity (PA) and exercise are beneficial for health. This holds for individuals as well as for the population in general (American College of Sports Medicine, 2010; Dishman, Heath, and Lee, 2013). This review focused on exercise, defined as planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health (Buckworth, Dishman, O'Conner, and Tomporowski, 2013). In fitness clubs, members predominantly exercise for health benefits (Baart de la Faille, Middelkamp, and Steenbergen, 2012). Several studies demonstrated that exercise behaviour, meaning the adaption of new behaviour and the maintenance of existing behaviour (adherence), is problematic (Berger, Pargman, and Weinberg, 2002; Bull, 2001). To systematically study and understand exercise behaviour, several social-cognitive models have been put forward. The transtheoretical model (TTM) is frequently used to study different kinds of health behaviours, including smoking, physical activity and exercise. In different populations and settings, the existence of significant relationships between the TTM and exercise behaviour have been demonstrated (Fallon, Hausenblas, and Nigg, 2005; Marshall and Biddle, 2001; Spencer, Adams, Malone, Roy, and Yost, 2006). To increase exercise behaviour, an in-depth understanding of the development of this specific behaviour and its change over time is needed, which makes the TTM useful as a theoretical model. Furthermore, the TTM is an integrative model, combining multiple theories or constructs increasing the understanding of complex behaviours like exercise.

The model was originally developed for smokers who wanted to change their behaviour without professional intervention, the

so-called "self-changers". It describes four key variables of a. stages of change; b. decisional balance; c. self-efficacy and, d. processes of change. The stages of change contain five main stages to cease an unhealthy or adopt a healthy behaviour (like exercise), or six stages if the termination/relapse stage is also included (Prochaska and Marcus, 1994). The stages are 1) Pre-contemplation where people who aren't currently active and do not intent to exercise in the nearby future (approximately 6 months); 2) Contemplation where people who aren't currently active, but do intent to exercise sometime in the next 6 months. 3) Preparation: this group contains people who are not or irregularly active, but are preparing to exercise (within the next 30 days). 4) Action: people who made a change in their behaviour and are currently exercising, but have only started recently (6 months). 5) Maintenance: people who have been exercising for some time, for at least six months, and for who exercise has become a reasonably stable characteristic. The decisional balance is the second construct of the TTM, and contains two main scales of pros and cons for changing behaviour. There are four dimensions for pros which are useful benefits for the self, useful benefits for others, self-approval, and approval of others. There are also four dimensions for cons that are useful losses for the self, useful losses for others, self-disapproval, and disapproval of others. The pros and cons are important for influencing people in an early stage (pre-contemplation – preparation) to the action stage. The third construct is self-efficacy (Bandura, 1997), which involves the degree of confidence a person has that he or she will not engage in a problem behaviour in tempting situations. In short, self-efficacy is a person's belief in capabilities to overcome personal, social and environmental

barriers to exercise. The fourth construct measures ten processes of change, which can be divided in five experimental or cognitive processes and five behavioural processes. The five cognitive processes are consciousness raising (e.g. looking for information), dramatic relief (e.g. emotional aspects of change), environmental re-evaluation (e.g. assessment of how inactivity affects society), self-re-evaluation (e.g. assessment of personal values) and social liberation (e.g. awareness, availability and acceptance of active lifestyles in society). The five behavioural processes are counter-conditioning (e.g. substituting physical activity for sedentary leisure choices), helping relationships (e.g. using social support during change), reinforcement management (e.g. self-reward for change), self-liberation (e.g. commitment and self-efficacy beliefs about change), and stimulus control (e.g. managing situations that prompt inactivity or activity) (Dishman, Jackson, and Bray, 2010; Reed, 2001).

Spencer et al. (2006) reviewed 150 studies using the TTM. Most the studies addressed middle-class, white, female populations, thereby limiting the generalisation of findings to some extent. A total of 31 stage-matched intervention studies were reviewed. 25 studies were shown to be successful in motivating participant towards higher stages and increased amounts of exercise. In the 15 studies that compared a matched intervention to a non-matched intervention, only slightly more than half of the studies found stage-matched interventions to be superior. Although the applicability of the TTM to exercise behaviour seems promising, the current state of the literature is inconclusive. This might be partly explained by limitations of the current studies. The most important limitations are (Fallon et al., 2005; Spencer et

al., 2006) a lack of diverse and representative participants, a lack of longitudinal studies, different definitions of exercise, that most studies rely on self-reports instead of objective measurements, some studies do not include all five TTM constructs there are differences between men and women that are not taken into account, and there is a lack of validity for several constructs (although some evidence), such as decisional balance and processes of change. A more recent study of Dishman, Vandenberg, Motl, and Nigg (2010) provided longitudinal evidence for the use of TTM constructs to predict maintenance or increase in exercise levels for a random, multi-ethnic population.

The International Health, Racquet and Sportsclub Association (IHRSA) (IHRSA, 2014), estimates that the global fitness club sector has about 140 million members. Based on estimations of IHRSA, the global fitness industry counts 160,000 fitness clubs. IHRSA (2010) uses the concepts fitness club and health club simultaneously. A fitness club is described as a facility that contains a Health and Fitness room with resistance training and (optional) cardiovascular equipment. The facility must be open to the general public on either a pay-and-play or membership basis. In the number of clubs, IHRSA includes public and private facilities. IHRSA (2010) defines a member as a person that has paid a membership of a fitness club. This definition has an important implication if a member only pays, but never visits the club or never exercises, he/she is still a member and will not be regarded as a drop-out. This is problematic from a health perspective.

The transtheoretical model of behaviour change (TTM) is often used to understand and predict health behaviour, and has been applied to physical activity and exercise. The applicability to exercise behaviour of members in fitness clubs has never

been systematically assessed and empirical studies seems scarce (Baart de la Faille et al., 2012). On one hand, existing studies using the TTM in other populations, such as cardiac patients or college students, can be used to understand and improve exercise behaviour in fitness clubs. On the other hand, the context in fitness clubs has its own specific and unique characteristics, which demands a study on its own. For example, members in fitness clubs are generally healthy adults, which differs from populations like cardiac patients. Members also must visit the club to exercise, which is different from situations such as home fitness. Another factor is that members usually pay a substantial membership fee per month, on average USD 60 to get access to the club, in contrast to (for example) students who often pay low or no membership fees (Baart de la Faille et al., 2012).

The objective of this paper is to review the existing literature on exercise behaviour of members in fitness clubs. The main questions are “what is the quantity and quality of studies on exercise behaviour of members in fitness clubs applying the TTM and which implications for future research can be found”? Included studies were assessed on methodological quality. The purpose of this paper is to review the current state of research on exercise behaviour of members in fitness clubs, and to provide directions for future research.

Method

Because it was expected that the amount of studies using the TTM towards the topic of this paper would be low, the review initially focused on all existing studies on exercise behaviour in fitness clubs. In the search for studies, three main databases were

used in January 2013, yielding seven sources in total. First, the databases PubMed, Sportdiscus, Cochrane and Web of Knowledge were searched. Second, more general sources were searched such as Google scholar and Google. Third, studies and literature were collected from the different fitness sector associations. Studies with the following search terms were included: exercise behaviour, health clubs, fitness clubs, retention fitness center, motivation fitness center, adherence health club, motivation health club, attendance fitness. This yielded in a total of 285 studies related to exercise behaviour. The search primarily focused on publications in English, but also articles in Spanish, French, German and Dutch languages were found.

The studies were screened on two main exclusion criteria of the environment of the study, and the participants of the study. Since the review focused on exercise behaviour in fitness clubs, all studies characterized as home-based, community-based, work-based, clinical-based and school or college-based, were excluded. Because the main population of fitness clubs exists of healthy adults, research on kids (<18), elderly (>65), and patients (like cardiac, diabetes, cancer, hypertension, low back pain), were excluded. In total, 44 research studies on exercise behaviour of members in fitness clubs were included. Nine are fitness sector studies. These studies are not peer-reviewed and generally showed a lack of scientific methodological reporting. For these reasons, they were excluded. Of the remaining 35 peer-reviewed studies, another two were excluded because these publications focus on economic factors, and did not specifically study exercise behaviour.

In total 33 studies were included of which 8 studies used constructs of the TTM.

Results

In the 33 studies, the participants were labelled by the stage of change. In most studies, the members were in the action or maintenance stage. One publication included the preparation stage. In 4 studies, it was not clear in which stage the members were in. In total, 8 studies used constructs of the TTM. Below, these 8 studies will be discussed. Nigg, Courneya, and Estabrooks (1997) tested the decisional balance sheet (DBS). The experimental group received a phone call and were asked to think systematically and record the expected gains and losses of exercising in a fitness center. Members reported twice as many pros as cons. Pros were good equipment & facilities and social interaction. The cons were crowded conditions and a lack of equipment. Attendance declined from the 4th week baseline to the 8th week in control and placebo groups, but there was less change in the experimental group. DBS was effective to keep attendance up. Annesi (2003) tested the effect of a multiple component behaviour change treatment package (for 36 weeks), partly based on the constructs of self-efficacy and processes of change. The package included strategies such as relapse prevention, self-reinforcement, and contracting. All studies (US, Great Britain and Italy) showed a significantly higher attendance (13-30%) and less drop-out (30-39%) for the treatment group. This coach-approach system was also tested in Annesi (2004b), Annesi (2007), Annesi and Unruh (2007) and Annesi, Unruh, Marti, Gorjala, and Tennant (2011) and proved again that adherence was positively influenced by the intervention. Cox, Burke, Gorely, Beilin, and Puddey (2003) compared home versus fitness centre-based exercise for 18 months, using the stages of change constructs. The centre-based group had higher adherence than the home-based group (97, 94, 81% versus 87, 76, 61%) at respectively 6, 12 and 18 months. The levels of drop-out ranges from 3 to 39%. Levesque, Gauvin, and Desharnais (2003) studied how learned resourcefulness is related to spontaneous process of change in 6 months, at adult members (n=104) in the preparation stage of the TTM. Learned resourcefulness are regulatory skills that enable a person to self-control his/her behaviour. They concluded that processes of change use can be predicted by baseline levels of learned resourcefulness. People with stronger self-regulatory capacity use more processes of change over time. They try harder in attempting to maintain exercise involvement. Overall, research using constructs of the TTM to improve exercise behaviour of members in fitness clubs seems to be promising. Below, the methodological quality of the studies will be reviewed.

Initially, the intention was to only review studies on exercise behaviour of members in fitness clubs that used the TTM model. However, because the amount available was limited to 8 it was appropriate that all 33 studies were reviewed. The 33 studies use a wide variety of research designs. There are several ways to categorize research designs. In the field of PA and exercise, Dishman, Heath, and Lee (2013) define cross-sectional, case control, cohort and randomized controlled trails (RCTs). Of the

33 studies, 18 are labelled as cross-sectional. Using the criteria of consort 2010 (Moher et al., 2010), none of the studies can be labelled RCTs. The main issues that were lacking are detailed descriptions of the type of randomization, implementation and blinding of the randomization. Also, none of the studies could be qualified as cohort studies. The remaining are case-controlled studies and for this reason the CASP (Critical Appraisal Skills Programme) checklist was used to analyze the methodological quality (CASP, 2013). The CASP tools comprise sections for assessing study validity, methodological quality, presentation of results and external validity. All 33 studies were fully read by two reviewers who were exercise scientists. Both scored independently on the items in the checklist, and produced their own evaluation. Initial inter-rater agreement on all studies was moderate (Cohen's Kappa=0,559). Two weeks afterwards, the reviewers discussed the individual scores in a review session and reached 100% consensus. The result of this methodological quality analysis is shown in Table 1, indicating that the overall quality of the included studies is considered low. Multiple studies lack essential methodological information or do not report these key elements. For example, in multiple studies cases were not recruited in an acceptable way, exposures were not accurately measured to minimize bias, and often confounding factors were not accounted for.

TABLE 1

Methodological quality of studies scored with CASP-checklist for case-control studies.

Study/CASP questions	1	2	3	4	5	6a	6b	7	8	9	10	11
1. Annesi & Mazas (1997)	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	N
2. Courneya et al. (1997)	Y	Y	C	C	Y	Y	N	Y	Y	Y	C	Y
3. Nigg et al. (1997)	Y	Y	Y	Y	Y	Y	N	C	N	C	C	Y
4. Annesi (1998)	Y	Y	Y	Y	C	N	N	Y	N	Y	Y	C
5. Annesi (1999a)	N	C	N	N	N	Y	N	C	Y	N	C	Y
6. Annesi (1999b)	Y	Y	Y	NA	N	Y	N	N	N	Y	N	C
7. Annesi (2002a)	Y	N	Y	NA	Y	Y	N	Y	N	Y	Y	N
8. Annesi (2002b)	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	Y
9. Annesi (2003)	Y	Y	Y	Y	Y	Y	N	C	Y	Y	Y	Y
10. Cox et al. (2003)	Y	Y	Y	NA	N	Y	N	Y	N	Y	N	Y
11. Annesi (2004a)	Y	Y	Y	NA	N	Y	N	N	N	Y	N	Y
12. Annesi (2005b)	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
13. Annesi (2007)	Y	Y	N	N	Y	Y	N	Y	N	Y	C	Y
14. Annesi & Unruh (2007)	Y	Y	N	N	Y	Y	N	N	N	Y	Y	C
15. Annesi et al. (2011)	Y	N	Y	Y	Y	Y	N	Y	N	Y	N	C
16. Spangenberg (1997)	N	C	C	C	Y	Y	N	Y	N	N	C	Y
17. Levesque et al. (2003)	Y	Y	Y	NA	N	Y	N	C	N	N	C	Y
18. Annesi (2004b)	Y	N	Y	NA	N	N	N	Y	N	N	Y	Y
19. Annesi (2005a)	Y	N	Y	NA	N	Y	N	N	N	Y	C	Y
20. Annesi (2005c)	Y	Y	Y	NA	Y	Y	N	Y	N	Y	N	Y
21. McKechnie et al. (2006)	Y	Y	N	NA	N	Y	N	N	N	N	N	N
22. Kruger et al. (2007)	Y	Y	Y	NA	N	Y	N	Y	Y	Y	C	C
23. Huang et al. (2007)	Y	Y	N	NA	N	Y	N	C	N	N	N	Y
24. Lin et al. (2007)	Y	Y	C	NA	Y	N	N	N	N	N	N	C
25. Wang et al. (2008)	N	C	N	NA	N	N	N	N	N	N	N	C
26. Prichard & Tiggemann (2008)	Y	Y	C	NA	N	Y	N	Y	Y	Y	N	y
27. Collishaw et al. (2008)	N	N	Y	NA	Y	Y	N	N	N	Y	C	Y
28. Vlachopoulos (2008)	Y	Y	Y	NA	N	Y	N	Y	N	N	N	N
29. Kaphingst et al. (2008)	Y	Y	Y	NA	N	Y	N	N	N	C	C	N
30. Miller & Miller (2010)	Y	N	Y	NA	N	Y	N	N	N	N	C	Y
31. Mullen & Whaley (2010)	Y	Y	Y	NA	N	N	N	Y	N	C	Y	Y
32. Kathrins & Turbow (2010)	Y	Y	N	NA	N	Y	N	Y	N	Y	Y	Y
33. Jankauskiene & Mieziene (2011)	Y	Y	C	NA	N	N	N	C	N	N	C	Y

Note. Y = Yes, N = No, C = Cannot tell, NA = Not applicable.
Explanation of numbers:
1. Did the study address a clearly focused issue?
2. Did the authors use an appropriate method to answer this question?
3. Were the cases recruited in an acceptable way?
4. Were the controls selected in an acceptable way?
5. Was the exposure measured accurately to minimize bias?
6a. Were confounding factors identified?
6b. Were confounding factors accounted for?
7. Were the results appropriately analysed?
8. Were the results precisely presented?
9. Are the results appropriately interpreted?
10. Are the results generalizable to a larger population?
11. Do the results of this study fit other evidence?

Discussion

This was the first study to systematically review exercise behaviour of members in fitness clubs. Although limited in quantity and quality, it can be concluded that the studies demonstrated promising results. In multiple studies the adoption and maintenance of exercise behaviour is significantly improved by factors related to self-efficacy, decisional balance and processes of change. The studies in Table 1 mainly tested exercise behaviour but the definitions used varied a lot. Spencer et al. (2006) stated that the definition of exercise has been a subject of debate in recent years. How much exercise should a person do to be defined as an exerciser in the action or maintenance stage? And when is an exerciser labelled as relapsed? The selected studies used diverse interpretations so an overall conclusion is not possible. For future research, more consensus is needed. For example, Dishman et al. (2009) use the US healthy people 2010 recommendations as a general guideline, which also can be applied to the population of members in fitness clubs.

In multiple publications, two other perspectives on the stages of change come forward. The first is visiting the club in general, often denoted attendance. Usually fitness clubs register attendance but it is not always known if members exercise (for

example, in many clubs, members can also visit the sauna facility or play tennis) and what kind of exercise members perform (in terms of duration, frequency and type of exercise). A second perspective is labelling stages of change to the membership. If a member of a fitness club does not visit or exercise in the club anymore, this does not automatically lead to the termination of the membership. Fitness clubs have an unknown number of members that pay a membership fee but do not visit the club nor exercise in the fitness club. Little is known on the relationship between exercise behaviour and visiting the club or paying a membership. Future research should cover the types of associations within this population.

Based on the systematic review, it can be concluded that research on exercise behaviour of members in fitness clubs is limited in quantity and quality. Not much is known on the applicability of the TTM to this population. The search had some limitations in the used search terms and the results are strongly influenced by one author with 15 studies included (Annesi). No studies were found on pre-contemplators and contemplators, and only one included the preparation stage. This leads to the conclusion that the TTM is hardly tested in this population. Future research is needed, starting with the core construct of the TTM, which are the stages of change. Finally, in addressing the population of fitness clubs, some additional comments can be made. The global fitness sector is a trendy environment. One characteristic of this is that new programmes and services are introduced regularly. The American College of Sports Medicine (2012) executed a survey on 2,600 fitness professionals to define the top 20 fitness trends. The study showed the top 10

programmes which include personal training; core training; group personal training. None of the 33 studies in this systematic review investigated the adaption and maintenance of exercise behaviour of for example personal training or group fitness programmes. This means that many topics are unclear so that questions such as, how does personal training or group fitness programmes affect members to progressively move in the stages of change? Or, how does personal training affect the self-efficacy of members? These are important topics to evaluate to support members in fitness clubs. The same applies for some club related factors, such as joining fees and payment methods. Because the payment of a substantial membership fee is one of the specific characteristics of fitness clubs, future scientific research could measure the influence of this kind of mediating factor. Constructs of the TTM need to be tested on these specific characteristics in the population of members in fitness clubs to develop tailor-made strategies and programmes to support exercise behaviour and by that the long-term health and fitness levels of the members.

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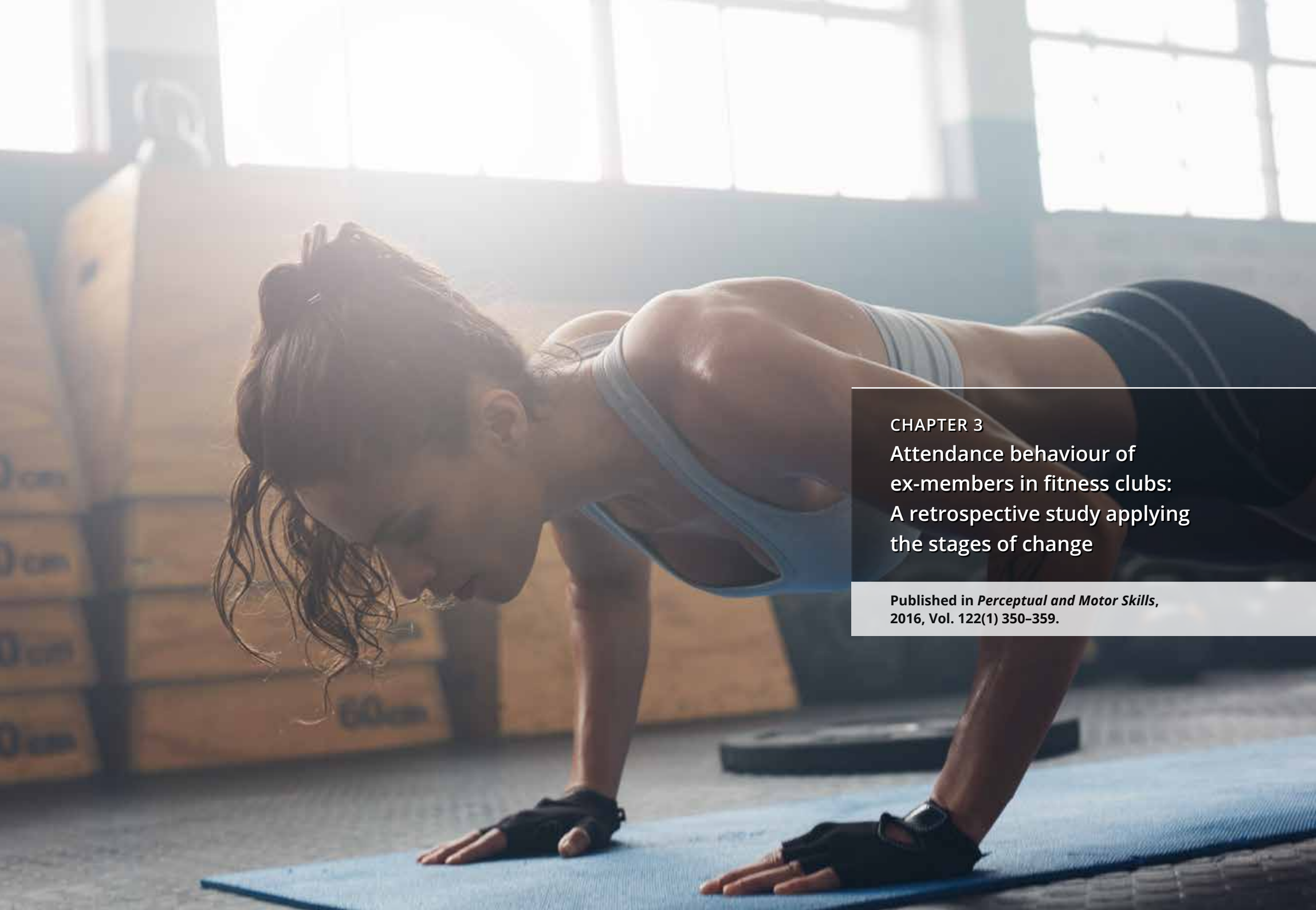

CHAPTER 3

Attendance behaviour of ex-members in fitness clubs: A retrospective study applying the stages of change

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ABSTRACT

Introduction: The transtheoretical model of behaviour change (TTM) is often used to understand and predict health-related behaviour, such as exercising in a fitness club. The stages of change are the organizing construct of the TTM and has been studied in several populations. Surprisingly, studies on the 140 million members in fitness clubs is limited. The objective of this study is to apply the stages of change to examine patterns of attendance behaviour within this specific population.

Method: A retrospective study on existing data was performed to study the later stages of change. Attendance data of members that cancelled their membership in 2012 of two European fitness chains (Basic-Fit and HealthCity) was collected. In total 259,355 ex-members of 267 clubs. A sample of 400 were selected at random for analyses. Overall M_{age} for Basic-Fit was 32.11 (SD 10.9) and 34.74 (SD 11.0) for HealthCity, of which 64% males at Basic-Fit and 51% at HealthCity. Regular attendance behaviour was defined by at least four visits per month.

Results: All ex-members had purchased a membership and entered the preparation stage, but 19.5% never attended the club in 24 months. Of the ex-members, 10% demonstrated regular attendance behaviour for six months in a row without relapsing, and 2.3% performed regular attendance for 24 months. 49% did not attend the club for one full month but restarted again. Significant (p = .01) positive correlations were found in attendance behaviour between the 6th and 12th month (r = .61), and the 12th and 24th month (r = .45), suggesting that ex-members who attended for more than six months will more likely maintain their attendance behaviour.

Discussion: With only 10% of the members demonstrating regular attendance behaviour, it is evident that appropriate strategies should be developed to improve attendance behaviour in fitness clubs.

Key words: Fitness, adoption, maintenance, adherence, drop out.

Introduction

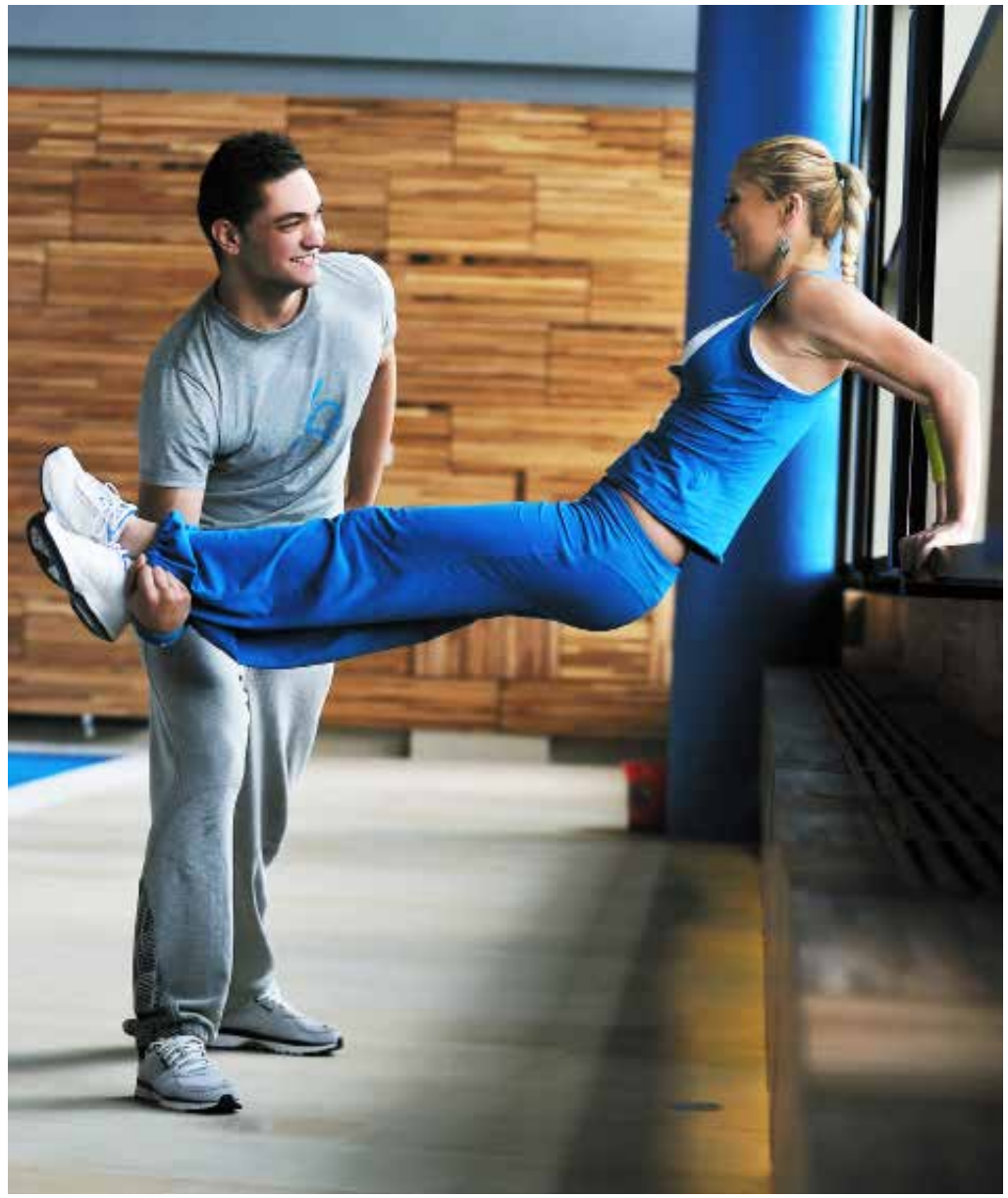
It is well documented that physical activity and exercise are beneficial for personal health (American College of Sports Medicine, 2010; Dishman, Heath and Lee, 2013). In fitness clubs, members predominantly exercise for health benefits (Baart de la Faille, Middelkamp, and Steenbergen, 2012). According to the International, Health, Racquet and Sportsclub Association (IHRSA, 2014), the global population of fitness clubs contains 140 million members defined as persons that paid a membership fee. In regard to exercising in a fitness club, three kinds of behaviour are relevant. First, to exercise in a fitness club, a member has to enter the club, denoted as attendance behaviour. Attendance is measured by swiping a membership card at the reception of the club. Second, the member should attend the programme, labelled as programme attendance. Third, the member needs to exercise according to certain standards or minimums in terms of frequency, duration and intensity, in short exercise behaviour. Exercise is defined as planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health (Buckworth, Dishman, O'Conner & Tomporowski, 2013). Research on exercise behaviour of members in fitness clubs is limited (Middelkamp and Steenbergen, 2015). In a Dutch study (Hover, Hakkers and Breedveld, 2012), 46% of the female members only participated in cardio programmes and 51% exercises in cardio as well in strength programmes. Of the males, 60% combined cardio and strength training and 33% exercises only in cardio programmes. Most males (60%) and females (45%) combine individual and group exercises, but 31% of the females only participated in group exercise programmes. This suggests that attendance behaviour is an indicator of exercise behaviour, but more information on frequency, intensity and duration is needed to conclude this.

Several studies report wide ranges of programme attendance and exercise behaviour in fitness clubs. Annesi and Mazas (1997) reported a variation of 17 – 100% in programme attendance for new members of a private fitness center in a 14-weeks programme. Annesi et al. (2011) found a range in programme attendance of 31 – 49%. These studies measured the actual attendance of the programme, which is different from attending a fitness club. Fitness club attendance was studied and measured by DellaVigna & Malmendier (2006) in an economical study on members in US fitness clubs. They found that the average number of visits for active members declined from 5.46 in month 2 to 4.32 in month 6 (month 1 covers only part of a month), based on a total sample of 7,752 members. The average forecasted number of monthly visits of members in this study was 9.50. It was concluded that members overestimate their future attendance behaviour. In a fitness industry study (Hillsdon, 2001), attendance behaviour data was available for a subset of 21,866 members. In the first calendar month after joining, 29% of members made less than four visits to their club. Overall the median number of visits in the first calendar month after joining was six. The existing studies demonstrated that research on attendance behaviour is limited and report mixed results on attendance behaviour in fitness clubs.

To systematically study and understand exercise behaviour, several social-cognitive models have been developed such as the transtheoretical model of behaviour change (TTM) (Reed, 2001; Buckworth et al., 2013) which describes the factors and stages

of exercise behaviour and its changes over time. The TTM was originally developed to describe smokers who wanted to change their behaviour without professional intervention, but in the last decades it is increasingly applied to exercise behaviour as well (Spencer, Adams, Malone, Roy and Yost, 2006). It is an integrative model, combining different theories and constructs. It describes four key variables that are the stages of change, decisional balance, self-efficacy and processes of change. A review by Adams and White (2002) showed that TTM based interventions are more effective than non-staged interventions in promoting short-term (i.e., shorter than 6 months) physical activity. Spencer et al. (2006) reviewed 31 stage-matched intervention studies and found 25 studies to be successful in motivating participants towards reaching higher stages, including the action and maintenance stages. Although the applicability of the TTM to exercise behaviour seems promising, the literature is inconsistent. TTM studies on attendance behaviour are scarce. According to Dishman, Vandenberg, Motl & Nigg (2010), Dishman, Jackson & Bray (2010) and Fallon, Hausenblas and Nigg (2005), the most important limitations are lack of diverse and representative participants, the lack of longitudinal studies, different definitions of exercise; that most studies rely on self-reports instead of objective measurements, some studies do not include all TTM constructs and, finally, the differences between men and women were not taken into account in the analyses. Spencer et al. (2006) reviewed 150 TTM-based studies. Most reviewed studies addressed middle-class, white, female populations, thereby limiting the generalisation of findings.

The core construct of the TTM concerns the stages of change. Initially, the stages of change contained six main stages to cease an unhealthy behaviour or adopt a healthy behaviour



(Prochaska & Marcus, 1994). The stages are pre-contemplation, which are people who aren't currently active and do not intent to exercise in the nearby future (approximately 6 months). Contemplation, where people who aren't currently active, but do intent to exercise sometime in the next 6 months. Preparation where this group contains people who are not or irregularly active, but are preparing to exercise (within the next 30 days). The action stage where people who made a change in their behaviour and are currently exercising, but have only started recently (6 months). The maintenance stage for people who have been exercising for some time, for at least six months, and for who exercise has become a reasonably stable characteristic. Finally, the relapse stage where on the one hand, people can maintain their behaviour, on the other hand, they can relapse into the previous behaviour and return to the earlier stages. Different researchers tested different stages and sub-stages (Reed, 2001; Spencer et al., 2006). In a systematic and comprehensive review, Spencer et al. (2006) identified 13 different exercise staging criteria to define individual stages. In regard to the early stages, Reed (2001) discussed two sub-stages for pre-contemplation which were the pre-contemplation believers and the pre-contemplation non-believers. The first group believes that exercise is a worthwhile behaviour, but they don't perceive themselves of being able to exercise regularly. The non-believers do not believe in regular exercise at all. In more recent publications, the TTM exists of five stages, excluding the stage of relapse (Buckworth et al. 2013; Dishman et al., 2010; Reed, 2001; Nigg, 2005). It was discussed if relapse should be regarded as a separate stage because when people stop exercising they will automatically return to one of the other stages (pre-contemplation,

contemplation or preparation). Cardinal (1998) stated that individuals that relapse are different from individuals that have never relapsed, because their progress was not continuously improving. As research demonstrated that 50% of the exercisers drop-out in the first six months (Berger, Pargman & Weinberg, 2002), it is especially important to study the later stages of change; starting with the preparation stage, but more important the action, maintenance and relapse stage.

Middelkamp and Steenbergen (2015) systematically reviewed studies using the TTM and stages of change in fitness clubs. In the included 33 studies, only 8 used constructs of the TTM. For example, Nigg, Courneya and Estabrooks (1997) tested the decisional balance sheet (DBS). The experimental group received a phone call and were asked to think systematically and record the expected gains and losses of exercising in a fitness centre. Members reported twice as many pros as cons. The pros were good equipment/facilities and social interaction, whilst the cons were crowded conditions and lack of equipment. Attendance declined from the 4th week baseline to the 8th week in control and placebo group, but less change in experimental group. DBS was effective to keep attendance up. Annesi (2003) tested the effect of a multiple component behaviour change treatment package (for 36 weeks). The package included strategies like relapse prevention, self-reinforcement, and contracting. All studies (US, Great Britain and Italy) showed a significantly higher attendance (13-30%) and less drop-out (30-39%) for the treatment group. This coach-approach system was also tested in Annesi (2004), Annesi (2007), Annesi and Unruh (2007) and Annesi, Unruh, Marti, Gorjala, and Tennant (2011) and proved again that attendance and exercise behaviour

were positively influenced by the intervention. Overall, research using constructs of the TTM to improve attendance and exercise behaviour of members in fitness clubs seems promising but the amount of studies is still limited. To examine attendance behaviour of members in fitness clubs, this retrospective study focused on the (later) stages of change to find answers to the following research question: To what extend do (ex) members of fitness clubs adopt and maintain attendance behaviour within the later stages of change?

Method

Participants

To study the later stages of change in attendance behaviour of members in fitness clubs, the largest fitness club chain in Europe was approached, who had recently re-branded to Leisure Group Europe (LGE). In December 2012 LGE had 573,441 members in 267 clubs in seven European countries. Key characteristics of LGE are that it is a chain that originated in the Netherlands, the group (2012) had 267 clubs in the Netherlands, Belgium, Luxembourg, Germany, France, Spain and Italy and that the group operates two brands called HealthCity (HC) an all-inclusive concept and Basic-Fit (BF) a low budget formula (self-service). In the first, an individual membership costs approximately 50 euro per month and includes diverse services, such as fitness, group fitness, sauna, DVD rental, drinks, etcetera. The Basic-Fit pricing starts from 16 euro per month and only includes fitness and virtual classes. In this group of clubs, in total 259,355 members cancelled their membership with an end date in 2012. From this group of ex-members, a sample was randomly selected. First, members of HealthCity (HC)

with an end date in 2012, were included. For the Basic-Fit clubs, only the members of the Belgium clubs (seven clubs in 2012) could be included because in other countries Basic-Fit (BF) introduced a transferable membership for the whole family, which made it impossible to follow attendance behaviour of individuals. In October and November 2013, five clubs per country were randomly selected. Belgium and Luxembourg were labelled as one country because the low number of clubs in Luxembourg. The following members were also excluded: members with 0 term fee (these are members doing company fitness who pay no membership fee themselves), members with visits before starting date, members with visits after end date, members that are double-administered in the system, and members <18 and >65 years of age. This gave a sample of 10,298 members of the HC clubs, and 6,366 members of the BF clubs. Finally, 200 HC and 200 BF members were selected at random from this database. The members in the two types of clubs showed an average age for Basic-Fit members of 32.11 (SD 10.9) and 34.74 (SD 11.0) for HealthCity, of which 64% males at BF and 51% at HC.

Procedures

The 400 selected ex-members were organized in an excel spreadsheet and analysed by the first and second author individually. First, per ex-member a frequency count in attendance behaviour was executed for every month, for the duration of 24 months. Second, the total sample of ex-members were analysed per later stages of change, including the preparation, action, maintenance, and relapse stage. The scores of the two authors were compared and double checked.

Measures

Attendance behaviour is measured by club visits of members. When members want to enter a club, they can only access by swiping a membership card at the gate. The card reader at the gate is connected to the membership database. Only paying members are able to enter the club. A membership card is for personal use only and has picture ID to be checked by receptionists at the entrance of a club. All swipes of individual membership cards are registered in the membership database and counted as an exercise session. The HealthCity and Basic-Fit clubs offer a range of fitness facilities and programmes. Importantly, the use of different areas or programmes are not recorded. Most clubs are equipped for exercise purposes only. The duration that members spend in the club is also not registered.

> Of the total sample, 10% demonstrated regular attendance behaviour for six months in a row (the action stage) and 2.3% never relapsed.

Results

When members want to exercise in a fitness club, they must first register as a member as part of their preparation. The difference between registration and first attendance to the club was

respectively 3.23 days (SD 24.5) at BF and 3.67 days (SD 17.2) at HC, for the members that started. The average ex-member of Basic-Fit paid for the membership a total of 475 days (SD 204) and 646 days (SD 597) at HealthCity, respectively. In the first full month (this is the second month because many members start during the first month for example on the 15th so in this month less visits are made), members were attending on average 3.23 times (SD 4.1) at BF and 5.28 (SD 5.4) at HC. The time between cancel date (cancel the membership) and end date (last attendance) is 97.77 days (SD 113.7) for BF and 102.66 days (SD 118.9) for HC. To answer the research question, both databases were combined yielding a total of 400 members. The attendance behaviour of the members in the first 24 months were analysed. In total the sample of 400 ex-members had attended the clubs 10.980 times in 24 months. In the first full month, the average number of visits were 3.63 compared to the last (24th) month 0.29. On average the members performed 1.1 visits per month over the total of 24 months. Based on the purchase of the membership, all members had entered the preparation stage. Of the total sample, 78 members (19.5%) never attended the club within the first 24 months, and 211 members (52.8%) did not visit the club in the first month. 40 members (10%) demonstrated regular attendance behaviour at least four times per month for the first six months in a row (the action stage) and made it to the maintenance stage without relapsing. For the total period of 24 months that were analysed, 9 members (2.3%) never relapsed. 199 members (49%) relapsed for one full month at least once, but then restarted their attendance behaviour again. Most of the members relapsed multiple times. A substantial group of members relapsed for two full months and became active again after that

(31%). The data demonstrated that attendance behaviour in the 6th month is positively associated to attendance behaviour in the 12th month and the 12th month to the 24th month. Significant (p = .01) positive correlations (two-tailed) were found between the 6th and 12th month (r = .61) and the 12th and 24th month (r = .45).

Discussion

Attendance behaviour of (ex) members in fitness clubs appears to be a problematic issue. With only 10% of the members reaching the maintenance stage without relapsing, and 19.5% never attending the fitness club at all, the amounts are so low that health benefits will be marginal to zero. The average attendance behaviour is extremely low. The decrease in attendance behaviour is substantial with attendance 12.5 times less in the 24th month compared to the first full month. Only a very small percentage of 2.3% of the ex-members never relapsed during the first 24 months. However, a substantial group (50%) of the ex-members that relapsed for one full month started again in the following month. This is a positive indication that a relapse in attendance behaviour does not automatically mean the final termination of the behaviour. Significant positive correlations were reported with the strongest correlation between the 6th month and the 12th month, showing that ex-members who make it to the maintenance stage are more likely to continue their attendance behaviour towards the 12th month, even if the frequencies are considered as low. Studies of Annesi (2003), Annesi (2004), Annesi (2007), Annesi and Unruh (2007), and Annesi et al. (2011) proved that attendance and exercise behaviour was positively influenced by the intervention. Future research should

test if this intervention can also improve attendance and exercise behaviour for a longer period of time, like 12 and 24 months. Most interventions on attendance and exercise behaviour are limited in terms of week (often 12, 14 or max 36 weeks) and thereby lacking the long-term effects on behaviour. Based on the data in this study it can be concluded that long term interventions are needed to maintain attendance behaviour.

The present study on attendance behaviour of members in fitness clubs has limitations. First, the sample of ex-members is from one fitness club chain only, albeit operating under two brands. Even though members from multiple countries were included and a random selection of a substantial sample of 259 thousand ex-members was analysed, it is still possible that the results are exclusive for this chain. The results are also affected by the specific group of members: ex-members. All participants in this study have ended their attendance behaviour in fitness clubs. The outcomes could be different when analyzing members that never relapsed and never cancelled their membership. Another factor to be mentioned is the measurement used. In this study, attendance behaviour was measured by swipes of the membership card and actual club visits. Unfortunately, it is unclear what kind of exercise the members did after their attendance, and what the duration and frequency of their exercise sessions were. Based on observations in the BF and HC fitness clubs, it is known that members do not travel to the fitness club and pay a membership fee to only exercise for a few minutes. Usually, exercise programmes like classes or fitness sessions last for approximately 45 to 60 minutes, with a moderate to high intensity. Finally, the definition of regular attendance behaviour was rather arbitrary with a minimum of four

visits per month. When counting the monthly visits, small (weekly) relapses, for example caused by holidays, are not taken into consideration. This could have influenced the results. An important question to fitness clubs and professionals is how to predict and promote the adoption and maintenance of attendance and exercise behaviour and progressively move forward through the stages of change. With only 10% of the members making it to the maintenance stage and just 2.3% that never relapsed in 24 months, it is evident that appropriate strategies have to be developed to improve long term adoption and maintenance of attendance and exercise behaviour, that will ultimately increase health and fitness levels of the members in fitness clubs.

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CHAPTER 4

The transtheoretical model and strategies of European fitness professionals to support clients in changing health-related behaviour: A survey study

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ABSTRACT

Introduction: The transtheoretical model of behaviour change (TTM) is often used to understand and predict changes in health related behaviour; for example exercise behaviour and eating behaviour. Fitness professionals such as personal trainers typically service and support clients in improving multiple types of health-related behaviour. However, research on the population of European fitness professionals in general is lacking, and with studies on strategies used by fitness professionals to support clients in changing health-related behaviour even more scarce. The purpose of this paper is to present the first explorative European study on this subject.

Method: An online survey was performed using the European Register for Exercise Professionals (EREPS), counting 6,681 professionals (January 2015). Most professionals are personal trainers, with a total of 5,222. Additionally, there are 1,620 level 3 fitness instructors and 39 at level 5 (exercise for health specialist). Professionals of five countries were surveyed in the first quarter of 2015. The survey was sent out by email to 3,497 fitness professionals.

Results: In total 178 fitness professionals participated. European fitness professionals use a mix of strategies to support behaviour change of health-related behaviours. The most addressed type of behaviour was exercise, followed by nutrition. The support mainly focused on clients in the preparation and action stage of the TTM. “Reaching the desired goal” and “too expensive” were the main reasons for relapse with respectively 51.7% and 38.3%.

Discussion: European fitness professionals use a wide range of strategies to support clients in changing health-related behaviour. This study draws a first picture of the used strategies within the TTM framework. Future research should focus on other frameworks for behaviour change and other populations, for example fitness professionals on other parts of the world. Ultimately, research should test the effectiveness of strategies to increase the adoption and maintenance of health-related behaviour of clients, and client retention of professionals.

Key words: Health behaviour, stages of change, motivation, retention

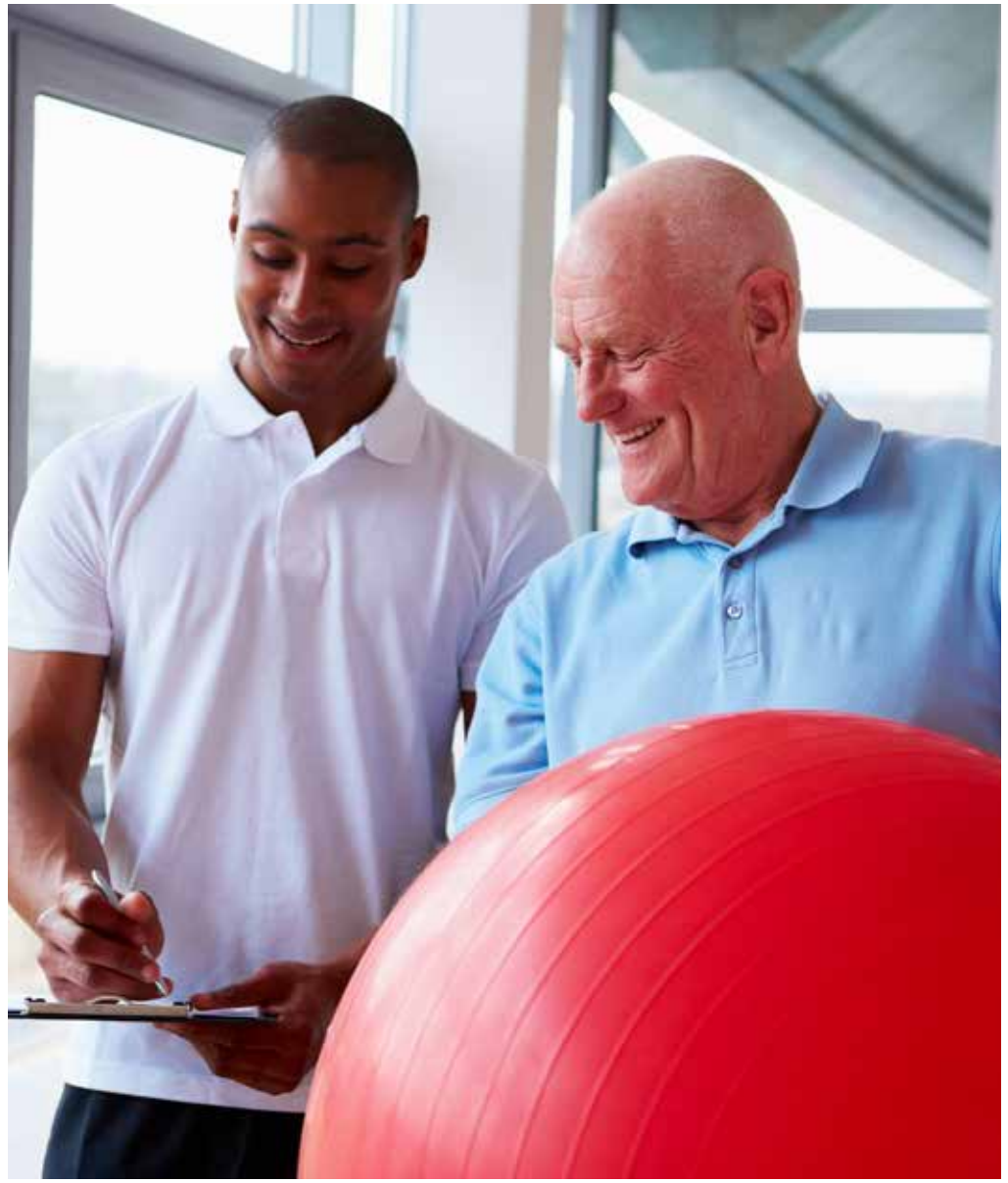
Introduction

According to the European association for fitness and health, EuropeActive (formerly European Health and Fitness Association, EHFA), the European sector consists of approximately 44,000 fitness centre facilities, 44 million members and 390,000 employees (Rieger, Naclerio, Jimenez and Moody, 2015). Detailed information on the population of employees within the fitness and health sector is limited. According to a Dutch study, one third of the fitness centres has over 5 FTE's (fulltime equivalent) employees (Hover, Hakkers and Breedveld, 2012). The largest group are fitness professionals, but it is known that fitness professionals operate both inside and outside fitness centres (Middelkamp and Willemsen, 2010). In Europe, fitness professionals are educated and organised within the European Qualification Framework (EQF). Within this framework, a professional matches different levels based on set minimum qualifications in terms of knowledge, skills and competencies. The framework starts with level 2, the fitness assistant; level 3 the (group) fitness instructor; level 4 the personal trainer; level 5 the exercise for health specialist and level 6 the advanced health and exercise specialist (Rieger, 2014). To develop the EQF standards, constructive discussions took place towards topics on knowledge, skills and compentencies needed for fitness professionals to meet a certain level and occupational requirements. There are just a few studies available that investigate which skill-set fitness professionals require to support the needs of their customers and match certain industry quality criteria (Baart de la Faille, Middelkamp and Steenbergen, 2012). Overall, the standards focus mainly on topics like physiology, atanomy, injury prevention, energy systems, and different kinds of training. Less focus is placed on motivation and the promotion of behaviour change. In

a German study on personal trainers (Horn, 2011), a set of success factors for trainers was summarised by the trainers themselves. The researchers discussed social compentences, sympathetic look, capability, communicative skills, appearance and being a role model. Two USA-based studies summarised similar success factors, including motivational skills, individuality (the ability of the trainer to give the customer a special feeling), emphatic ability and social skills (Melton, Katula and Mustian, 2008; Melton, Dail, Katula and Mustian, 2010). The focus on this kind of these so called ''soft-skills'' is becoming more apparent within fitness professionals and training providers. For fitness professionals like personal trainers, skills to motivate and support clients on behaviour change have a double impact. First, it helps the clients to adapt and maintain health-related behaviours which results in higher levels of health and fitness. Second, in supporting clients on motivation and behaviour change, personal trainers can improve the levels of client (member) retention, which affects their business as a profesional. Acccording to a study performed in Austria, the average membership duration of members that train with a personal trainer is 3.77 years, compared to members that train without a personal trainer, at 2.96 years (Kronsteiner, 2010). However, it is unknown which factors deliver the positive correlation for personal training and retention.

To maximise the long-term health and fitness effects for clients, the topics of motivation and behaviour change have experienced an increased degree of attention. This is not only towards exercise or training, but for health-related behaviours in general,such as in sleeping behaviour, smoking behaviour, sitting behaviour and nutrition (eating) behaviours. It is a matter of debate which behaviours should be addressed by fitness professionals, but

most professionals address multiple types of behaviour including exercise, nutrition and physical activity in general. Still, many aspects of health-related behaviour issues are not yet well understood. Therefore, researchers continue to attempt to understand the nature and causes of many different health behaviours. Health behaviour encompasses a large field of study that cuts across various areas, including psychology, education, sociology, public health, epidemiology, and anthropology. According to Mosby's Medical Dictionary, 8th edition, 2009, Elsevier, health behaviour is: "An action taken by a person to maintain, attain, or regain good health and to prevent illness". Thus, when considering that health behaviour is any activity undertaken by an individual, regardless of actual or perceived health status, for the purpose of promoting, protecting or maintaining health (whether or not such behaviour is objectively effective towards that end), it can be argued that almost every behaviour or activity by an individual has an impact on their health status. In the context of this paper, it is useful to differentiate between behaviours which are purposefully adopted to promote or protect health (as regular physical activity and/or exercise), and those which may be adopted regardless of the consequences to health. Health behaviours are sometimes distinguished from risk behaviours which are defined separately as behaviours associated with increased susceptibility to a specific cause of ill-health (i.e. smoking or alcohol consumption). Health behaviours and risk behaviours are often related in clusters in a more complex pattern of behaviours referred to as lifestyle. There are three categories of health behaviour; *preventive health behaviour* involves any activity undertaken by individuals who believe themselves to be healthy for the purpose of preventing or detecting illness in an asymptomatic state; *illness behaviour* is any activity undertaken



by individuals who perceive themselves to be ill for the purpose of defining their state of health, and discovering a suitable remedy; and, *sick-role behaviour* involves any activity undertaken by those who consider themselves to be ill for the purpose of getting well. It includes receiving treatment from medical providers, generally involves a whole range of dependent behaviours, and leads to some degree of exemption from one's usual responsibilities (Middelkamp, Jiménez and Rieger, 2015).

The transtheoretical model (TTM) is frequently used to study different kinds of health-related behaviours, including smoking, physical activity and exercise. In different populations and settings, the existence of significant relationships between the TTM and exercise behaviour have been demonstrated (Fallon, Hausenblas and Nigg, 2005; Marshall and Biddle, 2001; Spencer, Adams, Malone, Roy and Yost, 2006). To increase health-related behaviour, an in-depth understanding of the development of the specific behaviour, its change over time, and the factors leading to this change is needed, which makes the TTM useful as a theoretical model. Furthermore, the TTM is an integrative model, combining multiple theories or constructs which increase the understanding of complex behaviours. The model was originally developed to observe smokers who wanted to change their behaviour without professional intervention, the so-called self-changers. It describes four key variables: 1. stages of change; 2. decisional balance; 3. self-efficacy and, 4. processes of change. The stages of change contain five main stages to cease an unhealthy or adopt a healthy behaviour (exercise is used here as an example but the stages can be applied to many other types of health-related behaviour), or six stages if the termination/relapse stage is also included (Prochaska and Marcus, 1994). The stages are, 1) pre-contemplation where

people who aren't currently active and do not intent to exercise in the nearby future (approximately 6 months); 2) contemplation where people who aren't currently active, but do intent to exercise sometime in the next 6 months; 3) preparation where this group contains people who are not or irregularly active, but are preparing to exercise (within the next 30 days); 4) action where people who made a change in their behaviour and are currently exercising, but have only started recently (less than 6 months) and 5) maintenance where people who have been exercising for some time, for at least six months, and for who exercise has become a reasonably stable characteristic. The decisional balance is the second construct of the TTM, and contains two main scales of pros and cons for changing behaviour. There are four dimensions for pros which are 1) useful benefits for the self, 2) useful benefits for others, 3) self-approval, and 4) approval of others. There are also four dimensions for cons which are 1) useful losses for the self, 2) useful losses for others, 3) self-disapproval, and 4) disapproval of others. The pros and cons are important for influencing persons in an early stage (pre-contemplation – preparation) to the action stage. The third construct is self-efficacy (Bandura, 1997), which involves the degree of confidence a person has that he or she will not engage in a problem behaviour in tempting situations. In short, self-efficacy is a person's belief and confidence in capabilities to overcome personal, social and environmental barriers to exercise. There are two aspects that will influence the level of confidence. One is efficacy expectations which in short means one's belief about their own competence, and the second is the outcome of expectations where there is belief in ones perceived result or outcomes of a type of health behaviour. With respect to exercise behaviour, a person with high self-efficacy in relation to exercise feels that

he or she has the skills to be successful in exercise-related activities. Self-efficacy can affect performance in different manners, usually by choice of activities/actions, such as how much effort a person will extend and persistence when encountering difficulties. There are four sources for an individual's self-efficacy. These are (in order of effectiveness) past experiences in performing specific behaviours, vicarious experiences (watching others successfully perform behaviours), verbal persuasion (being told that one is capable), and experiences of physiological arousal. The fourth construct measures ten processes of change, which can be divided in five experimental or cognitive processes and five Behavioural processes. The five cognitive processes are consciousness raising (e.g. looking for information), dramatic relief (e.g. emotional aspects of change), environmental re-evaluation (e.g. assessment of how inactivity affects society), self-re-evaluation (e.g. assessment of personal values) and, social liberation (e.g. awareness, availability and acceptance of active lifestyles in society). The five behavioural processes are counter conditioning (e.g. substituting physical activity for sedentary leisure choices), helping relationship (e.g. using social support during change), reinforcement management (e.g. self-reward for change), self liberation (e.g. commitment and self-efficacy beliefs about change), and stimulus control (e.g. managing situations that prompt inactivity or activity) (Dishman, Jackson and Bray, 2010; Reed, 2001). To study behaviour change strategies of European fitness professionals, the framework of the TTM was used to develop an online survey. The main research question for this survey was "what strategies within the TTM do European fitness professionals currently use to support clients in changing health-related behaviour"?

Method

Participants

EuropeActive has developed a register for exercise professionals (EREPS), counting 6,681 professionals, in January 2015 (excluding REPS UK). By far the most are personal trainers are level 4, with a total 5,222. Additionally, there are 1,620 level 3 fitness instructors and 39 at level 5 (exercise for health specialist). For the study, this EREPS database was used, with four of the top ten countries in terms of registrations being selected. Their selection was influenced by the option to translate the survey from English to local languages. The large variety in languages is a typical characteristic of Europe. Because the original survey was written in English, the UK and Ireland were selected (with EREPS members working in the UK and Ireland). Translations into Dutch, German and Finnish were possible because of close relationships to EuropeActive training providers Trainer4You in Finland and LAPT in the Netherlands and Germany. Their databases of trainers were also included in the survey.

Procedure

In total, the survey was sent out via email to a total of 3,497 fitness professionals. The fitness professionals of the selected countries received an email on behalf of EuropeActive explaining the reasons for the survey and addressing topics like confidentiality and time needed to answer all questions (approx. 15 minutes). The survey was first sent out to professionals in Ireland and later across the UK. In the meantime, the surveys were translated into German, Dutch and Finnish. The survey was constructed in a way that a respondent had to answer all questions on page one, before he or she could move to the next page. Two weeks after the first email,

all fitness professionals received a second, or reminder email. On top of that, the training providers and local associations stimulated professionals to complete the survey.

Measures

The survey was set up in an online system named NETQ and contained 20 questions, which were mainly multiple choice. The first range of questions gathered information on age, gender, country, type of fitness professional and questions on organisation topics for example the work place of the professional, types of sessions and income. The main questions of the survey addressed the TTM framework. Per stage of change, professionals scored on a 5-point Likert scale to what extent they used TTM related strategies to support their clients or in health-related behaviours. It was also questioned which health-related behaviours they addressed, including exercise, nutrition, physical activity, relaxation/stress, sitting, smoking and sleeping. Respondents could always fill in ''other'' if they would like to add topics.

> The most frequently used strategies to support clients throughout the stages were 'perceived result belief', 'counter conditioning' and 'useful benefits'.

Results

In total 178 fitness professionals participated in the survey. This yielded a response rate of 5%. 276 professionals opened the survey link, and 60 fitness professionals answered all twenty questions. The largest group of fitness professionals that participated in the survey were in the age group of 31 – 40 (46%), with an average age of 38 (SD 10). More females (56.7%) than males participated. The highest percentage of fitness professionals were within their first year of their profession (26.7%) although the average number of working months showed a different picture of 72 months (6 years). Of the participants, 11.7% was working for more than 15 years as a professional, 21.7% are categorised as fitness instructors, 45% as group fitness instructors, 93% as personal trainers and only 12% exercise for health professionals (level 5). Although most professionals scored only one option, multiple answers were possible, because professionals sometimes have multiple categories of registration. The largest group of fitness professionals (75%) charge money for one-to-one sessions of 60 minutes, followed by small group training (41.7%) and group fitness classes (38.3%).

TABLE 1
Summary of data on participants in survey.

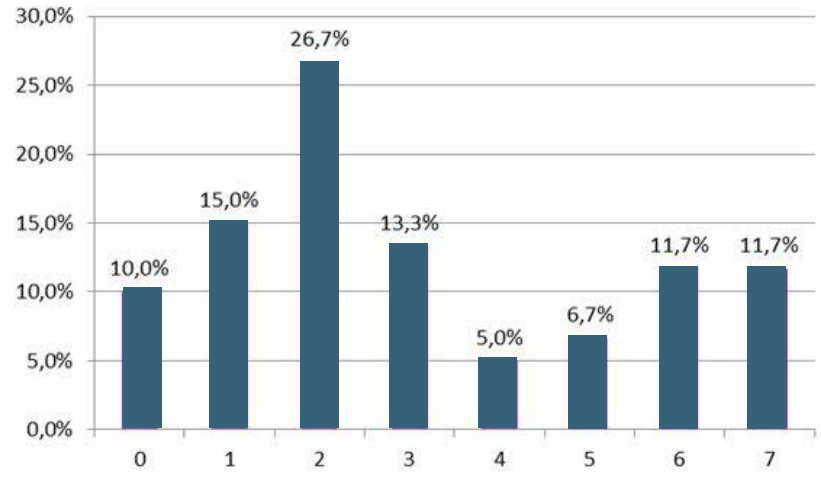
Variable	Results
n	178
Age	38 (SD 10)
Females	56.7%
Professionals active in their first year	26.7%
Professionals active > 15 years	11.7%
Fitness instructor*	21.7%
Group fitness instructor*	45.0%
Personal trainer*	93.0%

* Multiple answers possible

About one third (38.5%) of the fitness professionals reported an average monthly revenue of less than 1,000 euro (AUD 1500). On the other side of the spectrum, 13.5% reported a turnover of over 5,000 euros (AUD 7500) per month (excluding VAT), and 21% earns between 2,000 euro (AUD 3000) and 3,000 euro (AUD 4500) a month. The surveyed fitness professionals reported that the main goals clients mention at the start of a programme include: Losing weight (86.7%), getting fit (78.3%) and general improvement of health (75.0%). With respect to health-behaviours addressed by fitness professionals, exercise was the most common form of health behaviour, with 86.7% of the participants in the survey offering this kind of service. Second, nutritional services are offered by 56.7%. The majority (91.7%) of the fitness professionals claimed that they addressed all-day physical activity in their programmes “often” or “all the time”. As far as relaxation and stress release are concerned, 36.7% of the fitness professionals registered that they included these health behaviours “all the time” in their programmes. Almost 12 percent of fitness professionals said that they “always” addressed all seven different health behaviours in their programmes. A total of 35.1% of these fitness professionals “always” took care of at least 4 different health behaviours in their programmes. And, 25.0% of the fitness professionals “often” or “always” addressed all seven different health behaviour determinants in their programmes. A large number (78.4%) of the fitness professionals “often” or “always” included at least four different health behaviours in their programmes.

FIGURE 1

Number of health behaviours that are "always" addressed by fitness professionals.

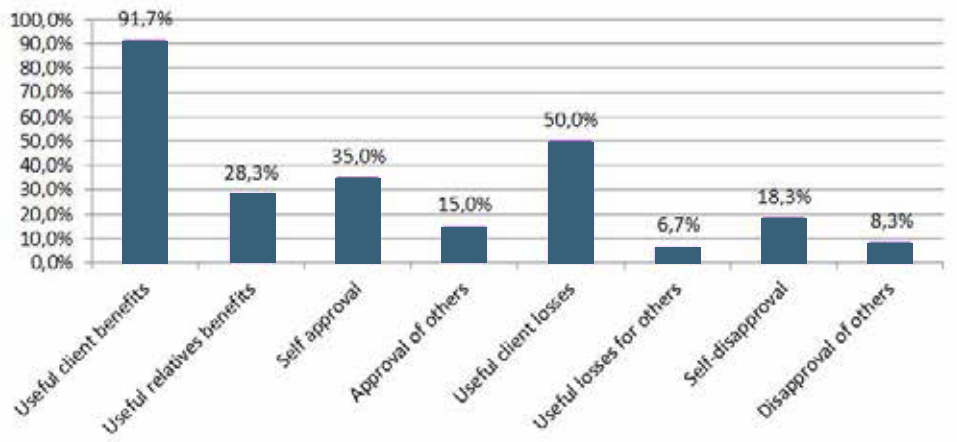


The most frequently used decisional balance strategy to increase behavioural change of potential clients (clients in the pre-contemplation, contemplation or preparation stage) focussed on the 'useful benefits for the client', with 91.7% of the fitness professionals using this strategy. The only other strategy that was used by 50% of the fitness professionals was 'useful losses for the client'. When confidence and beliefs of potential clients are concerned, 'the client's belief in regard to the perceived result of the outcomes of behaviour' is mostly used by the professionals. This strategy was used by 76.7% of the professionals, whereas 68.3% of the participants use 'the confidence of the client to be engaged in positive behaviours'. On the other hand, 28.3% of the participants use 'the confidence of the client not to be engaged in negative behaviours'. Fitness professionals used strategies

combined with practical tools, such as flyers or a personal website. The most frequently used tool to increase the interest of potential clients to participate was a website, focusing on the 'useful benefits for the client'. A total of 68.3% of the fitness professionals used this tool. Referral cards, press releases and seminars are used by 10%.

FIGURE 2

Decisional balance strategies used by fitness professionals to increase behavioural change in potential clients.



The most frequently used strategies to support clients throughout the preparation, action, maintenance and relapse stages were 'perceived result belief' (on average by 40.0% of the professionals), 'counter conditioning' (39.2%) and 'useful benefits' (38.4%). The less frequently used strategies to support clients throughout the preparation, action, maintenance and relapse phases are 'environmental re-evaluation' (on average by 23.8%

of the professionals), '(self-) disapproval' (24.2%) and 'reinforcement management' (24.2%). The relapse stage was the stage where the lowest number of strategies were used. During the preparation stage, professionals are most likely to use the listed tools or methods. The further their clients moved through the stages, the less tools are used by the professionals. Strategies like goal setting were used by 58.3% of the professionals in the preparation stage compared to 8.3% in the relapse stage. Motivational text messages or emails were used the most (55%), followed by confirmation calls for the first appointment (46%), and these tools were most often applied in the preparation stages. 46.1% did not included any tools to register drop-out reasons (relapse), or are not registering them. The most used tool to register drop-out reasons is 'on paper' (33.8% of the professionals are using this tool). As far as the drop-out reasons are concerned, the main reason (51.7%) was that clients have 'reached the desired goal'. None of the professionals (0.0%) indicated that clients are dropping-out because they were dissatisfied with the service of professional. Another important drop-out reason was that the service was 'too expensive' (mentioned by 38.3% of the professionals). Regarding specific strategies of professionals to retain clients, 'offering frequent new exercises and programmes to fight boredom' (80.0%) and 'contacting clients when they don't show up at an appointment' (71.7%) were most popular. 6.7% of the professionals used a loyalty programme for their clients.

Discussion

This European survey was the first to collect information on which strategies within the TTM European fitness professionals used to support clients in changing health-related behaviours.

The results demonstrated that professionals used a wide range of strategies related to the TTM and focus on multiple health-related behaviours. It seems that the largest group was relatively new to this profession, even if a substantial group have been ''in business'' for a much longer period. 93% were personal trainers, so this survey was mostly about this group of fitness professionals. Exercise was by far the most addressed type of behaviour by fitness professionals, followed by offering nutritional services. With 86.7% of the clients reporting that losing weight was a main motive to work with a fitness professional, it is logical that professionals included this kind of programming. Weight loss is highly influenced by nutrition. Research supported that the combination of exercise and nutrition is significantly more effective than a controlling diet alone (Wu, Gao, Chen and Van Dam, 2009). It was not clear what the level of knowledge, skills and competences of the European fitness professionals were in this field of expertise, and this could be addressed in future research. Health-related behaviour such as sitting and smoking do not have a huge focus of fitness professionals. This could bring opportunities for the future, if the positive effects of these factors on health are taken into consideration and 75% of the clients reporting ''improvement of health'' as a motive to participate in fitness programmes. Studies (Hamilton, Hamilton, Zderic, 2007; Wilmot, Edwardson, Achana, Davies, Gorely, Gray, Khunti, Yates and Biddle, 2012) demonstrated the effect of sedentary time and sitting behaviour on multiple diseases and premature death. If fitness professionals increasingly address these types of health-related behaviour, then next to smoking, they will positively increase the health and fitness levels of their clients. Only a small percentage of the fitness professionals were “always” addressing all seven (as summarised in this survey) health behaviours in their programmes. One third of the fitness professionals were “always” addressing at least four health behaviours in their programmes, although it should be reported that the survey did not consider how much time was spent and which results were generated.

Regarding the different components of the TTM, all components (decisional balance, self-efficacy and the processes of change) are equally used. Focusing on the different elements within the components however, some interesting findings deserve mentioning. Within the construct of decisional balance, professionals seem to be more likely to focus on the pros (the benefits for the client for changing their behaviour) than to the cons (the losses for the client for changing their behaviour). In the decisional balance, every (new) client experiences the disadvantages of changing their unhealthy behaviour, so it is suggested that this should also be addressed by fitness professionals. For example, by applying motivational interviewing and implementing monthly counselling to address these topics. Regarding self-efficacy, a client’s belief of the perceived results of the outcomes of behaviour was mostly addressed by the fitness professionals. Also popular was the focus on the confidence that a person will engage in positive behaviour in challenging situations. Significantly less attention was paid to a client’s confidence that he or she will not engage in negative behaviour when in tempting situations. Again, this raises the danger for fitness professionals to underestimate client’s discomfort of having to change their unhealthy behaviour. Within the component of processes of change, no significant differences were found between the five cognitive, and the five behavioural processes. When reviewing the strategies and tools used, professionals need to pay more attention to clients in the relapse stage and use the listed strategies and tools. Fitness professionals

used effective behaviour change strategies such as goal setting (Buckworth, Dishman, O'Conner and Tomporowski, 2013) seven times more often in the preparation stage as in the stage of relapse. Eventually, new strategies and tools specific for clients in this stage might need to be created, and some professionals mentioned tools such as wearable devices. Nearly half of all professionals did not used any tools to register the reasons for drop-out or were not registering what happens at all. Given the fact that relapse was a significant problem in the fitness sector (Middelkamp and Steenbergen, 2015), it seems sensible that all professionals should at least register and understand the reason for a drop-out. This will help to develop a better understanding of the 'retention-dilemma' in the fitness sector and provide directions for future research, interventions and tailor-made strategies. As far as the main reason why clients end their training, the survey indicates it is because clients have reached the desired goal. Interestingly, none of the professionals indicated that their clients were dropping-out because they were dissatisfied with the work of the professional. To track these kind of reasons, a further study towards client's experiences would be helpful. Another important reason for a client to drop out was because the programme was "too expensive". This was mentioned by almost forty percent of the surveyed professionals. It is unclear whether this was a result of the current economic climate, since many professionals are delivering 1-to-1 sessions which were the most expensive form of personal training.

The current study had an important limitation, with a low response rate of only 5%. In a similar type of web survey and target group in Germany, Horn (2011) reported a response of 244 out of the 2805, so a response rate of approximately 9%. This is higher

than the 5% of the current study, but still low, and thereby limiting the generalisation of the findings. One possible explanation for the slightly higher response rate could be that the Horn study focused on one country and the current study on five countries, which makes it more complex to motivate and communicate with potential participants. Further, to the response in the current survey, after the first email that was sent out, the responses were analysed. The delivery rate was checked and all countries had a score of 100%. The open rate (clicking and open the survey link) differed per country: Finland, 41%; Germany, 23%; Netherlands, 30%; UK, 50%; Ireland, 36%. An open rate of 20% is already labelled as ''good'', so the scores in this survey were high. The main issue was that professionals did not start the survey. For the second reminder email it was considered to reward (give a present for participating) the professionals to increase the response, but finally it was decided not to do this because it could influence the quality of the results and biased the findings. Professionals could fill in the survey to just get the reward and would perhaps care less about the answers. This study on strategies for fitness professionals was the first study within this area. This means that many questions remain unanswered, and to describe, understand and predict effective strategies to increase behaviour change much more research is needed. It would be valuable to repeat the current survey to increase the number of respondents and reliability of results. Next to research on physiological effects of exercise or nutrition, the health and fitness sector needs a better understanding and needs to test strategies to improve the adoption and maintenance of health-related behaviours. This survey made a first and important step in this direction.

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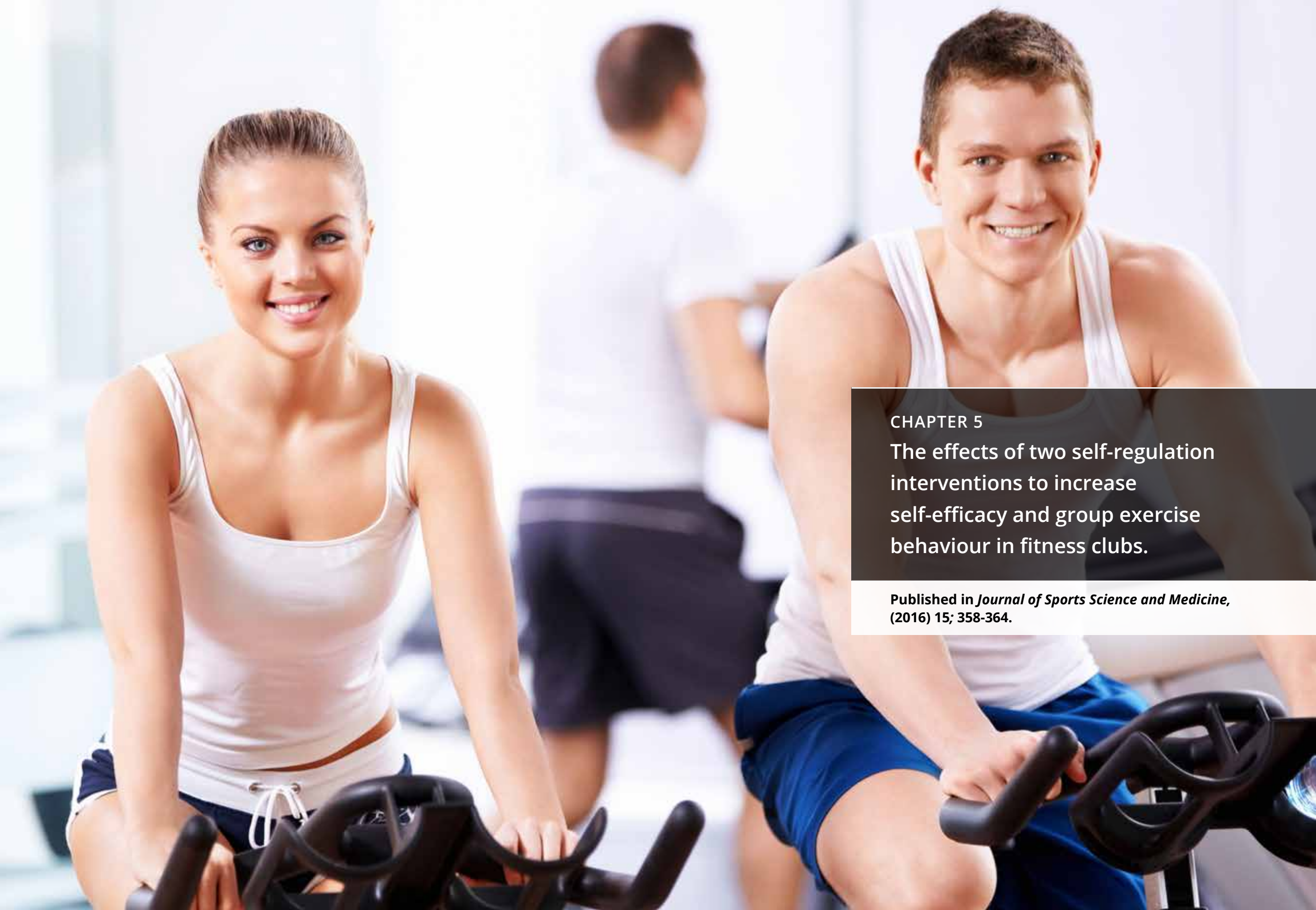

CHAPTER 5

The effects of two self-regulation interventions to increase self-efficacy and group exercise behaviour in fitness clubs.

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ABSTRACT

Introduction: Studies on the adoption and maintenance of group exercise behaviour are scarce. The objective of this study is to test two self-efficacy-based interventions to increase barrier self-efficacy and group exercise behaviour.

Methods: In total 122 participants (M_{age} 42.02 yr.; SD 12.29; 67% females) were recruited and randomly assigned to one control and two experimental groups. The control group was limited to the participation in one virtual group exercise programme only (group 1). The first experimental group was able to self-set their activities and participate in multiple group exercise programmes (group 2). The second experimental group received an additional monthly coaching protocol to manage self-set goals (group 3). A validated scale for barrier self-efficacy was used, with group exercise sessions measured and drop-out rates were registered.

Results: An ANOVA indicated that mean amount of sessions of group 1 and 3, and 2 and 3 differed significantly ($p < .05$) in 12 weeks. Descriptive statistics demonstrated mean group exercise sessions over the total of 12 weeks of 2.74 (SD 4.65) in the control group; 4.75 (SD 6.08) in the first experimental group, and 12.25 (SD 9.07) for the second experimental group. Regression analysis indicated that self-efficacy at 8-weeks explained the highest variance in overall group exercise sessions (R^2 =.18; $p < .05$). Overall drop-out rates were 88% in group 1, 78% in group 2 and 48% in group 3.

Discussion: The results showed that group exercise behaviour can be significantly improved by a coaching protocol on self-set goals. Future research should address the effectiveness of self-set activities and self-set goals for a longer period of time and in other types of exercise programmes.

Key words: Fitness, adoption, maintenance, adherence, drop-out.

Introduction

It is well documented that physical activity and exercise are beneficial for health (American College of Sports Medicine, 2010; Dishman, Heath and Lee, 2013). Physical activity includes all bodily movements produced by skeletal muscles resulting in energy expenditure. The current study focuses on exercise (behaviour) only, defined as planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health (Buckworth, Dishman, O'Conner and Tomporowski, 2013). According to the International Health, Racquet and Sportsclub Association (IHRSA, 2015), approximately 144 million individuals exercise in fitness clubs worldwide. In regard to exercising in a fitness club, three kinds of behaviour are relevant. First, an individual has to enter the facility, denoted as attendance behaviour. Second, the individual has to attend the programme, labelled as programme attendance. Third, the person needs to exercise according to certain standards or minimums in terms of frequency, duration and intensity, in short exercise behaviour. Research on attendance and exercise behaviour in fitness clubs is limited (Middelkamp and Steenbergen, 2015), but there are strong indications that the frequencies are low. Middelkamp, Van Rooijen and Steenbergen (2016) reported low amounts of exercise sessions in fitness clubs, using a database of 259,000 ex-members with an average of 1.1 session per month over 24-months, including a mix of individual and group exercise behaviour. Health effects based on these frequencies will be marginal at best. In regard to types of exercises, a Dutch study (Hover, Hakkers and Breedveld, 2012) reported that most males (60%) and females (45%) combined individual and group exercises, but 31% of the females only participate in group exercise programmes. The study

also reported that most individuals participate in two or more types of programmes with about 50% participating in at least one group exercise programme and 23% participating only in group exercise classes with instructor. Several studies reported large ranges of programme attendance and exercise behaviour in fitness clubs. Annesi et al. (2011) found a range in programme attendance spanning 31 to 49%, when measuring the actual attendance of the programme. Annesi (2003) tested the effect of a multiple component behaviour change treatment package (for 36 weeks), partly based on the constructs of self-efficacy. The package included strategies such as relapse prevention, self-reinforcement, and contracting. All studies (US, Great Britain and Italy) showed a significantly higher attendance (13 to 30%) and less drop-out (30 to 39%) for the treatment group. Seghers, Van Hoecke, Schotte, Opdenacker and Boen (2014) examined the effectiveness of a 15-minute self-efficacy coaching at the start of a 12-week lifestyle physical activity programme and reported significant effects on physical activity behaviour, self-efficacy and programme adherence. These and other studies (Buckworth et al., 2013; Middelkamp and Steenbergen, 2015) indicate that the adoption of new exercise behaviour and the maintenance of existing behaviour (adherence) is challenging, but can be improved by self-efficacy based interventions.

Studies on group exercise behaviour in general and more specifically within fitness clubs are also limited (Middelkamp, Dekkers and Wolfhagen, 2016), but again studies indicate positive correlations with exercise attendance and adherence. Burke, Carron, Eys, Ntoumanis and Estabrooks (2006) conducted a meta-analysis and examined home-based programmes not involving contact with researchers or health-care professionals,

home-based programmes that involved some contact, standard exercise classes, and exercise classes where group dynamics principles were used to increase cohesiveness (true group). The search produced 44 studies containing 214 effect sizes with results demonstrating that exercising in a true group was superior to exercising in a standard exercise class, although it remains unclear what defines a true group in real-life exercise settings (in fitness clubs). In the context of fitness clubs, Annesi (1999) reported a significant positive relationship between a small group exercise protocol for 15-weeks, including warming up and cooling down, and (higher) attendance resulting in reduced drop-out rates. Kovačova, Stejskal, Neuls and Elfmark (2011) analysed group exercise behaviour of participants to a half year dance aerobics and step aerobics programme in a fitness setting under supervision of an expert instructor. None of the participants showed 100% adherence with an average for the whole group at 70.42%. Mean attendance values of the group gradually decreased from 85.39% to 68.35% during the first four months of the intervention. The results demonstrated higher attendance values for the dance aerobics group compared to the step aerobics group, concluding that the type of exercise can influence attendance and adherence. Remers, Widmeyer, Williams and Meyer (1995) identified mediating factors for the relationship between group size and attendance. They investigated member's perception of class environment, instructor and classmates, members' satisfaction with the environment, instructor and exercise, and group cohesion in relationship to group size and adherence. First, they found that members of large class sizes (70-90 persons) had better attendance than members of medium sized classes (18-26). Furthermore, they found that members of the large-sized classes exerted themselves more than the members of medium sized-classes.

To systematically study and understand (group) exercise behaviour, several social-cognitive theories have been put forward like the self-efficacy theory (SET) (Bandura, 1997). Multiple studies demonstrated that the concept of self-efficacy (Bandura, 1997), a construct also incorporated in the Transtheoretical model of behaviour change (TTM) (Buckworth et al., 2013), is strongly related to exercise behaviour (Ashford, Edmunds and French, 2010; Poag-DuCharme and Brawley, 1993). Self-efficacy is a person's belief in capabilities to overcome personal, social and environmental barriers to exercise. Self-efficacy is a situational defined concept which should be measured depending on the type of behaviour. Based on self-efficacy theory, two important factors can influence the confidence to adopt and maintain exercise behaviour. The first is efficacy expectations, that is about one's belief in their own competence. The second factor is outcome expectations, that is one's belief in regards to the perceived result or outcomes of exercise behaviour. According to self-efficacy theory, human behaviour is strongly influenced by self-regulation (Bandura, 1991). Annesi and Gorjala (2010) investigated relations of self-regulatory skill use with self-efficacy for exercise and appropriate eating, and the resulting change in weight associated with participation in a nutrition and exercise treatment supported by cognitive-behavioural methods. They concluded that concerning exercise behaviour, changes in self-regulation were associated with self-efficacy change. These self-regulation mechanisms operate through three sub-functions, namely self-monitoring of one's behaviour on determinants and consequences, judgement of one's behaviour in relation to personal standards and circumstances, and affective self-reaction. According to Bandura, people can't

influence their behaviour and actions in an optimal way if they don't pay adequate attention to their own performances, the conditions under which they occur, and the immediate effects they produce.

Based on tenets of SET, the present research organises self-regulation in terms of self-set activities and self-set goals. Towards self-set activities, people who can execute different options to exercise and are able to regulate their own exercise behaviour, will have greater freedom to support their own exercise behaviour which can improve the adoption and maintenance of the behaviour. They can visualize outcomes and match the activity that is perceived the best towards the desired outcome. Self-set goals are initiated by the importance of outcome expectancies. When people set their own goals, based on desired outcomes of, for example, a group exercise programme, it will help them to execute this specific kind of behaviour (Annesi, 2002). Bandura (1997) states that goal intentions do not automatically activate behaviour, but need some structures to be effective. Goal specificity is a crucial structure that helps to guide behaviour. Clear, specific and attainable goals produce higher levels of performance than general intentions. Another factor is goal challenge, meaning that goals should be realistic, so not too easy, and not too difficult, and accepted by the person. Finally, goal proximity should be taken into account. Proximal goals are more effective than distal goals, so distal goals can be made more effective by creating subgoals that provide indications of mastery and enhance efficacy beliefs. Usually, new exercisers need to develop skills to use and manage goalsetting techniques in an optimal way and coaching can be used to support this process. The influence of self-regulation by

self-set activities and coaching on self-set goals has hardly been studied, even though the effect on respectively self-efficacy and group exercise behaviour seems promising (Ashford, Edmunds and French, 2010). In a systematic review of 33 studies on exercise behaviour of members in fitness clubs only four of those addressed self-efficacy (Middelkamp and Steenbergen, 2015). Thus, it seems that the effects of self-efficacy on (group) exercise behaviour in fitness clubs needs further investigation.

This study was guided by the following research question: What is the effect of self-set activities and a coaching protocol on self-set goals on self-efficacy and group exercise behaviour of members in fitness clubs? Group exercise behaviour is defined as exercising in the same structured programme in the same environment (group exercise room) with a minimum of two individuals. The following hypotheses were tested: 1. Providing self-set activities in group exercise programmes increases group exercise behaviour in the experimental group compared to the control group in 12 weeks; 2. Providing self-set activities and a coaching protocol on self-set goals increases group exercise behaviour in the second experimental group compared to the control group and first experimental group. 3. Self-efficacy predicts group exercise behaviour after 4, 8 and 12 weeks; 4. Providing self-set activities and coaching on self-set goals in group exercise programmes increases self-efficacy in the experimental groups compared to the control group in 12 weeks.

Methods

Participants

Two fitness clubs were approached, one in the South and one in the East of the Netherlands. Inclusion criteria were: that the clubs needed to have a dedicated group exercise room, that there was virtual group fitness equipment available that staff were willing to execute coaching sessions, there were pre-scripted group exercise programmes to provide equal levels of quality between group exercise programmes, and the clubs were willing to offer free memberships for three months to the participants. Participants for the study were recruited in two ways. First, an advertisement was published in a local newspaper explaining the purpose and programme of the study and describing a list of inclusion and exclusion criteria. Second, existing members were motivated by an internal newsletter to bring in referrals to participate. The selection criteria were that the participants' age was above 18 years and no older than 70, they were no overriding health conditions, that they had not been a member of a fitness club for the last six months. Health conditions were screened via a Physical Activity Readiness Questionnaire (PAR-Q), which is a standard protocol used in qualified fitness clubs in the Netherlands (LERF, 2012). A total of 122 participants volunteered to join the study, and signed two consent forms. The first was with the fitness club confirming to agree to the terms and conditions, and the second was specific for the purpose of the study, including a Dutch human subject protection statement. The study was performed in line with the principles of the declaration of Helsinki. In the randomization process, the participants were ranked first on gender and second on age, starting with the youngest males and ending with the oldest female. The youngest male was classified to group 1, the next male

on the list in group 2, the next in group 3, the fourth man again in group 3, the next in group 2, according to the following schedule: 1-2-3-3-2-1-1-2-3-3-2, et cetera. As a result, 42 participants were assigned to group 1 (13 males and 29 females), a total of 40 to group 2 (13 males and 27 females), and 40 subjects to group 3 (13 males and 27 females), with overall 67% females and 33% males. The participants in the three groups had an average age of 42.24 (SD 12.17) in group one, 41.53 (SD 12.55), in group two and 42.35 (SD 12.16) in the third group.

Procedure

For this study and for all groups, the group exercise-to-music programmes of Les Mills were used. These programmes were selected because they are pre-scripted and follow a standardized format, performed similarly by all instructors. These ensured the controllability and consistency of this 'real life' intervention study. The Les Mills programmes consist of 8 to 10 music tracks per class and for each track specific exercises are pre-scripted matching the music. Instructors can teach the programmes after they received certification by a national trainer (who are in turn trained by international master trainers). In addition, they have to follow an ongoing educational programme every three months. Furthermore, the quality of instructors is regularly checked by video assessment. The programmes are developed by a team of experts in New Zealand and released every three months and used in the same format in 17,000 fitness clubs worldwide, including 850 clubs in the Netherlands. The Les Mills programmes were also selected because multiple research studies provide detailed physiological profiles. Consequently, next to frequency and duration, data on exercise intensity is available (Harvey, 2012; Khan, Marlow and Head, 2008; Oliveira

et al., 2009; Rixon, Rehor and Bemben, 2006). Rixon, Rehor and Bemben (2006) tested the intensity of four Les Mills programmes (Bodypump, Bodycombat, Bodystep and RPM) which are also used in the current study, and reported a %HR-max in the range of 60 (SD 6.5) (BodyPump) to 74 (SD 6.7) (RPM). The energy expenditure (kcal/min) ranged from 8.0 (SD 1.6) for Bodypump to 9.9 (SD 1.7) for RPM. Oliveira et al. (2009) profiled the Bodypump programme in more detail, reporting HR ranges of 84 BPM (SD 14.05) at warming up (track number 1) to 164 BPM (SD 20.14) at track number 7. The intensity of the body and mind programme named Bodybalance is 137 BPM (SD 17.6), measured by Khan, Marlow and Head (2008). Les Mills provides live classes, with live coaching by a certified instructor and virtual classes. In virtual classes the exercise programme is broadcasted on a big screen using a beamer and sound system. All classes were limited to a maximum of 30 participants.

After being assigned to one of the three groups, participants started to exercise from April or May 2015. Group 1: The control group, this group could only exercise using a Les Mills virtual indoor cycling programme, named RPM virtual, with 15 scheduled classes available per week plus an unlimited number of on-demand classes. This group was not able to self-set their activities. The RPM virtual programme (releases 68 and 69) was selected as a control programme and was available for all groups. This programme was chosen because it has the lowest participation barriers (close to 100% of the Dutch population above 18 years are able to cycle) and because of controllability, due to the virtual component, the execution of the programme was similar for all participants during the complete intervention period. Group 2: The first experimental group, was provided with

self-set activities by giving multiple options to participate in group exercise programmes. They could choose between Les Mills RPM virtual indoor cycling (idem as group 1 with 15 scheduled virtual classes per week), and Les Mills live classes (instructor teaches) (30 additional live classes per week), different types of classes (cardio-based; strength-based; dance-based; body/mind-based, named, Bodycombat, Bodystep, Bodypump, Bodyjam and Bodybalance), and multiple instructors. Group 3: This is the second experimental group. This group was provided with the same group exercise programmes of group 1 and 2, but additionally received a coaching protocol on self-set goals. The coaching sessions took place in small groups of 2 to 6 participants, organized by in total three exercise professionals. The sessions were at baseline; after 4 weeks; after 8 weeks; and 12 weeks. At all four moments, in both fitness clubs, the first session was executed by an exercise professional (the third author of this study); the two other exercise professionals (one per club) shadowed this session and received detailed instructions to perform exactly the same procedures. In total 4x4 sessions per club of approximately 30 minutes were conducted, of which 24 sessions were delivered by the third author of this study and 8 by the other two exercise professionals. These monthly scheduled coaching sessions worked according to the following protocol. During the sessions, the participants work with an individual coaching form for self-set goals. For the purpose of goal setting, participants filled in a practical and standardized form (one page) concerning their self-efficacy expectations (which group exercise programme fits best to their level of fitness and the perceived self-efficacy; different options in Les Mills programmes were presented), outcome expectations (what goals a participant expects to achieve in six months and how can he or she set goals,

divided in short term monthly subgoals). Two types of goals were registered. First, results-oriented goals, for example losing 12 kg of body weight in 12 weeks. Second, process-oriented goals, for example exercising 2x per week with a minimum of 30 minutes. Finally, outcome values were discussed (what is the importance of these outcomes for the participant). During the sessions, it was also discussed what the confidence of the participant was to achieve the subgoals and what could be done to increase that level of confidence. The participants of all groups had to register at every visit before stepping into a group exercise programme and actual group participation was checked. The group exercise programmes had a duration of 30, 45 or 60 minutes. All participants performed the full duration of the programme. As discussed above, the intensity of the group exercise programmes differs per programme and was manageable by the participants, for example by using more or less weight or resistance, even though the basic design of each programme was standardized as developed by Les Mills in New Zealand.

Measures

A validated scale for barrier self-efficacy was selected (Geller, Nigg, Motl, Horwath and Dishman, 2012), and translated into Dutch. The scale consists of 6-items including statements such as ''how confident are you to exercise in the following situations'' and, for example, ''when you have to exercise alone''. Participants scored on a 5-point scale to indicate how confident they are, ranging from ''not at all confident'' till ''completely confident''. Exploratory factor analysis (principal component analysis) confirmed the internal validity of the Dutch version of the scale for barrier self-efficacy (scores on Q1 to Q6 were respectively:

.70, .73, .63, .61, .66 and .62). Reliability analysis on self-efficacy at P0, P1, P2 and P3 were acceptable (Cronbach's Alpha .74 to .87) (Field, 2009). Measurements were obtained at baseline (P0) and after approx. 4 weeks (P1), 8 weeks (P2) and 12 weeks (P4), via an online survey system (NETQ). Group exercise behaviour was measured continuously by registration of actual group exercise participation. During the intervention drop-outs were registered. Drop-outs were defined as not participating in a group exercise programme for 4 weeks in a row. Data was analysed using SPSS. An ANOVA was performed to test whether group means differed and a regression analysis was used to investigate whether self-efficacy could be used to predict exercise behaviour. Alpha level was set at .05 (Cohen, 1988).

> Providing self-set activities and a coaching protocol on self-set goals increases group exercise behaviour and decreases drop-out.

Results

Descriptive statistics demonstrated mean group exercise sessions over the total of 12 weeks of 2.74 (SD 4.65) in the control group (group 1); 4.75 (SD 6.08) in the first experimental group (group 2), and 12.25 (SD 9.07) for the second experimental group

(group 3). The average amount of group exercise sessions per week was respectively 0.23 (group 1), 0.40 (group 2) and 1.02 (group 3). In group 1 (control), the following drop-out pattern was reported: 20 in week 1-4, 12 in week 5-8 and 5 in week 9-12. The pattern in group 3 was: 4 in week 1-4, 6 in week 5-8 and 9 in week 9-12. In group 1, 2 and 3, respectively a total number of drop-outs in 12 weeks were 37, 31 and 19, resulting in an overall drop-out rate of 88% in group 1, 78% in group 2 and 48% in group 3. The overall response on the scales for self-efficacy at P0, P1, P3 and P4, were respectively 117, 106, 100, 90. At P3 the response rates of group 1, 2 and 3 were 67%, 75% and 80%.

TABLE 1

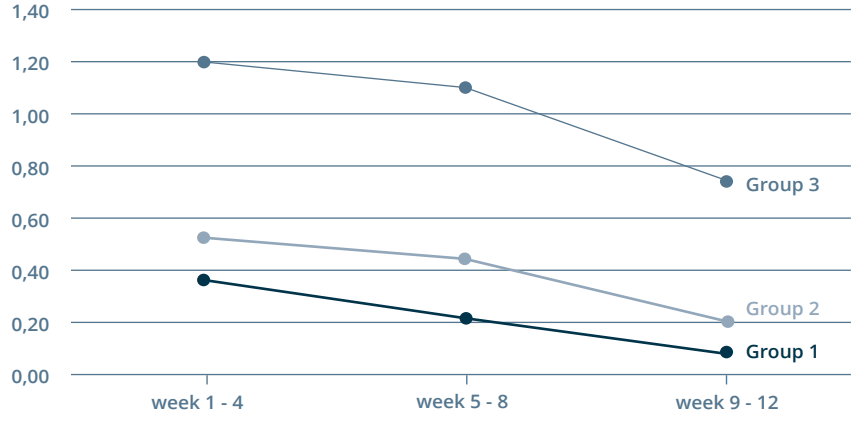
Overview of main data.

	Control Group 1	Experimental 1 Group 2	Experimental 2 Group 3
n	42	40	40
Age	42.24 (SD 12.17)	41.53 (SD 12.55)	42.35 (SD 12.16)
% Females	69	68	68
Mean total visits in 12 weeks	2.74 (SD 4.65)	4.75 (SD 6.08)	12.25 (SD 9.07)
Drop-outs in 12 weeks	37 (88%)	31 (78%)	19 (48%)
Response rates of total per group at P3	67%	75%	80%

An ANOVA test rejected the first hypothesis; providing self-set activities in group exercise programmes increases group exercise behaviour in the experimental group compared to the control group in 12 weeks. The total amount of sessions in 12 weeks differed between group 1 and 2 with 2.01 but was not significant ($p > .05$). The second hypothesis was supported showing that providing self-set activities and a coaching protocol on self-set goals increases group exercise behaviour in the second experimental group compared to the control group and first experimental group. ANOVA demonstrated significant ($p < .05$) differences between group 1 (control) and 3, and group 2 and 3. The third hypothesis, self-efficacy predicts group exercise behaviour after 4, 8 and 12 weeks, was tested at all three measurement moments. Regression analysis indicated that self-efficacy at 8-weeks (P2) explained the highest amount of variance in group exercise sessions in 12-weeks, with self-efficacy predicting 18% of the group exercise sessions ($R^2 = .18$; $p < .05$). Hypothesis 4 revealed no significant effects. Nor self-set activities, nor coaching on self-set goals significantly increased self-efficacy.

FIGURE 1

Development of group exercise sessions per group over time.



Discussion

The guiding question of this intervention study was ”what is the effect of self-set activities and coaching on self-set goals on self-efficacy and group exercise behaviour of members in fitness clubs”? In terms of sessions per week, the first intervention group almost doubled the amount of sessions compared to the control group, and the second intervention group scored approximately four times the amount of sessions compared to the control group over 12 weeks (0.23 to 1.02). The coaching protocol seems to be an intervention with a high return in group exercise sessions. It increases the amount of sessions substantially with a relatively low investment of time. In fitness clubs, 23% of the members only participate in group exercise programmes, usually without additional coaching on goal setting (Hover et al., 2012). Their

exercise behaviour can be significantly increased by adding monthly coaching sessions in small groups. In fact, this study demonstrated clearly that participants in group exercise needed additional support to maintain their exercise behaviour. Fitness and health professionals should add small group coaching sessions on goal setting to every group exercise programme. This is also clearly an effective strategy for drop-out prevention, with a drop-out rate decreasing by almost 50%. Other than hypothesized and expected, providing self-set activities and self-set goals, in short self-regulatory skills, did not increase barrier self-efficacy. Self-efficacy appeared to be a limiting factor in increasing group exercise behaviour with the highest prediction at 8-weeks of 18%. This result does not match other research findings (Ashford, Edmunds and French, 2010; Poag-DuCharme and Brawley, 1993). Multiple other factors seem to influence this kind of behaviour. Therefore, it is suggested to use a mix of behavioural strategies to increase group exercise behaviour, like Annesi (2003), testing the effect of a multiple component exercise behaviour change treatment package, partly based on the constructs of self-efficacy including strategies like relapse prevention, self-reinforcement, and contracting.

The current study had some limitations. First, although the coaching protocol was strictly defined and procedures for the sessions were clearly set and executed, the quality and the coaching skills of the individual coaches was not completely controlled. Individual skillsets or personality traits could have influenced the effectiveness of the coaches. Second, the study started in April and May, so the programme partly took place in the summer period. It is perceived that this resulted in lower amounts

of group exercise sessions in all three groups because it is known that members of fitness clubs in the Netherlands exercise less in the summer, for a variety of reasons, such as taking holidays. This could have contributed to the large number of drop-outs. Third, in this intervention a specific type of group exercise programme was tested; the exercise-to-music classes (live and virtual). Of course, there are many types of group exercise programmes, and the results cannot be generalized to all different types. For example, what is the influence of music or no-music and what is the effect of a live instructor compared to a virtual instructor? Fourth, the group sizes were not registered during this study, although a minimum of two and a maximum of 30 participants applied to this study. Remers et al. (1995) report that group-size is associated with attendance in group fitness, so it could be that the difference in group exercise behaviour between the three groups are affected by this factor. Fifth, although the duration of each session had a minimum of 30 minutes, some sessions lasted 45 to 60 minutes, which could have influenced the group exercise experience. It would have been more consistent to use programmes with the same duration, but this would have decreased the real-life approach of the study and limited the options for self-set activities.

Future research should investigate which factors of the coaching protocol are contributing the most to the effect on group exercise behaviour. This could be the goal-setting process itself, but also confounding factors like a scheduled meeting, small group setting, additional attention and the live support of a professional. More research is warranted on the influence of a ''true group'', as reported by Burke et al. (2006), on group exercise behaviour in fitness clubs. Exercising in a group exercise programme does not

automatically provide group dynamic principles that increases cohesiveness. This study made it clear that self-efficacy only explains a small proportion of the variance on group exercise behaviour in fitness clubs. This is understandable for complex types of behaviours like exercise. From literature, it is known that self-efficacy is strongly associated with exercise behaviour, so other strategies to increase self-efficacy should be tested, like individual coaching, more extensive coaching (60 minutes and more) or induction programmes were exercisers can try and test different types of programmes. Future research should also address the effectiveness of self-set activities and self-set goals for a longer period, for example 12 or 24 months. The current 12-weeks could be crucial for starting exercise behaviour and long term maintenance of behaviour, but time-effects on how long does a coaching session increases group exercise behaviour, should be investigated.

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CHAPTER 6

The effects of a self-efficacy intervention on exercise behaviour of fitness club members in 52 weeks and long-term relationships of transtheoretical model constructs

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ABSTRACT

Introduction: The transtheoretical model of behaviour change (TTM) is often used to understand changes in health-related behaviour, like exercise. Exercise behaviour in fitness clubs is an understudied topic, but preliminary studies showed low frequencies and large numbers of drop-out. An initial 12-week self-efficacy intervention reported significant effects on exercise behaviour. The objective of this follow up study is testing effects on exercise behaviour over 52 weeks and the long-term relationships of all TTM constructs.

Methods: In total 122 participants (M_{age} 42.02 yr.; SD 12.29; 67% females) were recruited and randomly assigned to group 1 (control), group 2 (self-set activities), and group 3 (self-set goals coaching). All participants were monitored over 52-weeks. Measurements were taken at baseline, 4, 8, 12, 26 and 52 weeks, using validated scales for stages of change, self-efficacy, decisional balance and processes of change. Exercise behaviour and drop-outs were registered.

Results: An ANOVA revealed that group 3 significantly ($p < .05$) differed in exercise sessions from group 1 and 2 during the 12 weeks. A chi-square test indicated significant differences for continuing exercising after the intervention: 7 of group 1; 6 of group 2; 19 of group 3. In total 5 demonstrated regular exercise behaviour at 26 weeks, and 3 at 52 weeks. Self-efficacy, decisional balance, and processes of change showed limited longitudinal changes over the later stages of change. At all measurements, participants reported more pros than cons, and used more behavioural than cognitive processes.

Discussion: Exercise behaviour of members in fitness clubs demonstrated dramatic developments in 52 weeks. The frequencies of sessions were so low that health effects will be minimal. The integrative character of the TTM appears to be weak; the data indicated limited relationships. More research is needed to understand exercise behaviour and define optimal strategies to increase exercise attendance and decrease drop-outs in the long term.

Key words: Health, programmes, maintenance, attendance, adherence, drop-out.

Introduction

Studies demonstrated that exercise is medicine and necessary for health (American College of Sports Medicine, 2010; Dishman, Heath and Lee, 2013; Lavie et al., 2013; Ross et al., 2016). In fitness clubs, members predominantly exercise for health benefits (Baart de la Faille, Middelkamp and Steenbergen, 2012). The International, Health, Racquet and Sportsclub Association (IHRSA, 2016), estimated that 151 million individuals exercise in 187,000 fitness clubs worldwide. Towards exercising in a fitness club, Middelkamp, Van Rooijen, Wolfhagen and Steenbergen (2016) distinguish three kinds of behaviour which are 1) attendance behaviour (this occurs when an individual enters the facility), 2) programme attendance (this is when an individual attends a specific programme), and 3) exercise behaviour (the individual needs to exercise towards certain standards or minimums in terms of frequency, duration and intensity). Research on attendance and exercise behaviour in fitness clubs is limited (Middelkamp and Steenbergen, 2015), but preliminary studies indicated low amounts of exercise sessions in fitness clubs with an average of 1.1 session per month over a 24-month period for a sample of 259,000 ex-members. Only 10% demonstrated regular exercise behaviour for six consecutive months and 2.3% never relapsed in two years (Middelkamp, Van Rooijen and Steenbergen, 2016). These frequencies will hardly impact personal health (ACSM, 2010; Dishman, Heath and Lee, 2013). Other studies reported low attendance figures as well, mainly for the first 36 weeks (Annesi, Unruh, Marti, Gorjala and Tennant, 2011; Annesi, 2003).

The transtheoretical model of behaviour change (TTM) is frequently used to systematically describe and understand a wide range of health behaviours and changes therein. Originally, the

model (at that time containing two constructs: the stages of change and processes of change) was developed observing individuals who wanted to stop smoking without professional help (Prochaska and DiClemente, 1982). Multiple studies applied the TTM to a list of other health behaviours like condom use, safer sex and quitting cocaine, as well for the adoption and maintenance of exercise (Prochaska and DiClemente, 1983; Prochaska et al., 1994). Although interventions demonstrated that physical activity and exercise are necessary for health (American College of Sports Medicine, 2010; Dishman, Heath and Lee, 2013), studies on different populations (USA and Europe) showed that less than 5% of adults exercise the minimum amount to positively impact their health (Cavill, Kahlmeier and Racioppi, 2006; Garber et al., 2011). Furthermore, research indicated that 50% of the exercisers drop-out in the first six months (Berger, Pargman and Weinberg, 2002). To study exercise behaviour, the TTM is often applied for an in-depth understanding of the development of this specific behaviour and its change over time, as well as the mechanisms responsible for it (Buckworth, Dishman, O'Conner and Tomporowski, 2013; Reed, 2001). In various populations and settings, the existence of significant relationships between the TTM and exercise behaviour have been demonstrated (Fallon, Hausenblas and Nigg, 2005; Marshall and Biddle, 2001; Spencer, Adams, Malone, Roy and Yost, 2006).

The current model describes four key constructs; which are the stages of change, decisional balance, self-efficacy, and the processes of change. The stages of change are the organizing construct of the TTM and hypothesize that individuals move cyclically through the stages with periods of progression and relapse. The stages of change contain five main stages (Dishman, Vandenberg, Motl and Nigg, 2010) to cease an unhealthy or adopt a healthy

behaviour (like exercise), or six stages if the termination/relapse stage is also included (Cardinal, 1998; Fallon et al. 2005; Prochaska and Marcus, 1994;). The stages are pre-contemplation, contemplation, preparation, action, maintenance and relapse. The decisional balance is the second construct of the TTM and contains two main scales of pros and cons for changing behaviour (Janis and Mann, 1977). There are four dimensions for pros that are useful benefits for the self, useful benefits for others, self-approval, and the approval of others. There are also four dimensions for cons that are useful losses for the self, useful losses for others, self-disapproval, and the disapproval of others. The pros and cons are important for influencing persons in an early stage (pre-contemplation – preparation) to the action stage (Velicer, Prochaska, Fava, Norman and Redding, 1998). The third construct is self-efficacy (Bandura, 1997), which involves the degree of confidence a person has that he or she will not engage in a problem behaviour in tempting situations. In short, self-efficacy is a person's belief in capabilities to overcome personal, social and environmental barriers to exercise. There are two important aspects that will influence the confidence to adopt and maintain exercise behaviour. The first is efficacy expectations; one's belief about their own competence. Second is outcome expectations; one's belief in regard to the perceived result or outcomes of exercise. According to self-efficacy theory, human behaviour is strongly influenced by self-regulation, for example by options to self-set (choose) activities and self-set goals (Bandura, 1991). A high level of (perceived) self-efficacy makes it more likely that an individual will initiate or maintain the behaviour. There are four sources for an individual's self-efficacy; 1) past experiences in performing specific behaviours, 2) vicarious experiences (watching others successfully perform behaviours), 3) verbal

persuasion (being told that one is capable), and 4) experiences of physiological arousal. Temptation to not exercise describes urges to engage in a specific habit for example remain sedentary and is conceptually related to self-efficacy. Dishman et al. (2010) reported that construct validity of temptation has been supported by significantly lower levels of temptation in the later stages but question whether temptation predicts physical activity independently of barrier self-efficacy. The fourth construct measures ten processes of change, which can be divided in five experimental or cognitive processes and five behavioural processes. The five cognitive processes are consciousness raising, dramatic relief, environmental re-evaluation, self-re-evaluation, and social liberation. The five behavioural processes are counter conditioning, helping relationship, reinforcement management, self-liberation, and stimulus control (Dishman, Jackson and Bray, 2010; Prochaska and DiClemente, 1983; Reed, 2001).

The TTM supposes to be an integrative model (Velicer, Prochaska, Fava, Norman and Redding, 1998) meaning that individual constructs are related. This contains primarily the relationship of decisional balance, self-efficacy, temptation and processes of change with the stages of change. Prochaska et al. (1994) studied twelve problem behaviours and ordered the usage of pros and cons to the stages of change participants claimed to be in. The outcomes showed that pros and cons develop over time over the stages of change, and variations per problem behaviour were observed. For exercise, cons outbalance pros until the preparation stage, and both become equal at the preparation stage. In the action and maintenance stage the 717 respondents reported more pros than cons, where pros stayed stable and cons decreased in the action and maintenance stage. The relationships are not only towards the

stages of change but also between the two correlated factors pros and cons. Concerning processes of change, Prochaska and DiClemente (1983) indicated that self-changers are using the fewest processes of change during precontemplation and emphasize consciousness raising at contemplation. They emphasized self-re-evaluation in contemplation and action stage, and reported increased usage of self-liberation, helping relationships, plus reinforcement management in the action and maintenance stage. Velicer et al. (1998) mentioned that the cognitive processes are mostly used in the early stages, and the behavioural processes in the later stages of change. Dishman et al. (2010) reported contrary results; people appear to use both cognitive and behavioural processes while they attempt to increase or maintain their physical activity. The integrative nature of the TTM has also been applied to self-efficacy and temptations. Based on theory, self-efficacy mainly starts to increase at preparation and remains stable in action and maintenance stage. Temptation decreases in the preparation, action and maintenance stage (Velicer et al. 1998; Dishman et al. 2010).

Spencer et al. (2006) reviewed 150 studies that applied the TTM to exercise behaviour, of which 38 studies were interventions, 70 population studies, and 42 validation studies. From the intervention studies, 32 stage-matched programmes were reviewed, plus 6 non-stage matched, with 29 using self-report exercise measures. 25 studies were shown to be successful in motivating participants towards higher stages and increased amounts of exercise. For example, Kim (2006) indicated that behavioural and cognitive processes of change, exercise efficacy, and pros differentiated participants across the stages of exercise behaviour. Exercise behaviour was significantly correlated with the TTM constructs. Although the applicability of the TTM to exercise behaviour seems

promising, the current state of the literature is inconclusive. For example, Dishman et al. (2009) concluded that the TTM failed to predict change in regular physical activity in a multiethnic cohort. Fallon et al. (2005) and Spencer et al. (2006), reported that TTM studies have important limitations: lack of diverse and representative participants; lack of longitudinal studies; different definitions of exercise; most studies rely on self-reports instead of objective measurements; some studies do not include all TTM constructs; lack of validity for several constructs; most studies addressed middle-class, white, female populations, thereby limiting the generalizability of the studies. More research on specific populations is needed, like the understudied population of members in fitness clubs.

In a systematic review, 33 studies were found on exercise behaviour of members in fitness clubs, and only eight addressed one or more constructs of the TTM (Middelkamp and Steenbergen, 2015), meaning that the TTM is hardly tested in this population. This supports the need for specific research in this setting. In an initial 12-week study (Middelkamp et al., 2016), only the effects of a self-efficacy (manipulating two options for self-regulation) intervention were investigated and reported with significant effects on increased exercise behaviour. This initial project was the start of a longitudinal study measuring all TTM constructs, guided by the following two research questions. What are the effects of a 12-week self-efficacy intervention on exercise behaviour of members in fitness clubs after 12, 26 and 52 weeks? What are the long-term relationships of TTM constructs over 12, 26 and 52 weeks?

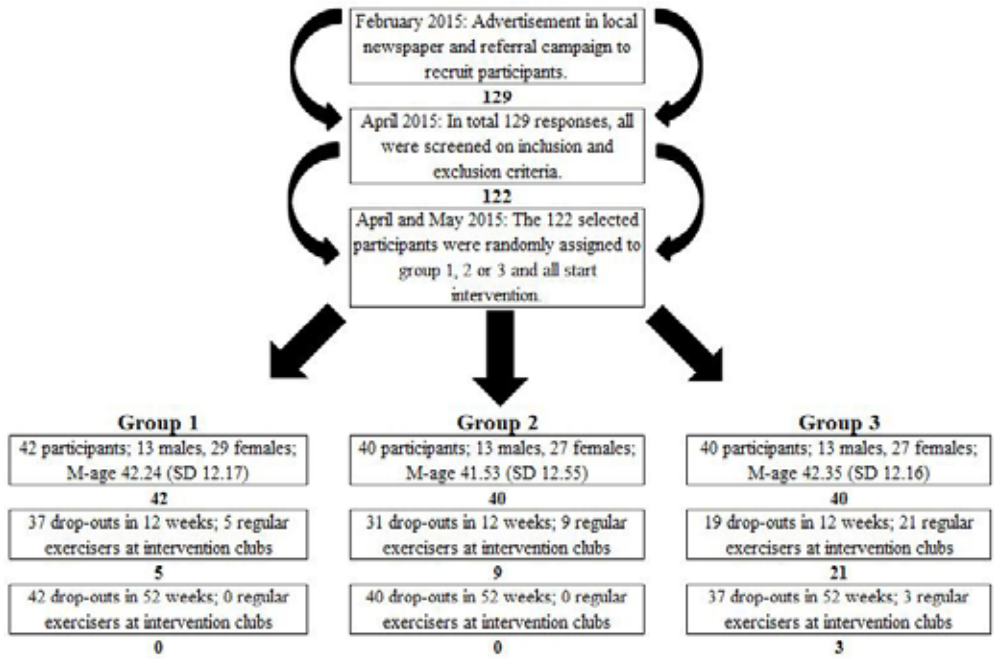
Methods

Participants

In February 2015, two fitness clubs in the Netherlands were approached for the initial project, testing the effects of two self-efficacy (self-regulation) interventions on group exercise behaviour in 12 weeks, reported in Middelkamp et al. (2016). The clubs had to match multiple inclusion criteria which included a dedicated group exercise room, virtual group fitness equipment, a willing to execute coaching sessions, pre-scripted group exercise programmes to provide equal levels of quality between group exercise programmes, and their willingness to offer free memberships for twelve weeks to the participants. Participants were recruited in two ways, firstly by an advertisement in a local newspaper, and then via existing members recruiting through referrals. The criteria included that they had to be aged 18+ and -70 years, they have no health conditions and that they had not been a member of a fitness club for the previous six months. Health conditions were screened via a PAR-Q. Finally, 122 participants agreed with all terms and conditions, and also signed a Dutch human subject protection statement that was aligned with the principles of the declaration of Helsinki, and that they participated voluntarily. In the randomization process, the participants were ranked first on gender and second on age, starting with the youngest males and ending with the oldest female. The youngest male was classified to group 1, the next male on the list in group 2, the next in group 3, the fourth man again in group 3, the next in group 2, per the following schedule: 1-2-3-3-2-1-1-2-3-3-2, et cetera. Thus, 42 participants were assigned to group 1 (13 males and 29 females), a total of 40 to group 2 (13 males and

27 females), and 40 subjects to group 3 (13 males and 27 females), with overall 67% females and 33% males (Figure 1). The participants in the three groups had an average age of 42.24 (SD 12.17) in group 1, 41.53 (SD 12.55), in group 2 and 42.35 (SD 12.16) in group 3.

FIGURE 1
Participant flow diagram.



Procedure

All participants started to exercise from April or May 2015. The group exercise-to-music programmes of Les Mills were used in all three groups, because they are pre-scripted and follow a standardized format, and were performed consistently by all instructors. This was done to ensure the controllability of this 'real-life' intervention. The programmes consist of 8 to 10 music tracks per class and for each track specific exercises are pre-scripted matching the music. Instructors only teach the programmes after certification, and follow an ongoing educational programme. The quality of instructors is checked by video assessment. The programmes are used in the same format in 17,000 fitness clubs worldwide, including 850 clubs in the Netherlands. Multiple scientific studies provide physiological profiles of the programmes (Harvey, 2012; Khan, Marlow and Head, 2008; Oliveira et al., 2009; Rixon, Rehor and Bemben, 2006), so next to frequency and duration, data on exercise intensity is available for the intervention. The programmes demonstrated a %HR-max in the range of 60 (SD 6.5) to 74 (SD 6.7) and an energy expenditure (kcal/min) from 8.0 (SD 1.6) to 9.9 (SD 1.7). Les Mills provides live classes, with live coaching by a certified instructor and virtual classes. In virtual classes the exercise programme is broadcasted on a big screen using a beamer and sound system. All classes were limited to a maximum of 30 participants. During the intervention, the three groups followed strictly defined programmes. Group 1: the control group, could only exercise using a Les Mills virtual indoor cycling programme, named RPM virtual, releases 68 and 69 (15 scheduled classes per week plus unlimited amounts of on-demand classes). The RPM virtual programme was selected as a

control programme and was available for all groups because it has the lowest participation barriers (close to 100% of the Dutch can cycle) and because of consistency due to its virtual component, the execution of the programme was similar for all participants during the complete intervention period. Group 2: the first experimental group was provided with self-set activities by giving multiple options to participate in group exercise programmes. They could choose between virtual indoor cycling (idem as group 1), and Les Mills live classes (instructor teaches) (30 additional live classes per week), different types of classes (cardio-based; strength-based; dance-based; body/mind-based, named, Bodycombat, Bodystep, Bodypump, Bodyjam and Bodybalance), and multiple instructors. Group 3: the second experimental group, was provided with the same group exercise programmes of group 1 and 2, but additionally received a monthly coaching protocol on self-set goals, in small groups of 2 to 6 participants, organized by three exercise professionals at baseline; after 4 weeks; after 8 weeks; and 12 weeks. The first session was executed by an exercise professional (the third author of this study); the two other exercise professionals (one per club) received detailed instructions to perform the same procedures, with in total four thirty minute sessions per club per four weeks, of which 24 sessions by the third author. The coaching followed a strict protocol for goal setting and participants filled in a standardized form (of one page) concerning; 1) their self-efficacy expectations to participate in group exercise programmes, 2.) their outcome expectations of goals to achieve in six months, divided in short term monthly subgoals, including two types of goals; a. results-oriented goals (e.g. losing 12 kg of body weight in 12 weeks), and b. process-oriented goals (e.g. exercising 2x per

week with a minimum of 30 minutes). Outcome values were also discussed (what is the importance of these outcomes for the participant). The participants of all groups had to register at every visit before stepping into a group exercise programme and actual group participation was checked. The group exercise programmes had a duration of 30, 45 or 60 minutes. All participants performed the full duration of the programmes. After the initial intervention, the participants could decide to maintain to exercise in the current fitness club by paying a membership fee, or choose to exercise in another fitness club, or exercise a different setting or not exercise at all. All 122 participants were included in the follow up study and monitored at 12 weeks, 26 weeks and 52 weeks.

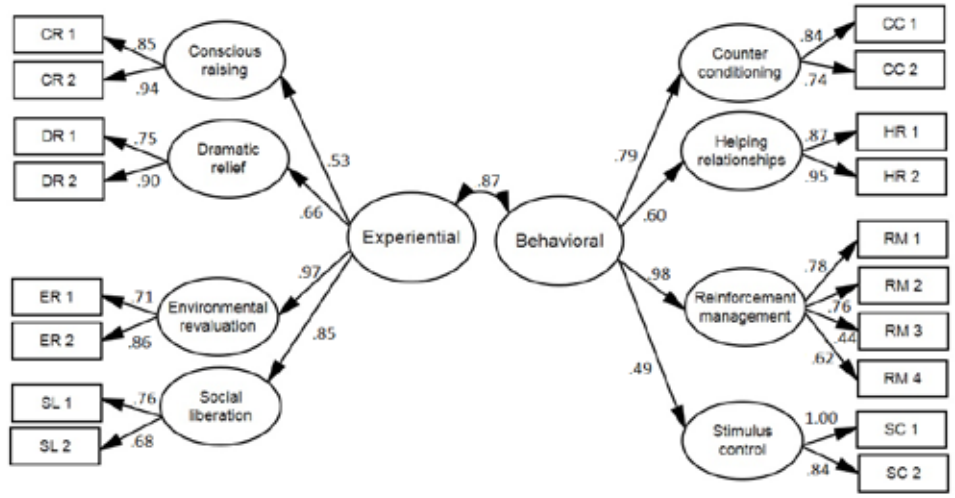
Measures

The TTM constructs were measured using validated scales of Geller, Nigg, Motl, Horwath and Dishman (2012), using a 1-factor construct with 6-indicators for barrier self-efficacy. Temptation is represented by two correlated latent factors; affect (3-indicators) and competing demands (4-indicators). The decisional balance construct used two correlated latent factors; pros and cons with 5- and 4-indicators, respectively. For processes of change (cognitive/experimental and behavioural) a scale that represents 8 of the original 10 processes was used (with 18 indicators). Scales consists of statements like (in case of barrier self-efficacy) ''how confident are you to exercise in the following situations'' and for example, ''when you must exercise alone''. Participants reported on a 5-point likert scale to indicate how confident they are, ranging from ''not at all confident'' till ''completely confident'', with exception of the temptation scale (0-100%). All scales were translated into Dutch. Measurements were obtained at baseline (M0) and after 4

weeks (M1), 8 weeks (M2), 12 weeks (M3), 26 weeks (M6) and 52 weeks (M12), via an online survey system (NETQ). Confirmatory factor analysis (CFA) confirmed the internal validity of the Dutch version of the scales. Reliability analysis were acceptable at all measurements: Cronbach's Alpha at M0, M1, M2, M3, M6 and M12 were respectively for self-efficacy (.74; .81; .85; .87; .86; .85), temptation (.81; .85; .84; .82; .86; .85), decisional balance pros (.77; .76; .83; .85; .81; .89), decisional balance cons (.71; .75; .73; .77; .67; .83) and processes of change (.86; .86; .88; .90; .89; .92) (Field, 2009). A Structural Equating Modelling (SEM) was performed at M3 (12-weeks) to evaluate the relationships (fits) of processes of change right after the initial intervention, using AMOS 24 (Arbuckle, 2016). The fit indices □2, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI) and Tucker Lewis coefficient (TLI) were used to evaluate the fit of the models. The chi-square index is a badness-of-fit-index and should be non-significant ($p > .05$). RMSEA values smaller than .08, and CFI or TLI values higher than .90 indicate a good fit (Kline, 2005). The fit indices showed a sufficient fit of the model (□*2* (127) = 201.44, $p <$ .001, RMSEA = .07, CFI = .91, TLI = .88). There is a high correlation between the latent factors experimental and behavioural (r =.87). The factors of environmental revaluation (□ = .97) and social liberation (□ =.85) are strongly related to the experiential latent factor, whereas conscious raising and dramatic relief showed lower regression coefficients (□ = .53, and □ = .66, respectively). Concerning the behavioural latent factor, reinforcement management (□ = .98) showed the strongest relation in comparison to stimulus control (□ = .49) and helping relationships (□ = .60). The model is presented in Figure 2.

FIGURE 2

Structural Equation Model (SEM) of Processes of Change at 12 weeks (simplified version; all numbers above the arrows are standardized regression coefficients).



Exercise behaviour was measured continuously by registration of actual exercise participation, which consisted of group exercise sessions only in the first 12 weeks, but included individual exercise sessions as well from week 13 to 52. Group exercise behaviour is defined as exercising in the same structured programme in the same environment (group exercise room) with a minimum of two individuals. Regular exercise behaviour was defined as exercising with a minimum once per week on average. Drop-outs were registered during the full 52 weeks, and defined as not exercising in the intervention clubs for four weeks

in a row (Middelkamp et al., 2016). Because it is known from previous studies that exercise behaviour in fitness clubs is low and drop-outs are high, an additional measurement was performed after 52 weeks, using an online version of the stages of change scale (short version) (Marcus, Selby, Niaura and Rossi, 1992). This self-report scale asked participants to self-select their current stage of change based on the question ''are you currently exercising"? Participants could score according to the stage of change, like ''yes, I am for more than six months (maintenance)'' or ''no, I am currently not exercising and have no intentions within the coming six months (pre-contemplation)''. The scale was modified to the current study and defined regular exercise towards the participants as: any planned physical activity performed to increase physical fitness, on average once a week for minimum of 30 minutes per session; exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat. Data was analysed using SPSS. An (repeated measure) ANOVA and chi-square tests were performed. Alpha level was set at .05 (Cohen, 1988).

In total 5 of the 122 participants reached the maintenance stage at 26 weeks and 3 at 52 weeks.

Results

The first research question focused on the effects of a 12-week self-efficacy intervention on exercise behaviour of members in fitness clubs after 12, 26 and 52 weeks. Table 1 summarizes descriptive statistics including mean group exercise sessions over the initial 12-week intervention of 2.74 (SD 4.65) in group 1; 4.75 (SD 6.08) in group 2; 12.25 (SD 9.07) in group 3.

TABLE 1
Overview of participants, response rates on TTM scales, exercise sessions and drop-out over 52 weeks.

	Control	Experimental 1	Experimental 2
n	42	40	40
Age (years)	42.24 (SD 12.17)	41.53 (SD 12.55)	42.35 (SD 12.16)
% Females	69	68	68
Range of response rates online scales	93% (T0) – 55% (T12)	100% (T0) – 60% (T12)	95% (T0) – 70% (T12)
Total exercise sessions week 1 - 12	115	190	490
Drop-outs in 12 weeks	37 (88%)	31 (78%)	19 (48%)
Total exercise sessions week 13 - 52	114	126	264
Drop-outs in 52 weeks	42 (100%)	40 (100%)	37 (93%)

An ANOVA at 12 weeks, after finalizing the intervention, demonstrated significant differences between group 1 and 3, and group 2 and 3 in exercise sessions over the total 12 weeks, F (2, 119) = 13,30, p < ,001, $\square^2$ = ,18. In the follow up stage of the intervention, participants first had to decide if they wanted to continue to exercise in the current fitness club by paying a membership fee, choose to exercise in another fitness club, exercise in a different setting, or not exercise at all. A chi-square test indicated significant (p < .05) differences with 7 participants of group 1, 6 of group 2 and 19 participants of group 3 purchasing a membership in the same fitness club to continue their exercise program. Exercise sessions in the total follow up period (week 13 – 52) demonstrated the following; the participants of respectively group 1, 2 and 3 executed 114, 126 and 264 exercise sessions for the total period of 40 weeks. The average amount of sessions per participant per week per group was 0.41 (1), 0.53 (2) and 0.35 (3). Based on the definition of regular exercise behavior, 5 of the in total 122 participants reached the maintenance stage at 26 weeks and 3 at 52 weeks, for exercise sessions in the intervention clubs only. The 3 regular exercisers were all from group 3. In Table 2, the scores on the stages of change scales after 52 weeks are presented per group and for two questions “do you exercise in general, and do you exercise in (any) fitness club”? On average 51% reported to be in the maintenance stage for regular exercise in general, with no significant differences between the three intervention groups. For exercise in a fitness club, 43.7% of group 3 reported maintenance stage, compared to 25% and 23% in group 1 and 2.

TABLE 2

Percentages of participants in stages of change after 52 weeks (n=86) based on self-report (PC=pre-contemplation; C=contemplation; P=preparation; A=action; M=maintenance).

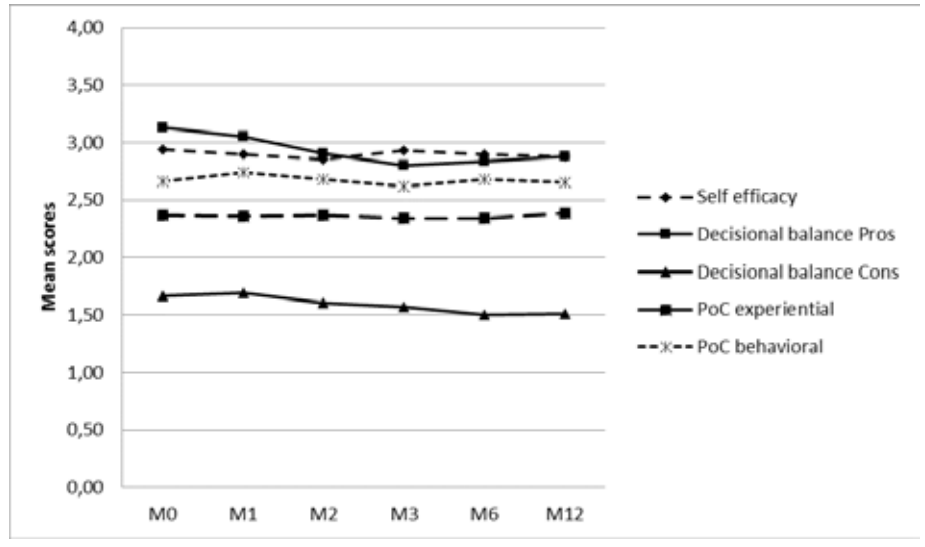
Exercise in general	PC	C	P	A	M
Control	28.6%	14.3%	7.1%	7.1%	42.9%
Experimental 1	26.9%	7.7%	0.0%	11.5%	53.8%
Experimental 2	6.3%	18.8%	6.3%	12.5%	56.3%
Exercise in (any) fitness club	**PC**	**C**	**P**	**A**	**M**
Control	53.6%	10.7%	10.7%	0.0%	25.0%
Experimental 1	61.5%	7.7%	0.0%	7.7%	23.1%
Experimental 2	31.3%	15.6%	6.3%	3.1%	43.7%

The second research question studied the long-term relationships of TTM constructs over 12, 26 and 52 weeks. The response rates on the TTM scales over the total of 52 weeks ranged from 55% – 100% and differed per group (see Table 1). As visualized in Figure 3, self-efficacy, decisional balance (pros and cons), and processes of change (cognitive/experimental and behavioural) showed limited developments over time and changes related to the later stages of change (action and maintenance). Barrier self-efficacy demonstrated almost no changes over the stages of change. Temptation is not included in the figure because of the ranges in values differ from the other scales, but showed no significant changes. At all measurements, participants reported more pros than cons, starting at M0 (preparation). Over 52 weeks, participants

used more behavioural processes than cognitive processes. An ANOVA indicated one significant difference ($p < .05$) between group 1 and 2 combined, and group 3; the coaching group used more behavioural processes. On other factors, there were no differences between the research groups on TTM constructs.

FIGURE 3

Developments of TTM constructs over 52 weeks (MO=baseline; M1=4-weeks; M2=8-weeks; M3=12-weeks; M6=26-weeks; M12=52-weeks).



Discussion

Although the outcomes of the first research question on the long-term effects of a 12-week self-efficacy intervention showed statistical significant results on (group) exercise behaviour in 12

weeks (Middelkamp et al, 2016), the effects were diminished at 26 and 52 weeks, with respectively only 5 and 3 participants maintaining regular exercise behaviour in fitness clubs. This implies that exercise behaviour of members in fitness clubs demonstrated dramatic decreases in 52 weeks and indicated that exercise adherence is very weak. The frequencies of exercise sessions are so low that health effects will be minimal to non-existent (ACSM, 2010). As concluded by Middelkamp et al. (2016), self-efficacy only explains a small proportion of the variation (18% at best) in exercise behaviour of members in fitness clubs. The effects of the coaching protocol (group 3) on exercise behaviour are terminated fast after the end of the programme, even when the coaching protocol stimulated significantly more participants to continue exercising in the same fitness clubs (3x as much compared to group 1 and 2). Although the coaching group showed less drop-out in 12-weeks, the average attendance in week 13 to 52 is not higher and drop-out on 52 weeks also showed small differences. Other studies that conducted similar self-efficacy based interventions, did not test the long-term effects of a coaching programme, after ending the programme. For example, Seghers, Van Hoecke, Schotte, Opdenacker and Boen (2014), and Annesi (2002) examined the effectiveness of a self-efficacy (goal setting) coaching and reported significant effects but did not test the long-term effects on exercise behaviour after the coaching. Based on the current results, the TTM constructs explain limited variations towards exercise behaviour of members in fitness clubs. In line with theory, participants reported using more behavioural than cognitive processes in the later stages of change. Other than theory suggests, pros

and cons stayed stable from preparation to maintenance stage. The same for temptation as the TTM suggests that temptation decreases during action and maintenance, but this could not be confirmed in the current study. This challenges the integrative character of the TTM. In fact, the data indicated that constructs are to some exceptions not related as theory suggests. For the fitness sector, there is another memorable result since approximately 50% of the participants report to still exercise in general after 52 weeks, with about 30% in another fitness club. This could indicate that overall exercise frequencies are not that low and demonstrated that different exercise settings are used by the participants, but studies on this topic are lacking.

This real-life study demonstrated multiple challenges. The first is typical for this kind of research with a large number of drop-outs. The frequencies on exercise behaviour on 26 and 52 weeks were so low that multiple tests could not be conducted. Even when the additional self-report on stages of change after 52-weeks had a response rate of 70%, it is a less objective measurement. A second flaw is the limited control on the exercise programme from week 13 to 52. During the initial intervention of 12 weeks, frequency, duration and intensity of the group programmes was fully controlled. In the follow up period, only frequency and duration were checked, but for the levels of intensity only indications could be used because participants also exercised individually in a non-pre-scripted programme. There is a third limitation which is that the study mainly focused on the later stages of change. With only a small proportion of the participants making it to the maintenance stage, the later stages of change of the TTM model seems to be a difficult one to investigate. Even when criticism

exists, the current study was the first TTM based study of 52 weeks on exercise behaviour of members in fitness clubs and provides important insights for future research. Additional studies are needed to understand this complex kind of behaviour and define optimal strategies to increase exercise attendance and decrease drop-outs. A special focus is recommended on the long-term effects of programmes preferably stretched towards multiple years because health benefits will mainly occur by maintaining exercise behaviour lifelong.

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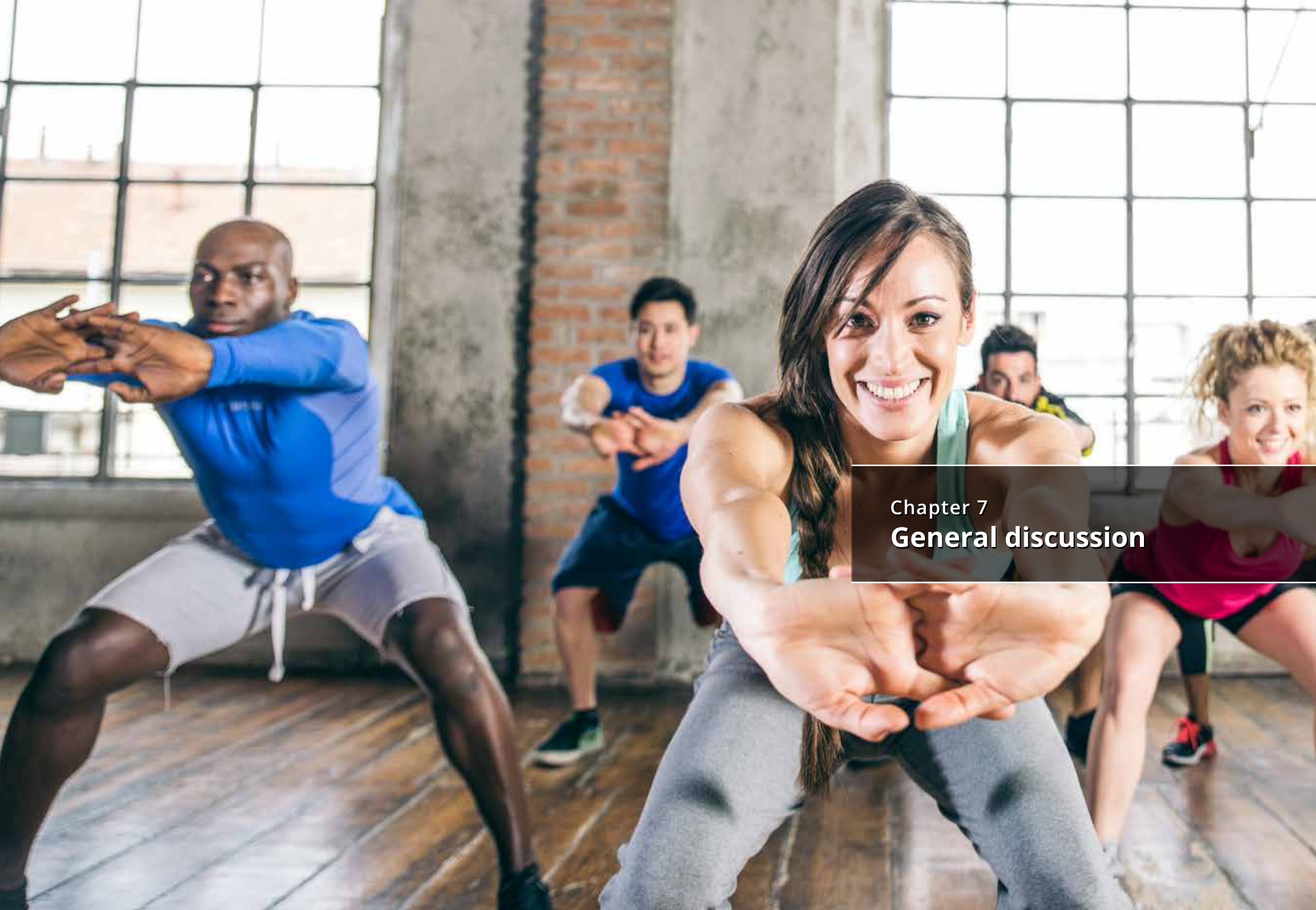

Chapter 7

General discussion

Sections

This thesis studied the transtheoretical model of behaviour change and exercise behaviour of members in fitness clubs. Based on the systematic review it was concluded that TTM studies on this population are limited and exercise behaviour of fitness club members in general appears to be an understudied topic. In this last chapter, an overall discussion and conclusion will be presented. This general discussion is organised in five small sections. First, comments on the social-cognitive nature of the TTM model are discussed. Second, the outcomes of the research series (chapters 2 to 6) are systematically reviewed per construct. Third, the overall effectiveness of the TTM model is evaluated. Fourth, some notes on definitions of exercise are made. Fifth, the future development of behavioural models is briefly discussed.

Social-cognitive models

In research on health and exercise behaviour, social-cognitive models are dominating with an impressive list studies. These theories are well developed and tested and therefore a logical step to use as a framework to study exercise behaviour of members in fitness clubs. The most applied social-cognitive models on exercise behaviour were summarized in chapter 1. The social-cognitive nature of the TTM is debatable, which is similar for the other models. The models, including the TTM, assume that people are rational creatures who consciously guide their behaviour. However, it can be discussed whether people's behaviour always comes about in such a conscious way. Rebar et al. (2016) conducted a systematic review based on the statement that physical activity theories are almost exclusively focused on conscious regulatory

processes such as plans, beliefs, and expected value. The aim of the review was to study to what extent physical activity is determined by non-conscious processes (e.g., habits, automatic associations, priming effects). The study included 52 publications. The findings support that habitual regulatory processes measured via self-reporting are directly associated with physical activity beyond conscious processes, and that there is likely interdependency between habit, strength and intentions. Some studies demonstrated a variety of priming effects on physical activity. Overall, the authors concluded that physical activity is partially regulated by non-conscious processes, but much is not yet known about this. To include non-conscious factors, new models and frameworks must be developed and tested. Hollands, Marteau and Fletcher (2016) started this development of the inclusion of nonconscious processes in changing health-related behaviour. The central premise of their framework is that interventions that rely less on conscious engagement and instead target non-conscious processes have significant potential for changing behaviour in populations. Kahneman (2011) could provide content for such a framework. He states that the human brain is comprised of two characters. One that thinks fast; called system 1, and one that thinks slow; that is called system 2. System 1 operates automatically, intuitively, involuntary, and effortlessly. He gives examples such as when we drive a car or read an angry facial expression. System 2 requires slow thinking, deliberating, solving problems, and reasoning, concentrating, considering different kinds of information, and not jumping to quick conclusions. Humans use this brain technique when calculating a maths problem, or choose where to invest money, or how to fill out a complicated form. When applied to health and exercise behaviour it can be understood that smoking

cigarettes or consuming a copious meal often happens automatically or instinctively. Even though smokers know that smoking can end their lives prematurely, and even though they try to quit, they still light up a cigarette because it immediately makes them feel good as a short-term reward. The two systems often conflict with one another. The TTM does not take this battle of the systems or non-conscious processes into consideration and future development of the TTM should consider including this kind of constructs.

Constructs

When discussing the four constructs of the TTM, most critisism addressed the core and organizing construct the stages of change, which was a main topic in all of the studies within this thesis. In the retrospective study on attendance behaviour of ex-members, all ex-members had entered the preparation stage but 19.5% never attended the club in 24 months and moved to the action stage. This indicated a weakness of the stages of change because theory suggests that individuals in this stage start to exercise within 30 days. In this context, Bridle et al. (2005) discussed an interrelated issue that may contribute to the lack of evidence regarding the effectiveness of interventions based on the TTM which is a lack of model specification. Towards this issue, it remains unclear when an individual is labelled as entering the preparation or any other stage. When using self-report measures, participants choose one of the options, but when more objective measures are applied, a lack of clarity happens. In the study on ex-members it was defined as buying a membership, because this

indicated an interest in starting to exercise. The results of the study demonstrated that buying a membership does not automatically mean that members start to exercise. Almost twenty percent of the members did not start at all. The TTM provides a lack of guidelines to assign individuals to a stage, resulting in arbitrary selections like the purchase of a membership. Additionally, Bridle et al. (2005) explain that stage progression is poor proof for the effectiveness of the TTM, because this is only an indirect measure of behaviour change. The stages are a discrete (ordinal) variable with no detailed information on progression other than the movement from one to another, so more theoretical specifications are needed. This is not only related to the organising construct of the stages, but also towards other constructs. West (2005), also heavily criticises the TTM and the stage of changes, expressing that the model draws arbitrary lines to differentiate the different stages. Additionally, the model assumes that individuals make coherent and stable plans within a specific stage, which is often not the case. Even though the criticism is significant, the basic idea of a model that applies a stage-based approach gains popularity over an on-off approach towards health behaviour change. Most social-cognitive models like the TRA and TPB present steps or stages (like intention) before behaviour is displayed. A new to develop ''adoption and maintenance to exercise behaviour scale'' is suggested which could improve the arbitrary selection of stages, and measure stage progression more continuously. Towards the second construct, decisional balance, TTM literature in general, but also the current thesis, is lacking information. The focus of the studies in chapters 2 to 6 was mainly on the later stages of change, that is moving from preparation to maintenance. Less data was collected on pre-contemplation and contemplation. Other than

theory suggested, pros and cons stayed stable from preparation to maintenance stage in the intervention over 52 weeks. In literature (Ashford, Edmunds and French, 2010), the third construct of the TTM appears to be the strongest predictor of exercise behaviour. This initiated the longitudinal study testing two self-efficacy and self-regulation inspired interventions to increase barrier self-efficacy and group exercise behaviour. Self-regulation was operationalised in terms of self-set activities and self-set goals (chapter 5). The intervention was successful in increasing group exercise behaviour in 12 weeks, but the effect was diminished after the coaching ended with no significant differences at 26 and 52 weeks. Only 18% of the variance in group exercise behaviour could be explained by self-efficacy, indicating that many other factors are at stake. In the self-efficacy intervention of 52 weeks (chapter 6), little to no development was reported on barrier self-efficacy and temptation to not exercise. Other studies that conducted similar self-efficacy based interventions, reported significant effects but did not test the long-term effects on exercise behaviour after the coaching (Seghers et al., 2014; Annesi, 2002). The fourth construct of the TTM contains the ten processes of change. Based on theory, the usage of cognitive processes is higher in the early stages and behavioural processes increase in the later stages of change. In the intervention of 52 weeks (chapter 6), little to no development was reported on cognitive and behavioural processes over time. In line with theory, participants reported using more behavioural than cognitive processes in the later stages of change. Even when differences in processes over time were recorded, the theoretical explanation would be lacking. Although consciousness-raising is a cognitive process of change, there is no theory-driven specification concerning the target of this consciousness raising.

Effectiveness

The effectiveness and integrative character of the TTM model is discussed in multiple systematic reviews. Also in this thesis, the integrative character of the TTM was challenged and criticised with weak long-term relationships, as reported in chapter 6. Bridle et al. (2005) criticised the model but defends the TTM by explaining that under the null hypothesis that there is no difference in effectiveness between TTM interventions and non-stage-based interventions. It could be expected to find 5 in 100 trials reporting statistically significant differences at the $p < 0.05$ level, with about half favouring TTM interventions and the other half favouring other interventions. However, of the 20 trials that compared a TTM intervention with a non-stage-based intervention, five reported effects favouring the TTM intervention whilst none reported significant results in the other direction. That five statistically significant positive results were obtained purely by chance seems unlikely. Studies on the TTM and exercise behaviour, report more positive outcomes. For example, Adams and White (2002) concluded that TTM based interventions are more effective than non-staged interventions in promoting short-term (i.e., shorter than 6 months) physical activity. Spencer et al. (2006) reviewed 150 studies applying the TTM to exercise. As discussed before, a total of 31 stage-matched intervention studies were reviewed of which 25 studies were shown to be successful in motivating participant towards higher stages and increased amounts of exercise. In the 15 studies that compared a stage-matched intervention to a non-stage-matched intervention, only slightly more than half of the studies found stage-matched interventions to be superior. Although the applicability of the TTM to exercise behaviour seems promising, the current state of the literature and research findings challenge the integrative character of the TTM.

Definitions

In future studies, a more uniform definition on exercise will be needed. The common definition, that exercise is planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health (Buckworth, Dishman, O'Conner and Tomporowski, 2013), is lacking specific guidelines resulting in the usage of different concepts between studies. The definition should be based on amounts of exercise needed to gain health benefits. This affects the classification of participants towards a stage. In the current research studies, regular exercise behaviour was defined as exercising with a minimum of once a week on average for a minimum of 30 minutes per session; exercise does not have to be painful to be effective but should be done at a level that increases breathing rates and causes sweat. Recent studies (ACSM, 2014; Lee et al., 2011; Ross et al., 2016) demonstrated that light types of physical activity or limited loads of exercise resulted in measurable effects on health, indicating that future definitions on intensity, duration and frequency do not need to be set to high. This was supported by Haskell (2012) who concluded that moderate-intensity physical activity for at least 150 minutes per week in addition to daily activities significantly reduces risks of various chronic diseases. Towards future research on the TTM, Bridle et al. (2005) explain that an important goal should be to establish an evidence base with respect to the central propositions of the TTM. More research is needed concerning stage-specific processes of change, the validity of a stage-based conceptualization of behaviour change and to accurate measurement. The authors state: ''until these issues have been clarified empirically, there seems little point in pursuing the question

of effectiveness, since interventions may well be built upon unfounded methodological, theoretical, and conceptual assumptions'' (p298). Towards the TTM, model specification is required and this specification should reflect methodologically evidence. And because the TTM addresses a large amount of health behaviours, like exercise, specifications and methodological evidence per behaviour should be tested.

Future development

Although the future development of models for health and exercise behaviour is the responsibility of scientists, the fitness sector has a shared responsibility towards exercisers or members by developing, implementing and supporting effective strategies and programmes. Fitness clubs are growing globally since the eighties, offering exercise programmes combined with nutritional and lifestyle interventions to millions of members worldwide. It seems positive that so many start an exercise programme in a fitness club, but it is depressing that exercise adherence is so low and drop-out rates are extremely high. People are paying to not to go to the gym (DellaVigna and Malmendier, 2006). In general, researchers showed a lack of interest in this population and specific setting. Even when studies on other populations can be applied to exercise behaviour in fitness clubs, specific research in this context is needed to develop tailor made strategies and programmes to increase exercise behaviour, and ultimately increase the health and fitness levels of members. The population of members in fitness clubs is specific because members in fitness clubs are generally healthy adults, which could differ from populations such as cardiac patients.

Members must also visit the club to exercise, which is different from settings like home fitness (e.g. no travelling involved and most often no other exercisers around). Another factor is that members usually pay a substantial membership fee per month, on average EUR 45, = to get access to the club (Baart de la Faille, Middelkamp and Steenbergen, 2012), in contrast for example to students who often pay low, or no membership fees. It is important for researchers to understand the specific characteristics of this population and how to involve stakeholders such as fitness professionals. The current study made clear that a web survey to this group scored a low response rate (5%). In a comparable study in Germany, Horn (2011) reported a rate of 9%. Little is known on response rates of fitness professionals in general. Other methods could be considered, for example face-to-face interviews, phone calls or live observations. It is perceived that fitness professionals would give more and better information if they are approached during events, conferences, workshops, or other opportunities having personal contact. Next to fitness clubs, fitness professionals also need to understand their responsibility to support behaviour science research and assist in developing more effective strategies and programmes to motivate clients and members. In this plan, key stakeholders including governments, national fitness and health associations, chains, and more, should be included.

To conclude, exercise behaviour remains an understudied topic and more research is needed on the fast-growing population of members in fitness clubs (151 million in 2016), but also on niches such as personal training studios and boutique studios. Multiple studies, including the self-efficacy intervention showed that exercise behaviour can be increased when proper coaching

is executed. Behavioural coaching on exercise can also affect other kinds of health behaviour. According to Annesi (2017), exercise is the best predictor of long-term weight loss. This is not due to the associated caloric expenditure of individuals who are deconditioned, but to building behavioural skills to control eating prior to changing their diet (Annesi, 2017; Fogelholm and Kukkomen-Harjula, 2000; MacLean et al. 2015; National Institutes of Health, 2008; Svetkey et al., 2008). Research indicates that building self-regulatory skills in one context (e.g., exercise) can be leveraged to transfer the same skills over to another context (e.g., controlled eating) (Annesi, 2017). This is most effective when the skills are intentionally taught, nurtured, and supported. This thesis should be understood as the start of a long-term journey with the mission to find strategies to effectively support health and exercise behaviour. This is to ultimately improve the health and fitness levels of millions of members.

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Addendum

Summary

An overwhelming amount of studies have demonstrated that exercise is beneficial for health. This thesis focusses on exercise (behaviour) which contains planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health. The transtheoretical model of behaviour change (TTM) is often used to understand changes in health related behaviour, like exercise. The TTM is an integrative model, combining different theories and constructs. It describes four key variables that are the stages of change, decisional balance, self-efficacy and the processes of change. The applicability of this model to exercise behaviour of the 151 million members in fitness clubs worldwide has never been studied. The purpose of this thesis is to study exercise behaviour of this specific population, applying the framework of the TTM. This thesis and research series are organised by a set of different research questions and hypothesis.

The first guided the systematic review: what is the quantity and quality of studies on exercise behaviour of members in fitness clubs applying the TTM and which implications for future research can be found? The systematic literature review was performed using three kinds of databases. In total 285 studies were found. On these studies, specific inclusion and exclusion criteria were applied. The methodological quality of the studies was reviewed by using the CASP checklist. Applying the inclusion and exclusion criteria yielded 33 studies on exercise behaviour of members in fitness clubs. Only 8 studies were based on one or more constructs of the TTM. The reviewed research demonstrated promising results. In multiple studies exercise behaviour was significantly increased by factors related to self-efficacy, decisional balance and processes of change. The overall quantity of studies is considered low, and the overall quality is limited, because, for example, randomised controlled trails were lacking. It was concluded that research on exercise behaviour of members in fitness clubs using constructs of the TTM is, therefore, limited.

A follow-up study contained the following question of "to what extend do (ex) members of fitness clubs adopt and maintain attendance behaviour within the later stages of change?" The objective of this study is to apply the stages of change to examine patterns of attendance behaviour within this specific population. A retrospective study on existing data was performed to study the later stages of change. Attendance data of members that cancelled their membership in 2012 of two European fitness chains (Basic-Fit and HealthCity) was collected. In total 259,355 ex-members of 267 separate clubs. A sample of 400 were selected at random for deeper analyses. Overall M_{age} for Basic-Fit was 32.11 (SD 10.9) and 34.74 (SD 11.0) for HealthCity, of which 64% were males at Basic-Fit and 51% at HealthCity. Regular attendance behaviour was defined by at least four visits per month. All ex-members had purchased a membership and entered the preparation stage, but 19.5% never attended the club in 24 months. Of the ex-members, 10% demonstrated regular attendance behaviour for six months in a row without relapsing, and 2.3% performed regular attendance for 24 months. 49% did not attend the club for one full month but restarted again. Significant (p = .01) positive correlations were found in attendance behaviour between the 6^{th} and 12^{th} month (r = .61), and the 12^{th} and 24^{th} month (r = .45), suggesting that ex-members who attended for more than six months will more likely maintain their attendance behaviour.

A preliminary survey study was conducted on fitness professionals to investigate what strategies within the TTM do European fitness professionals currently use to support clients in changing health-related behaviour? An online survey was performed using the European Register for Exercise Professionals (EREPS) (January 2015). Professionals of five countries were surveyed in the first quarter of 2015. The survey was sent out by email to 3,497 fitness professionals. In total 178 fitness professionals participated. European fitness professionals use a mix of strategies to support behaviour change of health-related behaviours. The most addressed type of behaviour was exercise, followed by nutrition. The support mainly focused on clients in the preparation and action stage of the TTM. "Reaching the desired goal" and "too expensive" were the main reasons for relapse with respectively 51.7% and 38.3%. Due to a low response rate (only 5%), this topic needs further study.

A real-life intervention in two parts was guided by another research question "what is the effect of self-set activities and a coaching protocol on self-set goals on self-efficacy and group exercise behaviour of members in fitness clubs in 4, 8, 12, 26 and 52 weeks"? Group exercise behaviour is defined as exercising in the same structured programme in the same environment (group exercise room) with a minimum of two individuals. In total 122 participants (M_{age} 42.02 yr.; SD 12.29; 67% females) were recruited and randomly assigned to one control and two experimental groups. The control group was limited to participate in one virtual group exercise programme only (group 1). The first experimental group was able to self-set their activities and participate in multiple group exercise programmes (group 2). The second experimental group received an additional monthly coaching protocol to manage self-set goals (group 3). A validated scale for barrier self-efficacy was used, group exercise sessions were measured, and drop-out rates were registered. An ANOVA indicated that mean amount of sessions of group 1 and 3, and 2 and 3 differed significantly ($p < .05$) in 12 weeks. Descriptive statistics demonstrated mean group exercise sessions over the total of 12 weeks of 2.74 (SD 4.65) in the control group; 4.75 (SD 6.08) in the first experimental group, and 12.25 (SD 9.07) for the second experimental group. Regression analysis indicated that self-efficacy at 8-weeks explained the highest variance in overall group exercise sessions ($R^2 = .18$; $p < .05$). Overall drop-out rates were 88% in group 1, 78% in group 2, and 48% in group 3. The results showed that group exercise behaviour can significantly be improved by a coaching protocol on self-set goals.

A follow-up study was performed testing effects on exercise behaviour over 52 weeks and the longitudinal relationships of all TTM constructs. All 122 participants of the first study were monitored 52-weeks. Measurements were executed at baseline, 4, 8, 12, 26 and 52 weeks, using validated scales for stages of change, self-efficacy, decisional balance and processes of change. Exercise behaviour and drop-outs were registered. A chi-square test indicated significant differences for continuing exercising after the intervention: 7 of group 1; 6 of group 2; 19 of group 3. In total 5 demonstrated regular exercise behaviour at 26 weeks, and 3 at 52 weeks. Self-efficacy, decisional balance, and processes of change showed limited longitudinal changes over the later stages of change. At all measurements, participants reported more pros than cons and used more behavioural than cognitive processes. Exercise

behaviour of members in fitness clubs demonstrated dramatic developments in 52 weeks. The frequencies of sessions were so low that positive health effects will be minimal. The integrative character of the TTM appears to be weak and the data indicated limited relationships. More research is needed to understand exercise behaviour and define optimal strategies to increase exercise attendance and decrease drop-outs in the long term.

This thesis should be understood as the start of a long-term journey with the mission to find strategies to effectively support behaviour and ultimately improve the health and fitness levels of members. This thesis strongly promotes health behavioural support as the core mission of the sector. Individuals can exercise everywhere, at work, at home, in the gym and more, but personalised behaviour coaching is the key to success and should be provided by the sector in the most effective manner.

Samenvatting

Er is de laatste decennia een grote hoeveelheid onderzoek gepubliceerd waaruit blijkt dat training (exercise) een positief effect heeft op legio gezondheidsfactoren. Er wordt geconcludeerd dat ''exercise is medicine'' oftewel ''training is een medicijn voor de gezondheid''. Dit promotieonderzoek richt zich op training gedefinieerd als geplande en gestructureerde lichamelijke oefeningen met de intentie tot het verbeteren of onderhouden van de fitheid en gezondheid. Het transtheoretische model voor gedragsverandering (afgekort in het Engels: TTM) wordt veelvuldig gebruikt om veranderingen in gezondheidsgerelateerd gedrag te begrijpen, zoals (fitness) training. Het TTM is een geïntegreerd model waarbij diverse theorieën zijn samengebracht. Het huidige model bestaat uit vier kernvariabelen (zogenaamde constructen): 1. fasen van verandering; 2. beslissingsbalans; 3. zelf-effectiviteit; 4. processen van verandering. Het eerste construct, de fasen van verandering (stages of change), vormt het verbindende deel van het model en bestaat uit zes fasen: 1. niet-overwegen om te veranderen; 2. overwegen om te veranderen; 3. voorbereiding; 4. beginnen (actie); 5. volhouden; 6. een eventuele terugval. De toepasbaarheid van dit model op trainingsgedrag van de 151 miljoen leden van fitnessclubs wereldwijd is amper tot niet onderzocht. Dit promotieonderzoek bestudeert het transtheoretische model voor gedragsverandering en trainingsgedrag in deze specifieke populatie. Dit onderzoek is georganiseerd aan de hand van een reeks van richtinggevende onderzoeksvragen en hypotheses.

De eerste onderzoeksvraag hoort bij het literatuuronderzoek; wat is de kwantiteit en kwaliteit voor wat betreft studies naar trainingsgedrag van leden in fitnessclubs op basis van het transtheoretische model voor gedragsverandering en welke implicaties voor toekomstig onderzoek komen hieruit voort? In deze systematische review werden in totaal 285 relevante studies gevonden als gevolg van een speurtocht in drie soorten databases. Op deze studies zijn specifieke inclusie en exclusie criteria toegepast, hetgeen resulteerde in 33 studies over trainingsgedrag in fitnessclubs, waarvan slechts 8 gebaseerd waren op een of meer constructen van het TTM. De studies laten veelbelovende resultaten zien voor wat betreft het positief beïnvloeden van trainingsgedrag. In diverse studies werd trainingsgedrag significant verhoogd en langer volgehouden door TTM constructen zoals zelf-effectiviteit, beslissingsbalans en processen van verandering. De methodologische kwaliteit van de studies werd getoetst aan de hand van de CASP checklist. De overall kwaliteit werd als laag beoordeeld. De meeste studies waren transversaal van aard en experimenteel onderzoek (RCT) ontbrak. Er werd geconcludeerd dat onderzoek naar trainingsgedrag en het TTM bij leden in fitnessclubs beperkt is en dat nader onderzoek noodzakelijk is.

In een vervolgstudie werd onderzoek gedaan naar de volgende vraag: in welke mate kunnen (ex) leden van fitnessclubs bezoekgedrag adopteren en volhouden binnen de latere fasen van gedragsverandering? Het doel van deze studie was om gedragspatronen te onderzoeken qua bezoekgedrag (welke indicatief kunnen zijn voor trainingsgedrag). De data van 259.355 ex-leden van 267 clubs uit twee Europese fitnessketens (Basic-Fit en HealthCity) die in 2012 hun lidmaatschap hadden opgezegd werden verzameld. Via een aselecte steekproef werden 400 ex-leden geanalyseerd, met als gemiddelde leeftijd van 32,11 jaar (SD 10,9) bij Basic-Fit en 34,74 jaar (SD 11,0) bij HealthCity, waarvan 64% mannelijk bij Basic-Fit en 51% bij HealthCity. Regelmatig bezoekgedrag werd gedefinieerd als minimaal vier bezoeken per maand. Alle ex-leden hadden in het verleden een lidmaatschap gekocht; dit werd gelabeld als de voorbereidingsfase. Van alle leden had 19,5% nooit de club bezocht.

Van de ex-leden voldeed 10% aan de definitie van regelmatig bezoekgedrag voor zes maanden achtereenvolgend, zonder terug te vallen. Slechts 2,3% vertoonde regelmatig bezoekgedrag over 24 maanden. 49% bleef een volle maand afwezig maar begon daarna toch weer de club te bezoeken. Er werden significant (p = .01) positieve correlaties gevonden voor wat betreft het bezoekgedrag tussen de 6^{e} en 12^{e} maand (r = .61) en de 12^{e} en 24ste maand (r = .45).

Voorts werd een verkennend onderzoek uitgevoerd met de volgende onderzoeksvraag: welke strategieën op basis van het TTM gebruiken Europese fitness professionals om hun klanten te ondersteunen bij het beginnen en volhouden van aan gezondheid gerelateerd gedrag? Een online vragenlijst werd verstuurd naar professionals binnen het Europese register voor fitness professionals. De professionals uit vijf verschillende landen werden gemaild in het eerste kwartaal van 2015. De lijst werd verstuurd naar 3.497 respondenten in de lokale taal. In totaal 178 lijsten werden geretourneerd (slechts 5%). De Europese fitness professionals gebruikten een mix aan strategieën om gedragsverandering- en behoud te ondersteunen. Qua type gezondheidsgedrag ging het vooral over training, op de voet gevolgd door voeding. De professionals ondersteunen klanten met name in de fase van voorbereiding en actie (eerste zes maanden); coaching in de andere fases was beperkt. Het ''bereiken van het doel'' en ''te duur'' werden genoemd om terug te vallen, respectievelijk 51,7% en 38,3%. Vanwege de lage respons (welke ook in soortgelijke studies werd gerapporteerd) is vervolgonderzoek noodzakelijk.

Als derde studie binnen dit promotieonderzoek werd een interventie opgezet op basis van de volgende onderzoeksvraag: wat is het effect van het zelfstandig kunnen kiezen van groepsfitness activiteiten en een coachingsprogramma ten aanzien van zelfgekozen doelen op zelf-effectiviteit en groepstrainingsgedrag bij leden in

fitnessclubs over 4, 8, 12, 26 en 52 weken? Groepstrainingsgedrag werd omschreven als het trainen in een gestructureerd programma in dezelfde setting met minimaal twee personen. In totaal werden 122 participanten (gemiddelde leeftijd 42,02 jaar; SD 12,29; 67% vrouwen) gerekruteerd en bij toeval ingedeeld over een controle en twee experimentele groepen. De controlegroep kon alleen trainen in een virtueel indoor cycling programma (groep 1). De eerste experimentele groep kon zelf kiezen uit een veelheid aan groepsprogramma's (groep 2). De tweede experimentele groep kreeg een additionele maandelijkse coaching inzake het zelf bepalen en monitoren van trainingsdoelen (groep 3). Een gevalideerde vragenlijst voor zelf-effectiviteit werd gebruikt, groepssessies werden doorlopend geregistreerd en uitvallers werden strikt bijgehouden. Uit een ANOVA-toets bleken significante verschillen (p < .05) in trainingssessies tussen groep 1 en 3 en groep 2 en 3 over 12 weken. De volgende gemiddelde aantallen qua trainingssessies over 12 weken werden gemeten: 2.74 (SD 4.65) voor groep 1; 4.75 (SD 6.08) voor groep 2; 12.25 (SD 9.07) voor groep 3. Een regressieanalyse liet voorts zien dat zelf-effectiviteit op 8 weken de hoogste variantie gaf qua groepstrainingssessies (R^2 =.18; p < .05). Uitvalpercentages waren 88% in groep 1, 78% in groep 2 en 48% in groep 3. De resultaten lieten zien dat trainingsgedrag in groepen significant kan worden verbeterd (verhoogd) door een coachingsprogramma. Tevens bleek uit de resultaten dat zelf-effectiviteit slechts voor een klein deel dit complexe gedrag kan verklaren; er zijn dus legio andere factoren die medebepalend zijn.

In een vervolgonderzoek werd het effect van de interventie bestudeerd over 52 weken. Tevens werd gekeken naar het integratieve karakter en de longitudinale relaties van constructen in het TTM. Er werden metingen verricht voor aanvang, op 4, 8, 12, 26 en 52 weken. Hier werd gebruik gemaakt van gevalideerde

vragenlijsten voor de fasen van verandering, zelf-effectiviteit; beslissingsbalans en de processen van verandering. Een chi-kwadraat toets liet significante verschillen ($p < .05$) zien voor wat betreft het zelfstandig doorgaan met trainen na de interventieperiode van 12 weken: 7 in groep 1; 6 in groep 2; 19 in groep 3. Slechts 5 van de 122 proefpersonen lieten regelmatig trainingsgedrag zien over een periode van 26 weken en 3 over de volle 52 weken. Zelf-effectiviteit, beslissingsbalans en processen van verandering vertoonden een geringe relatie met de fasen van verandering. Op alle meetmomenten rapporteerden de respondenten meer voordelen dan nadelen van trainen. Tevens gebruikten ze continu meer gedragsmatige processen dan cognitieve processen. De conclusie dringt zich op dat trainingsgedrag van leden in fitnessclubs een dramatisch patroon vertoont over een periode van 52 weken. De frequenties van trainen zijn zo laag dat gezondheidseffecten op basis van dit gedrag amper kunnen worden verwacht. Het integratieve karakter van het TTM bleek beperkt te zijn; uit het huidige onderzoek bleek dat de constructen amper aan elkaar (met name aan de fasen van verandering) zijn gerelateerd. Er is derhalve meer onderzoek nodig om te komen tot een optimaal wetenschappelijk model en tot optimale strategieën om trainingsgedrag van leden in fitnessclubs te vergroten.

Dit promotieonderzoek dient te worden gezien als de start van een reis naar effectieve gedragsstrategieën met als ultieme doel het vergroten van fitheids- en gezondheidseffecten van leden in fitnessclubs. De fitness sector heeft als kerntaak om leden in hun gezondheids- en trainingsgedrag te ondersteunen. Leden kunnen tegenwoordig overal trainen, maar gepersonaliseerde en effectieve gedragscoaching zou weleens het onderscheidende vermogen van de sector kunnen zijn voor de lange termijn.

"Jan, you've carved out an important niche in an important and understudied population; keep up the good work."

Rod K. Dishman (in personal email)

Dankwoord

Een promotieonderzoek lukt alleen met veel steun van anderen. Het is teamwork! Het bedanken van deze personen kan op diverse manieren en het benoemen in dit dankwoord is slechts een van die manieren. Andere vormen zijn bijvoorbeeld een boek cadeau geven of samen feestvieren! Ook al staat jouw naam niet op deze pagina; het komt dus goed! De grootste dank gaat uit naar mijn ouders! Zij hebben mij altijd de vrijheid gegeven om mijn passie en eigen interesses te volgen en hebben hun hele leven onvoorwaardelijke steun gegeven. Ik heb simpelweg de meest geweldige ouders op aarde! Pa en ma; super bedankt! Ik houd heel veel van jullie en ook van mijn topbroer Sander! Tevens dank ik mijn grote liefde Kelby voor haar oneindige geduld, onder meer wanneer ik weer eens oneindig zat te analyseren tijdens het onderzoek (werkelijk alles werd bediscussieerd, verschrikkelijk).

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Cheers,
Jan Middelkamp
Beckum/Den Bosch (20 februari 2017)

Curriculum vitae

Jan Middelkamp

Jan is father of Collin and Jason. He graduated at the Academy of Physical Education (Bachelor Degree) and Sport, Exercise and Health at Utrecht University (Master in Science Degree). In his youth, he was a judo teacher and part of the Dutch National Judo team. He became club and franchise manager at Fit-Care, a franchise fitness chain in the Netherlands. From 1997, Jan was responsible for the introduction of Les Mills in the Netherlands and Belgium. Later he became the COO of Fitness First in the Netherlands; a leading health club chain. In 2003, Jan became commercial director and shareholder at HDD Group. From 2006 to 2009 he was the COO and business development director at HealthCity & Basic-Fit International (200+ clubs). In 2009, he returned to the HDD Group as the CEO. Currently, Jan is the Development Director at the HDD Group, CEO of BlackBoxPublishers and Board Member of EuropeActive (the European association for the health and fitness sector). He published over 20 books and conducted a list of studies and reports: www.janmiddelkamp.com.

Peer-reviewed publications related to this PhD study

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Training programme related to this PhD study

LAPT Motivation Essentials: A three day course for fitness professionals to learn more on motivation and health behaviour change, including a package of simple TTM based tools to coach clients daily.

Presentations on health and exercise behaviour change

To learn from others and to share knowledge on health and exercise behaviour change, the studies of this thesis have been presented around the globe in the last five years. A selection of some conferences (including month/year; conference; city):

07/12 at Canfitpro in Toronto;
04/13 at Mefitpro in Dubai;
08/13 at ELF in Bilbao;
09/13 at VIRKE in Oslo;
11/13 at HDD in Veldhoven;
02/14 at Les Mills in San Diego;
06/14 at Fitness Challenges in Aix en Provence;
06/14 at DHFO in Copenhagen;
10/14 at ISM in Amsterdam;
12/14 at HDD in Krefelt;
01/15 at Trainer4You in Helsinki;
06/15 at Fitness Challenges in Aix en Provence;
06/15 at ELF in Vienna;
06/16 at HDD in Veldhoven;
08/16 at Crown Consultancy in Breda;
09/16 at FIBO in Shanghai;
10/16 at HDD in Amsterdam;
10/16 at DIFG in Dusseldorf;
12/16 at LAPT in Houten;
02/17 at FEM in Warschau.

Team!

This thesis is a result of a huge passion for the health and fitness sector and a strong believe that behavioural support is the core mission of the sector. Individuals can exercise anywhere, at work, at home, at the gym, and more, but personalised behaviour coaching is the key to success and should be provided by the sector in the most effective ways. Much more research is needed to support this mission. The journey has just started and hopefully continues with the team that made this thesis happen. Team; it was a huge pleasure and honour to work with you! Many thanks!

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Bert Steenbergen

Peter Wolfhagen

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Jan Middelkamp

The transtheoretical model of behaviour change and exercise behaviour in fitness clubs

An overwhelming amount of studies have demonstrated that exercise is beneficial for health. Exercise is medicine! But do people take the medicine? And for how long? How can exercise behaviour be increased? This thesis focusses on exercise behaviour which contains planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health. The transtheoretical model of behaviour change (TTM) is often used to understand changes in health related behaviour, such as exercise. The TTM is an integrative model, combining different theories and constructs. It describes four key variables that are the stages of change, decisional balance, self-efficacy and the processes of change. The applicability of this model to exercise behaviour of the 151 million members in fitness clubs worldwide has never been studied. The purpose of this thesis is to study exercise behaviour of this specific population, applying the framework of the TTM, to get more people, more active, more often!

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