

SYSTEMATIC REVIEW

# THE TRANSTHEORETICAL MODEL AND EXERCISE BEHAVIOUR OF MEMBERS IN FITNESS CLUBS

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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.

**Methods:** 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. Only 8 studies were based on one or more constructs of the TTM. The reviewed research demonstrate 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 low and the overall quality is limited; for example randomised controlled trails are lacking.

**Conclusion:** 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 programs 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<sup>1</sup>. This review focuses on exercise, defined as planned, structured, repetitive bodily movements with the intention to improve or maintain (physical) fitness or health<sup>3</sup>. In fitness clubs, members predominantly exercise for health benefits<sup>4</sup>. Several studies demonstrate that exercise behaviour, meaning the adaption of new behaviour and the maintenance of existing behaviour (adherence), is problematic<sup>5</sup>.

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<sup>6-8</sup>. 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 that wanted to change their behaviour without professional intervention, the so-called self-changers. It describes four key variables: 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<sup>9</sup>. The stages are: Pre-contemplation: people who aren't currently active and do not intent to exercise in the nearby future (approximately 6 months). Contemplation: people who aren't currently active, but do intent to exercise sometime in the next 6 months. Preparation: this group contains people who are not or irregularly active, but are preparing to exercise (within the next 30 days). Action: people

who made a change in their behaviour and are currently exercising, but have only started recently (6 months). 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: useful benefits for the self; useful benefits for others; self-approval; approval of others. There are also four dimensions for Cons: useful losses for the self; useful losses for others; self-disapproval; 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<sup>10</sup>, 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 reevaluation (e.g. assessment of how inactivity affects society); self-reevaluation (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); stimulus control (e.g. managing situations that prompt inactivity or activity)<sup>11-12</sup>.

Spencer et al. (2006) reviewed 150 studies using the TTM. The majority of the studies addressed middle-class, white, female populations, thereby limiting the generalisability of findings to some extent. A total of 31 stage-matched intervention

studies were reviewed and 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 partly be explained by limitations of the current studies. According to Fallon et al. (2005) and Spencer et al. (2006), the most important limitations are: 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 five TTM constructs; Differences between men and women are not taken into account; Lack of validity for several constructs (although some evidence), such as decisional balance and processes of change. A more recent study provided longitudinal evidence for the use of TTM constructs to predict maintenance or increase in exercise levels for a random, multi-ethnic population<sup>13</sup>.

### Population of Members in Fitness Clubs

According to the International, Health, Racquet and Sportsclub Association (IHRSA), the global fitness club sector has about 140 million members, of which 50% were males<sup>14</sup>. Based on estimations of IHRSA, the global fitness sector counts 160,000 fitness clubs<sup>15</sup>. IHRSA<sup>16</sup> 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

because if people do not exercise there will also be no effect on the level of fitness or health.

Based on an initial review of Baart de la Faille et al. (2012), the applicability to exercise behaviour of members in fitness clubs has never been systematically assessed and empirical studies on this population seems scarce. 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 have to 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, globally on average AUD 80 to get access to the club, in contrast to (for example) students who often pay low or no membership fees<sup>17</sup>.

The objective of this paper is to review the existing literature on exercise behaviour of members in fitness clubs. The main research question is: 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.

## METHODS

Since 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. To 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 centre, motivation fitness centre, 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 the Spanish, French, German and Dutch language were found.

The studies were screened on the two exclusion criteria: the environment of the study and the participants of the study. Since the review focused on exercise behaviour in fitness clubs, all studies characterised 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<sup>18</sup>, 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 selected. Nine are fitness sector studies. These studies are not peer-reviewed and generally show 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 study exercise behaviour.

## RESULTS

In the 33 studies, the participants were labeled by the stage of change (Table 1). In most studies, the members were in the action or maintenance stage. Only one publication included the preparation stage. In four studies it was not clear in which stage the members were in.

In total only 8 studies used constructs of the TTM. Below, these 8 studies will be summarised. Nigg et al. (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. Pros were: good equipment/facilities and social interaction. 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<sup>19</sup>. 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 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<sup>20</sup>. This coach-approach system was also tested in Annesi (2004b)<sup>21</sup>, Annesi (2007)<sup>22</sup>, Annesi and Unruh (2007)<sup>23</sup> and Annesi et al. (2011)<sup>24</sup> and proved again that adherence was positively influenced by the intervention. Cox et al. (2003)<sup>25</sup> 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 et al. (2003)<sup>26</sup> 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. Persons with stronger self-regulatory capacity use more processes of change over time. They try harder in attempting to maintain exercise involvement.

The remaining included studies that are not based on TTM constructs, and for that reason not discussed above, are described briefly in Table 1.1 for case-control studies<sup>27 28 29 30 31 32 33 34 35</sup> and 1.2 for cross-sectional studies<sup>36 37 38 39 40 41 42 43 44 45 46 47 48 49 50</sup>. Below, the methodological quality of the studies will be reviewed.

**Table 1.1: Case-control Studies on Exercise Behaviour of Members in Fitness Clubs.**

Author(s)	Purpose	Conclusion	Construct(s) of TTM	Stages of change of members
1. Annesi & Mazas (1997)	Test effects of virtually enhanced exercise equipment on adherence and exercise-induced feeling states.	Virtual reality bike had highest adherence. 17 – 43% non adherence.	None.	Action.
2. Courneya et al. (1997)	Test the effects of the reinforcement condition, were members could earn one month free membership if they would attend the facility at least 12 times in the next month.	One month free membership increased attendance with 17.2%.	None.	Action & maintenance.
3. Nigg et al. (1997)	Test the effect of a decision balance sheet (DBS). 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.	DBS was effective to keep attendance up.	Decisional balance.	Action & maintenance.
4. Annesi (1998)	Test the effect of computer feedback that provided enhanced tracking, goal setting & feedback, compared to standard exercise tracking & feedback.	Computer feedback had higher attendance. 46 – 77% drop-out.	None.	Action & maintenance.
5. Annesi (1999a)	Test effects of minimal group promotion on cohesion & exercise adherence. Treatment group followed a program by an exercise professional in small groups for 5 - 7 min, before and after workout.	Minimal group promotion improves attendance and prevents drop-out.	None.	Action & maintenance.
6. Annesi (1999b)	Test relationship between exercise professionals behavioural styles and clients exercise adherence.	Note of author: study requires replication.	None.	Action & maintenance.
7. Annesi (2002a)	Test relationships between changes in acute exercise-induced feeling state, self-motivation and adult's adherence to moderate aerobic exercise.	Low self-motivation group 25% of variance in attendance was explained by scores on feeling states.	None.	Action.
8. Annesi (2002b)	Test a goal-setting protocol for adherence to exercise in Italian adults.	Attendance & drop-out were better in goal-setting group. 26 – 70% drop-out.	None.	Action & maintenance.
9. Annesi (2003)	Test the effect of a multiple component behaviour change treatment package (36 weeks) in fitness facilities, like goal setting, relapse prevention, self-reinforcement, contracting.	A behaviour change treatment package is effective to improve attendance and adherence.	Self-efficacy and processes of change.	Action & maintenance.
10. Cox et al. (2003)	Test and compare home versus fitness center based exercise for 18 months.	Exercise adherence in fitness center is higher than exercise adherence at home.	Stages of change.	Action & maintenance.
11. Annesi (2004a)	Test psychological improvement and exercise session attendance over 10 weeks in formerly sedentary adults.	Exercise session attendance rates were significantly higher in group with reductions on mood states.	None.	Action.
12. Annesi (2005b)	Test change in body esteem factors and relationship with exercise session attendance and check if age is a moderating factor in a 12 weeks program.	Perceived progress in body build and health motivates adherence in an exercise program.	None.	Action.
13. Annesi (2007)	Test three treatments to estimate their associations with drop-out: standard exercise counseling; computer feedback treatment and behavioural support. In the computer feedback condition, a Fitlxxx system was used.	Even under the guidance of exercise specialists in well equipped facilities the drop-out rates were high.	Self-efficacy and processes of change.	Action & maintenance.
14. Annesi & Unruh (2007)	Test an interpersonal counseling intervention named the coach approach, in 2003, 2004 and 2005.	Drop-out rates with typical exercise counseling reduced by approximately one-third.	Self-efficacy and processes of change.	Action & maintenance.
15. Annesi et al. (2011)	Test effects of the coach approach intervention on adherence to exercise in obese women: assessing mediation of social cognitive theory factors, like physical self-concept; exercise self-efficacy; total mood disturbance and body areas satisfaction.	Coach approach intervention improved adherence to exercise in obese woman.	Self-efficacy and processes of change.	Action.



**Table 1.2: Cross-sectional Studies on Exercise Behaviour of Members in Fitness Clubs.**

Author(s)	Purpose	Conclusion	Construct(s) of TTM	Stages of change of members
16. Spangenberg (1997)	To study the increase of fitness club attendance through self-prophecy. Non-using members were called to ask (predict) if they would attend the club again.	Subjects over-predicted that they would visit their fitness club again.	None.	Action & maintenance.
17. Levesque et al. (2003)	To study how learned resourcefulness is related to spontaneous process of change in 6 months. Learned resourcefulness are regulatory skills that enable a person to self-control his/her behaviour.	Greater tendency to use problem-solving skills is associated with greater processes of change use.	Stages of change & processes of change.	Preparation, action & maintenance.
18. Annesi (2004b)	To study relationship of social cognitive theory factors to exercise maintenance in adults.	Social cognitive theory is an effective basis for analysing exercise behaviour.	Processes of change.	Action & maintenance.
19. Annesi (2005a)	To study relations between changes in feeling states at moderate cardiovascular exercise and two measures of adherence, testing principles of operant conditioning.	Positive feeling states improved adherence.	None.	Action.
20. Annesi (2005c)	To study relations of self-motivation, perceived physical condition, and exercise induced changes in revitalization and exhaustion with attendance in woman initiating a cardio vascular exercise regimen.	Self-motivation is associated with attendance.	None.	Action.
21. McKechnie et al. (2006)	To study characteristics and exercise behaviour in an emerging market in the UAE.	Fitness trends are moving across cultures.	None.	Action & maintenance.
22. Kruger et al. (2007)	To study fitness facilities for adults, differences in perceived access and usage.	Having access to fitness facilities is significant associated with levels of PA.	None.	No info.
23. Huang et al. (2007)	To study the influences of personality and motivation on exercise participation and quality of life.	Significant relationships between exercise participation and quality of life.	None.	No info.
24. Lin et al. (2007)	To study the relation between extroversion and leisure motivation.	Extrovert persons are highly motivated to attend fitness centers.	None.	No info.
25. Wang et al. (2008)	To study changes in consumer behaviour in fitness clubs, comparing two market studies with a time span of 8 years.	Overall the fitness consumers are stable in terms of joining a club but motives and programs have diversified in years.	None.	No info.
26. Prichard & Tiggemann (2008)	To study relations among exercise type, self-objectification and body image in the fitness centre environment: the role of reasons for exercise.	Exercise motivated by appearance reasons (like weight control) can lead to poorer body image in woman.	None.	Action & maintenance.
27. Collishaw et al. (2008)	To study leisure employees emotional expression and its effect on client satisfaction with group fitness classes.	Relationship between class experience and loyalty to instructor.	None.	Action & maintenance.
28. Vlachopoulos et al. (2008)	To study the predictive efficacy of the modified involvement scale (MIS).	Modified involvement scale was not predictive of important exercise related psychological and behavioural constructs	None.	Action & maintenance.
29. Kaphingst et al. (2008)	To study examined self-reported, physical activity, dietary behaviours, body mass index and correlates of behaviour change among short term (1 yr or less) and long term (>1 yr) members.	Length of the membership was not significantly related to weight status, dietary behaviours of physical activity.	None.	Action & maintenance.
30. Miller & Miller (2010)	To study attitudes of overweight and normal weight adults regarding exercise in a fitness club.	Overweight and normal weight people did not differ in their overall attitude towards exercising in a fitness club.	None.	Action.
31. Mullen & Whaley (2010)	To study individual and contextual factors that contribute to initial involvement and sustained participation in fitnessclub. Membership across age and gender.	Age difference in factors related to commitment involved feeling in control: older adults were less concerned.	None.	Action & maintenance.
32. Kathrins & Turbow (2010)	To study demographic characteristics and health self-determination (intrinsic or extrinsic motivation) of fitness center participants to their levels of resistance training.	No significant association between demographic characteristics of study participants and reported quantity of resistance training.	None.	Action & maintenance.
33. Jankauskiene & Mieziene (2011)	To study relationship between body image and exercise adherence in fitness centre exercising sample.	No longer exercise involvement in members with more positive body image and lower social physique anxiety.	None.	Action & maintenance.

## Quality of Studies

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 is limited to only 8 all 33 studies were reviewed. The 33 studies use a wide variety of research designs. There are several ways to categorise research designs. In the field of PA and exercise, Dishman et al. (2013) define cross-sectional, case control, cohort and randomised controlled trials (RCTs). Of the 33 studies, 18 are labeled as cross-sectional. Using the criteria of consort 2010<sup>51</sup>, none of the studies can be labeled RCTs. The main issues that were lacking are: no detailed descriptions of the type of randomisation, implementation and blinding of the randomisation. Also, none of the studies could be qualified as cohort studies. The remaining studies are case control studies and for this reason the CASP (Critical Appraisal Skills Program) checklist was used to analyse the methodological quality<sup>52</sup>. 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 (exercise scientists). Both scored independently on the items in the checklist and produced their own evaluation. Initial interrater 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 end result of this methodological quality analysis is shown in Table 2, 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 minimise bias, and often confounding factors were not accounted for.

## CONCLUSION AND DISCUSSION

This paper is the first to systematically review exercise behaviour of members in fitness clubs. Although limited in quantity and quality, it can be

concluded that the studies demonstrate 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 used definitions vary a lot. Spencer et al. (2006) states 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 labeled 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)<sup>53</sup> 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 in Table 1, 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 labeling 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 this kind of associations within this population.

Based on this 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

**Table 2:** 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 minimise 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 generalisable to a larger population? 11. Do the results of this study fit other evidence?



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, 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 programs and services are introduced regularly. The American College of Sports Medicine<sup>54</sup> executed a survey on 2,600 fitness professionals to define the top 20 fitness trends. The study shows the top 10 programs which include personal training; core training; group personal training. None of the 33 studies in this systematic review investigated the adaptation and maintenance of exercise behaviour of for example personal training or group fitness programs. This means that many topics are unclear like, how does personal training or group fitness programs effect members to progressively move in the stages of change? Or how does personal training effect the self-efficacy of members? These are important topics to evaluate to support members in fitness clubs. The same for some club related factors, like joining fees and payment method. Since 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 factors. 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 programs to support exercise behaviour and by that the long term health and fitness levels of the members.

## **PRACTICAL APPLICATION**

Fitness clubs have been growing globally since the eighties, offering exercise programs to approximately 140 million members worldwide in 2014. It seems positive that so many start an exercise program in a fitness club, but exercise adherence is low and drop-out rates are high.

People are paying to not to go to the gym<sup>55</sup>. In general, researchers show 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 programs to increase exercise behaviour and ultimately the health and fitness levels of members. The transtheoretical model of behaviour change (TTM) is often used to understand changes in health related behaviour. The purpose of this review of literature was to study current TTM studies on exercise behaviour of this population to set a status quo and to develop a plan and program for future scientific research. Ultimately, this should lead to improved adoption and maintenance (adherence) of exercise behaviour in fitness clubs worldwide.

## **REFERENCES**

1. American College of Sports Medicine (2010). *ACSM's guidelines for exercise testing and prescription*. American College of Sports Medicine. 8<sup>th</sup> revised edition. Williams & Wilkins.
2. Dishman, R.K., Heath G.W., & Lee, I-M. (2013) *Physical activity epidemiology*. 2<sup>nd</sup> Edition. Human Kinetics Publishers, Champaign USA.
3. Buckworth J., Dishman, R.K., O'Conner, P.J., & Tomporowski, P.D. (2013). *Exercise Psychology*, 2<sup>nd</sup> Edition. Human Kinetics, Champaign, USA.
4. Baart de la Faille, M., Middelkamp, J., & Steenbergen, J. (2012). *The state of research in the global fitness industry*. BlackBox Publishers, the Netherlands.
5. Berger, B.G., Pargman, D., & Weinberg, R.S. (2002). *Foundations of exercise psychology*. Morgantown, WV: Fitness Information Technology.
6. Fallon, E.A., Hausenblas, H.A., & Nigg, C.R. (2005). The transtheoretical model and exercise adherence: examining construct associations in later stages of change. *Psychology of Sport and Exercise*, 6(6), 629-641.
7. Marshall, S. J., & Biddle, S. J. H. (2001). The transtheoretical model of behaviour change: A meta-analysis of application to physical activity and exercise. *Annals of Behavioural Medicine*, 23, 229-291.

8. Spencer, L., Adams, T. B., Malone, S., Roy, L., & Yost, E. (2006). Applying the transtheoretical model to exercise: a systematic and comprehensive review of the literature. *Health promotion practice*, 7(4), 428-443.
9. Prochaska, J., & Marcus, B. (1994). The transtheoretical model: applications to exercise. Dishman R.K. ed. (1994) *Advances in exercise adherence*. Human Kinetics, Illinois, 161 - 180.
10. Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
11. Dishman, R. K., Jackson, A. S., & Bray, M. S. (2010). Validity of processes of change in physical activity among college students in the TIGER study. *Annals of Behavioural Medicine*, 40(2), 164-175.
12. Reed, G.R. (2001). Adherence to exercise and the transtheoretical model of behaviour change. In: Bull, S. (Ed.) (2001) *Adherence issues in sport and exercise*, 19 – 45.
13. Dishman, R. K., Vandenberg, R. J., Motl, R. W., & Nigg, C. R. (2010). Using constructs of the transtheoretical model to predict classes of change in regular physical activity: a multi-ethnic longitudinal cohort study. *Annals of Behavioural Medicine*, 40(2), 150-163.
14. IHRSA (2012). Profiles of success. International Health Racquet and Sportsclub Association, Boston.
15. IHRSA (2014). *The IHRSA Global Report 2014*. International Health Racquet and Sportsclub Association, Boston.
16. IHRSA (2010). *The 2010 European Health Club Report*. International Health Racquet and Sportsclub Association, Boston.
17. Rutgers, H. (2012). Market Size and Statistics. In: Baart de la Faille, M., Middelkamp, J., & Steenbergen, J. (2012). *The state of research in the global fitness industry*. BlackBox Publishers, the Netherlands.
18. Baart de la Faille, M. & Middelkamp, J. (2012). Member profiles. In: Baart de la Faille, M., Middelkamp, J., & Steenbergen, J. (2012). *The state of research in the global fitness industry*. BlackBox Publishers, the Netherlands.
19. Nigg, C.R., Courneya, K.S., & Estabrooks, P.A. (1997). Maintaining attendance at a fitness center: an application of the decision balance sheet. *Behavioural medicine*, 23: 130 – 137.
20. Annesi, J.J. (2003). Effects of a Cognitive Behavioural Treatment Package on Exercise Attendance and Drop-Out in Fitness Centers. *European Journal of Sport Science*, 3 (2): 1 - 16.
21. Annesi, J.J. (2004b). Relationship of social cognitive theory factors to exercise maintenance in adults. *Perceptual and Motor Skills*, 99: 142-148.
22. Annesi, J.J. (2007). Effects of computer feedback and behavioural support protocol on dropout from a newly initiated exercise program. *Perceptual and Motor Skills*, 105: 55 – 66.
23. Annesi, J.J., & Unruh, J.L. (2007). Effects of the coach approach intervention on drop-out rates among adults initiating exercise programs at nine YMCA's over three years. *Perceptual and Motor Skills*, 104: 459 – 466.
24. Annesi J.J., Unruh, J.L., Marti, C.N., Gorjala, S., & Tennant, G. (2011). Effects of the coach approach intervention on adherence to exercise in obese women: assessing mediation of social cognitive theory factors. *Research Quarterly for Exercise and Sport*, 82 (1): 99 – 108.
25. Cox, K.L., Burke, V., Gorely, T.J., Beilin, L.J., & Puddey, B. (2003). Controlled comparison of retention and adherence in home- versus centre-initiated exercise interventions in woman ages 40-65 years: the SWEAT study (sedentary woman exercise adherence trail). *Preventive Medicine*, 36: 17 - 29.
26. Levesque, L., Gauvin, L., & Desharnais, R. (2003). Maintaining exercise involvement: the role of learned resourcefulness in process of change. *Psychology of Sport and Exercise*, 4: 237 – 253.
27. Annesi, J.J., & Mazas, J. (1997). Effects of virtual reality-enhanced exercise equipment on adherence and exercise-induced feeling states. *Perceptual and Motor Skills*, 85: 835 - 844.
28. Courneya, K.S., Estabrooks, P.A., & Nigg, C.R. (1997). A simple reinforcement strategy for increasing attendance at a fitness facility. *Health Education and Behaviour*, 24(6): 708 - 715.
29. Annesi, J.J. (1998). Effects of computer feedback on Adherence to Exercise. *Perceptual and Motor Skills*, 87: 723 - 730.
30. Annesi, J.J. (1999a). Effects of minimal group promotion on cohesion and exercise adherence.

- Small group research*, 30 (5): 542-557.
31. Annesi, J.J. (1999b). Relationship between exercise professionals' behavioural styles and client's adherence to exercise. *Perceptual and Motor Skills*, 89: 597 - 604.
  32. Annesi, J.J. (2002a). Relationship between changes in acute exercise-induced feeling states, self-motivation, and adults' adherence to moderate aerobic exercise. *Perceptual and Motor Skills*, 94: 425-439.
  33. Annesi, J.J. (2002b). Goal-setting protocol in adherence to exercise by Italian adults. *Perceptual and Motor Skills*, 94: 453 - 458.
  34. Annesi, J.J. (2004a). Psychological improvement is associated with exercise session attendance over 10 weeks in formerly sedentary adults. *European Journal of Sport Science*, 4 (2): 1 - 10.
  35. Annesi, J.J. (2005b). Relations of body esteem factors with exercise session attendance in woman initiating a physical activity program. *Perceptual and Motor Skills*, 100: 995 - 1003.
  36. Spangenberg, E. (1997). Increasing health club attendance through self-prophecy. *Marketing Letters*, 8(1): 23 - 31.
  37. Annesi, J.J. (2005a). Relationship between before-to-after-exercise feeling state changes and exercise session attendance over 14 weeks: Testing principles of Operant Conditioning. *European Journal of Sport Science*, 5(4): 159 - 163.
  38. Annesi, J.J. (2005c). Relations of self-motivation, perceived physical condition, and exercise induced changes in revitalization and exhaustion with attendance in woman initiating a cardio vascular exercise regimen. *Women and Health*, 42(3): 77 - 93.
  39. McKechnie, D.S., Grant, J., Shabbir, F., & Ganesh, P. (2006). The fitness trend moves east: emerging market demand in the UAE. *European Sport Management Quarterly*, 6 (3): 289 - 305.
  40. Kruger, J., Carlson, S.A., & Kohl, H.W. (2007). Fitness facilities for adults: differences in perceived access and usage. *American Journal of Preventive Medicine*, 32: 500 - 505.
  41. Huang, C.H., Lee, L.Y., & Chang, M.L. (2007). The influences of personality and motivation on exercise participation and quality of life. *Social Behaviour and Personality*, 35(9): 1189 - 1210.
  42. Lin, J.Y.C., Chen, L.S.L., Wang, E.S.T., & Cheng, J.M.S. (2007). The relationship between extroversion and leisure motivation: evidence from fitness center participation. *Social Behaviour and Personality*, 35(10): 1317 - 1322.
  43. Wang B., Wu, C., & Quan, W. (2008). Changes in consumer's behaviour at fitness clubs among Chinese urban residents. *Asian Social Science*, 4 (10): 106 - 110.
  44. Prichard, I., & Tiggemann, M. (2008). Relations among exercise type, self-objectification and body image in the fitness centre environment: the role of reasons for exercise. *Psychology of Sport and Exercise*, 9: 855 - 866.
  45. Collishaw, M.A., Dyer, L., & Boies, K. (2008). The authenticity of positive emotional displays: client responses to leisure service employees. *Journal of Leisure Research*, 40(1): 23 - 46.
  46. Vlachopoulos, S.P., Theodorakis, N.D., & Kyle, G.T. (2008). Assessing exercise involvement among participants in health and fitness centers. *European Sport Management Quarterly*, 8(3): 289 - 304.
  47. Kaphingst, K.A., Bennett, G.G., Sorensen, G., Kaphingst, K.M., O'Neil, A.E., & McInnis, K. (2007). Body mass index, physical activity, and dietary behaviours among members of an urban community fitness center: a questionnaire survey. *BMC Public Health*, 7 (181).
  48. Mullen, S.P., & Whaley, D.E. (2010). Age, gender, and fitness club membership: factors related to initial involvement and sustained participation. *IJSEP*, 8: 24 - 35.
  49. Kathrins, B.P., & Turbow, D.J. (2010). Motivation of fitness center participants towards resistance training. *Journal of Strength and Conditioning Research*, 24: 2483 - 2490.
  50. Jankauskiene, R., and Mieziene, B. (2011). The relationship between body image and exercise adherence in fitness centre exercising sample. *Sportas*, 1(80): 36 - 41.
  51. Moher, D., Hopewell, S., Schulz, K.F., Montori, V., Gøtzsche, P.C., Devereaux, P.J., Elbourne, D., Egger, M., & Altman, D.G. (2010). CONSORT 2010 Explanation and elaboration: updated guidelines for reporting parallel group randomized trials. *BMJ*, 1 - 28.

- 
52. CASP (2013). Critical Appraisal Skills Programme, Case Control Study Checklist, Edition May 31<sup>st</sup> 2013. <http://www.casp-uk.net>.
53. Dishman, R.K., Thom N.J., Rooks C.R., Mot R.W., Horwath C., & Nigg C.R. (2009). Failure of post-action stages of the transtheoretical model to predict change in regular physical activity: a multiethnic cohort study. *Annual Behavioural Medicine*, 37: 280 – 293.
54. American College of Sports Medicine (2012). Worldwide Survey of Fitness Trends for 2012. *ACSM's health and fitness journal*, November/December. American College of Sports Medicine. Lippincott Williams and Wilkins.
55. DellaVigna, S. & Malmendier, U. (2006). Paying not to go to the gym. *The American Economic Review*, 96: 604 – 719.