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Exercise motives and gains: implications for health behaviour change

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Exercise Motives and Gains: Implications for Health Behaviour Change

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Glossary of Terms

Autonomous Motivation	A type of motivation that reflects personal interests and values for engaging in an activity.
Behavioural domain	Area of behaviour; e.g., exercise is a separate behavioural domain to working, or learning.
Behavioural Regulation	The locus of control for our actions, used interchangeably with 'motivation' in this thesis. Whether we are engaging in behaviour because of personal volition or external or internal pressures.
Controlled Motivation	A type of motivation that reflects external or internal pressures for engaging in an activity.
Dispositional Motives	Life goals. General goals people have for their lives, e.g. building a career.
Gain	A gain is what a person perceives to have actually attained or avoided by engaging in a behaviour. Gains are results of behaviour which people are aware of
Motivation	Motivation is a regulatory process that drives goal-directed behaviour. Motivation is the driving force behind behaviour.
Motivational Interviewing	A collaborative, person-centred form of counselling to elicit and strengthen motivation for change, and explore and resolve ambivalence.
Motive	A motive represents the content of a goal. The term as it is used here refers to what people seek by engaging in a behaviour, i.e. a reason for engaging in that behaviour.
Outcome Expectation	A belief about the likelihood of the behaviour leading to a specific outcome.
Perceived Benefit	Good things associated with being more physically active. Particularly, things people anticipate to get out of exercising.
Self-Efficacy	The belief in one's capabilities to organize and execute the courses of action required to engage in a behaviour.
Stages of Change	A temporal dimension of behavioural change, six stages people are proposed to go through in adopting new behaviours: precontemplation, contemplation, preparation, action, maintenance, and termination.

List of Abreviations

AVE	Average Variance Extracted
BHFNC	British Heart Foundation National Centre
BREQ	Behavioural Regulation in Exercise Questionnaire
CFA	Confirmatory Factor Analyses
CFI	Comparative Fit Index
EMGI	Exercise Motives and Gains Inventory
EMI2	Exercise Motivations Inventory Version 2
ESEM	Exploratory Structural Equation Modeling
GCEQ	Goal Content for Exercise Questionnaire
HAPA	Health Action Process Approach
HBM	Health Belief Model
HSE	Health Survey England
MI	Motivational Interviewing
MPAM-R	Revised Motivation for Physical Activity Measure
NHS	National Health Service
OIT	Organismic Integration Theory
PA	Physical Activity
PAPM	Precaution Adoption Process Model
PIEQ	Personal Incentives for Exercise Questionnaire
REI	Reasons for Exercise Inventory
RFT	Regulatory Focus Theory
RMR	Root Mean Square Residual
RMSEA	Root Mean Square Error of Approximation
SCT	Social Cognitive Theory
SDT	Self-Determination Theory
SRMR	Standardized Root Mean Square Residual
TPB	Theory of Planned Behaviour
TTM	Transtheoretical Model
WHO	World Health Organisation

Thesis Summary

The role of motives (what people want) has become a cornerstone of exercise participation research. The role of gains (what people get from exercise), on the other hand, has been largely overlooked. The aim of this thesis was to examine the nature and role of gains in exercise behaviour. In Chapter 2, people's personal experiences of exercise were qualitatively explored, particularly with regard to their motives and what they did or did not gain from it. Primarily active participants described a multiplicity of motives and gains that were experiential, and positive past experiences, whereas primarily inactive participants described a narrow range of motives and gains that were instrumental, and negative past experiences. Accounts suggested that gains themselves are motivating and people naturally appreciate them. In Chapter 3, a measure of exercise gains was developed to complement an existing measure of motives. The exercise motives and gains inventory (EMGI) was used to quantitatively assess gains and their relationship with motives. In Chapter 4, the concept of gains was applied to an intervention. The measure developed in study 1 was utilised as a means to reflect on gains. No significant effects of the intervention were found, but autonomous motivation increased significantly in both groups. Suggestions are made for future research and efforts in implementing gains in supporting autonomous motivation. The work presented in this thesis demonstrates that gains can be measured, that gains are distinguished from motives, that people are aware of them, and that gains have the potential to shape exercise experiences and habits. Gains currently have potential uses through being incorporated into existing means of supporting health behaviour change, such as motivational interviewing.

Thesis Outline

Chapter 1: Introduction

The introduction outlines the need for researching physical activity behaviour and reviews the most prominent theories in the health behaviour change literature, that have also been used to better understand exercise participation. It is then suggested that there is a gap in the literature: motivational, social and cognitive determinants of behaviour and stages people move through in adopting new behaviour dominate, but actual experienced outcomes on behaviour and their potential influence on continuing to engage in the behaviour are overlooked. The current work seeks to address that gap.

Chapter 2: Experiences of Motives and Gains

A sample of 20 young adults were interviewed to better understand the interplay between their motives for exercising and what they have or have not gained from it. Interviewees ranged in age and occupation from students to individuals in retirement, and in activity levels from predominantly inactive to very active. Accounts were analysed thematically to develop an understanding of exercise motives and gains. Primarily active participants described a variety or both instrumental and experiential motives and gains, whereas primarily inactive participants described a narrow range of mainly instrumental motives and gains. Accounts also indicate that gains themselves are motivating and have the potential to bring about new motives. **Contributions:** SS, DI, DM developed ideas, SS carried out recruitment, data collection and thematic analysis, and wrote up the findings, DI and DM reviewed the write-up.

Chapter 3: Development of the Exercise Motives and Gains Inventory

An Exercise Motives and Gains Inventory (EMGI) was created by adding gain scales to an existing exercise motives inventory. It was completed by 196 young adults. Confirmatory factor analyses of EMGI items established that items reflected their intended constructs; and that motive and gain constructs were distinct. The higher-order structures of motives and gains were somewhat different: appearance motive was associated with weight management, whereas appearance gain was associated with health and fitness. Paired-sample t-tests established that gains were less than motives in some instances (ill-health avoidance, positive health), and greater in others (e.g., affiliation, challenge). The EMGI can be used to investigate the consequences and causes of motives and gains. **Contributions:** SS, DI, DM developed ideas, SS carried out recruitment, data collection and analysis, and wrote up the findings, DI and DM advised on analytical procedures and reviewed the write-up.

Chapter 4: Reflecting on Exercise Gains

A parallel groups trial was conducted to examine the feasibility of supporting autonomous motivation in young adults by reflecting on gains. The study compared an e-mail mediated intervention asking participants to reflect on exercise gains to a control group who reflected on the type of exercise they did. Autonomous motivation increased significantly from baseline to follow-up in both groups. No between group differences were found for either controlled or autonomous motivation when their baseline values were controlled for. The study highlights the need for better understanding of gains and their role in exercise participation. **Contributions:** SS, DI, DM developed ideas, SS carried out recruitment, data collection and analysis, and wrote up the findings, DM monitored integrity of MI delivery, DI and DM advised on analytical procedures and reviewed the write-up.

Chapter 5: General Discussion

The work presented in this thesis suggests that gains can be measured, are identified and valued by lifelong exercisers, and have the potential to bring about new motives. There is a need to better understand how gains may be utilised to support autonomous motivation and incorporated into individual as well as public health interventions. It is also necessary to better understand gains in clinical populations and individuals most at risk because of physical inactivity.

Chapter 1
Introduction

The Health Implications of Physical Inactivity

Physical inactivity is recognised by the World Health Organisation (WHO) as the fourth leading risk factor for global mortality, accounting for 6% of all deaths (WHO, 2010). A lack of physical activity is linked to overweight and obesity and a number of non-communicable diseases such as diabetes, cardiovascular disease and some cancers. (e.g., Ford & Caspersen, 2012; WHO, 2010). Reducing these preventable diseases through health behaviours has become a global health priority that is reflected in both international and governmental recommendations for physical activity, as outlined by the British Hearth Foundation National Centre (BHFNC: 2013; 2014). The WHO recommends that adults should do at least 150 minutes (2.5 hours) of moderate-intensity physical activity each week (WHO, 2010). In the UK, the Department of Health (DOH) physical activity guidelines for adults (19-64 years) are 150 minutes of moderate intensity activity a week in bouts of 10 minutes or more, or 75 minutes of vigorous intensity activity, or a combination of the two (DOH, 2011; BHFNC, 2013; 2014). The guidelines also provide examples of what constitutes moderate and vigorous intensity activities (Department of Health, 2011).

Despite the health benefits of physical activity, inactivity remains highly prevalent. According to Health Survey England (HSE) 2012 (Scholes & Mindell, 2012), 67% of men and 55% of women report meeting the exercise guidelines. These may be optimistic figures, given that 94% of men, and 96% of women do not meet recommended levels when activity is measured objectively (Craig, Mindell, & Hirani, 2008). These figures are also expected to rise owing to technological advances that have led to occupations, transportation, and lifestyles that require little exertion (WHO, 2010). The direct cost of inactivity to the UK National Health Service (NHS) was estimated at £940 million in 2009/2010 (Townsend, Wickramasinghe, Williams, Bhatnagar, & Rayner, 2015), with potentially far higher indirect costs to society (Allender, Foster, Scarborough, & Rayner, 2007). Increasing physical activity is required on a societal level through public health programmes, as well as interventions to help individuals, to prevent ill health, premature death and improve mental health and quality of life (Townsend et al., 2015; Active UK, 2014).

Targeting physical activity and exercise is necessary to address the adverse health implications of inactivity, but it is also a valuable and appealing outcome to focus on in interventions. In contrast to many other health behaviours such as smoking cessation, alcohol or drug use, exercise participation involves adopting a new behaviour or

increasing current behaviour, rather than having to give up something physiologically addictive. In contrast to others, such as improving diet, which is complex and involves eating more of some things (fruit and vegetables) and less of others (fat and sugar), it involves a simpler process of increasing activity (Baird et al., 2014). Exercise participation is also a flexible behaviour; there are many options for how to incorporate exercise into one's life, and many forms of exercise to try, and various levels of intensity to choose from.

The Aim of the Thesis

The aim of this thesis is to examine the nature and role of gains in exercise behaviour. Specifically, the work within this thesis explores the effects of gains alone, and in conjunction with motives, on behavioural and psychological outcomes (e.g., exercising, behavioural regulation, affect). The role of motives in exercise participation has been widely researched and provides a solid basis to build on by also examining gains. It is important to define the terms at the centre of this thesis: motives and gains. In this thesis, the term motive represents the content of a goal. The term as it is used here refers to what people seek by engaging in a behaviour. This work focuses exclusively on self-attributed (explicit) motives, and specifically participatory motives pertaining to the domain of exercise. The term motivation is used in line with the self-determination theory (SDT: Deci & Ryan, 1985) definition: a regulatory process that drives goal-directed behaviour (Ryan & Deci, 2000). Motives, as used in this thesis, are therefore defined as: the self-attributed contents of goals.

Whereas there is a significant body of research related to goal constructs, that helps shape the definition of the term motive, the same cannot be said for gains. Although some comparable constructs have occasionally surfaced in the research into goal directed behaviour, the concept of gains has largely been absent from this body of work. A gain is here defined as also relating to the content, or the *'what'* of a goal. The distinction from a motive is that a gain can only exist after behaviour or event has occurred, whereas a motive can exist before, during and after behaviour. Whereas a motive denotes what a person seeks to attain or avoid by engaging in a behaviour, a gain is what a person perceives to *have* actually attained or avoided (Ingledew, Markland, & Strömmer, 2014). The present thesis focuses only on subjective gains, measured by self-report. Gains, as used in this thesis, are therefore defined as: results of behaviour which people are aware of.

Models of Behaviour Change for Exercise Behaviour

Many authors have focused on understanding the determinants and correlates of physical activity, particularly psychosocial influences (Buchan, Ollis, Thomas, & Baker, 2012). There is a Swedish proverb, "Kärt barn har många namn" (Ström, 1981, p. 178). It translates to: A beloved child has many names. It refers to popular people or concepts often being referred to by various epithets, and is a saying that very much applies to the study of health behaviour change. A wide variety of theories are described in the literature, in a recent review, Michie, West, Campbell, Brown, and Gainforth (2014) identified 83 theories aimed at understanding and supporting health behaviour change with considerable overlap in the determinants they describe. Two distinct approaches are most prominent in the literature: the stage based approach and the cognitive based approach (Sutton, 2008). Stage based models are used to describe various types of phases individuals go through in order to adopt and maintain complex behaviours such as physical activity. Stage theories of behaviour change include models such as The Transtheoretical Model (TTM: Prochaska, DiClemente, & Norcross, 1992), the precaution adoption process model (PAPM: Weinstein & Sandman, 2002), and the health action process approach (HAPA: Schwarzer, 1999, 2008). It is worth noting that some researchers argue that the HAPA is strictly not a stage theory but would describe it as a continuum theory comparable to some cognitive models (Sutton, 2005). Cognitive based approaches on the other hand are used to explain how complex behaviours are influenced by cognitive processes such as perception, memory, judgement and reasoning. Cognitive models aim to identify the determinants that can explain behaviour, and that could in turn be targeted in interventions in order to support health behaviour change (Sutton, 2008). Cognitive approaches to health behaviour change include models such as the Health Belief Model (HBM: Rosenstock, Strecher, & Becker, 1994), the Integrative model of health behaviour (Fishbein & Cappella, 2006), The Social Cognitive Theory (SCT: Bandura & McClelland, 1977), The Theory of Planned Behaviour (TPB: Ajzen, 1991). In addition to the two predominant approaches to health behaviour change, the literature also includes models that focus on emotional and motivational determinants of health behaviour change. Such models include Regulatory Focus Theory (RFT: Higgins, 2000, 2005) and SDT (Deci & Ryan, 1985). Each of the three approaches to health behaviour change is represented among the four most prominent theories utilized within the physical activity domain (Nigg, Borrelli, Maddock, & Dishman, 2008): SCT, TPB, which are cognitive models, SDT, which is a motivation model, and the TTM, which is a stage model. These models have been tested and adopted most widely in the health

behaviour and within the domain of exercise behaviour (Buchan et al., 2012; Michie et al., 2014). Therefore, the following sections will focus on describing the three general approaches to health behaviour change by reviewing these four models.

Cognitive models of exercise behaviour change. Cognitive models such as the SCT and TPB describe factors that may influence behaviour. For the most part, cognitive models of health behaviour include many overlapping determinants that may be described using different labels (Bandura, 2004; Michie et al., 2014). Most of these factors across cognitive models are various types of outcome expectations. The SCT specifies a set of core determinants predict behaviour: knowledge of health risks and benefits of healthy behaviours, perceived self-efficacy that one is capable of taking action, outcome expectations about the costs and benefits of making a change, goals that people set for their health behaviour change and the strategies to reach them, and perceived facilitators and external impediments that affect the changes they are considering (Bandura, 2004). The TBP in turn comprises the following determinants: attitude toward behaviour, subjective norms, and perceived behavioural control, which are proposed to shape intentions and behaviours. Attitude is measured by perceived outcomes and the value that individuals place on those outcomes. Norms in turn are comparable to the expected social outcomes for a specific behaviour. The TPB has been shown to predict health behaviour change intentions in a range of populations (Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Hagger, Chatzisarantis, & Biddle, 2002). However, many of the predictors of TPB and SCT, such as intentions and perceived behavioural control, have been shown to have less bearing on behavioural outcomes than others, such as self-efficacy (Bauman et al., 2012; Buchan et al., 2012; Dishman, Dunn, Sallis, Vandenberg, & Pratt, 2010). Self-efficacy has become more prominent in the literature compared to the other proposed determinants, and it has been consistently been shown to be a key variable in predicting health behaviour (Buchan et al., 2012; McAuley, Jerome, Marquez, Elavsky, & Blissmer, 2003). Self-efficacy has been utilized in a myriad of research studies as an antecedent, outcome or process variable in the context of exercise behaviour (Ashford, Edmunds, & French, 2010; Hagger & Chatzisarantis, 2005; Olander et al., 2013; Williams & French, 2011). Researchers have demonstrated a consistent relationship between self-efficacy and exercise participation in a variety of contexts. While self-efficacy has become a widely studied determinant of behaviour, it is often incorporated into other behavioural models (Buchan et al., 2012). Social cognitive models such as the TPB have been criticised for

the limited effectiveness of intentions predicting health behaviours (Webb & Sheeran, 2006). Some researchers have suggested that intention-behaviour relationships weaken over time (Chatzisarantis, Hagger, Biddle, & Smith 2005), and that the strength of this relationships varies across age groups (Hagger et al., 2002). This imperfect relation between intentions and actual behaviour engagement has become known as the intention-behaviour gap (Hagger & Luszcynska, 2014). Researchers have suggested volitional planning interventions as an avenue to resolve the intention-behaviour gap. While reviews of volitional planning interventions have reported medium effect sizes, and have identified substantial variation in effect sizes across studies particularly when longer-term follow-up measures are used (Bélanger-Gravel, Godin, & Amireault, 2013; Hagger & Luszcynska, 2014). The intention-behaviour gap problem, and the variance in effect sizes of volitional planning present considerable challenges for social cognitive models in effectively explaining health behaviours.

Stage models of exercise behaviour change. To address the limitations of social cognitive models, researchers have proposed applying stage based approaches to health behaviour change. The TTM (Prochaska et al., 1992) is the most widely used stage model within the physical activity domain (Buchan et al., 2012). The model was originally developed for understanding smoking cessation. The model proposes that individuals pass through six stages in adopting behavioural change: precontemplation, contemplation, preparation, action, maintenance and termination (Prochaska, Redding, & Evers, 2008). Within the context of physical activity, the model is seen as comprising only the first five stages (Buchan et al., 2012). Each stage is characterised by specific kinds of psychosocial and behavioural changes. At the precontemplation stage an individual has no intention to take action in the near future, in the contemplation stage, they have increased their motivational readiness and intent to take action within the next 6 months. Once an individual intends to take action in the immediate future and have taken some steps towards change, they are considered to be at the preparation stage. When an individual begins to actively engage in change or has been active in changing their behaviour for up to 6 months, they are in the action stage. Finally, the maintenance stage is reached once a person has continued their changed behaviour for over 6 months. The conceptualisation of the termination stage explains why it does not lend itself well to physical activity behaviour and why it has received muss less research exposure compared to the other phases (Prochaska et al., 2008). The termination stage is described as an individual having zero temptation to engage in the unhealthy behaviour and having

full self-efficacy. This ultimate goal may work for behaviours such as smoking cessation or seat belt use, but in areas like physical activity, a more realistic goal may be a lifetime of maintenance.

The stages of change model has a cyclical element to it, where it is recognised that relapse is a common occurrence and that several attempts at change are likely before maintenance is reached (Marcus & Forsyth, 2003). The TTM has been utilised in physical activity such that interventions address an individual's stage of change. This approach has been shown to move individuals towards the action and maintenance stages in adopting physical activity (Kirk, Mutrie, MacIntyre, & Fisher, 2004). The TTM also proposes means of supporting progression through the different stages referred to as processes of change (Prochaska et al., 2008). These include: increasing awareness of the causes and consequences of the unhealthy behaviour, creating emotional experiences associated with change, assessment of one's self-image, assessment of the implications of personal behaviour on one's social environment, fostering the belief that one can change and commitment to that belief, increasing social opportunities, learning healthier behaviours that can replace unhealthy behaviours, removing cues for unhealthy habits and adding prompts for healthier ones, planning consequences for taking steps in a particular direction, fostering helping relationships. The processes of change represent the behavioural and emotional changes that an individual would use to modify their behaviour and experiences (Buchan et al., 2012). The evidence for the effectiveness of the TTM in supporting health behaviour change is mixed. Systematic reviews have found no evidence to show that stage-based interventions are more advantageous compared to alternative approaches (Riemsma et al., 2002; van Sluijs, van Poppel, Twisk, & van Mechelen, 2006). This has led to some uncertainty over the suitability of the TTM model for physical activity interventions and calls for further research (Buchan et al., 2012).

Motivation models of exercise behaviour change. Theories such as the SDT (Deci & Ryan, 1985) of behaviour change focus how the type of motivation can influence the success of adopting healthy behaviours such as exercise. Although numerous motivational theories exist, such as RFT (Higgins, 2000, 2005) researchers have predominantly sought to understand motivation for health behaviours through SDT (Buchan et al., 2012). The SDT developed in the form of mini-theories, and is effectively a metatheory comprised of sub-theories that seek to explain human motivation and behaviour. The sub-theories all share common assumptions about basic psychological needs (Deci & Ryan, 2000; 2008). The SDT outlines three innate psychological needs:

autonomy, competence and relatedness (the latter being analogous to affiliation motive). A central hypothesis of SDT is that conditions that satisfy these needs have positive consequences on psychological wellbeing, whereas conditions that thwart the basic needs bring about negative consequences (Ryan & Deci, 2000). The SDT conceptualises motivation as a continuum of behavioural regulation with differing levels of relative autonomy. The continuum of behavioural regulation comprises six different types of behavioural regulation (motivation): amotivation, external regulation, introjected regulation, identified regulation, integrated regulation and intrinsic motivation. Amotivation denotes complete unwillingness to engage in behaviour. External regulation represents doing something because of pressure from significant others such as friends, family or doctors (e.g., "because people say I should"), whereas introjected regulation manifests as applying sanctions and self-controlling behaviours on the self (e.g., "I feel guilty when I don't"). Identified regulation denotes an individual recognising the value in a given behaviour (e.g., "I value the benefits of exercise"). Integrated regulation denotes engaging in behaviour because the activity is fully integrated with the individual's sense of self (e.g., "it's a fundamental part of who I am"), and finally, intrinsic motivation is enjoyment of interest in the activity itself (e.g., "because I enjoy it"). Integrated regulation and intrinsic motivation are both considered fully self-determined.

The continuum of behavioural regulation was recently challenged. Chemolli and Gagné (2014) suggested that that a continuum structure was an inaccurate description for behavioural regulations. Instead, they proposed that behavioural regulation is more akin to adjacent categories, which also allow being in more than once place at a time (i.e., having more than one type of regulation for an activity). Even within SDT, a different grouping has been applied to the categories of behavioural regulation that does not rely on the continuum and may allow for having more than one type of regulation for an activity. This division proposed two types of motivation: controlled motivation (comprising extrinsic and introjected regulations) and autonomous motivation (comprising identified, integrated and intrinsic motivation) (Deci & Ryan, 2008).

As an explanation for engaging in, and maintaining exercise behaviour, the SDT has demonstrated exceptional longevity since it was originally created over thirty years ago (Buchan et al., 2012). Numerous studies have consistently demonstrated that autonomous motivation is associated with greater persistence, positive affect, enhanced performance and greater psychological wellbeing (Deci & Ryan, 2008; Ingledew & Markland, 2008; Landry & Solmon, 2002; Williams et al., 2002). Within the domain of

exercise behaviour, autonomous motivation has been associated with engagement in exercise intentions, behaviour and adherence over time (Chatzisarantis, Hagger, Biddle, Smith, & Wang, 2003; Chatzisarantis, Hagger, Biddle, & Karageorghis, 2002; Hagger et al., 2007; Ingledew & Markland, 2008).

The research linking SDT to exercise behaviour also includes research of participatory motives for exercise. Participatory motives refer to what people wish to attain or avoid by engaging in that particular behaviour (Ingledew, Markland, & Ferguson, 2009; Segar, Eccles, Peck, & Richardson, 2007). The link between motives and motivation is that some goal contents or reasons will give rise to autonomous motivation; whereas others will bring about controlled motivation. Motives for exercise participation traditionally fall into broad categories of appearance/weight motives, social engagement, health/fitness and enjoyment related categories (Ingledew & Markland, 2008; Ingledew et al., 2009; Segar et al., 2007). From these, appearance/weight motives have been observed as the prominent motives for adopting exercise and are associated with controlled forms of motivation, whereas other motives such as affiliation, challenge, and revitalisation are associated with autonomous forms of motivation and are necessary for maintaining exercise participation in the long run (Ingledew & Markland, 2008; Ingledew et al., 2009; Segar et al., 2007; Segar, Eccles, & Richardson, 2008). The mediated influences of participatory motives on behaviour through type of motivation have been shown specifically in the context of exercise participation (Ingledew & Markland, 2008; Ingledew et al., 2009).

The body of literature applying SDT in the exercise domain has not been without its limitations. Criticisms have noted that the research applying behavioural regulation to exercise behaviour suffers from some methodological shortcomings: many studies adopt cross sectional designs as opposed to experimental ones (Chatzisarantis et al., 2003; Teixeira, Carraça, Markland, Silva, & Ryan, 2012). Experimental and intervention studies have been conducted primarily adopted in studying sport, but until recently, few studies had used the approach for exercise behaviour research (Buchan et al., 2012). Despite methodological shortcomings, the SDT framework has been well supported within the exercise behaviour domain, and is increasingly being used and recommended for use in intervention designs (Edmunds, Ntoumanis, & Duda, 2008; Teixeira et al., 2012). It is evident that further research is required, but the theory is recognised to have much to offer in terms of understanding behavioural mechanisms and supporting exercise

participation and maintenance; it has even been referred to as "the best option to promote adherence to a physically active lifestyle" (Buchan et al., 2012, p. 6).

Potential for Interventions: Changes in Motives and Motivation for Behaviour

It is important to note that motives are not considered to be static and remain the same over time. SDT is in a key position to explain the process by which individuals may move away from being driven into action by external pressures and begin to value and self-regulate that activity; a process SDT refers to as internalization and integration of values and motivation (Deci & Ryan, 2008). The process is described in a sub-theory of SDT, referred to as organismic integration theory (OIT: Deci & Ryan, 1985). SDT suggests that a person may transform the behavioural regulation into their own (move along that continuum towards more autonomy) by identifying personal importance in the activity, self-reflection, and bringing the values associated with an activity into agreement with their own values and needs (Ryan & Deci, 2000). Progression along this continuum is not necessarily chronological, but can develop any type of behavioural regulation depending on what type of internalisation takes place. For example, intrinsic internalisation may denote developing an interest for doing an activity itself (e.g., "I have started to really enjoy cooking"), whereas identified internalisation may denote beginning to value the outcomes of the activity (e.g., "I value preparing home cooked meals").

People may change the types of motives they have or the importance they place on specific motives over time. For example, people have been shown to change the relative priority they place on motives across stages of change. Controlled motives (appearance/weight management) are dominant at the early stages of change for exercise adoption, whereas autonomous motives (enjoyment/revitalisation) prevail in later stages (Ingledew, Markland, & Medley, 1998; Maltby & Day, 2001). Numerous studies mapping motivation onto stages of change for exercise participation have demonstrated that autonomous motivation increases across stages and reaches its peak at the action or maintenance stage (Landry & Solmon, 2004; Matsumoto & Takenaka, 2004; Rose, Parfitt, & Williams, 2005; Teixeira et al., 2012; Thøgersen-Ntoumani & Ntoumanis, 2006; Wininger, 2007). The mechanisms by which motives and motivation change over time and become more autonomous, is still unclear.

Recently, it has been demonstrated that motives can change in response to interventions. Knowels, Herbert, Eason, Sculthorpe, and Grace (2015) studied the effects of high intensity interval training on men who identified as either sedentary or as life-

long exercisers. They found that even though the life-long exerciser group generally reported higher autonomous motives (enjoyment, challenge, social recognition, affiliation and competition), the greatest increase over time in motives was demonstrated by the sedentary group as a result of the intervention. Even when baseline values were controlled for in the analysis, weight management, stress, revitalisation, challenge, enjoyment, strength and nimbleness and appearance motives showed significant increases with large effect sizes for the sedentary group. The authors concluded that high intensity interval training can have positive effects on the levels of exercise motives in people who are starting to exercise. The authors did not comment or speculate on the mechanism by which exercise causes these motives to increase in importance, and others not to.

Gap In the Literature: Gains from Health Behaviours

The existing behaviour change theories focus on understanding exercise engagement through determinants of behaviour such as beliefs, intentions, memory, reasoning, and motivation, or a individual's readiness to change, determined by their stage of change. This body of literature has largely overlooked exercise gains, in other words, what people get from activities. Some research has explored goal attainment, which refers to attaining outcomes corresponding to original goals for a behaviour (e.g., Carver & Scheier, 2001). It is generally suggested that reaching goals will have positive consequences. For example, RFT (Higgins, 2000; 2005) proposes that achieving a goal will lead to feelings of pleasure and success, as well as strengthen the regulatory orientation through which the person has pursued the goal. Specifically, RFT distinguishes between a promotion focus which denotes aiming for positive outcomes and a prevention focus, which in turn denotes avoiding negative outcomes. The theory proposes that a person's regulatory orientation also determines how they experience the outcomes of their actions. In a promotion focus, success denotes positive outcomes or "gains" (Idson, Liberman, & Higgins, 2000, p. 253), whereas failure denotes the absence of positive outcomes or "non-gains". Conversely, in a prevention focus, success denotes the absence of negative outcomes or "non-losses", and failure denotes the presence of negative outcomes or "losses". RFT proposes that the pleasure of promotion success or a "gain" is greater than that of prevention success or a "non-loss". On the other hand the pain of prevention failure or "loss" is more intense than promotion failure or "non-gain".

Distinguishing between motives for attaining desired outcomes and motives to avoid undesired end-states as independent and distinct is a topic raised intermittently

through the history of psychological research (e.g., Atkinson, 1958; Lewin, 1935; Miller, 1959; Pavlov, 1927). Despite the distinction being a classic in psychology, it has had little attention within health behaviour change research. The interventions utilising this distinction generally fall into the category of message framing, where individuals are in some way exposed to either promotion messages or prevention messages (e.g., Pfeffer, 2013). However, this is approach utilises researcher generated gains and non-losses, and in doing so taps into outcome expectations rather than actual outcomes individuals have experienced. The message and potential of the theory seems to be lost in translation into practical applications; RFT even directly suggests that not only the orientation towards pursuing a goal, but also the outcomes of a peron's actions play into their affective responses and reinforce their approach to future goals. This branch of research lends support to the notion that it is worth going beyond examining goal pursuits, and extend attention to the consequences of reaching goals. Nevertheless RFT and its practical applications only address outcome expectations. The existing research using RFT does not address subjective experienced gains, goal contents (motives or gains), nor does it address the possibility of getting something out of an activity that a person did not initially seek (unanticipated gains).

Some models of health behaviour change even incorporate the notion that past experiences will shape expectations of future behaviour and in so doing influence the likelihood that people will engage in that behaviour. Some cognitive models, such as the value-expectancy model (Heckhausen, 1977; Heckhausen & Heckhausen, 2010) proposes that outcome expectations that predict behaviour are shaped by previous engagement in that behaviour and the outcomes that were experienced at the time. It is suggested that cycling through the stages of change will ultimately strengthen behaviour change as individuals learn from their past experiences (Buchan et al., 2012). Even though some behaviour change models recognise the potential effects of experienced behavioural outcomes, these primarily serve as a theoretical determinant that informs outcome expectations. As such, actual experienced gains have received little research attention. The existing literature provides little in the way of recognising that the outcomes and consequences of behaviour become past experience over time and in so doing may influence the determinants of future behaviour. The existing models do not include feed-back loops that would provide a link between outcomes and determinants of future behaviour. Understanding this link may be beneficial for better understanding health behaviour, and requires further examination through research.

Gains Research in Other Behavioural Domains

The actual experienced outcomes of behaviour have been largely overlooked in the literature health behaviours, but such gains have been explored in the context of other behaviours. The distinction between what people seek to attain or avoid (motives) and what people have attained or avoided (gains) has been made in literature on volunteer work and organizational behaviour (e.g., Clary et al., 1998; Finkelstein, 2006). The research into volunteering behaviour describes a functionalist theory of motivation, which proposes that when motives are met with corresponding gains, this will have beneficial effects for engagement (Snyder, 2009). The research studying the functionalist theory within volunteering research typically comprises measuring motives for volunteering (e.g., values, enhancement, understanding, protective, social, career), and benefits corresponding to those motives and examining the interaction of motives and gains, such as a high motive-high gain group. Having a high motive and a high gain combination is associated with greater satisfaction and a stronger intention to volunteer in the future (Davis, Hall, & Meyer, 2003; Caldarella, Gomm, Shatzer, & Wall, 2010). Similar positive additive effects of gains on satisfaction have also been found in studies of organizational behaviour (e.g., Finkelstein, 2006). The research conducted on prosocial behaviours such as volunteering and organisational behaviour suggests that gains have the potential to boost satisfaction in behaviour and to increase intention to continue to engage in it in the future. This provides merit in incorporating this line of research to exercise participation and potentially to other health behaviours.

Goal attainment has also been examined within the SDT framework focusing on life goals. Within this approach, it is proposed that both life goal importance and attainment will have beneficial effects on psychological well-being, but only if life goals are relatively autonomous in nature. This proposal was tested by Niemic, Ryan and Deci (2009), who asked people about their autonomous and controlled life goals (dispositional motives), and the degree to which these life goals had been attained over a one-year period, and assessed how attainment related to psychological health. Autonomous life goals encompass seeking affiliation and personal growth, whereas controlled life goals encompass seeking power and influence, wealth, or social recognition. It is important to note that both life goals (dispositional motives), as well as domain specific goals (participatory motives) can be distinguished in this way, but people may also have goals that have both autonomous and controlled qualities. For example, a health motive may comprise wanting to attain a state of well-being and feeling positive and healthy

(autonomous qualities), or it may denote wanting to avoid health problems (controlled qualities). Niemic, Ryan and Deci (2009) found support for a positive relationship between the importance of a goal and its attainment. Additionally, the authors found that attainment of autonomous and controlled life goals differentially related to psychological health as predicted by the SDT model; Attaining autonomous goals was positively related to well-being and negatively related to ill-being, whereas attaining controlled goals was unrelated to well-being and positively related to ill-being.

More recent research within the domain of exercise participation has suggested that gains may have a more complex relationship with motives and behavioural regulation. Ingledew, Markland and Strömmer (2014) examined the additive and interactive effects of motives and gains on exercise outcomes. Interactive effects of motives and gains, or motive fulfilment, were such that gains could attenuate the effects of motives on controlled regulation, and augment the effects of motives on autonomous regulation. Specifically, the effects of appearance motive on controlled regulation were attenuated when it was met with a high gain. The effects of positive health motive on autonomous regulation was amplified when it was met with a high gain. Additive effects of gains were also found, and were observed to have positive effects on autonomous regulation. Challenge motive had a positive effect on autonomous regulation, and challenge gain was found to have additive positive effects on autonomous regulation, but not moderating effects. These findings would suggest that, at least at the level of participatory motives, the effects of gains on autonomous and controlled motivation (which in turn affects psychological wellbeing), is not necessarily dependent on whether those gains themselves are considered autonomous or controlled.

The current research is encouraging and suggests that gains merit being researched. Social cognitive models of behaviour change recognise that people strive for goals, that behaviour may lead to reaching those goals, and that past experience may influence current and future behaviour, yet has not incorporated outcomes of behaviour as a variable into research within this domain. The research into goal attainment suggests that attaining goals can bring about positive consequences, such as powerful positive emotions, commitment and engagement in activity, and psychological wellbeing. The literature on goal attainment also reveals that there is currently no clear conceptualisation and differentiation between gains and motive fulfilment (i.e., goal attainment). The studies outlined above set out to assess motive fulfilment, but their measures of fulfilment are different to the conceptualisation of motive fulfilment presented in other

research (Ingledew, Markland, & Strömmer, 2014). Definitions of terms and constructs are unclear, which makes it difficult to determine the true role or gains in relation to motives, as well as behavioural and affective outcomes. Additionally, gain like constructs have primarily been researched in prosocial behaviours such as organisational behaviour and volunteering. In the context of health behaviours, gains have been largely overlooked, with the exception of the recently conducted study by Ingledew and colleagues (2014). The means to measure gains have not yet been fully developed and tested. With the exception of the recent Ingledew and colleagues study, the literature on gain constructs and motive fulfilment has also primarily focused on gains that had an original motive. More research is required to establish whether it is possible to make gains that you did not originally have a motive for and what the effects of such an experience would be for motives, psychological outcomes or behaviour. Because the assessment of the additive and interactive effects of motives and gains have only recently begun, the current understanding of this dynamic is limited. The potential for utilising gains in health behaviour interventions also remains to be assessed.

The Research Programme of the Thesis at Hand

The focus of the present thesis was to examine the concept of gains within the domain of exercise participation. The present programme of research presents three studies, collectively designed to explore the nature of gains, their relationship with motives, and their possible effects on psychological and behavioural outcomes. The studies focus on addressing gaps in the motivation and exercise participation literatures; specifically by developing a measure of exercise gains, using the measure to explore the nature and taxonomy of exercise gains, exploring personal experiences of exercise motives and gains qualitatively, and finally, applying the gains construct in a controlled trial design.

The programme of research within this thesis first explores the lived experiences of exercise gains as described by individuals themselves. In Chapter 2, people's personal experiences of exercise participation were explored, with particular focus on their motives for exercising, and what they gained from it. A qualitative approach was adopted to gain an in depth understanding of participants lived experiences. The second study addresses the gap in literature whereby there are various measures for exercise motives, but no corresponding measures of gains. In Chapter 3, a measure of motives and gains was developed by adding gains scales to an existing measure of motives, the Exercise Motivations Inventory version 2 (EMI-2: Markland & Ingledew, 1997). Through

structural equation modelling, the structure of motive and gain items and higher order scales were examined. The differences and correlations between motives and gains were also explored to understand their relationship better. Finally, in Chapter 4, gains were applied in an intervention study to examine their potential effects on autonomous and controlled motivation, and to assess their change over time. The thesis concludes with a general discussion of findings, how they relate to the extant motivation literature, and recommendations for future research and practice.

Chapter 2
Experiences of Motives and Gains:
Personal Accounts of Exercise Participation

Introduction

Aim

Exercise participation research has examined the social cognitive determinants of behaviour (e.g., Bandura, 2004), the stages people go through in changing their behaviour (Prochaska, Redding, & Evers, 2008), and the motives and motivation that drive their engagement (Deci & Ryan, 1985; Ingledew & Markland, 2008). The role of gains (what people get from exercise) and hence the possible benefits of motive fulfilment (when high motive is met by high corresponding gain) have been largely overlooked. Both motives and gains refer in some way to the content (the "what") of behavioural goals (such as engaging in exercise). Motives are what people *seek to* attain or avoid, gains are what people *have* attained or avoided by engaging in a behaviour. In the simplest terms, gains can be referred to as what people get from exercising. Motive fulfilment in turn refers to making gains that correspond to motives a person had for that behaviour. It is possible to also experience and appreciate gains that do not correspond to original motives. People can have a variety of motives for exercising, but what they actually get from exercising may or may not correspond to those motives. People may gain what they wanted, they may feel they did not gain anything, or they may find they gained something completely different from what they initially sought. These contrasting exercise experiences may result in individuals reacting in different ways. The aim of the present study was to utilize the strengths of a qualitative approach to explore the roles of motives and gains in accounts of exercise experiences.

Motives and Gains in Research

In the body of literature on exercise adoption and maintenance, motives are recognized as meaningful determinants of behaviour. Within a SDT framework (Deci & Ryan, 2000), motives have effects on exercise participation through behavioural regulations (e.g., Ingledew & Markland, 2008). According to SDT, behavioural regulations can be more controlled or more autonomous. Generally, more autonomous regulation is associated with sustained engagement in exercise participation (e.g., Landry & Solomon, 2004; Mullan & Markland, 1997; Wilson, Rodgers, Blanchard, & Gessell, 2003; Wilson, Rodgers, & Fraser, 2002). Little attention has been paid to the consequences of behaviour, specifically to what people gain from exercising. A recent study found that gains had the potential to attenuate adverse effects of their corresponding motives by decreasing their influence on controlled behavioural regulation, or augment their beneficial effects by supporting their influence on

autonomous behavioural regulation (Ingledew et al., 2014). Some gains also had effects in their own right that generated autonomous motivation. The findings support the merit of examining exercise gains alongside motives.

Some theoretical frameworks focusing on goal directed behaviour have recognized that actions can have various outcomes. For example, within the value-expectancy model (e.g., Eccles et al., 1983), actions lead to outcomes, and those outcomes have consequences (Heckhausen, 1977). An outcome is related to an original goal, for example, whether or not a person wins a race. Consequences of that outcome are a sequence of events that occurs as a result of the outcome and give it value. In the previous example, winning the race may result in feelings of personal achievement and recognition from other people, whereas not winning may result in feelings of failure and disappointment. The existing literature primarily considers these consequences in terms of outcome expectations, and actual outcomes and consequences so far have not been thoroughly researched or well understood. The literature on goal directed behaviours has also studied goal attainment, recognizing that we may or may not get what we want from behaviour. The prevalent way in which goal attainment is measured, is by asking about people's motives or goals before and after the activity has occurred (e.g., Davis, Hall, & Meyer, 2003; Finkelstein, 2006; Niemic, Ryan, & Deci, 2009). In this regard, the research is measuring what people wanted (motives), and what people got (gains), where goal attainment or motive fulfilment is more clearly represented by an interaction between the two (high motive and high gain). The research into goal attainment also focuses on gains that directly correspond to original motives, overlooking the possibility of making gains that were not originally sought. Overall, the idea of gains is in some form contemplated in the goal directed behaviour literature. The gain-like concepts are often not clearly defined, gains are not differentiated from motive fulfilment, and as a result gains are insufficiently understood.

A growing body of qualitative research has explored individuals' experiences of exercise (Munroe-Chandler, 2005), and a naturally occurring discourse of what we would call exercise motives and gains can be observed. For example, Mulvihill, Rivers, and Aggleton (2000) found that 5-15 year old children and adolescents described feelings gained from doing their preferred activity (e.g., energy, enjoyment, happiness) and factors associated with increased activity (e.g., appreciating being a part of a team, social interaction, enjoyment of competition, physical challenge, and a sense of achievement). Other studies across different age and ethnic groups have similarly reported reasons for

continued engagement that relate to what the activity has served to provide. These included making friends (e.g., Brooks & Magnusson, 2007), increased skill (e.g., Gillison, Sebire, & Standage, 2012), enjoyment (e.g., Ketteridge & Boshoff, 2008), stress reduction (e.g., Finch & White, 1998), improved fitness (e.g., Beck, Gillison, & Standage, 2010), and confidence (e.g., Gillison et al., 2012). Some studies also reported that a lack of gains would lead to disengagement from activity. For example, Buman, Giacobbi, Yasova and McCrae (2009) explored the views of sedentary adults over 50 years of age, and reported that among the reasons participants gave for stopping activity was that they did not experience expected benefits, or were dissatisfied by the lack of observable benefits.

It is sometimes difficult to tease apart the motives from the gains described in in the existing qualitative literature. The focus of many studies was not to specifically examine or identify motives or gains, or other similar constructs, but to explore perceptions and experiences of exercise in general. As a result, there is little distinction between what people wanted, and what they got from exercising. Findings related to what we would call motives and gains would often be presented under a general theme or blanket term. For example, Grieser and colleagues (2006) presented participant accounts of perceived benefits of physical activity, defined as good things associated with being more physically active. The perceived benefits included things participants felt physical activity would provide (e.g., staying in shape), as well as what they had actually experienced (e.g., gave them energy). Similarly, Hardy and Grogan (2009) presented a grounded theory model of predictors of physical activity; these included what people wanted from activity, for example to prevent health decline and to enable them to do other preferred activities; as well as things people were getting from activities, for example feeling good after exercise, having more energy, social support. In a study by Finch (1997), descriptions of reasons for exercising included thing they wanted (e.g., wanting to counter effects of aging), as well as things they had experienced (e.g., getting enjoyment, helps to concentrate, relaxing). The existing literature does not readily distinguish between wanting to attain or avoid something (motive), and having experienced and appreciated something they got (gain). Because such a distinction is often missed, we have a limited understanding of the true roles of the two constructs in actual exercise experiences.

There are some instances that come close to making this distinction. For example Beck and colleagues (2010) found that for active older adults, physical activity was a

way of seeking ongoing challenges. Beck and colleagues also described physical activity as being a "good source of challenge" (p. 14) and that the challenge often related to fitness gains that were noticeable and valued by the individuals. Some research has also revealed the distinction between motive fulfilment and unsought gains. Harley and colleagues (2009) presented a grounded theory model of long-term physical activity, and describe two kinds of benefits experienced by participants, each at a different phase of the model. At the early stages of exercise adoption, participants described experiencing benefits such as feeling good, relieving stress, feeling more alert, and having time for themselves. At later stages when activity was being maintained, participants reported beginning to experience changes that they initially sought out, such as weight loss, muscle toning, and blood pressure control. The authors also suggest that the benefits corresponding to original motives for initiating exercise are more substantial than initial gains in that the motive fulfilment integrates the activity into an individual's life and make it more than just exercise. Similar findings were presented by Price, Greer, and Tucker (2013), where participants described experiencing benefits that were different to their original reasons for exercising shortly after initiating activity. The benefits included increased energy and feeling good or better. Participants also described eventually experiencing the benefits they originally adopted exercise to achieve. The participants reported that unexpected, as well as anticipated benefits motivated them to continue being active. These findings suggest that unsought gains may play a role in maintaining behaviour in the absence of motive fulfilment, or before it has time to materialize.

Present Study

The relationship between motives and gains, and the role of gains in exercise behaviour, require further examination. The existing literature often does not readily distinguish between motives for exercising, and gains experienced from exercising. The roles of motives and gains in exercise have not been the focus of existing research and easily become blurred into the mass of other information related to exercise experiences. There is still a need to better understand how the relationship between motives and gains varies across individuals and what other factors may affect those individual differences. Even though some recent qualitative research has revealed the distinction between gains and motive fulfilment, we know very little about whether unsought gains may bring about new motives for activity. By examining the relationship between motives and gains we may also better understand how they develop over time from adopting an activity, as well as over a person's lifespan. The aim of the study at hand was to explore people's

personal experiences of exercise particularly with regards to motives and gains. The purpose is to yield an enriched understanding of the relationship between motives and gains, individual differences in that relationship, and factors that influence it.

Method

Study Design

A qualitative approach was selected, which adopts the viewpoint that it is possible to gain insight into how people make sense of a phenomenon through their descriptions of it. The study employed semi-structured interviews and analysed data using thematic analysis (Braun & Clarke, 2006).

Participants and Recruitment

The study used theoretical sampling that aimed to ensure a wide range of exercise participation levels and experiences of exercise. Theoretical sampling here refers to aiming to recruit a wide variety of participants, men and women, representing a range of age groups. Ethical approval for this study was granted by a University departmental ethics committee.

Recruitment of participants was initially conducted by placing posters and flyers at local leisure and sports centres and other public spaces such as university notice boards and community centres. In the interest of reaching non-student populations, local recreational groups were contacted by e-mail and social media websites. To reach primarily inactive participants, a method of snowballing was initiated by asking participants to distribute recruitment material to any primarily inactive people they knew.

Due to research related economic reasons, it was not possible to execute the constant comparative method in a case by case manner. Instead, data collection and analysis were done in two steps: first, ten participants were recruited and interviewed before their accounts were transcribed and provisionally analysed for emerging themes. The emerging themes were then used to inform further participant recruitment. After the first ten participants, an additional ten participants were recruited. The final analysis was conducted at one time and all twenty interviews were included. Theoretical saturation was observed in that by the time of analysing the final interview, no new categories, subthemes or themes were emerging. Of the 20 participants, 11 were women and 9 were men. The age range of the sample was 18-75 years of age (M = 31.52, SD = 15.07).

Three activity groups were apparent in the sample based on the participant accounts: primarily inactive, in-between, and very active. These groups were based on

how participants described themselves and their exercise habits, both current and past. Two criteria were used to denote the activity group of each participant: 1) how frequent they described their current exercise as being, for example “at the moment, I’m into a lot of resistance training… I train five days a week in the gym, for normally about an hour to an hour and a half”, and 2) how they described their lifelong exercise tendencies, for example “I’ve participated in lots of sports, I’ve in the past, I was a county level swimmer, I played rugby, for my city, I played football for my towns”. Both example quotes are from an 18 year old male participant who was categorized as very active. It is important to note that in the process of analysing the participants’ descriptions of their activity levels, it was not possible to purely categorize them as either primarily inactive, or very active. Instead, a middle group emerged, of people who were not particularly active, exercising once or twice a week, but not completely inactive; or who were currently active, with less active pasts and vice versa.

Interview Procedure

Participants were offered the opportunity to be interviewed at a location of their choice either at their home, place of work, or at the university. All participants chose to be interviewed at the university. Participants were given information sheets and signed informed consent forms. Participants were reminded that data would be anonymized, they were free to refrain from answering any question, and that they could withdraw from the study at any time including after the interview. An initial interview schedule was devised that included five broad open questions and five possible follow-up questions (Appendix C) designed to gain a detailed exploration of the processes under study. In addition to the formal follow up questions, the interviewer also reflected on the participant’s statements and produced spontaneous questions in order to facilitate the participant talking freely and in depth about what they felt was relevant. The interim analysis (after ten participants) resulted in the addition of two follow up questions to the interview schedule: “What does losing weight mean to you?” and “What do the social aspects mean to you?” Each interview lasted between 20 and 60 minutes. Interviews were audio recorded using a digital recording device. Interviews were transcribed verbatim, and data were stored and coded using QSR International’s NVivo 9 (2010) qualitative data analysis software.

Analytical Procedure

Data were analysed thematically (Braun & Clarke, 2006). Analysis began with line-by-line coding of the transcribed interviews. This is referred to as open coding and it

enables immersion in the data and the development of initial codes. At this stage, short passages of participant accounts were analysed to identify ideas being described. Similar passages of text were coded with a label such as “childhood”, “weight-loss”, or “friendship”.

The next stage of coding involved refining ideas that arose from open coding and developing categories. In simple terms, open codes with similar meaning and properties were collapsed into categories. This phase involved identifying causal relationships between ideas identified through open coding (Flick, von Kardorff, & Steinke, 2004). The phenomenon denoted by a category is for example an event such as “giving up”, “committing to activity”, “forming an identity”. The actions of an individual revolve around the phenomenon, other people can affect it and other factors can cause it or be caused by it.

Memo writing was used throughout this process to note reflections on interpretations of phenomena, connections between phenomena, and patterns emerging from the data. Finally, the categories were further refined through selective coding. Selective coding incorporates coding lists and memos to further examine commonalities among categories and relationships between them to create subthemes and finally the key themes presented in this paper. At this stage, it was also deemed worthwhile to contrast activity groups (primarily inactive, in-between, and very active), as well as accounts of continued participation in exercise versus disengagement from exercise. As could be expected, primarily inactive participants had far fewer, if any, accounts of continued participation. Participants from all activity groups discussed instances of disengagement.

After these coding procedures, each interview was reread to check that all relevant information had been coded consistently. To evaluate the credibility of this coding, an impartial researcher reviewed all codes, categories, subthemes and the resultant themes.

Results

Overview

Overall, the way participants talked about exercising was filled with emotions. Some participants expressed positive feelings, communicating a passionate commitment to their activities and a “love” of exercising. Other participants expressed negative feelings, describing a defensive stance and a “hate” for many aspects of exercising. Whatever their orientation was towards activity, their thoughts and attitudes were not

merely logically or analytically determined, but involved a lot of intuitive and subjective processing.

The analysis of the participant accounts produced various categories and subthemes. Examining these revealed four key themes that illustrate the relationship between motives and gains in exercise behaviour: (a) Variety of Motives and Gains, (b) Instrumentality of Motives and Gains, (c) Quality of Past Gain Experiences, and (d) Gains as Motivators. The next subsections will present the main themes accompanied by example quotes from participants. Quotes are accompanied by the participant's ID number, sex and age. A table depicting the hierarchy of categories and themes accompanied by quotes is included in Appendix D.

Theme 1: Range of Motives and Gains

The first main theme highlights a contrast in the Number of motives and gains that participants described. Particularly, primarily inactive participants described having a very narrow scope of motives, often only one or two reasons for activity.

> "To look good… to try and lose weight basically… to get in shape" (20: F, 21)
>
> "I'm thinking of exercise now as not wanting to put weight on." (1: M, 53)"Entirely vanity for me, I feel that I just, exercise will help me look good… It just might make my tummy a bit flatter." (14: F, 26)

More active participants on the other hand reported a wider range of reasons for exercising:

> "Well the first reasons are the health reasons… a way to challenge yourself… either take your mind off things… or help you actually focus on thinking about something." (7: F, 36)
>
> "I do it as a test, you know, it's purely, can I still you know, push myself…I got into yoga, and then, uhm, that fixed up most of the hamstring problems…as I get older, the health benefits of exercise, as more and more of a motivation… I love harrowing around on a horse… and then you're hitting the ball as well, so it's doubly fun! So there's plenty of things I do because I really enjoy them." (2: M, 55)

In similar essence, the accounts reflected a narrow scope of gains for those who were primarily inactive, compared to more diversified gains for the primarily active participants. Primarily inactive participants predominantly described gains exclusively related to the reasons they had for adopting exercise.

> "I'm starting to lose a little bit of weight, I'm starting to feel, you know, lose a bit of my stomach" (1: M, 53)
>
> "I go to the gym in order to like, for a target, so it makes you feel good, like you weigh yourself that week and you've lost like 2 lbs." (20: F, 21)

More active participants on the other hand described making various gains from activity:

> "Being able to do something new, like, accomplish things… and like my fitness as well… like confident enough to show off my body and I know that that is because of exercise… letting off steam." (17: F, 19)
>
> "One thing I quite like about, erm, tennis is the… social side of it a little bit…increased confidence I think is probably the biggest thing I've got out of it. Just, err, just the feeling of doing anything you know." (8: M, 38)

More active participants named gains corresponding to their motives, as well as additional ones that they did not originally describe as being sought. The gains described in these accounts included appearance or weight related changes. The difference seems to be that in these accounts, gains beyond appearance and weight changes were also appreciated.

Theme 2: Instrumentality of Motives and Gains

The second theme formed around major differences in participants' motivational landscapes. Primarily inactive participants viewed activity as instrumental; their only reason for being active was appearance improvement and weight management. For them, activity was a means to an end in the short term. Their activity was primarily limited to training at the gym.

> "My main motivation in terms of running and, uhm, the fitness class, I want to get fitter in terms of really want to lose weight." (15: M, 32)
>
> "The jogging and the gym would be…for just like, like toning up" (6: F, 18)
>
> "I mainly just go to the gym, it's really bad, I only go… to try and lose weight." (20: F, 21)

Their exercise experiences also only delivered on those reasons; they did not report any other gains than those they were seeking out.

> "I lost a pile of weight and I got really strong and I had really impressive muscles for a while." (14: F, 26)

> "When I was running my stomach flattened but I didn't actually lose any weight because it went to muscle." (6: F, 18)

The gains were not enough to maintain the activity over time; most participants reported being inactive at the time of the interview and described intermittent spurts of activity in the past.

In contrast, primarily active participants described activity as a more emotional and visceral experience, serving to provide a feeling of connectedness to things and an expression of self.

> "I kind of took that aspect of it, it was: right ok, this is my escape route, I'm going to exercise. And that's why it's always been part of my life; because it's always been a great form of ike a cathartic escape route." (3: M, 18)

> "It's almost, meaning for life, it's just, something that's just, I don't remember ever going on a walk in the countryside that I haven't enjoyed. You know, it's that level of, you know, I don't know if I can talk about spiritual, but it's uhm, it's just, intense enjoyment I think." (18: M, 74)

Primarily active participants' reasons included enjoyment, challenge, health, social interaction and revitalization. These participants would also describe doing various activities, where each activity might serve slightly different motives. Activities that individuals continued to engage in were often described as more than just exercise:

> "Walking is kind of, erm, probably what I enjoy most out of everything because that's not just the good feeling of having exercise, and doing your body good, it's being outside all day, and being with friends, really socializing. So you know you're exercising without feeling that you are exercising really. It's just a day out with friends you just happen to be enjoying it, you know." (11: F, 48)

> "I just like spending time with horses, I like being around horses, uhm, really like riding them. In morocco, you know, we just did heaps and heaps of galloping, we you know, had beaches, which were just completely empty and, you know… my motivation for doing the polo, there's a whole lot of things, there's the love of animals, there's the challenge of learning a new sport, there's the adrenalin buzz, of galloping around."

These activities were be a big part of the participant's life and provided numerous gains, the prominent ones being enjoyment, social aspects, appreciating the environment, and being revitalized.

Theme 3: Quality of Past Gain Experiences

The analysis revealed differences in the quality of past experiences of gains. Primarily inactive participants did not typically mention gains when recalling childhood activities. These participants described a recurrence of discouraging experiences at engaging in an activity and failed attempts at trying something new:

> "I always used to think: 'oh I'll take up kick boxing or taekwondo or something'! Again, you know, it's just… either classes were too expensive and my parents, knowing how I quit everything, wouldn't pay… or I went once or twice, found it hard and stopped." (14: F, 26)
>
> "When I was a kid I always used to hate, like really hate things like sports day and P.E. and stuff like that. I'm not sure if it was for the actual things that they made you do, so the actual activities, or if it's the fact that they kind of made you do it. I don't like that, and maybe that's what's always made me think, like 'ugh!'." (13: M, 25)

They described having had a childhood where they had either not engaged in any structured activity, or having tried something they briefly enjoyed, but had given up without recalling a reason for doing so. For these participants, the threshold for engaging in an activity later in life was high because they considered it to be too late to start something new:

> "I've never done any clubs or anything… I think originally it was because of money; you had to pay to join the clubs. And then it felt like as I got older, I'd missed out on it as a kid so I never joined in. Everyone seemed more experienced." (20: F, 21)
>
> "I did do trampolining. I'd quite like to try that again. But I don't know if I'm too old for it now." (19: F, 25)

Participants also sometimes felt they were likely to just give up sooner or later because they had done so in the past:

> "Most sports don't interest me. It's something I see as being necessary, but not enjoyable… same story with everything I start and quit: I'm not good at it, and then I just give up." (14: F, 26)

An inactive childhood seemed to generate a self-fulfilling prophecy: repeated experiences of disengaging from activities and not enjoying activities created an inactive self-image and the belief that activity would probably never be a permanent part of their life.

Experiences of disengagement also included accounts of more recent negative experiences, such as pressure, physical injury or aversive emotional experiences:

> "Me and one of my flat mates did go to canoe club, but that was a bit of a disaster 'cause we fell in the lake and stuff. It was freezing and we never went back so, yeah, we haven't joined any societies." (6: F, 18)
>
> "I went to a salsa dancing class one time, because, I get, I've tried like probably everything, in an effort to enjoy it. But I found it really intimidating, I felt really like uncomfortable, because I felt like, uhm, not like I was being laughed at, but they were like, 'oh come on, do a better job' and it's quite intimate thing as well, being pressed against a stranger." (14: F, 26)

More active participants described an active childhood and reported experiences of activity being enjoyable:

> "I did competitions with gymnastics from like the age of four to like sixteen... I've always had a flexible back and you know everyone always picked up on that like 'aw you've got such a beautiful bridge'… I went to the nationals five times and yeah, that was fun." (10: F, 22)
>
> "Because that was why I started, when I was, when did I start? When I was 8 I think, so I wasn't really, yeah I wasn't really conscious of it I think it was more of enjoyment that side of it." (6: F, 18)
>
> "I wasn't into team sport so we just started skateboarding, me and a few, you know some other kinds the same age. So it was just easy to do and that, and that is quite social in a way because you just like a gang of sort of teenagers." (8: M, 38)

These accounts were telling a story of more childhood activity, but also that activity had provided gains they appreciated. These were primarily enjoyment, social recognition, challenge and social engagement.

Theme 4: Gains as Motivators

Gains against barriers. The accounts indicate that in a situation where an activity does not provide gains, barriers become more prominent and thwart activity. Participants across activity groups described disengaging from activities that were associated with various burdens and barriers:

> "The pool became far from where I used to live, from where I could walk to the pool, so it just made it easy. I guess I'm not motivated enough to get in a car and drive there, and all the faff with changing and brushing your hair after and stuff." (12: F, 34)
>
> "It's very inconvenient and I only ever, you know, if I go out on it, I need to, I think, I need to set aside like a few hours really. Warrant putting it, take the wheel off, take it downstairs, put the wheel back on and then go out, for a couple of hours." (13: M, 25)

In these descriptions of disengagement, participants do not mention making any gains from those activities and tend to focus on barriers to that activity. Conversely, in some cases, an activity that provided gains was worth effort and barriers were not a concern:

> "I now play polo, you know, I love harrowing around on a horse, I love belting around, galloping on a horse is fantastic fun… yeah... it's a bit of travelling, but then my cricket involved a lot of travelling so it's… I've sort of swapped one for the other" (2: M, 55)

Competence gains. Participants (across activity levels) did not state that it was important for them to find an activity they were good at; in other words, they did not identify it as a reason *for* exercising. Once they tried out a new activity, feeling a sense of competence quickly seemed to become the dividing line between disengaging from the activity and continuing to do it. A lack of competence seemed to promptly lead to disengagement:

> "I was never that good… I just couldn't do anything fancy and that annoyed me; I didn't like not being able to do that… So that led me to withdraw from that." (3: M, 18)
>
> "I mean it's mainly that and it is mainly just dance and stuff, erm, I've got no hand eye co-ordination, I can't catch a ball or anything, so no I'm not very good at that sort of stuff." (10: F, 22)

Conversely, a key feature of feeling like an activity is "your thing" and becoming more engaged and committed to it seemed to be competence in that activity:

> "That's what got me hooked, knowing I was good at it. And then once I was hooked, it just, that was it, I was like 'oh this is brilliant'." (3: M, 18)
>
> "I think I enjoy... latin and ballroom, I actually think I'm, without being too arrogant, like, I think I'm OK at it, I'm good at it. Whereas, uhm, I did… I tried out contemporary, and ballet, and jazz and, and it was, I never felt as fluid in them… good at them." (16: F, 20)

Being good at an activity was described as a gain that was valued, whether or not there had been a motive for it.

Social Gains. Some participants also described social gains as an appreciated bonus from engaging in activity,, but not being an explicit reason for doing it:

> "Walking is quite social, the social part is quite big which I didn't realize when I first joined to be honest,, but you do, it's amazing how many friends you do make." (11: F, 48)
>
> "I mean if all my friends didn't pole dance, it was just me, I'd still want to do it, but I think having like the social side of it, it kind of improves the experience… it's nice to like share it." (10: F, 22)

If an activity no longer provides the social gains that an individual wanted or appreciated, they may disengage from it:

> "My coach, he retired so I guess that wasn't as fun. I stopped doing gymnastics 'cause it got like, we got like new teachers and stuff and they weren't as fun" (17: F, 19)
>
> "I went to the university tennis sort of team thing and I really didn't like it, it was all these, kind of, young kids who just like charged up on testosterone and it was just really annoying." (8: M, 28)

Participants described disengaging from activities that were not providing something they wanted. Overall, the accounts indicate that gains themselves can be powerful motivators, even lead to new motives. Experiencing gains can make it worthwhile to go through efforts that may become barriers to activity if gains are not experienced.

Discussion

Summary of Results

The aim of this study was to explore individual differences in the relationship between motives and gains through people's personal accounts of exercise experiences. The intention was to better understand the interplay between motives and gains and the role this plays in exercise behaviour. Four themes emerged: Number of Motives and Gains Instrumentality of Motives and Gains, Quality of Past Gain Experiences, and Gains as Motivators.

Number of motives and gains highlighted, that maintaining exercise behaviour was linked to a Number of motives and gains, whereas disengagement was linked to a narrow range of motives and gains. The multiplicity of motives and gains seemed to help participants be open to also perceiving and appreciating gains they did not originally seek, and helped sustain activity in the long run.

The instrumentality of motives and gains was related to different levels of instrumentality that an activity could have (i.e., to lose weight). It seemed that active individuals viewed activity as being about the experience, more than exercise, and a way of expressing themselves. The accounts described feeling thrill, enjoyment, excitement, relief, relaxation, pride. The exercise itself was not necessarily the main focus of the activities they engaged in. For the individuals in this sample, this kind of experience seemed to support activity in the long term. In contrast, primarily inactive participant's accounts reflected their narrow scope of motives also in that the activity was a means to an end, a way to achieve a physical change. The primary concern for inactive participants' accounts was to pursue a specific goal through exercise, use it as a tool to achieve that goal. The quality of past experiences of gains was related to current activity. Participants with past experiences that consistently provided welcomed gains described enjoying activities and currently being active. These participants' past experiences included positive childhood experiences of activity, parental support and encouragement to be active and enjoying activity. Participants with such positive past experiences now considered themselves active individuals who were highly motivated to continue being active because they enjoyed it and it was a part of their life. Some inactive participants described one or two occasions of having experienced gains they appreciated from an activity, but these were not the predominant memory of past activity and were not reflected in their current feelings towards activity. Participants with limited, or negative, past experiences described barriers to activity and expressed a pessimistic outlook for

being active in present, or the future. Their past experiences included little parental support or encouragement, a primarily inactive childhood or quitting activities. Their current view was that they were not active people; exercise did not interest them and was not a significant part of their life. Finally, the accounts demonstrated that gains themselves can be motivating and people appreciate them. People seek them out (i.e., they have motives), but also recognize and appreciate additional gains. People may disengage from activities that do not provide gains, but continue to engage in activities that provide them, whether or not they fulfil original motives.

Theoretical Implications

The themes that emerged from the data have some potential theoretical implications. In general, the findings are in line with existing literature, in that more active individuals to report enjoyment as a primary determinant (be that motive or gain) of exercising, and report more reasons overall, whereas inactive individuals generally focus on the appearance of their body (e.g., Bélanger et al., 2011; Bulley, Donaghy, Payne, & Mutrie, 2009; Finch & White, 1998; Mulvihill et al., 2000). The study offers a deeper understanding of the role of gains in exercise behaviour and the relationship between motives and gains. Number of Motives and Gains and Instrumentality of Motives and Gains themes illustrated that more active participants describe a Number of motives, many of which are considered conducive to autonomous regulation, whereas inactive participants described instrumental motives considered conducive to controlled regulation (Ingledew & Markland, 2008). The findings also add a different perspective to recent quantitative findings. Recent research has suggested that appearance motive increases controlled regulation, but this effect can be attenuated by an appearance gain (Ingledew et al., 2015). The participant accounts in the current study revealed that appearance motives and corresponding gains alone would not support activity or the enjoyment of it. Rather, appearance motives and gains were more conducive to exercise engagement and enjoyment when they are a part of a wider array of exercise motives and gains.

The quality of past gain experiences seems to set the tone of current beliefs about exercising. Accounts of an inactive childhood reflect a lack of parental support for engaging in activity, and a pattern of events that resulted in an inactive self-concept. These participants would readily describe themselves as inactive, ‘lazy’ and uninterested in being active. Inactive participants seemed to also hold the view that they were in some way predestined to fail at sustaining or enjoying activity. These participants did not

describe making any gains from childhood activities. Conversely more active participants' accounts reflected childhoods with encouragement and support for engaging in activities. These participants' self-concept was active, they would describe themselves as active individuals who valued and prioritized activity in their lives. More active participants seemed to view activity as a smorgasbord of pursuits to enhance their life, use and improve their skills and express themselves. More active participants described their childhood experiences of activity as having provided gains in enjoyment, challenge, social engagement and social recognition. These findings are in line with previous research that has found parental support as an important factor in continued exercise engagement throughout childhood and adolescence (Bélanger et al., 2011; Coleman, Cox, & Roker, 2008; Eime, Payne, Casey, & Harvey, 2010). Previous research also supports the finding that active participants have a positive view of their own abilities in terms of exercise whereas primarily inactive participants have a negative perception of their potential to engage in activity (Coleman et al., 2008). These findings are also in line with research on habit formation, according to which past experiences are used as a reference point when deciding upon a current or future opportunity to exercise (Aarts, Paulussen, & Schaalma, 1997).

The findings of this study lend insight to the relationship *between* motives and gains. Particulary, findings add to the existing literature in highlighting that unsought gains are experienced and appreciated and may even foster new reasons for engaging in the activity. For example, social engagement was described as an unsought gain that emerged and that had since become one of the main reasons for engaging in it. These findings aupport previous research, where unsought gains, as well as motive fulfilment were found to motivate people to continue engaging in their activity (Harley et al., 2009; Price et al., 2013). The findings suggest that what is essential is that people are able to also notice the gains they did not originally seek. The accounts support the notion that motives may facilitate gains because those with a particular motive will seek out an activity that fulfils it. The Gains as Motivators theme illustrated that gains were described as essential for continued engagement, and experiencing gains often resulted in valuing them and later seeking them out.

The gains that were most prominent in the participant accounts were characterized by experiences that could be considered to support the basic psychological needs within SDT (Deci & Ryan, 2000). Within this theory, psychological well-being and optimal functioning is dependent on the satisfaction of the need to be a causal agent

of one's own life (autonomy), to experience proficiency and use one's skills (competence), and to interact and connect with others (relatedness). The importance of finding an activity that fits you, and fulfils the motives that you have, reflects the basic need for autonomy. The importance of being good at an activity (making competence gains) and wanting to use and develop those skills reflect the basic need for competence. Finally, the importance of the social aspects of the activity reflects the basic need for relatedness. The findings may also shed light on the potential processes underlying Ingledew and colleagues' (2014) findings in relation to affiliation. In Ingledew and colleagues' study, affiliation motive was found to generate autonomous regulation, *regardless* of gain, but gain itself did not generate autonomous regulation. Although for some participants in the present study outlined affiliation gains as related to enjoying the activity, many accounts described them as secondary bonuses. In these accounts social engagement was not reported to be a motive and social gains were described as a pleasant side-product, but not essential to the enjoyment of the activity or continuing to engage in it. This supports the proposition that affiliation gains may be valued, but not strongly associated with exercise itself.

The three themes together seem to suggest a temporal development of sustained activity. A person tries out an activity that they hope will fulfil the motives they have. Their past experiences of activities form the basis on which they decide which activities are most appealing to them, and whether they are likely to successfully engage in that activity over time. It seems that once some initial (sometimes unsought) gains are made (e.g., competence, social aspects, and enjoyment) they are appreciated and valued and form new motives. By experiencing initial gains and developing additional motives, individuals may become open to perceiving other additional gains and to pursuing yet other motives. These findings echo views from positive psychology, where positive emotions are proposed to broaden attention to a wider physical and social environment, whereas negative emotions lead to narrow and defensive critical thinking (Carr, 2004; Isen, 2000). Making initial gains and having an active self-concept foster positive emotions towards activity, which in turn broadens attention to new ideas and experiences. A lack of gains and an inactive self-concept conversely seem to facilitate a narrow and critical outlook, where the activity is only seen as serving instrumental motives. Even though past experiences set the tone for current activity and attitudes towards future activity, the finding that gains can act as motivators and may give rise to

new motives gives hope that a narrow motivational landscape, and an inactive self-concept can be changed.

Limitations and Implications for Future Research

The limitations of this study relate to the study sample. Recruiting a wide variety of participants was a priority for this study, and the sample comprises various age groups, both men and women, people who are very active and people who are not active at all, people who were students, people in working life, and people in retirement. Despite these efforts, the study is limited in that the participants were all generally healthy and fully functional individuals without significant health risks. The study sample did not include individuals belonging to clinical populations, who may be most in need of exercise behaviour change interventions. It is particularly clinical populations, such as individuals with diabetes or coronary heart disease, and people who are more at risk of developing these health problems through being overweight or obese, whose lives and motivational processes need to be better understood in order to develop more effective interventions. Therefore it is suggested that future research should explore the views and experiences of people belonging to risk groups and clinical populations to better understand their experiences of exercise engagement from a motives and gains perspective.

The findings of this study further understanding of the relationship between motives and gains, and their role in exercise behaviour. The findings of the study have various implications for future research. For instance, based on this investigation alone, it is not possible to determine specific processes by which individuals develop a wide range of motives and perceive a wide variety of gains. The findings suggest that experiencing unsought gains may give rise to new motives; this should be further explored using quantitative methods. Furthermore, the current study suggests that unsought gains play an important role in continued engagement. It is worth noting that the findings of this research rely not only on what people say, but also what they do not say. Not talking about experiencing specific gains is taken to indicate they did not make them, or notice them, or that they were not significant to them. It is important that the issue of unsought gains is explored through a variety of methods (e.g., longitudinal designs) to better understand whether any gain can be an appreciated unsought gain or whether some are more likely to have this capacity than others. Research should also explore whether these gains are truly unsought or perhaps serving underlying life goals or implicit motives that operate outside of conscious awareness. Findings have implications for use in supporting behaviour change and the design of exercise interventions. For example, interventions

could foster a variety of motives for exercise and support recognition of gains by encouraging individuals to focus attention on them. Overall, gains play a notable role in exercise behaviour; individuals recognize and value them both when they fulfil original motives and when they do not. The relationship between motives and gains is subject to individual differences, which also need to be better understood in order to better support exercise engagement and behaviour change. The findings further merit examining gains alongside motives and their potential for use in health interventions.

Chapter 3

Development of the Exercise Motives and Gains Inventory[1]

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Introduction

Aim

Participatory motives are what individuals seek to attain or avoid by engaging in a particular domain of behaviour. The study of such motives has become an important cornerstone of exercise participation research (Ingledew & Markland, 2008). Whereas motives have received ample attention, gains have not. By gains, we mean what people have attained or avoided through engagement. Arguably, motives (what people want) and gains (what they get) should be studied in parallel, because they are likely to influence each other and jointly influence exercise-related processes and outcomes such as behavioural regulation, exercise amount, satisfaction, and intention. The aim of the present study was to develop a measure of motives and gains by adding gains scales to an existing measure of motives, the Exercise Motivations Inventory version 2 (EMI-2: Markland & Ingledew, 1997). First, the EMI-2 is reviewed.

The EMI-2

Various instruments exist to assess individuals' motives for exercising. These include the Reasons for Exercise Inventory (REI: Silberstein, Striegel-Moore, Timko, & Rodin, 1988), the Personal Incentives for Exercise Questionnaire (PIEQ: Duda & Tappe, 1989), the Revised Motivation for Physical Activity Measure (MPAM-R: Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997), and the Goal Content for Exercise Questionnaire (GCEQ: Sebire, Standage, & Vansteenkiste, 2008), as well as the EMI-2 (Markland & Ingledew, 1997). As is apparent from the names of these instruments, some researchers prefer other terms to describe motives, such as “reasons” (Silberstein et al., 1988) or “goal contents” (Sebire et al., 2008). It is important to note that reasons and goal contents (i.e. motives) are distinct constructs to behavioural regulation (i.e. motivation). In line with this distinction, measures of motives for exercising are distinguished from measures of exercise motivation such as the Behavioural Regulation in Exercise Questionnaire (BREQ: Mullan, Markland & Ingledew, 1997) in the body of literature on physical activity (e.g., Sibley& Bergman, 2016).

The EMI-2 is a flexible instrument. It comprises 14 scales: Affiliation, Appearance, Challenge, Competition, Enjoyment, Health Pressures, Ill-Health Avoidance, Nimbleness, Positive Health, Revitalization, Social Recognition, Strength and Endurance, Stress Management, and Weight Management. In comparison, other measures outlined above comprise between five (e.g., MPAM-R) and nine (PIEQ) scales. Some researchers appreciate the EMI-2's wide coverage of motives (Kilpatrick, Hebert, & Bartholomew,

2005; Maltby & Day, 2001; Shen & Xu, 2008). If circumstances require, the 14 scales can be aggregated into superscales, for example, by combining appearance and weight, or health and fitness-related scales (Ingledew & Markland, 2008; Ingledew, Markland, & Ferguson, 2009; Shen & Xu, 2008). The EMI-2 can be used with current nonexercisers as well as exercisers, because the item stem and wording were designed to make this possible. It has performed well in confirmatory factor analysis (Markland & Ingledew, 1997) and partial least square analysis (Ingledew et al., 2009), with items reflecting their intended constructs and constructs being discriminated from each other. With only minor occasional exceptions, internal consistencies of scales (Cronbach's alpha) have been high (> .70) (e.g., Egli, Bland, Melton, & Czech, 2011; Funk, Jordan, Ridinger, & Kaplanidou, 2011; Grogan, Conner, & Smithson, 2006; Ingledew, Markland, & Medley, 1998; Ingledew & Sullivan, 2002; Kulavic, Hultquist, & McLester, 2013; Maltby & Day, 2001; Quindry, Yount, O'Bryant, & Rudisill, 2011; Shen & Xu, 2008; Zajac & Schier, 2011).

The EMI-2 has demonstrated usefulness in identifying various determinants of exercise motives (e.g., Santos, Mata, Silva, Sardinha, & Teixeira, 2015). Motives have been found to differ by age (Dacey, Baltzell, & Zaichkowsky, 2008; Ingledew & Sullivan, 2002; Quindry et al., 2011); for example, appearance and stress management being lower in older than in not so old adults (Dacey et al., 2008). Traditional students (full-time, 18-22 years old, living on campus) compared with non-traditional students were more motivated by challenge, social recognition, affiliation, competition, appearance and nimbleness, and less by health pressure and ill-health avoidance (Kulavic, Hultquist, & McLester, 2013). Sex differences have been found (Dacey et al., 2008; Egli et al., 2011; Grogan et al., 2006; Ingledew & Sullivan, 2002; Kilpatrick et al., 2005; Quindry et al., 2011; Shen & Xu, 2008); for example, adolescent females compared with males having higher weight management and lower strength and endurance motives (Ingledew & Sullivan, 2002). Differences by sexual orientation have also been found; for example gay men compared with heterosexual men having higher appearance and lower enjoyment and competition motives (Grogan et al., 2006). Ethnic differences (Egli et al., 2011; Zajac & Schier, 2011) have also been found; for example, Black compared with White students being more motivated by health pressures, ill-health avoidance, and nimbleness, and less by stress management, revitalization, enjoyment, and weight management (Egli et al., 2011). Body image has predicted motives (Ingledew & Sullivan, 2002; Zajac & Schier, 2011) differently in males and females. Personality traits have predicted motives; for example openness positively predicting health/fitness motives and neuroticism positively

predicting appearance/weight motives (Ingledew & Markland, 2008). Life goals (what individuals generally aim to attain or avoid in life) have also predicted motives; for example image life goal predicting appearance/weight motives (Ingledew et al., 2009).

The EMI-2 has also demonstrated usefulness in identifying various consequences of exercise motives. Motives have been associated with psychological well-being; for example appearance motive being associated with poorer well-being in pre-maintenance exercisers (Maltby & Day, 2001). Motives have predicted behavioural regulation (Ingledew & Markland, 2008; Ingledew et al., 2009); for example, appearance/weight and social recognition predicting external regulation (control by external contingencies), appearance/weight also predicting introjected regulation (control by internalized contingencies), stress management and health/fitness predicting identified regulation (conscious valuing), and affiliation and challenge predicting intrinsic regulation (enjoyment) (Ingledew et al., 2009). Through behavioural regulation, motives have predicted amount of exercise participation (Ingledew & Markland, 2008; Ingledew et al., 2009); for example, stress management, health and fitness, affiliation, and challenge positively predicting participation (Ingledew et al., 2009). Motives have also been associated with stage of change (Dacey et al., 2008; Ingledew et al., 1998); for example appearance and weight motives being prominent in early stages but enjoyment and revitalization motives being conducive to maintenance (Ingledew et al., 1998), with commitment and intention to continue exercising (Funk et al., 2011), and with adherence to an exercise program (Izquierdo-Porrera, Powell, Reiner, & Fontaine, 2002). Finally, motives have been shown to be associated with type of activity (e.g., Kilpatrick et al., 2005); for example, aerobics compared with yoga participants manifesting higher weight management and lower positive health and stress management motives (Zajac & Schier, 2011).

According to Markland and Ingledew (2007), many of these findings can be interpreted in terms of SDT (Ryan & Deci, 2000). From this theoretical perspective, motives lead to autonomous regulation depending upon their potential to satisfy basic needs for autonomy, competence and relatedness (Vansteenkiste, Lens, & Deci, 2006). Ingledew and colleague's (2009) three-level model of motivation (life goals leading to exercise motives, leading to behavioural regulation and thereby behaviour) is consistent with this theory, although these authors did not measure need satisfaction. Use of the EMI-2 is not limited to this particular theory and has been used with reference to other frameworks such as Leary and Kowalski’s (1990) model of impression management

(Strong, Martin Ginis, Mack, & Wilson, 2006). It has also been used in studies without reference to any specific theoretical frameworks (Grogan et al., 2006; Halliwell, Ditmar, & Osborn, 2007; Izquierdo-Porrera et al., 2002; Kulavic, Hultquist, & McLester, 2013). If validity is the "degree to which scores on an appropriately administered instrument support inferences about variation in the characteristic that the instrument was developed to measure" (Cizek, 2012), then the cumulative evidence supports the use of the EMI-2 as a measure of exercise motives.

Need for an Exercise Motives and Gains Inventory

Motives are reasons *to* engage whereas gains are results *from* having engaged. Motives and gains are distinct from goal features such as importance, difficulty or specificity (see Austin & Vancouver, 1996). For example, two individuals may place the same importance on a behavioural goal, but have different motives for pursuing it and experience different gains from achieving it. When people's gains correspond to their original motives, we would call this motive fulfillment. For example, a person may take up a martial art solely to develop new skills (challenge motive) and find that they do indeed develop such skills (challenge gain). Additionally, unsought gains may occur. For example, the same person may incidentally find that they make new friends and come to appreciate this social gain.

A distinction can be made between subjective and objective gains. A subjective gain is the person's own perception that they have gained something through participation, for example, "I have acquired new skills though this martial art". An objective gain, in contrast, is an external observer's assessment that the person has gained something through participation, for example, "The individual has scored well on this grading of skill". The present study focuses only on subjective gains, measured by self-report. As in research into volunteering (Clary et al., 1998; Clary & Snyder, 1999; Davis, Hall, & Meyer, 2003), there will be one set of scales measuring motives and a separate set of scales measuring gains. Each motive and each gain scale would be expected to be homogeneous (unidimensional), but each motive scale would be expected to be distinct from its corresponding gain scale (separate dimensions). The higher order structure of motives would be expected to be similar to that previously suggested by Ingledew and Markland (2008; see also Ingledew, Markland, & Ferguson, 2009). The higher order structure of gains might differ from the higher order structure of motives. This is because, in the translation of motives into gains, there will be perturbations arising from, for example, unsought gains.

There are four good reasons for creating a measure that allows one to examine exercise gains alongside motives. First, individuals with a particular motive may be more likely to make a corresponding gain, and individuals experiencing a particular gain may be more likely to develop a corresponding motive. This would manifest as a positive association between motive and corresponding gain. Such positive associations have been found in research into volunteering with charity organisations and other prosocial behaviour such as organisational citizenship behaviour (Davis, Hall, & Meyer, 2003; Finkelstein, 2006, 2008). Second, some motives may be easier or harder than others to convert into corresponding gains (harder to attain or to perceive). This would manifest as a within person mean difference between motive and corresponding gain. Such motive-gain mean differences have not been examined in the existing literature. Third, individuals with a particular motive may experience different outcomes (such as level of satisfaction) depending on whether they make a corresponding gain. This would manifest as an interactive effect of motive and corresponding gain. Such interactive effects have been found in research into volunteering (Clary et al., 1998). Fourth, even if exercise gains do not moderate the effects of motives, gains could have effects in their own right. This would manifest as an additive effect of motive and corresponding gain. Such additive effects have been found in research into volunteering and other prosocial behaviour (e.g., Davis et al., 2003; Finkelstein, 2006, 2007).

Present Study

The aim of the present study was to develop a measure of motives and gains by adding gains scales to the EMI-2 (Markland & Ingledew, 1997). The resulting composite measure would be known as the Exercise Motives and Gains Inventory (EMGI). The objectives were to assess the lower-order structure (factor analysis of items) and the higher-order structure (factor analysis of scales), and to examine discrepancies between motives and corresponding gains (within-person gain-motive differences). The effects of motives and gains on exercise-related processes and outcomes (behavioural regulation, exercise amount, satisfaction, and intention) are considered in another paper (Ingledew, Markland, & Strömmer, 2014).

The expected findings were that:

1. Motive and gain items would reflect their intended constructs, and motive and gain constructs, though correlated, would be distinct.
2. The higher-order structure of motives would be similar to that identified by Ingledew & Markland (2008), that is to say health-fitness, appearance-weight,

social engagement, and enjoyment related groupings. The higher order structure of gains might be somewhat different.

3. There would be discrepancies between gains and motives, of varying size and direction. For example, gains that are harder to attain or perceive, such as perhaps health-related gains, would show negative mean differences between motives and gains. Conversely readily attainable or perceptible gains, such as perhaps social gains, would show positive mean differences between motives and gains.

Method

Design and Sample

The study was a cross-sectional survey using a questionnaire. Ethical approval was granted by a University departmental ethics committee. Participants were adults between 18 and 35 years of age. Participants were recruited from communal areas of a British university (e.g., kitchens and lounges of halls of residence, cafeterias, seating areas), rather than from sport and exercise facilities, so as to ensure a wide range of exercise participation levels. A total of 210 individuals completed the questionnaire, but 14 (7%) of these did not complete the gains section of the questionnaire because they had not engaged in *any* exercise in the past 12 months. Therefore, the effective sample size was 196. Of these, 60% (118/196) were women and 40% (78/196) men. The mean age was 22.12 years (*SD* 3.08). The mean BMI was 22.53 (*SD*), and 55% belonged to a club in order to participate in sport or recreational physical activity.

Measures

EMGI. The EMGI comprised a motives section and a gains section. The motives section was the EMI-2 (Markland & Ingledew, 1997). The instructions and stem for this section (see Appendix F) invited participants to focus on their personal reasons as to why they exercise or might exercise. The items were of the form "To ...", or "Because ...", or "For ...". The gains section was newly created. The instructions and stem for this section (see Appendix F) invited participants to focus on their personal experience of exercise and what they had gained from it. The items were of the form "I have ...", or "I have been able to ...", or "It has allowed me to ...", or "It has enabled me to ...". Each gain item corresponded to a particular motive item. For example, the gain item "[My personal experience of exercise has been that] it has helped me to maintain good health" corresponded to the motive item "[I exercise] to maintain good health". For each gain item, the wording was determined by consensus between the three authors. For both

motives and gains sections, response options ranged from *not at all true for me* (0) to *very true for me* (4). The order of items was randomized, separately for each section. Each section comprised 51 items forming 14 scales of 3 or 4 items each.

Other measures. The motives and gains measures were presented along with other measures, in the following order: exercise motives (EMGI) and behavioural regulation of exercise (BREQ-2: Markland & Tobin, 2004); exercise amount, stage of change, and intention; affect (Positive and Negative Affect Scale: Watson, Clark, & Tellegen, 1988); exercise gains (EMGI) and exercise satisfaction. The order of measures was designed to flow well, whilst separating gains from motives. Analyses using some of the other measures are reported elsewhere (Ingledew et al., 2013).

Analyses

Missing values. Missing values were imputed. As there were only seven missing data points, single imputation by expectation-maximization was used (Olinsky, Chen, & Harlow, 2003).

Confirmatory factor analysis of items. The EMGI item scores were subjected to confirmatory factor analyses (CFA) using Mplus version 7 (Muthén & Muthén, 2012). This was to assess how well items reflected intended constructs and whether motive and gain constructs were distinct. A CFA approach was adopted in this study because the gain items were developed based on existing motive items from the EMI-2. The 14-factor structure of the EMI-2 has been previously established with items reflecting their intended constructs and constructs being discriminated from each other (Markland & Ingledew, 1997). Due to the well-established factor structure of the EMI-2, there were strong hypotheses for the factor structure of the gain scales. Because of these hypotheses, the CFA approach was deemed appropriate. Based on the factor structure of the motives scale, a series of 14 two-factor models was tested. In each model, a motive construct was examined alongside the corresponding gain construct. To illustrate, in the two-factor model for affiliation, the four motive items were free to load onto one factor, the four gain items onto another factor (Figure 1). The affiliation motive and affiliation gain factors were allowed to correlate. The measurement errors of corresponding motive and gain items (e.g., "To make new friends" and "I have made new friends") were also allowed to correlate, to accommodate their matching content. For each model, we examined the Satorra-Bentler scaled χ^2 (Satorra & Bentler, 1994), which adjusts for multivariate nonnormality, the Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMR). Following Hu and Bentler (1999), the criterion for

adequate fit was a combination of CFI close to .95 and SRMR close to .08. For completeness, we also report the Root Mean Square Error of Approximation (RMSEA). The discriminant validity of the scales was assessed by calculating the average variance extracted (AVE) (Fornell & Larcker, 1981) and comparing that to the inter-scale correlations. Discriminant validity is considered to be confirmed when the AVE estimates for both constructs (motive and gain) are greater than their shared variance (i.e., square of the correlation) (Fornell & Larcker, 1981). Having established the factor structures of the items, we then computed motive and gain scale scores as the means of item scores (i.e., unit weighted composite scores).

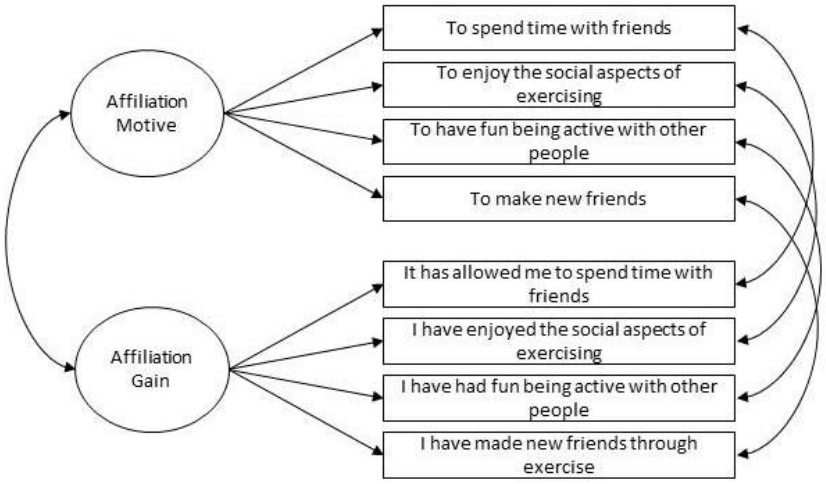

Figure 1. Example 2-factor CFA model using affiliation motive and gain.

Exploratory structural equation modeling of scales. The EMGI scale scores were subjected to exploratory structural equation modeling (ESEM) following procedures outlined by Asparouhov and Muthén (2009) within Mplus version 7 (Muthén & Muthén, 2012). This was to explore the higher order factor structures of motives and gains. The ESEM approach was deemed appropriate as motives had a hypothesised higher order factor structure based on previous work on the EMI-2 (Ingledew & Markland, 2008) but gains were not necessarily expected to exhibit the same higher order factor structure. The ESEM approach was adopted in preference to CFA because we did not hypothesize that the structures of motives and gains would necessarily be the same, nor did we hypothesize strictly simple factor structures. ESEM was adopted in preference to traditional exploratory factor analysis because it provides a range of fit statistics, and allows comparison of models to determine the optimal number of factors.

The term 'exploratory structural equation modelling' is potentially misleading when applied purely to factor analysis as this does not include the estimation of structural relations between latent variables. Nevertheless, ESEM procedures have been widely used for factor analytic purposes (c.f., Guay Morin, Litalien, Valois, & Vallerand, 2015). Guay and colleagues draw a distinction between the use of ESEM as a confirmatory factor analytic procedure, where the number of factors are specified a priori, and its use as an exploratory factor analytic procedure where model fit information is used to determine the optimal number of factors to extract. In the current study, ESEM was used in an exploratory fashion. Separate analyses were conducted for motives and gains. For each of these, six models were sequentially fitted to the data, systematically increasing the number of factors from one to six and the models were compared using Satorra-Bentler $\chi 2$ difference tests (ΔSatorra-Bentler $\chi 2$, Satorra & Bentler, 2001), with alpha set to .01 due to the susceptibility of this approach to lead to over-factoring (c.f., Myers Chase, Pierce, & Martin,2011). Oblique (promax) rotation was used. In each analysis, the number of factors was constrained, but (in contrast to confirmatory factor analysis) each item was free to load on any factor. For ESEM with promax rotation and a robust estimator, Mplus only produces the Satorra-Bentler scaled $\chi 2$, Root Mean Square Residual (RMR), and RMSEA. These are reported as well as the CFI, calculated by hand.

Differences between means. To compare mean differences between motives and gains, a *t*-test and correlation were then conducted for each pairing of motive scale with its corresponding gain scale[2]. Negative mean differences denote a lower gain relative to the original motive, conversely positive mean differences denote a higher gain relative to the original motive.

Results

CFAs of Items

The results of the CFAs of item scores are shown in Table 1. The Satorra-Bentler scaled χ^2 was non-significant for 11 of the 14 models, though not for Enjoyment, Social

[1] It was not possible to compute the difference between factor means in the CFAs. Multi-group CFA was not appropriate, since motives and gains were not separate groups. In principle, latent change analysis might have been appropriate (motives changing into gains). However, in practice, this would have required strong factorial invariance across motives and gains (same configuration, equal loadings and intercepts), whereas we only hypothesised configural factorial invariance (same configuration, unconstrained loadings and intercepts).

Recognition, and Weight Management. All 14 models met the criteria for adequate fit according to the CFI (≥ .95) and SRMR (≤ .08). Factor loadings were greater than .60 for 92 of the 102 items. The lowest loadings were for the appearance motive item "look younger" (.47) and the health pressures motive item "recover from an illness or injury" (.49). The correlations of motive factors with corresponding gain factors were all positive, and the 95% confidence intervals of these correlations all had lower boundaries above 0.00 and upper boundaries below 1.00, except for Revitalization which had an upper boundary of 1.00 (95% CI [.86, 1.00]). Discriminant validity was satisfactory for affiliation, appearance, competition, ill health avoidance, nimbleness, positive health and strength and endurance. The AVEs for the corresponding motives and gains scales were smaller than their shared variance for challenge, enjoyment, health pressures, revitalisation, social recognition, and stress management. The AVE for weight management motive (.70) was higher than the shared variance (.55), whereas the AVE for weight management gain was lower (.52).

Table 1
Confirmatory Factor Analyses of Motive and Gain Items

	Factor loadings		Average Variance Extracted		Correlation between factors (95% CI)	Fit statistics			
Construct, and essence of items	Motive	Gain	Motive	Gain		Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Affiliation			.68	.75	.80 (.74, .87)	$\chi^2(15) = 20.55$, $p = .15$	.02	1.00	.04
Spend time with friends	.87	.91							
Enjoy the social aspects of exercising	.84	.88							
Have fun being active with other people	.83	.84							
Make new friends	.76	.82							
Appearance			.64	.59	.62 (.49, .74)	$\chi^2(15) = 19.35$, $p = .20$	.03	1.00	.04
Help me look younger	.47	.51							
Have a good body	.84	.70							
Improve my appearance	.92	.88							
Look more attractive	.90	.92							
Challenge			.47	.59	.79 (.69, .89)	$\chi^2(15) = 15.88$, $p = .39$	.03	1.00	.02
Give me goals to work towards	.69	.84							
Give me personal challenges to face	.83	.78							
Develop personal skills	.62	.62							
Measure myself against personal standards	.59	.81							
Competition			.81	.82	.87 (.82, .92)	$\chi^2(15) = 25.05$, $p = .05$	.02	.99	.06
Like trying to win in physical activities	.91	.91							

Construct, and essence of items	Factor loadings		Average Variance Extracted		Correlation between factors (95% CI)	Fit statistics			
	Motive	Gain	Motive	Gain		Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Enjoy competing	.86	.90							
Enjoy physical competition	.93	.93							
Find physical activities fun, especially when competition is involved	.89	.88							
			.60	.69		$\chi2(15) = 27.13$, p =			
Enjoyment					.91 (.87, .95)	.03	.03	.99	.06
Enjoy the feeling of exerting myself	.71	.74							
Find exercising satisfying in and of itself	.79	.93							
For enjoyment of the experience of exercising	.82	.85							
Feel at my best when exercising	.77	.80							
			.29	.43		$\chi2(5) = 5.96$, p =			
Health Pressures					.80 (.64, .96)	.31	.02	1.00	.03
My doctor advised me to exercise	.60	.73							
Help prevent an illness that runs in my family	.54	.66							
Help recover from an illness/injury	.49	.56							
						$\chi^2(5) = 9.18$, p =			
Ill Health Avoidance			.65	.60	.58 (.45, .71)	.10	.04	.99	.07
Avoid ill-health	.93	.84							
Prevent health problems	.76	.84							
Avoid heart disease	.71	.62							
						$\chi^2(5) = 2.17$, p =			
Nimbleness			.68	.73	.74 (.64, .83)	.82	.01	1.00	.00
Stay/become more agile	.75	.72							
Maintain flexibility	.81	.94							

Construct, and essence of items	Factor loadings		Average Variance Extracted		Correlation between factors (95% CI)	Fit statistics			
	Motive	Gain	Motive	Gain		Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Stay/become flexible	.90	.88							
Positive Health			.60	.56	.60 (.47, .74)	$\chi^2(5) = 3.65$, $p = .60$	.02	1.00	.00
Have a healthy body	.87	.80							
Want to maintain good health	.73	.81							
Feel more healthy	.71	.62							
Revitalization			.43	.54	.93 (.86, 1.00)	$\chi^2(5) = 3.18$, $p = .67$	.02	1.00	.00
Makes me feel good	.78	.92							
Find exercise invigorating	.55	.69							
Recharge my batteries	.61	.56							
Social Recognition			.47	.55	.81 (.74, .88)	$\chi2(15) = 42.40$, $p < .001$	.04	.96	.10
Show my worth to others	.73	.79							
Compare my abilities with other peoples'	.56	.82							
Gain recognition for my accomplishments	.70	.66							
Accomplish things that others are incapable of	.75	.69							
Strength and Endurance			.70	.69	.67 (.56, .78)	$\chi^2(15) = 21.38$, $p = .13$	.03	.99	.05
Build up my strength	.90	.94							
Increase my endurance	.66	.62							
Get stronger	.90	.88							
Develop my muscles	.88	.85							
Stress Management			.65	.69	.92 (.88, .95)	$\chi^2(15) = 23.39$, $p = .08$	.03	.99	.05

Construct, and essence of items	Factor loadings		Average Variance Extracted		Correlation between factors (95% CI)	Fit statistics			
	Motive	Gain	Motive	Gain		Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Give me space to think	.63	.71							
Helps to reduce tension	.83	.84							
Help manage stress	.82	.82							
Release tension	.93	.94							
Weight Management			.70	.52	.74 (.66, .83)	$\chi^2(15) = 31.14$, $p = .01$	.04	.98	.07
Stay slim	.67	.57							
Lose weight	.81	.69							
Help control my weight	.96	.84							
Helps me to burn calories	.88	.77							

Note. $N = 196$.

The means, standard deviations, internal consistencies, and motive-gain correlations of the scales are shown in Table 2. Means (on a scale from 0 to 4) were not strikingly low or high, except for Health Pressures Motive (M = 0.96) and Gain (0.87), and Positive Health Motive (3.23). Cronbach's alpha was above .70, with the exception of Health Pressures Motive (α = .54), Health Pressures Gain (α =.68), and Revitalization Motive (α =.68). The correlations of motive scales with corresponding gain scales were all significant and positive, and were notably high for Enjoyment (r = .83), Competition (.84), and Stress Management (.86).

Table 2
Descriptive Statistics, Correlations and Differences for Motive and Gain Scales

	Motive			Gain			Correlation between motive and gain	Gain minus motive *M (SD)*
Construct	*M*	*SD*	Cronbach's α	*M*	*SD*	Cronbach's α		
Affiliation	1.87	1.15	.89	2.14	1.30	.92	.75**	0.27 (0.88)**
Appearance	2.21	0.99	.86	2.15	0.98	.83	.58**	-0.06 (0.90)
Challenge	2.21	0.92	.77	2.44	1.02	.85	.69**	0.23 (0.77)**
Competition	1.87	1.27	.94	1.90	1.36	.95	.84**	0.03 (0.76)
Enjoyment	2.52	1.00	.86	2.81	1.00	.89	.83**	0.28 (0.59)**
Health Pressures	0.96	0.87	.54	0.87	0.91	.68	.72**	-0.09 (0.67)
Ill-Health Avoidance	2.36	1.05	.82	2.10	1.05	.81	.53**	-0.26 (1.02)**
Nimbleness	2.28	1.00	.86	2.52	1.05	.88	.68**	0.24 (0.82)**
Positive Health	3.23	0.74	.81	2.80	0.85	.79	.51**	-0.43 (0.80)**
Revitalization	2.46	0.91	.68	2.51	0.99	.74	.78**	0.05 (0.63)
Social Recognition	1.39	0.94	.78	1.71	1.04	.83	.70**	0.32 (0.78)**
Strength and Endurance	2.62	1.00	.90	2.75	0.94	.89	.62**	0.13 (0.85)*
Stress Management	2.40	1.09	.87	2.42	1.12	.90	.86**	0.02 (0.59)
Weight Management	2.48	1.15	.89	2.49	1.00	.80	.69**	0.01 (0.86)

*p < .05. **p < .01.
Note. N = 196.

ESEMs of Scales

In the ESEMs of scales, for both motives and gains, fit improved significantly with more factors up to five, according to the ΔSatorra-Bentler χ^2 tests. To save space, we only report findings for the three models with the most factors (four, five and six). The results for all factor solutions tested are available from the first author by request. The results of the four factor model for motives showed adequate fit: Satorra-Bentler χ^2 (41) = 102.85, p < .001, CFI = .95, RMR = .04, RMSEA = .08. So did the 4-factor model for gains: Satorra-Bentler χ^2 (41) = 85.81, p < .001, CFI = .98, RMR = .03, RMSEA = .08. The five-factor model for motives fitted well: Satorra-Bentler χ^2 (31) = 56.11, p = .004, CFI = .98, RMR = .02, RMSEA = .06. So did the five factor model for gains: Satorra-Bentler χ^2 (31) = 56.43, p = .004, CFI = .99, RMR = .02, RMSEA = .07. A six-factor model for motives failed to converge, and a six-factor model for gains gave an improper solution. Chi square difference tests confirmed that the five factor model for motives fitted significantly better than a four factor model: ΔSatorra-Bentler χ^2 = 45.52, Δdf = 10, p < .001. The five factor model for gains also fitted significantly better than a four factor model: ΔSatorra-Bentler χ^2 = 28.34,Δdf = 10, p < .01. Therefore, a five-factor model was deemed optimal for both motives and gains. The five-factor models are shown in Tables 3 (motives) and 4 (gains).

The factor structures of motives (Figure 2) and gains (Figure 3) were similar in many respects. Both motives and gains had a Social Engagement factor, encompassing Affiliation, Challenge, Competition, and Social Recognition. Both also had an Enjoyment/Revitalization factor, encompassing Enjoyment, Revitalization and Stress Management. Both had a Negative Health factor, encompassing Health Pressures and Ill-Health Avoidance. Both also had a Health/Fitness factor, encompassing Positive Health, Strength/Endurance and Nimbleness, and also to some extent Ill-Health Avoidance. Motives had an Appearance/Weight Management factor, whereas gains had a Weight Management factor, with Appearance gain loading predominantly on the Health/Fitness factor. Correlations between factors were more positive for gains (range .15 to .64) than for motives (-.18 to .51).

Table 3
Exploratory Structural Equation Modeling of Motive Scales

Variable	Factor				
	1. Appearance/ Weight Management	2. Negative Health	3. Social Engagement	4. Health/Fitness	5. Enjoyment/ Revitalization
	Scale-factor loadings				
Appearance	.88	-.11	.21	.14	-.04
Weight Management	.70	.13	-.05	.06	.05
Affiliation	-.03	.01	.55	-.09	.13
Challenge	.11	-.12	.52	.15	.23
Competition	-.25	.09	.63	.13	-.01
Social Recognition	.19	.10	.99	-.12	-.10
Enjoyment	-.06	-.21	.09	.15	.79
Revitalization	.04	.03	-.08	.05	.90
Stress Management	.01	.23	.11	-.12	.73
Health Pressures	-.06	.73	.15	.05	-.01
Ill-Health Avoidance	.16	.46	-.10	.58	-.10
Positive Health	.31	-.02	-.18	.61	.11
Nimbleness	-.02	.18	-.04	.41	.20
Strength/Endurance	.01	-.04	.25	.60	-.04
	Factor correlations				
1. Appearance/Weight Management	-				
2. Negative Health	.28	-			
3. Social Engagement	-.18	-.05	-		
4. Health/Fitness	.40	.17	.26	-	
5. Enjoyment/Revitalization	.12	.10	.52	.51	-

Note. $N = 196$. Satorra-Bentler $\chi^2(31) = 56.11$, $p = .004$; Root Mean Square Residual = .02; Comparative Fit Index = .98; Root Mean Square Error of Approximation = .06.

Differences between Means

The differences between motives and gains composite scores are shown in Table 2. There were significant positive differences (gain greater than motive) for Affiliation, Challenge, Enjoyment, Nimbleness, Social Recognition and Strength and Endurance, and negative differences (motive greater than gain) for Ill-Health Avoidance and Positive Health.

Table 4

Exploratory Structural Equation Modeling of Gain Scales

Variable	Factor				
	1. Health/Fitness	2. Weight Management	3. Social Engagement	4. Enjoyment/ Revitalization	5. Negative Health
	Item-factor loadings				
Appearance	.58	.27	.11	-.08	.09
Weight Management	.08	.99	.02	.01	-.00
Affiliation	-.05	.00	.70	.14	-.06
Challenge	.22	.08	.48	.31	-.07
Competition	.02	-.10	.76	-.08	.10
Social Recognition	.04	.06	.92	-.07	.07
Enjoyment	.21	-.01	.14	.74	-.14
Revitalization	.02	-.00	-.06	.95	.07
Stress Management	.04	-.01	.08	.60	.21
Health Pressures	-.15	-.03	.08	.01	.76
Ill-Health Avoidance	.38	.03	-.04	-.01	.53
Positive Health	.67	.12	-.13	.24	.05
Nimbleness	.70	-.10	.04	.03	.07
Strength/Endurance	.91	-.11	.09	.02	-.14
	Factor correlations				
1. Health/Fitness	-				
2. Weight Management	.55	-			
3. Social Engagement	.52	.15	-		
4. Enjoyment/Revitalization	.64	.35	.56	-	
5. Negative Health	.43	.42	.32	.33	-

Note. $N = 196$. Satorra-Bentler $\chi^2(31) = 56.43$, $p = .004$; Root Mean Square Residual = .02; Comparative Fit Index = .99; Root Mean Square Error of Approximation = .07.

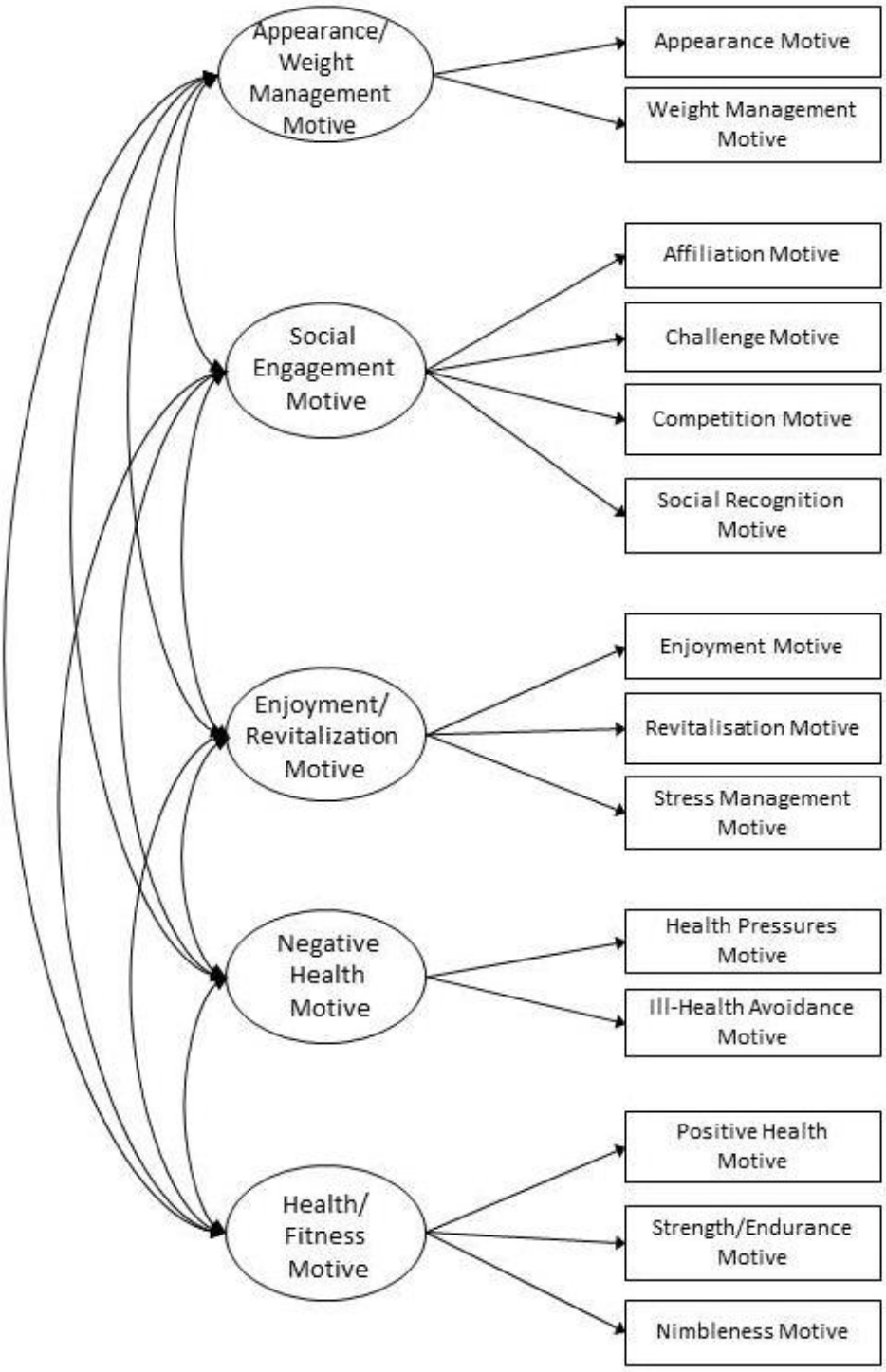

Figure 2. Five factor ESEM model for Motives.

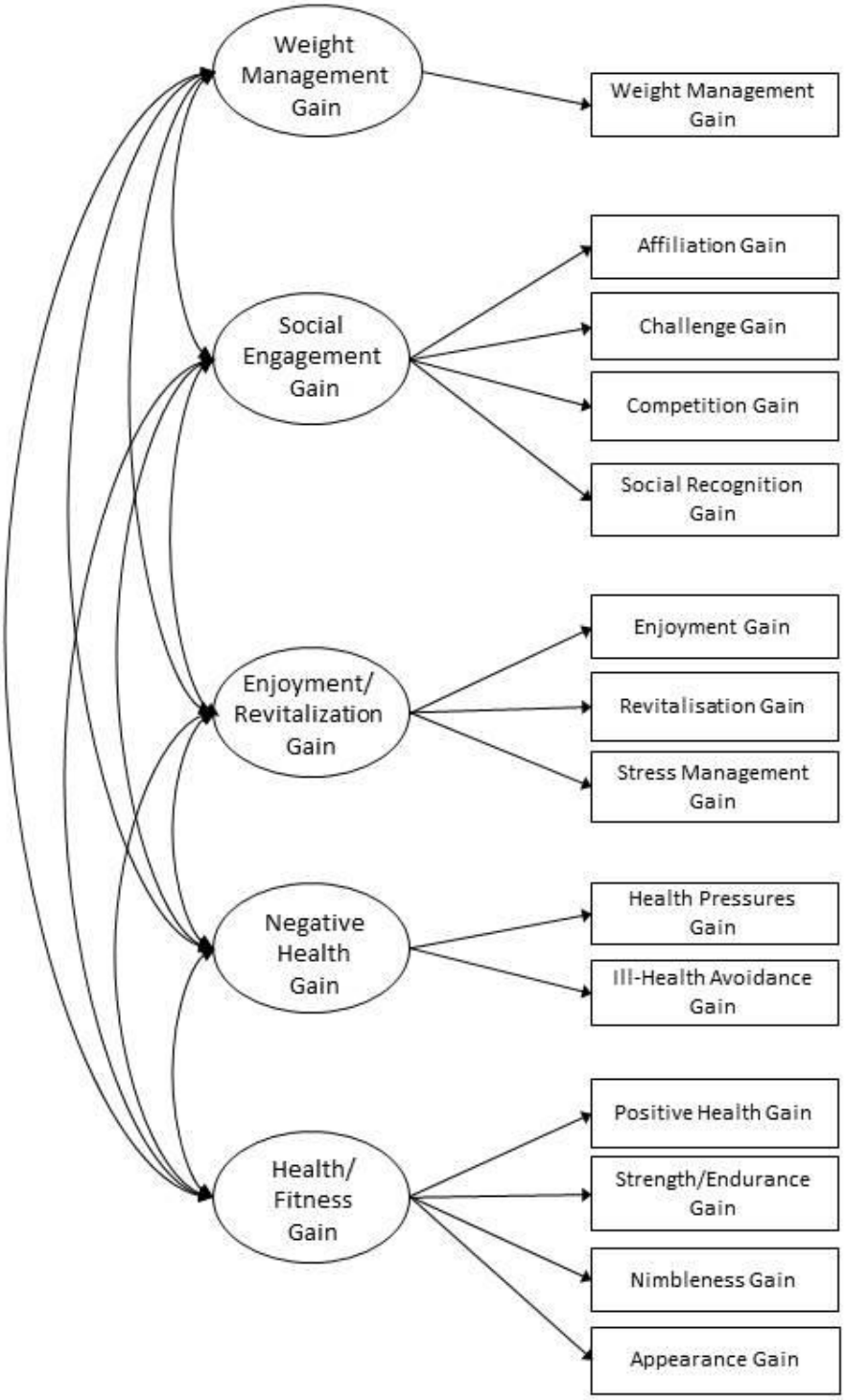

Figure 3. Five factor ESEM model for Gains.

Discussion

Main Findings

The results were consistent with expectations, with minor exceptions. All EMGI items reflected their intended constructs. There were two factor loadings that were comparatively low. These were the appearance motive item “look younger”, and the health pressures motive item "recover from an illness or injury". It is likely that these items do not apply well to the present sample of healthy young adults, but could apply to other samples. Correlations between motive factors and corresponding gain factors were all positive, and the 95% confidence intervals excluded 1.00 except for Revitalization where it touched 1.00. Discriminant validity was confirmed by AVE for affiliation, appearance, competition, ill health avoidance, nimbleness, positive health and strength and endurance. AVE for challenge, enjoyment, health pressures, revitalisation, social recognition, stress management and weight management did not fully support discriminant validity. Discriminant validity for these scales based on the AVE’s is an issue, and arises from the similar wording and content of the corresponding motive and gain scales. Further research is required to establish the discriminant validity of the scales. The true test of the discriminant validity of the scales will be whether they have differential predictive capabilities in practice. Some support for this has already been established (Ingledew, Markland, & Strömmer, 2014). The higher order structures of motives and gains were similar in many respects. Appearance motive was associated with weight management, whereas appearance gain was associated with health and fitness. Gain factors were more positively intercorrelated than were motive factors. There were significant mean differences between some motives and gains. Positive mean differences suggested a higher degree of attainability for affiliation, challenge, enjoyment, nimbleness, social recognition and strength and endurance, whereas negative differences suggested a low degree of attainability for ill-health avoidance and positive health, with appearance, competition, health pressures, revitalization, stress management, and weight management. Overall, the aim, to develop a measure of gains that corresponded to the existing EMI-2 measure of motives, was met.

Implications of Findings for Existing Literature

It seems that people can distinguish between their motives and their gains. Even though the motive and gain items were similar in wording and proximal in time, the psychometric results indicate clear separation of constructs for many of the scales used. Results indicated less than desirable discriminant validity for challenge, enjoyment,

health pressures, revitalization, social recognition, stress management and weight management. The motives for enjoyment, revitalization, stress management and challenge are prominent in habitual exercisers and could have come into an alignment with their corresponding gains due to individuals pursuing activities they know will fulfil their motives. The scales for health pressures, positive health and social recognition and weight management could represent gains that are difficult for participants to gauge because these gains are slow to materialise and/or difficult to perceive. It remains to be seen whether discriminant validity for these scales might improve when the motives and gains measures are used at a longer time interval. Nevertheless, even if highly correlated, such measures might be useful for research because asking about motives and gains in this way taps into a natural form of discourse. Having asked someone what they want from exercise ("I want to lose some weight") it is natural to then ask them what they have gained ("No, I haven't lost much weight, but I have felt much more relaxed"), and perhaps odd not to ask.

The positive associations between motives and corresponding gains (evident in the factor-factor correlations and the scale-scale correlations) could reflect two possible causal relationships. It may be that people who strive for something (motive) are generally more likely to attain it and to notice if they do attain it (gain). It may alternatively or additionally be that people come to seek (motive) what they happen to get and appreciate (gain). They may not have initially been aware that such a gain was possible, or that they would appreciate it. Correlations may be particularly high for some motives such as enjoyment and competition because these are prominent in regular exercisers (Ingledew et al., 1998) in whom there would be more opportunity for motives and gains to come into alignment. Whatever the explanation for the positive correlations, previous research findings on the effects of motives may have been confounded by unmeasured but correlated gains. In light of this, previous conclusions about the effects of motives will need to be re-evaluated (see Ingledew et al., 2013).

The differences in higher-order structures of motives and gains are intriguing. From motive to gain, appearance shifted its association from weight management to health and fitness. Perhaps initially people see weight loss as the primary means to improve their appearance. In due course they may come to recognize that physical changes such as muscle tone and agility also convey a positive impression. These different characteristics of appearance motive and appearance gain may reflect a shift in body image from investment (excessive preoccupation) to evaluation (constructive

management) (cf. Carraça et al., 2011). From motive to gain, intercorrelations between factors became more positive. Perhaps initially most individuals want a limited number of things out of exercise. People may subsequently experience a range of other benefits, which they acknowledge as personal gains. The different higher-order structures of motives and gains mean that one would need to think carefully and perhaps do preliminary analyses before aggregating motives and gains when studying their effects.

There may be two reasons for the mean within-person differences between gains and motives. Some gains may be easier to actually attain, or easier to perceive, or both. For example, ill health avoidance may be difficult to attain (could take a long time) and to perceive (few overt signs). Affiliation may be relative easier to attain (exercise often has a strong social element) and to perceive (plenty of overt signs). Weight management may be difficult to attain in practice but easy to perceive should it happen. It is important to note that around each of the mean within-person differences, there was extensive individual difference (SD), so that in all instances there were some individuals who gained less than they wanted, some who gained about what they wanted, and some who gained more than they wanted.

Limitations of the Study and Future Directions for research

Some of the study limitations related to the cross sectional nature of the study have already been discussed in the implications of findings section. Other limitations of this study that should be mentioned relate to the study sample. The study sample was 196 university students. The study sample did not include individuals in working life or belonging to clinical populations, or clinical risk groups. It is particularly clinical populations, such as individuals with diabetes or coronary heart disease, and people who are more at risk of developing these health problems through being overweight or obese, who may be most in need of exercise behaviour change interventions. Therefore it is suggested that the utility of the measure should be tested in the abovementioned populations to ensure its wider applicability and assess motives and gains in these groups.

Further research is needed to ascertain the psychometric properties of the EMGI in a variety of populations. From a theoretical perspective, the value of the instrument will lie in the study of the *consequences* and *causes* of motives and gains. It will provide a means of studying how motives and gains influence exercise-related processes and outcomes, including their interactive effects (see Ingledew et al., 2013). It will also provide a means of studying how motives and gains arise, including how they influence each other. Longitudinal and experimental designs will allow for more precise

determination of causality. Such studies of change over time and response to interventions are particularly illuminating in the ongoing effort to validate the use of an instrument (Messick, 1995). It might be possible to measure gains in other ways such as developing standalone gains measures, but the instrument created here is presented as a means of measuring gains corresponding to an existing measure of motives for exercising. Ultimately, the instrument may merit use within public health programs to promote physical activity.

Chapter 4
Reflecting on Exercise Gains:
An Intervention to Support Autonomous Motivation

Introduction

Aim

A person is autonomously motivated when they engage in behaviour based on their own volition and choice. Conversely, a person is driven by controlled motivation when they feel coerced into doing something under pressure or obligation. Previous research has recognised that fostering of autonomous motivation is essential to supporting health behaviour change and maintenance over time (e.g., Teixeira, Carraça, Markland, Silva, & Ryan, 2012). Consequently, autonomy supportive interventions have been developed in a wide variety of settings to support the adoption of exercise and its maintenance. Highlighting gains (what people have attained or avoided) has been proposed as a potential mechanism for exercise interventions, as gains have potential to boost the positive effects of motives, and weaken their negative effects (Ingledew, Markland, & Strömmer, 2014). The aim of the present study was to assess the effects of a gains focused intervention on autonomous and controlled motivations.

Types of Motivation

Motivation has become a cornerstone of understanding health behaviour (Ng et al., 2012). Certain types of motivation have been consistently linked with increased and long term physical activity whereas other types have been shown to only support it in the short term (Markland & Ingledew, 2007). Within the domain of exercise behaviour, SDT (Deci & Ryan, 1985; Deci & Ryan, 2000) offers insight into how different types of motivation can foster or impede adopting and maintaining physical activity. A basic principle of SDT is that a person can be both intrinsically and extrinsically motivated. Intrinsic motivation refers to engaging in an activity because you find it inherently pleasurable and satisfying. In contrast, extrinsic motivation pertains to participation in order to achieve some separable outcome, such as rewards or avoidance of an undesirable outcome (Ryan & Deci, 2000).

Within the framework of SDT, extrinsic motivation is conceptualized as comprising qualitatively different types of motivation with differing levels of relative autonomy. From least to most relatively autonomous, these types are: external regulation (“because people say I should”), introjected (“I feel guilty when I don’t”), identified (“I value the benefits of exercise”), and integrated regulation (“It’s a fundamental part of who I am”). Extrinsic and introjected regulation are classed within SDT as controlled forms of motivation. These controlled forms of extrinsic motivation may regulate short-term behaviour, but are generally not sufficient to maintain behaviour over time (e.g., Landry

& Solmon, 2004). Identified and integrated regulation are those where behaviour is self-endorsed; they are grouped together with intrinsic motivation to represent autonomous motivation (Deci & Ryan, 2000).

According to self-determination theory, how an activity is regulated depends on its potential to fulfil basic psychological needs. Specifically, SDT recognises three basic psychological needs; autonomy, competence and relatedness (Ryan, Williams, Patrick, & Deci, 2009). In the context of exercise behaviour, autonomy denotes being the causal agent of your decisions to exercise, and doing so in a way that is true to yourself. Relatedness refers to connecting with others in a meaningful way. Finally, competence pertains to developing and applying one's skills and experiencing mastery. The fulfilment of these needs is seen as leading to better psychological health and autonomous forms of motivation (Deci & Ryan, 2000).

Autonomous Regulation and Exercise Behaviour

Autonomous regulation has been shown to have a positive influence on exercise behaviour (e.g., Landry & Solmon, 2004; Mullan & Markland, 1997, Wilson, Rodgers, Blanchard, & Gessell, 2003; Wilson, Rodgers, & Fraser, 2002). A review by Teixeira, Carraça, Markland, Silva, and Ryan (2012) assessed 66 peer reviewed papers on the relations between SDT variables and physical activity. The review found consistent support for the relationship between autonomous regulation and exercise participation. In light of the potential of autonomous motivation to support the adoption and maintenance of exercise behaviour, SDT has been applied in intervention studies in a variety of settings (Fortier, Sweet, O'Sullivan, & Williams, 2007). For example, Silva and colleagues (2010) conducted a large scale randomised control trial with a 1-year intervention and a 2-year follow-up in overweight sedentary women. The intervention group received 30 SDT based sessions and a control group received 29 sessions of an informational course. The intervention group demonstrated higher autonomous motivation, as well as greater amounts of exercise and percent weight loss over time. Additionally, the intervention group reported higher fitness motives and psychological motives for exercise, which have been shown to predict autonomous motivation (Ingledew, Markland, & Ferguson, 2009). Ultimately, autonomous motivation was identified as the critical intermediate mechanism, predicting exercise at 2 years and weight loss at 3 years (Silva et al., 2011).

SDT based interventions have also involved exercise classes where the instruction style has been designed to support autonomous motivation and basic psychological needs. Edmunds, Ntoumanis, and Duda (2008) conducted a 10 week intervention on female

exercisers where an exercise class leader focused on acknowledging participants' feelings, providing information, opportunities for choice and informative feedback, and minimising pressure or demands. The control group received a standard style of exercise class teaching. The intervention increased autonomous regulation, relatedness and competence need satisfaction, and attendance. Moustaka, Vlachopoulos, Kabitsis and Theodorakis (2012) conducted a similar 8 week intervention on female exercisers, where an exercise class leader focused on providing a meaningful rationale for activities, acknowledging difficulties, minimising pressure and providing choice in music and exercises. A control group received instruction that did not provide a rationale for exercises or allow choices in activities and used pressuring language. The intervention group had higher autonomy and competence need satisfaction, autonomous motivation, as well as higher attendance compared to the control group.

Another approach to interventions has been to employ physical activity counselling. For example, Hsu, Buckworth, Focht, and O'Connell (2013) examined the effectiveness of an 8-week SDT intervention on increasing exercise participation in overweight women. The control group received supervised and individualised exercise training twice a week. In addition to receiving 30 minutes of supervised exercise training, the intervention group received weekly behaviour change focused group meetings the delivery of which was designed to support basic psychological needs. The intervention had a large effect (Cohen's $d > 0.8$) on weekly energy expenditure, and this expenditure continued to rise for the experimental group even after the intervention (to a 4 week follow-up). At the end of the intervention period, the experimental group showed increased autonomous motivation and decreased controlled motivation, which together consituted a large effect for increased relative autonomy. Midestvedt, Meland, and Eide (2008) assessed the effect of individual, autonomy supportive lifestyle counselling, compared to group counselling, on maintaining exercise participation over time in patients with coronary heart disease. The intervention group received two individual sessions during 4-8 weeks of rehabilitation and follow-up phone calls at 6 and 24 months. Although there was no effect of the intervention compared to the control condition, the results showed an overall improvement in exercise amount and physical capacity for all participants, and autonomous motivation was found to be associated with increased exercise amount and intensity.

Motivational interviewing (MI; Miller & Rollnick, 2013) is a counselling style that is recognised as a promising approach to supporting behaviour change and has been

described as closely aligned with SDT's core principles and philosophy (Markland, Ryan, Tobin, & Rollnick, 2005). Intervention studies applying MI to physical activity have generally shown a good compatibility with SDT, and the potential to support behaviour change (Rubak, Sandbæk, Lauritzen, & Christensen, 2005). For example, Gourlan, Sarrazin, and Trouilloud (2013) applied an SDT based intervention using MI with overweight adolescents. The intervention group received six sessions of MI in addition to a standard weight loss programme over a six month period, whereas the control group received the standard programme only, consisting of two 30 minute sessions at a hospital over three months. Compared to the control groups, the intervention group significantly decreased their BMI, and increased their amount of exercise, perceived autonomy support and autonomous motivation.

Health Promotion Potential of Gains

Overall, studies have shown that interventions designed to fulfil basic psychological needs and foster autonomous motivation show promise in supporting exercise behaviour change and its maintenance. Interventions have primarily focused on creating exercise climates that are designed to fulfil basic psychological needs, or provide forms of physical activity counselling designed to support readiness to change behaviour. A recent study has suggested that there is merit in considering exercise gains as a potential mechanism to help support autonomous motivation.

In contrast to motives, which are what people *seek* to attain or avoid, gains are what people perceive they *have* attained or avoided through engagement. The EMI-2 (Markland & Ingledew, 1997) differentiates between fourteen specific motives, which can be aggregated into appearance/weight, social engagement, health/fitness, and enjoyment components. Whereas people may have a variety of motives for taking up exercise, the most prominent initial motives have been shown to be appearance-related (Ingledew, Markland, & Medley, 1998). Different exercise motives have been argued to be more or less conducive to controlled or autonomous motivations (Markland & Ingledew, 2007; Ingledew & Markland, 2008). Consequently, through their effects on controlled or autonomous motivations, motives would have indirect effects on exercise behaviour itself (Ingledew, Markland, & Ferguson, 2009). Specifically, appearance/weight motives have been shown to increase external regulation, consequently having a negative effect on exercise participation. Conversely, health/fitness motives have been shown to increase identified regulation, thereby having a positive effect on exercise participation (Ingledew & Markland, 2008).

Recently, a measure of exercise gains was designed to complement the 14 motives in the EMI-2 (Markland & Ingledew, 1997). The two measures together were branded the Exercise Motives and Gains Inventory (EMGI; Strömmer, Ingledew, & Markland, 2012). Using the EMGI, gains have been shown to have the potential to attenuate the effects of appearance motives on controlled regulation, and augment the effects of positive health motives on autonomous regulation (Ingledew, Markland, & Strömmer, 2014). Gains have also been found to have effects in their own right (additive but not moderating effects). Specifically, challenge motive was shown to generate autonomous motivation regardless of gain, but challenge gain itself also generated autonomous regulation.

On the basis of these findings Ingledew and colleagues (2014) speculated that gains could be incorporated into the design of health behaviour interventions. Ingledew and colleagues proposed that by presenting a range of possible gains, it may be possible to draw people's attention to gains they had not consciously reflected upon, or potential gains they have not yet experienced, which in turn could highlight a range of possible motives for exercising. This may support the discovery of new motives that are more conducive to autonomous regulation. Overall, gains may lessen the effects of motives on controlled motivation, amplify the effects of motives on autonomous motivation, potentially have effects on autonomous motivation regardless of the presence of a motive, or they may simply encourage the discovery of new motives. Whichever the mechanism by which gains exert their effects, including gains in health promotion interventions may help support autonomous motivation on the whole.

Present Study

The aim of the current study was to examine the feasibility of supporting autonomous motivation by reflecting on gains. In a brief longitudinal design (6 weeks) participants were asked to reflect on their exercise related progress each week. The study examined differences between participants reflecting on gains (experimental group), and participants reflecting on the types of exercise they have done (control group). The main outcome variables were autonomous and controlled regulations which were compared between groups. It was expected that reflecting on gains would have effects above those of reflecting on other aspects of progress (type of activity). It was expected that reflecting on gains would increase autonomous motivation, and decrease controlled motivation. This would manifest as a significant difference between groups at follow-up where autonomous motivation is higher and controlled motivation lower in the intervention group, when baseline scores are controlled for.

Methods

Trial Design

The study was a parallel groups trial design with stratified (males and females) randomisation. The total duration of the study was 6 weeks, including 1 week baseline testing, 4 weeks intervention through e-mail contact, and 1 week follow-up testing.

Participants

Participants were adults aged 18 or over, currently doing little or no exercise, who were contactable by e-mail. Participants were recruited by advertising the study using leaflets, posters, emails, websites, and a community participant panel. Participants were recruited both within the university and in the wider local community (e.g., libraries and community centres). The study took place at Bangor University in Wales from May 2014 to September 2014.

Baseline Motivational Interviewing

Participants were asked to take part in a physical activity MI with the principal investigator. MI is defined as ". . . a collaborative, person-centred form of guiding to elicit and strengthen motivation for change." (Miller & Rollnick, 2009; p.137). MI was developed by Miller (1983) based on his experience in the treatment of problem drinkers. The sessions were consistent with MI as outlined by Miller and Rollnick (2013). The interviewer adhered to the "spirit" of MI, which is made up of three key elements: 1) collaboration between the therapist and the client, 2) evoking or drawing out the clients own ideas about change, and 3) emphasising the autonomy of the client. The interviewer adhered to the principles upon which MI was built: 1) expressing empathy, 2) supporting self-efficacy, 3) developing discrepancy between the participants' current state/behaviour and their values and future goals, and 4) rolling with resistance to change. In terms of practical skills and strategies, the researchers utilised OARS (open-ended questions, affirmations, reflective listening and summaries) throughout the session to elicit and support autonomous change talk (Deci & Ryan, 2012).

Numerous named behavioural therapies exist in the literature, some say as many as 550, with notable overlap in their core components (Breckon, 2014) and many studies employ physical activity counselling without clearly describing the features of their approach (Breckon, Johnston, & Hutchison, 2008). MI was adopted here as opposed to other, more goal directed approaches such as Solution Focused Brief Therapy, because the aim was not to ask participants to set goals or formulate action plans and if-then plans.

The approach was used to engage the participants in thinking about what the study was asking them to do over the following four weeks, where they were at with their physical activity and feelings about change at the time of interviewing, and how they felt about making any changes to the status quo.

The interviews were conducted in English and lasted around 30 minutes. The MI was a baseline experience for both groups, and not a distinguishing feature of the intervention itself. The purpose of this session was to build rapport with the participants and to cultivate motivation for engaging with the study. The principal investigator received 52 hours of formal training in this this technique over 8 separate sessions. The training was delivered by members of the Motivational Interviewing Network of Trainers and included supervised application of MI in role play and reviews of audio tapes. An example schedule for a session is attached in Appendix J. To monitor that the motivational interviewing was delivered in line with the proposed design (treatment fidelity; Bellg et al., 2004), sessions were audio recorded and reviewed by a second investigator using the Motivational Interviewing Supervision and Training Scale (Madson, Campbell, Barrett, Brondino, Melchert, 2005) Appendix K.

Intervention

Participants were asked to self-monitor their exercise experiences. Self-monitoring has been found to be an effective technique in supporting behaviour change (e.g. Dombrowski, Sniehotta, Avenell, & Coyne, 2007; Michie, Abraham, et al., 2009). Participants received weekly e-mails from the principal investigator during the 4 week intervention. The main body of the e-mail contained a standard text, and was the same for all participants. The two groups received a different question about progress in the body of the e-mail in plain text format (Appendix L).

The experimental group received an e-mail each week with a structured question about exercise gains. The body of the e-mail included a list of statements representing possible gains they may have made; the list included the option for ‘other’ to allow the inclusion of any additional gains participants may have experienced. Participants responded by indicating which statements applied to them by deleting ‘yes’ or ‘no’ as appropriate. Participants were also asked to elaborate on their choices by giving examples. The instructions were “What have you gained from exercising in the past week? Please consider the following list of possible gains and indicate whether they apply to you (by deleting ‘yes’ or ‘no’ as appropriate). For each of the gains that you have made, please give a specific example from your own experience in the last week”.

The control group received an e-mail each week asking about the type of activity they had done that week and were asked to provide details about the nature of the activity. "What kind of activity did you take part in? As well as naming the activity, please give as much detail as possible. For example, tell us whether it was a competitive activity, whether you did it alone or with other people etc." Participants responded by describing the types of exercise they had done.

Outcomes

Participants were asked to complete a printed baseline questionnaire. The questionnaire measured demographic information, amount of exercise, exercise motives, and behavioural regulation (in that order). After 4 weeks of e-mail intervention, participants were asked to complete a printed follow-up questionnaire asking about their motives for exercise, behavioural regulation, exercise amount, intention to exercise in the future, gains they made from exercising, and satisfaction with exercising (in that order). The participants' scores on behavioural regulation were combined to produce two outcome variables: controlled regulation, and autonomous regulation.

Measures

Order of measures. The following measures were used in this study. Measures are presented in the order that they appear in the questionnaires. Some measures (exercise motives, behavioural regulation, and amount of exercise) appear in both the baseline and follow-up questionnaire. In the follow-up questionnaire, measures were presented in an order that separated the gains from the motives, whilst feeling natural, and the amount of exercise section was placed after the motives section.

Demographics. Participants were asked to report their age in years and their gender as male/female or other, with space for them to describe their gender. Participants were asked to describe their ethnic background in their own words with the stem: "How would you describe your ethnic background?". Participants were asked to report their height in feet and inches or centimetres, and their weight in stones and pounds or kilograms. Finally, participants were asked about club membership using the stem: "Are you a member of any club, in order to participate in sport or recreational physical activity?" with a yes or no answer choice.

Exercise amount. Participants were asked 'During the past 7 days, how many times did you do each of the following types of exercise for at least 30 minutes?'. The three types were 'vigorous exercise, for example, running, jogging, squash, swimming lengths, aerobics, fast cycling, football', 'moderate exercise, for example, fast walking,

dancing, gentle swimming, golf, heavy housework, heavy gardening (e.g., digging)', and 'light exercise, for example, walking at an average pace, table tennis, light housework, light gardening (e.g., weeding)'. This item was taken from the Welsh Health Survey (National Assembly for Wales, 1999), and was previously used by Ingledew, Markland, & Strömmer, 2013 and Ingledew and Markland (2008). It is akin to the Leisure Time Exercise Questionnaire (Godin & Shephard, 1985). To produce a score for overall extent of exercise participation, the frequencies of vigorous, moderate and light exercise were weighted and then summed. The weightings were 9 for vigorous exercise, 5 for moderate, and 3 for light, based on typical metabolic equivalent ratings (Ainsworth et al., 2000). To avoid undue influence of outliers, the distribution of scores was winsorised: Six individuals with scores well in excess of 100 had their scores fixed at 100.

Motives for exercise. Participatory motives were measured using a shortened version of the EMI- 2 (Markland & Ingledew, 1997). The measure was shortened by comparing item-factor loadings across three data sets and assessing the items for how well they represented the scales. The three investigators then collaboratively selected two of the existing items that best represented each scale. The scales were Affiliation, Appearance, Challenge, Competition, Enjoyment, Health Pressures, Ill-Health Avoidance, Nimbleness, Positive Health, Revitalisation, Social Recognition, Strength and Endurance, Stress Management, and Weight Management. The stem was 'Personally, I exercise (or might exercise) ...'. Response options ranged from not at all true for me (0) to very true for me (4).

Behavioural regulation. Behavioural regulation was measured using the BREQ-2 (Markland & Tobin, 2004). The scales were Amotivation, External Regulation, Introjected Regulation, Identified Regulation, and Intrinsic Regulation. Each scale comprised three or four items. The BREQ-2 items were intermingled with the EMI-2 items, using the same stem and response options, as in previous research (e.g., Ingledew & Markland, 2008). Following common practice (e.g., Williams, Grow, Freedman, Ryan, & Deci, 1996), controlled regulation was computed as the mean of external and introjected regulation, and autonomous regulation was computed as the mean of identified and intrinsic regulation.

Exercise intention. Participants were asked 'On a scale from 0 to 10, how strongly do you intend to exercise regularly in the future?', with anchors of absolutely no intention and strongest possible intention.

Gains. Exercise gains were measured using the Gains section of the Exercise Motives and Gains Inventory (EMGI: Strömmer et al., 2012). Each gain item corresponds to an EMI-2 motive item (both measures contain the same scales). The stem was 'My personal experience of exercise has been that ...'. The response options ranged from not at all true for me (0) to very true for me (4). The order of the gain items was randomised so as to be different from that of the motive items. The gains measure was used at follow up to ensure ethical practice in that all participants reflected on their gains at some point in the study, as well as a manipulation check.

Satisfaction. Participants were asked 'Overall, on a scale from 0 to 10, how satisfied are you with your experience of exercise?', with anchors of not at all satisfied and completely satisfied.

Sample Size

The sample size required for this study was 50, with 25 per group. The necessary sample size for this study was originally calculated using the methods of Hopkins (2006), based on the two principal outcome variables. The sample size was designed to detect a large effect size (.91) based on a previous study with similar design and outcome variables (Hsu, Buckworth, Focht, & O'Connell, 2012). Power was specified at .80 based on previous studies using the same primary outcome measures (Farmanbar, Niknami, Hidarnia, & Lubans, 2011; Solberg, Halvari, & Ommundsen 2013). Sample size was further inflated by 21.95% to allow for drop-outs and to establish a number divisible by two. The recommended allowance for drop-outs is between 10-30% (Hopkins, 2006). In contrast, using more traditional approaches to power calculations for a regression with two predictors, $\alpha = 0.05$, and power specified at .80, the estimated total sample size required is 68 to detect a medium effect (f^2=.15), and 31 to detect a large effect (f^2=.35) (Cohen, 1988).

Randomisation

Participants were allocated to groups using stratified randomisation, where the stratification variable was sex. Stratified randomisation was achieved by performing a separate randomisation procedure for each subset of participants (i.e., males and females). Stratification was done in blocks of 10 to optimise the balance of males and females in each group. The principal investigator was blind to the size and nature of the blocking used until the end of the study. The randomisation sequence was programmed using JAVA programming language (Gosling, 2000). Randomised lists were generated and kept by a researcher not in contact with the participants. The principal investigator of

this study obtained the allocation of the participants after baseline contact in order to avoid the motivational interviews being affected by foreknowledge of treatment assignment. Couples were allocated together to ensure participant blindness to the study conditions and minimise their travel demands.

Blinding

The primary investigator was not blind to participant allocation because the study required sending personalised e-mails to participants (i.e., addressing them by name). Participants themselves were blind to the study design and their allocation.

Analyses

Missing data. To assess the nature of missing data, missing value analysis including little's missing completely at random (MCR) test were conducted separately for baseline items, follow-up items in completed follow-up questionnaires, and finally missing scales arising from incomplete follow-up questionnaires. The test showed that the missing values occurred completely at random for baseline items (p = .244), completed follow-up items (p = 1.00) and the scales (p = .313). There were only four missing data points for baseline variables and single imputation by expectation-maximisation was used to impute them from existing baseline variables (cf., Olinsky, Chen, & Harlow, 2003). There were also four missing data points for completed follow-up questionnaires; the same procedure was applied to impute missing follow-up items from existing follow-up items. To treat missing scales arising from incomplete follow up questionnaires, multiple imputation with 1000 iterations was used. Missing data were imputed using existing data from both baseline and follow-up measures. A total of 5 imputed data sets were created. Multiple imputation and subsequent analyses were conducted using SPSS version 22.

Group differences on baseline and demographic variables. Group differences at baseline were explored using independent t-tests for continuous variables and Pearson's chi-square test for categorical variables. Differences between individuals who completed the study and those who did not were also explored. Group differences in motivation were assessed separately for each motive scale. A Bonferroni correction was applied to control for familywise error; the criterion for significance was .003.

Effects of the intervention. To assess the effects of the intervention on autonomous and controlled motivation whilst controlling for their baseline values, two multiple regression analyses were conducted. The analyses were conducted such that the outcome score was regressed on a baseline score (covariate) and the grouping variable (Enders, 2010; Field, 2013; Croudace, Dunn, & Pickles, in press). These analyses are

functionally equivalent to analyses of covariance (ANCOVA). In the first regression analysis, follow-up autonomous motivation scores were regressed onto baseline autonomous motivation scores and the grouping variable. The same analysis was repeated for controlled motivation. The results are reported with means, standard deviations, intercorrelations, unstandardised regression coefficients (*B*), 95% confidence intervals, *t*-statistics and *p*-values.

Post-hoc analyses. Change in autonomous and controlled motivations from baseline to follow-up were separately assessed using paired *t*-tests. Differences between groups on satisfaction with exercise and intention to exercise in the future were assessed using independent t-tests.

Manipulation check. The intention of the intervention was to engage participants in reflecting on their gains. Those participants who saw a list of potential gains each week and reflected on their own experiences using that list could be expected to score differently on gains at follow-up, compared to those in the control group. If the intervention was successful, participants in the intervention group may have reinforced their perceptions of gains (higher ratings) by reflecting on them or highlighted more gains than they originally recognised (rating a wider variety of gains highly). As a manipulation check, follow-up gain scores of the control and intervention groups were compared using a *t*-test for each gain scale. A Bonferroni correction was applied to control for familywise error; the criterion for significance was .003.

Engagement with intervention. Descriptive statistics were obtained for participants' engagement with the intervention e-mails. These included overall response rate to e-mails, response rates per week, response rates per group, and average time it took for participants to respond. Participants' responses were also qualitatively assessed to determine whether participants reported additional gains to those available in the list of statements. The responses from participants in the intervention group were examined using content analysis (Holsti, 1969; Berg, 2008) by the primary researcher. Participants were asked to provide examples from their own experience of gains they made. The responses were classified by content into categories and these were used to determine the rate of compliance with the e-mails and the effects of the intervention.

Results

Losses and Exclusions

Overall, 48 participants completed follow up (81.4%) and 11 did not (19.6%). Participants were lost to follow-up because they did not respond to attempts to contact them, and ultimately did not complete the follow-up measures. To retain and optimise statistical power they were still included in the analysis; therefore the total sample size was 59. Results of complete case analyses are also reported for comparison. Only one participant in the control group asked to be removed from the participant list. Their data were excluded from the analysis.

Out of those who did not complete follow-up, 7 (63.6%) were female, 8 (72.7%) and were in the intervention group. There were no differences between those who completed the study and those who did not, on BMI, club membership, sex, or ethnicity. Non-completers were on average younger than completers ($t(57) = -1.65$, $p = .04$). Levene's test for the comparison of age was significant, therefore equal variances were not assumed in these results.

Baseline Demographic and Characteristics of Participants

Participants were between 20-68 years of age (M=31.64, SD=13.37). The average BMI was 24.71(SD 4.59). In the whole sample, 43 participants were female (72.9%), 16 participants were male. The majority of the sample (88.1%) described themselves as White. Of all the participants, 19 belonged to a club for the purpose of taking part in exercise or sport (32.2%). There were 30 participants in the intervention group and 29 participants in the control group. There were no differences between groups on demographic variables (Table 5). There were also no differences between groups on baseline variables (Table 6). Overall, results supported the effectiveness of the randomisation.

Table 5

Demographic Characteristics of the Intervention and Control Groups

	Control group (n = 29)	Intervention group (n = 30)	*p*
Age	33.45 (15.18)	29.90 (11.34)	.31
Sex (female)	22 (75.9%)	21 (70%)	.77
BMI	24.10 (4.37)	25.29 (4.79)	.33
Club Membership	9 (31%)	10 (33.3%)	1.00
Completed follow-up	26 (89.7%)	22 (73.3%)	.18
Ethnic origin:			.32
White European	20 (69%)	25 (83.3%)	
White other/unspecified	7 (24.1%)	0 (0%)	
Other	2 (6.9%)	3 (10%)	
Declined to say	0 (0%)	2 (6.7%)	

Note: Data are means (SD) or numbers (percentages). *p* = significance value for group differences assessed with independent samples t-tests for means and Person's chi-square test for percentages.

Table 6
Differences between the Intervention and Control Groups at Baseline.

	Control		Intervention				
Construct	*M*	*SD*	*M*	*SD*	*t*-statistic	*p*	ES
Total Exercise	31.50	24.58	25.98	18.00	-0.98	.331	-0.26
Exercise Motives							
Affiliation	1.21	1.16	1.71	1.34	1.54	.130	0.40
Appearance	2.86	1.16	3.00	0.90	0.51	.610	0.13
Challenge	1.84	1.05	2.16	1.12	1.11	.273	0.29
Competition	0.97	1.29	1.90	1.31	2.76	.008	0.72
Enjoyment	1.90	1.08	2.19	1.11	1.02	.310	0.27
Health Pressures	1.28	1.16	1.17	1.05	-0.38	.706	-0.10
Ill-Health Avoidance	3.16	0.84	2.87	0.80	-1.36	.180	-0.35
Nimbleness	2.41	1.15	2.62	0.92	0.75	.456	0.20
Positive Health	3.19	0.89	3.46	0.49	1.46	.151	0.38
Revitalization	2.10	1.10	2.45	0.92	1.32	.194	0.34
Social Recognition	1.19	1.13	1.21	1.01	0.09	.929	0.02
Strength and Endurance	2.69	1.16	2.58	0.86	-0.41	.680	-0.11
Stress Management	1.97	1.35	2.23	1.24	0.76	.449	0.20
Weight Management	2.78	1.34	2.99	1.22	0.64	.526	0.17
Exercise Self-Regulation							
Controlled Motivation	1.14	0.72	0.93	0.50	-1.322	.189	-0.35
Autonomous Motivation	2.09	0.94	2.36	0.82	1.17	.248	0.30

Note. ES denotes Cohen's d effect size.

Participant flow

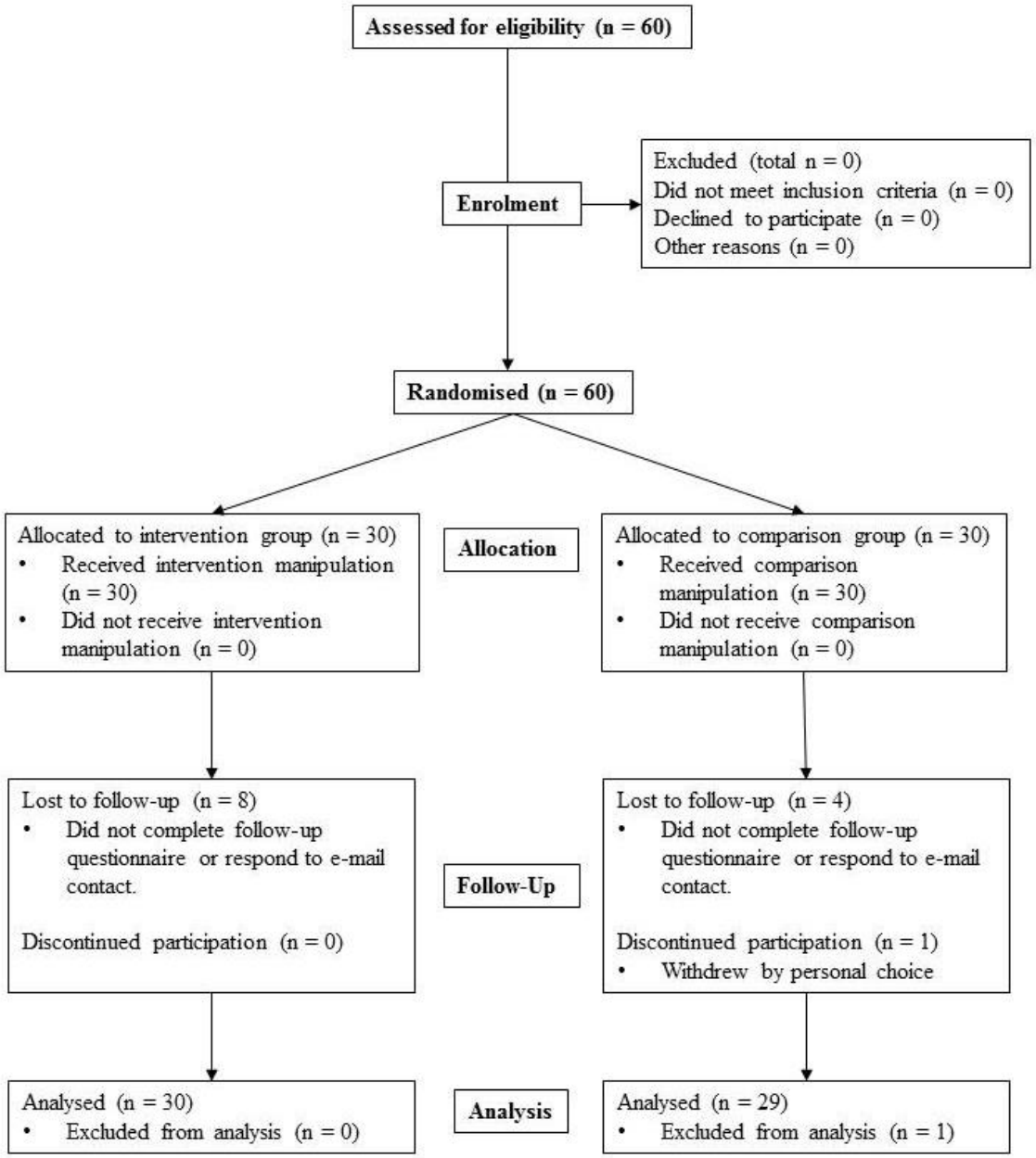

Figure 4. Flow of Participants through Each Stage of the Experiment.

Effect of Intervention

The intervention did not have a significant effect on controlled motivation. The estimated effect of treatment on controlled motivation was $b = .061$, $p = .68$. The means, standard deviations and intercorrelations related to the predictors of controlled motivation are presented in Table 7. The results of the regression analysis for controlled motivation are presented in Table 8.

Table 7
Means, Standard Deviations, and Intercorrelations for Controlled Motivation and Predictor Variables

Variable	*M*	SD	1	2
Controlled Motivation	.98	.59	-.001	.31*
Predictor Variable				
1. Intervention	-	-	-	-.17
2. Baseline Controlled Motivation	1.03	.62		-

*$p < .05$. **$p < .001$.

Table 8
Summary of Multiple Regression Analysis for Variables Predicting Controlled Motivation.

		95% CI			
Variable	*b*	Lower	Upper	*t*	*p*
Intervention	0.061	-0.23	0.36	0.41	.683
Baseline Controlled Motivation	0.295	0.04	0.55	2.29	.023

Note: CI = Confidence Interval for *b.*

Similarly, the intervention was not found to have an effect on autonomous motivation. The estimated effect of treatment on autonomous motivation was $b = .131$, $p = .37$. The means, standard deviations and intercorrelations related to the predictors of autonomous motivation are presented in Table 9. The results of the regression analysis for controlled motivation are presented in Table 10. For comparison, complete cases were analysed and they provided comparable results; the intervention did not have significant effects on controlled ($b = -.006$, $p = .97$) or autonomous ($b = .104$, $p = 51$) motivation.

Table 9
Means, Standard Deviations, and Intercorrelations for Autonomous Motivation and Predictor Variables

Variable	*M*	SD	1	2
Autonomous Motivation	2.47	.75	.19	.70**
Predictor Variable				
1. Intervention	-	-	-	.15
2. Baseline Autonomous Motivation	2.23	.88		-

*$p < .05$. **$p < .001$.

Table 10
Summary of Multiple Regression Analysis for Variables Predicting Autonomous Motivation.

Variable	*b*	95% CI Lower	95% CI Upper	*t*	*p*
Intervention	0.131	-0.15	0.42	0.90	.368
Baseline Autonomous Motivation	0.581	0.42	0.74	7.09	.000

Note: CI = Confidence Interval for *b.*

Post-hoc Analyses

The effect of time was explored as a post-hoc analysis. Autonomous motivation significantly increased from baseline (M=2.23, SD=0.88) to follow-up (M=2.46, SD=0.76) across groups $t(58) = 2.625$, $p = .009$. The results represented a small effect $d = .28$. Controlled regulation decreased slightly from baseline (M=1.03, SD=0.62) to follow-up (M=0.98, SD=0.58) across groups, where the effect size was $d = -.09$ (Table 11). A complete-case analysis provided comparable results of a significant increase in autonomous motivation $t(47) = 2.464$, $p = .017$, but no change in controlled motivation.

Differences between the intervention and control group on intention to exercise in the future and overall satisfaction with exercise were assessed (Table 12). The groups did not significantly differ on intention to exercise in the future. The control group was significantly more satisfied with their experience of exercise in the past month $t(57) = -2.443$, $p = .016$. The results represented a medium effect $d = -.64$. A complete-case analysis provided comparable results; groups did not differ on intention, but control group reported significantly higher satisfaction with exercise $t(46) = -2.752$, $p = .008$, $d = -.79$.

Table 11
Main Effect of Time: Change in Motivation from Baseline to Follow-Up across Groups.

Construct	Baseline *M*	Baseline *SD*	Follow-Up *M*	Follow-Up *SD*	*t*	*p*	ES
Controlled Motivation	1.03	0.62	0.98	0.58	-0.57	.572	-0.09
Autonomous Motivation	2.23	0.88	2.46	0.76	2.63	.009	0.28

Note. ES denotes Cohen's d effect size.

Manipulation Check

As a manipulation check, differences between the intervention and control group on gains were assessed. The groups did not significantly differ on any gains (Table 12). The highest average gain was for positive health, for the intervention group (M=2.90, SD=.76) as well as the control group (M=3.02, SD=.74). The lowest average gain was

social recognition, with (M=.99, SD=.93) and (M=.94, SD=1.14) for intervention and control groups respectively. Similar results were provided by a complete-case analysis.

Table 12
Differences between the Intervention and Control Groups on Gain, Intention and Satisfaction.

	Control		Intervention				
Gain Construct	*M*	*SD*	*M*	*SD*	*t*	*p*	ES
Affiliation	2.08	1.51	2.01	1.39	-.18	.855	-0.05
Appearance	2.28	1.04	2.32	0.95	.17	.862	0.05
Challenge	2.15	1.17	2.31	1.11	.53	.595	0.14
Competition	1.14	1.27	1.38	1.16	.76	.447	0.20
Enjoyment	2.66	1.05	2.88	0.95	.83	.408	0.22
Health Pressures	1.12	1.18	1.03	0.92	-.34	.732	-0.09
Ill-Health Avoidance	1.96	1.05	2.26	1.03	1.10	.272	0.28
Nimbleness	2.29	1.10	2.01	1.01	-1.00	.319	-0.26
Positive Health	3.02	0.74	2.90	0.76	-.64	.525	-0.16
Revitalization	2.40	1.03	2.58	1.05	.67	.506	0.18
Social Recognition	0.94	1.14	0.99	0.93	.18	.860	0.05
Strength and Endurance	2.53	1.12	2.60	1.00	.25	.806	0.06
Stress Management	2.55	1.14	2.51	1.13	-.13	.898	-0.03
Weight Management	2.54	1.11	2.73	1.03	.69	.494	0.18
Intention	7.72	1.70	8.07	1.89	.78	.433	0.19
Satisfaction	6.83	1.85	5.55	2.14	-2.44	.016	-0.64

Note. ES denotes Cohen's *d* effect size.

Responses to E-mails

The response rate was high over all. Response rates were highest in the first week (98.3%), with a slight decline in weeks 2 (89.8%) and 3 (76.3%). A total of 51 (86.4%) participants responded to the intervention e-mail in the final week. Out of all the participants 67.8% (N=40) responded to all four e-mails and 88.1% (52) responded to at least three e-mails. Response rates were similar in both groups, with 86.7% of participants in the intervention group and 89.7 % of participants in the control group responding to at least three e-mails. The average response rate to e-mails was 2.71 days with a standard deviation of 3.29.

Eight categories were identified based on the content of the examples of gains provided by the participants. Most common responses (36%) were ones that identified

and described experiencing a gain, for example “afterwards when I have a sense of achievement and endorphins” (Participant 12, Week 1), these were categorized as Gain responses. Responses that described a gain together with the activity experience, for example “Yoga maintained my flexibility” (Participant 17, Week 3) were categorized as Activity and Gain responses. Some examples focused on reasons as to why the gain was not experienced, for example “Since I was only walking I don't think my exercising led to building up my strength” (Participant 16, Week 1), these were categorized as Reason for No Gain responses. Other examples outlined gains that related to the item, but were not attributed to exercise, for example “I felt quite stressed so I watched a film with friends” (Participant 34, Week 1); these were categorized as Other Gain responses. Responses in the Activity Only category describe only the activity the participant did, without relating it further to any potential gain experience, for example “Walking”(Participant 6, Week 1). Responses in the No Gain category were statements about how the gain was not experienced, for example “I do not feel like I have made any accomplishments”(Participant 17, Week 1). Some examples acknowledged a gain, but expressed some limitations to it, for example “[flexibility]'s been maintained but I haven't improved it.”(Participant 14, Week 2); these were classed as Limited Gain responses. Finally, 5% of responses were unclear, for example “difficult to say”(Participant 27, Week 2). The frequency of each of the different response types are presented in Figure 2. Overall, the majority of the responses described exercise gains with or without reference to a specific activity. The most common lack of gain response was providing a reason as to why the gain was not experienced, or why activity did not take place.

Overall, responses to the intervention items had appropriate content. Only two responses related to the offered “other” category, one explanation offered the additional gain of personal accomplishment (“finally broke through the barrier of avoiding exercise!”) and the other provided an unclear explanation (“made a contact for a potential client for work”) without further relating it to exercise gains.

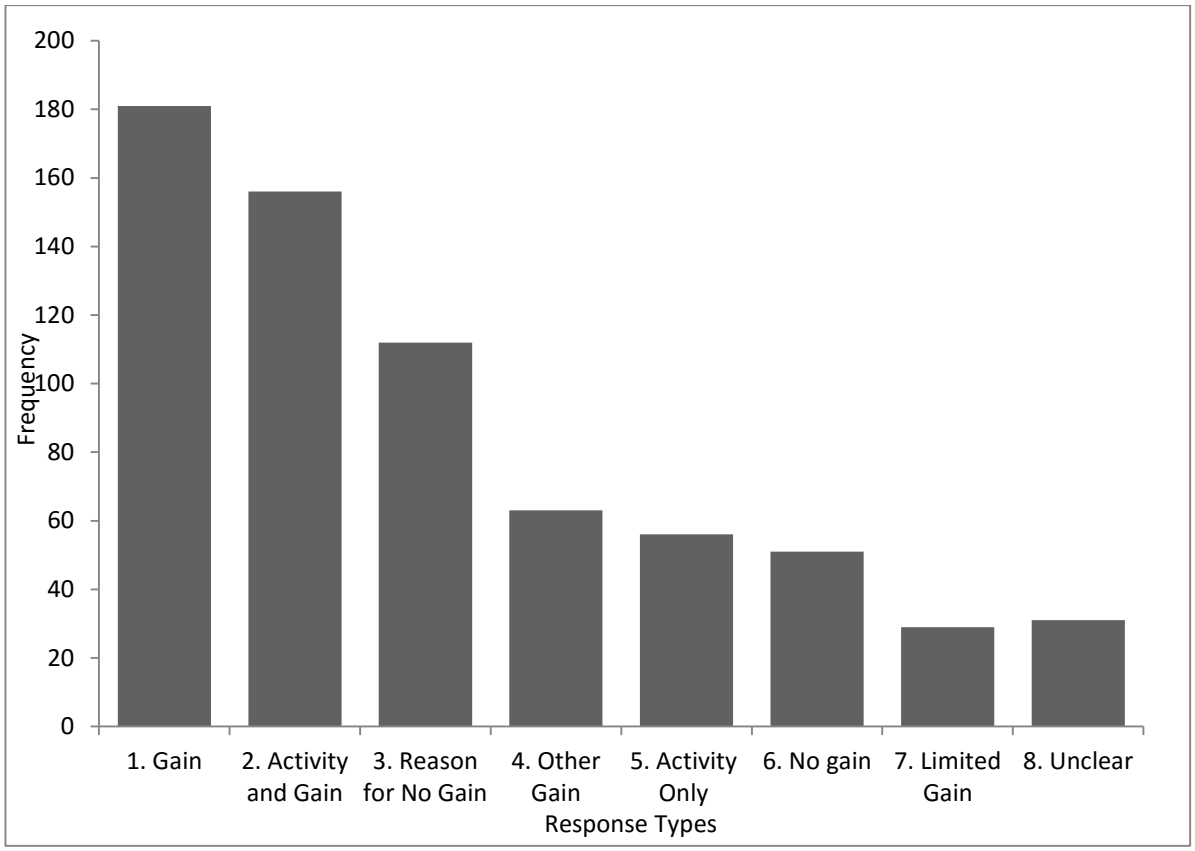

Figure 5. Frequency of response types.

Discussion

Findings

The aim of the current study was to examine the feasibility of supporting autonomous motivation by reflecting on gains. The study compared an e-mail mediated intervention asking participants to reflect on exercise gains to a control group who reflected on the type of exercise they did. Autonomous motivation increased significantly from baseline to follow-up in both groups. No between group differences were found for either controlled or autonomous motivation when their baseline values were controlled for. There were no differences in drop-out rates between groups, and participants who did not complete follow-up were included in the analysis by imputing missing data. A manipulation check demonstrated that both groups reported gains, some gains being rated higher than others in a similar pattern across groups. The rate of compliance with e-mails was generally high. A content analysis of participant responses to intervention e-mails revealed that examples of gain experiences were primarily appropriate in content, suggesting that participants understood what they were being asked to do. The results suggest that both groups experienced some benefits from the study, as demonstrated by

the significant increase in autonomous motivation from baseline to follow-up. The results from the manipulation check suggest that gains were experienced similarly by both groups. The control group reported being more satisfied with their experience of exercise over the past month compared to the intervention group. The groups did not differ on their intention to exercise in the future

Methodological Considerations for the Results

The lack of effect of the intervention above that of the control group will be explored by examining internal, external, construct validity, and statistical conclusion validity, as outlined by Shadish, Cook and Campbell (2001).

Internal validity concerns the proposition that the independent variable of an experimental design, in this case the intervention, is truly the cause of the observed effect. In the context of this study, the proposition would be that the intervention did not produce an effect on autonomous or controlled motivation. It may be that the intervention itself was simply not sufficient to produce an increase in autonomous motivation or reduction in controlled motivation of the experimental group, over that of any change in motivation in the control group.

Other factors that may have contributed to these findings are participants' personal life events that occur during the study (history). The study took place from May to August, covering periods of university exams, balancing work and family when children are not in school, as well as summer holidays and trips. This may have affected their ability to fully engage with the study. On the other hand, it may be that participants across groups had more opportunities and reasons to exercise over the summer, which may have had a positive influence on activity experiences and motivation. It is also possible that baseline procedures in some way affected follow-up scores (testing). Both groups attended a short session of MI at the beginning of the study. The intention was to discuss participants' feelings about exercising and their readiness to engage with the study. MI is acknowledged to be conducive to autonomous motivation (Markland, Ryan, Tobin, & Rollnick, 2005), and may in its own right have raised autonomous motivation during the following weeks for both groups. It is unlikely that the internal validity of the study was jeopardised by baseline and follow-up conditions not being comparable. Both baseline and follow-up meetings were conducted by the same investigator, in the same facilities, using the same procedures. Finally, the groups were assessed for differences at baseline, as well as differences in drop-out rates, and were found to be homogenous; therefore, it is unlikely that internal validity was affected by a selection bias or experimental mortality.

Construct validity relates to whether scores and data actually represent their intended constructs. The constructs that represent motives and gains in the study at hand (i.e., the EMGI) have been developed with a sound theoretical basis. The study may have been affected by treatment diffusion, where the study conditions are not as clearly distinct as they are thought to be. Both groups were reflecting on the activity they had done. The control group may have been reflecting on gains despite not being prompted to do so, and the experimental group may have reflected on many aspects of their experience, not just the gains. Recent research suggests that activating positive memories of exercise episodes is conducive to higher levels of exercise (Biondolillo & Pillemer, 2014). It is possible that reflecting on past experiences of exercise in general can also be supportive of autonomous motivation, and this could explain why both groups benefitted from the intervention in the same manner. The study uses only self-report measures, which may not adequately represent participants' true feelings and appraisals of their experiences. Written items are also subject to a participant's interpretation of them, and reflect what the participant understands as relevant to that item. For example, competing may for one person represent friendly competition, but to another, only represent formal competition that requires training and preparation.

External Validity relates to the extent to which the results can be generalised to other situations and populations. External validity may be affected by the influence of baseline testing on a participant's responsiveness to follow-up outcome variables. It may be that the findings reflect effects of baseline motivational interviewing, which may have in itself fostered autonomous motivation in both groups during the study. Finally, the generalizability of the findings may have been affected by the experimental setting. Participants attended baseline and follow-up sessions at a university testing facility, and the intervention involved them reporting back to the investigator by e-mail. It may be that participants were aware of the presence of the investigator at the baseline and follow-up, and also comply with reflecting on their experiences differently knowing that someone is expecting to receive their e-mail.

Finally, statistical conclusion validity requires examination of the statistical procedures and assumptions used. The two fundamental errors are finding a difference or relationship where there is none (type I error), or not finding a difference or relationship where they exist (type II error). The study at hand may have been affected by low statistical power, which denotes a higher probability of concluding that there is no effect when there actually is. Specifically, the sample size was calculated based on detecting a

large effect size, but this effect size may have been a liberal estimate. If the effect size of interest was in fact small or even medium, the sample size of the study would have been insufficient to correctly detect it. In general, a greater heterogeneity of participants can also impact interpretation of results. The study may have been affected by a wide age range in the group; participants may have been in very different life stages and situations which may have obscured the effect of the intervention.

Limitations of the Study

It is worth noting that the study could be improved upon in various ways in future research. Firstly, the duration of the study was only 6 weeks, and the intervention itself (e-mails) only lasted 4 weeks. This is a relatively short time to change behaviour and even though some motivational changes were observed in both groups, long term processes and impact should be assessed with longer studies. Secondly, the study relied entirely on self-report, which may have had implications on the study findings. Future studies should explore the potential for using gains in interventions where compliance and outcomes involve also objective assessment. Finally, other limitations of this study that should be mentioned relate to the study sample. The study sample was primarily made up of university students, although some people in full time employment also took part. The study sample did not include clinical populations, or clinical risk groups. The findings of this study therefore may not represent processes in the wider population, or in populations who may be most in need of exercise behaviour change interventions. Therefore it is suggested that future intervention studies explore effective ways of utilising gains to support exercise behaviour change in the abovementioned populations to optimise the utility of their findings for clinical practice.

Theoretical and Applied Implications

Overall, both groups demonstrated a similar increase in autonomous motivation. Even though the control group was not explicitly asked to reflect on exercise gains, they were in effect reflecting on their exercise experiences, which in themselves can be motivating. An alternative or perhaps additional consideration is that both groups received motivational interviewing at baseline, which may have in itself affected their readiness for exercising, openness for reflecting on it, and being more autonomously motivated to exercise. The findings suggest that motivational interviewing and reflecting on exercise experiences over time can foster autonomous motivation. The control group reported higher satisfaction with their experience of exercise over the past month compared to the experimental group. This was surprising and may reflect differences in how participants

were asked to reflect on their activities. Participants in the control group were allowed to reflect more freely on their activities, and may have naturally thought about primarily positive aspects of their exercise experiences. Conversely, participants in the intervention group were asked specifically to reflect on a list of possible gains. This may have led them to reflect on how their experience had *not* provided some gains, which may in fact represent a shortcoming for their activity, and thus decrease satisfaction with that activity. It is worth noting that this can also be interpreted as an increase in the dissatisfaction with exercise in the intervention group, reflecting a potential harmful effect of the reflection methods chosen for this study. This suggests the need for some refinement in thinking about how best to approach reflecting on gains in order to optimize satisfaction with activity and supporting autonomous motivation. Previous research suggests that autonomous motivation in itself fosters satisfaction (Ingledew, Markland, & Strömmer, 2014).

The current study also suggests that the effect of reflecting on gains is comparable, though not superior, to reflecting on exercise experiences in general in terms of supporting autonomous motivation, though this effect was not assessed against a no-treatment group. Further research is required to investigate the individual role of each of the factors at play. For example, it is important to investigate whether reflecting on exercise experiences has similar effects when not preceded by motivational interviewing and vice versa. By assessing the study conditions in the absence of motivational interviewing, it would also be possible to better understand the differences between reflecting on exercise experiences in general and reflecting on exercise gains specifically. The findings here call for further investigation of this potential, whether it works best in a supportive role in conjunction with other techniques, or has merit on its own.

Chapter 5:
General Discussion

Thesis Aims and Purpose

Theoretical models of behaviour change consider various determinants of adopting exercise, stages which people move through from not even thinking about exercising, to maintaining changes they have made over time, and maintain that more autonomous forms of motivation sustain behaviour better than more controlled forms. There is still limited knowledge about how a person moves through the stages of change, develops more autonomous forms of motivation, or boosts the determinants that underlie behaviour change efforts. The existing methods for supporting behaviour change are largely based on resource heavy support from practitioners through various forms of physical activity counselling. The current work suggests that there are additional features that may influence behaviour change process that have received little attention: gains. Gains relate to various outcomes of engaging in a behaviour, sometimes but not necessarily related to the ultimate goal that a person has for that behaviour. The thesis of this work is that gains are constructs that we are conscious of, but perhaps are not paying attention to enough, both as researchers and as goal striving individuals. The aim of the research presented in this thesis was to explore the nature and role of gains alone and in relation to motives in exercise behaviour. The work presented developed a measure of motives and gains, explored lived experiences of motives and gains to gain insight into the type of processes that underlie exercise participation, and finally, assessed the feasibility of utilising gains in an intervention to promote autonomous motivation for exercise. The studies have extended existing health behaviour literature on motives and demonstrated that gains merit being researched alongside motives. The following section summarises the chapters presented in this thesis, particularly with regards to their findings and limitations.

Summary of Thesis Studies and Their Findings

The qualitative study (Chapter 2) explored people's personal experiences of exercise participation with particular regard to their motives and what they did or did not gain from it. Data were collected by semi-structured interviews with 20 adults who ranged in age and occupation from students to individuals in retirement, and in activity levels from predominantly inactive to very active. Four main themes emerged from this qualitative inquiry. The theme of Multiplicity illustrated that maintaining exercise behaviour was linked to a variety of motives and gains, whereas inactivity was characterised by a narrow range of motives and gains. The theme of Instrumentality denoted that disengagement was linked to motives and gains that were instrumental in

nature (e.g., to lose weight), whereas for primarily active people, exercise was more experiential (e.g., to enjoy nature). The theme of Quality of Past Gain Experiences demonstrated that participants with past experiences that consistently provided welcomed gains described enjoying activities and currently being active, whereas participants with limited, or negative, past experiences described barriers to activity and expressed a pessimistic outlook for being active in the future. Finally, the theme of Gains as Motivators revealed that gains themselves can be motivating; people naturally seek them out and appreciate them. Overall, the findings suggest that experiencing gains play an important role in continued exercise engagement and may give rise to new motives.

The psychometric study (Chapter 3) developed a measure of gains to supplement an existing measure of motives (EMGI). Using this measure, data were collected from 196 young adults and exploratory structural equation analyses were conducted to assess the psychometric properties of the EMGI. The study showed that people seem generally able to distinguish between their motives and gains. Motives and gains were positively associated but discriminated from each other, although further assessment of discriminant validity should be conducted in future research and the true test of the scales will be whether they have differential predictive capabilities in practice. The positive associations between motives and gains were proposed to reflect two possible causal relationships; that people who strive for something are more likely to attain it, and to notice if they do attain it, or that people happen to make gains and appreciate them, and subsequently begin to seek them, whereby the gains become motives. Motives and gains were shown to have slightly different higher order structures. From motive to gain, appearance switched its association from weight management to health and fitness. This was proposed to reflect a shift in body image, where appearance motives denote a body image investment, whereas appearance gain represents body image appraisal. Finally, mean within-person differences were observed, which was proposed to reflect that some gains may be easier to actually attain, or easier to perceive, or both. Ultimately, the comparison demonstrated that in some instances, individuals gained less than they wanted, and in others, they gained roughly what they wanted, or even more than they wanted. One limitation of the work presented here related to the discriminant validity of the EMGI motive and gain scales, which was less than ideal for seven out of fourteen scales. It is also important to note that the participants for the development of the EMGI were primarily students, which may have affected some of the findings (e.g., low factor loadings for items that did not apply well to a young population).

Finally, the intervention study (Chapter 4) examined the feasibility of supporting autonomous motivation by reflecting on gains on a weekly basis for 4 weeks. Participants were adults between 20-68 years of age, and were asked to respond to weekly e-mails asking about their exercise experiences that week. The experimental group received a structured question about exercise gains, whereas the control group was asked about the type of activity they had done that week and were asked to provide details about the nature of the activity. Autonomous motivation increased significantly from baseline to follow-up in both groups. No effects of the intervention were found for either controlled or autonomous motivation when baseline scores were controlled for. It was proposed that having a no-treatment control group may have helped to elucidate these results. Even though the control group was not explicitly asked to reflect on exercise gains, they were in effect reflecting on their exercise experiences, which in itself could have been motivating. The study also found that the control group reported higher satisfaction with their exercise experiences over the course of the study compared to the experimental group. This was suggested to potentially reflect the different formats in which participants reflected on their experiences in the study. Overall, the study demonstrated that reflecting on gains was comparable though not superior to reflecting on exercise experiences as a means to support autonomous motivation. The study highlights the need for better understanding of gains and their role in exercise participation. It is important to acknowledge some limitations in the design of the intervention study, which saw the similarity between conditions to be problematic in determining the usefulness of reflecting on gains. The timespan of the study was also relatively short, and future research could assess whether these effects are the same over a longer time span. Additionally, the inclusion of motivational interviewing as a baseline procedure, through likely being useful in itself in increasing autonomous motivation, may have blurred the contribution of the gain reflections on outcome variables.

The work in this thesis serves as initial steps in exploring the role of gains in exercise behaviour. A measure of exercise gains has been developed that can be utilised in future research. It has been applied in some recent research (Ingledew, Markland, & Strömmer, 2014) and a shortened version was used in Chapter 4 of this thesis. For the qualitative study and the intervention study, efforts were made to ensure the sample was representative of a broader population and was not exclusively made up of students. It should be mentioned that even with advertising outside of the university, recruitment within a university town meant that many participants were students, or had previous

experience in taking part in research conducted at the university. As preliminary studies, the work presented here yield interesting results which are worthy of replication in future research, but the generalisability of the current findings must be interpreted with caution.

The Role of Gains in Relation to Existing Theoretical Frameworks

The work presented in this thesis has some implications regarding the role of gains in relation to existing theoretical frameworks. A wide variety of theories are described in the literature, in a recent review, Michie et al (2014) identified 83 theories aimed at understanding and supporting health behaviour change with considerable overlap in the determinants the theories describe. The following section will examine what the potential role of gains might be in relation to the four most prominent theories utilized within the physical activity domain: SDT and its sub-theories (Deci & Ryan, 1985, 2000), TTM (Prochaska, DiClemente, 1984), SCT (Bandura, 1998; 2004) and TPB (Ajzen, 1991). Additionally, the concept of gains will be considered in relation to the regulatory focus theory (RFT: Higgins, 2000; 2005) and the functionalist theory of motivation (e.g., Clary et al., 1998; Snyder, 2009; Snyder & Cantor, 1998).

Self-determination theory. According to the goal contents theory within SDT (Deci & Ryan, 1985), some of the goals people pursue are more likely to promote wellbeing than other goals (Vansteenkiste, Lens, & Deci, 2006). Particularly, some goal contents (motives) foster autonomous motivation (e.g., personal growth and affiliation), whereas others give rise to more controlled motivation (e.g., accumulating wealth). Within the domain of exercise participation, motives such as appearance and weight management have been shown to be conducive to controlled motivation, whereas others such as personal challenge and social affiliation foster autonomous motivation (Ingledew & Markland, 2008). The research presented in the intervention study (Chapter 4), suggests that gains may have the potential to support autonomous motivation. More recently, Ingledew, Markland and Strömmer (2014) also demonstrated the potential for gains to moderate the effects of motives on behavioural regulation. As outlined in the introduction, appearance motive increased controlled regulation, unless appearance gain was high, whereas positive health motive increased autonomous regulation, provided positive health gain was high. Gains were also found to have effects in their own right, such that both challenge motive and gain supported autonomous motivation but gain did not moderate the effects of challenge motive. The findings from the psychometric study (Chapter 3) also support the findings of Ingledew and colleagues (2014) in that motives and gains are correlated. It has been proposed that this close relationship reflects a

dynamic where either people who seek something are more likely to get it, or that when people get something and appreciate it, they are more likely to seek it in the future. Additionally, the qualitative study (Chapter 2) found that having a variety of motives and experiencing a variety of gains were prominent in the accounts of those participants who exercise regularly and have done so throughout their life. It could be speculated that having a variety of motives and experiencing a variety of gains may together provide the most beneficial environment for fostering autonomous motivation, as the effects of controlled motives are weakened whilst the effects of autonomous motives are strengthened by the experienced gains. Overall, the current research evidence related to gains indicates that the goal contents theory provides a limited understanding of the mechanisms which govern motivation. Motives only provide a part of the whole, and it is only by considering gains that a fuller picture of what determines motivation for behaviour can be achieved. Together with recent findings from Ingledew and colleagues (2014), the current research evidence about gains suggests that gains can have an overall positive effect on autonomous motivation through weakening the effects of some motives on controlled regulation, and augmenting the effects of other motives, as well as having effects in their own right.

The SDT hierarchy of motives proposes that dispositional motives (life goals) influence participatory motives (domain specific goals), which in turn give rise to regulatory motives (i.e. autonomous or controlled motivation) (Ingledew et al., 2009). Based on the correlations between motives and gains, it seems plausible that there may be a causal relationship where having a motive leads to seeking the gain and noticing it when it occurs, or experiencing a gain leads to appreciating it and seeking it out in the future. Having dispositional motives will lead people to seek out gains related to them (i.e., fulfilling those motives). It is therefore also logical that gains have effects at each level of the hierarchy, and should potentially be considered in the theoretical outline of that hierarchy. If gains related to domain specific motives can alter the effects of those motives on motivation, then it can be speculated that gains may also play a role in the relationship between dispositional motives and participatory motives. Perhaps fulfilling motives or experiencing gains at the life goal level may reinforce similar motives pertaining to particular activities. For example, if a person fulfils their dispositional motives for relationships, then perhaps this reinforces the affiliation motives they have for particular behaviours. Additionally, if a person makes unsought gains at the

dispositional level, they may develop new motives which are then reflected at the level of domain specific behaviours.

Speculation about the potential influences of gains on the currently suggested relationships in the hierarchy also raises the question about a potential trickle-down effect. Is it possible for gains higher up in the hierarchy to affect goals and motives at lower levels? For example, a person begins exercising to lose weight and attends a Zumba class. Over time the person may notice that they have connected with a friendly community of Zumba goers, and perhaps also feel more agile and healthy as a result of the exercise. It seems reasonable that these things would become new reasons for this person to continue the activity. It is not unreasonable to speculate that these gains might also be fulfilling related life goals such as health, relationships and community. Discoveries in the form of unsought gains at the domain specific level may also highlight the importance of motives at both levels that may not have been as valued before.

It is worth noting that there is some conflicting research evidence related to the effects of motive fulfilment at different levels of the hierarchy. Niemic and colleagues (2009) examined life goals, or dispositional motive fulfilment, and suggested that the effects of dispositional gains are only beneficial to wellbeing if they are fulfilling autonomous motives. At the level of participatory motives, Ingledew and colleagues (2014) suggested that gains have the potential to moderate the effects of some motives, augmenting the effect of positive health motive on autonomous regulation, and weakening the effects of appearance motive on controlled regulation. Gains can also have effects in their own right, where both challenge motive and gain independently increased autonomous regulation. Gains do not diminish the effects of motives, as affiliation motive increased autonomous motivation regardless of gain and the gain itself did not affect autonomous motivation. Overall, it is likely that gains will exert effects at each level of the hierarchy; it is still unclear whether gains exert similar effects at each level (overall improving the effects of motives), or whether their effects may be different at different levels.

Currently, SDT postulates that it is possible for people to go through a process of internalization of values and shift their motivation from more controlled forms toward more autonomous forms (Deci & Ryan, 1985). There is limited information on the exact mechanisms by which this process works. The current understanding is that what needs to take place is identifying personal importance in the activity, self-reflection, and

bringing the values associated with an activity into agreement with a person's own values and needs (Ryan & Deci, 2000).

The transtheoretical model. Organismic integration theory (OIT; Deci & Ryan, 1985) has been mapped onto the stages of change of TTM (Prochaska, DiClemente, & Norcross, 1992) in the existing literature (e.g., Mullan & Markland, 1997; Landry & Solomon, 2004). This mapping pertains primarily to a linear path from pre-contemplation to maintenance of behaviour and suggests that more controlled forms of motivation dominate at the early stages, whereas more autonomous motivation supports maintenance. The current understanding of gains, based on the findings presented in this thesis and related recent literature (Ingledew et al. 2014), suggests that gains may play a role in the process by which people develop their behavioural regulation from more controlled to more autonomous forms. The findings from the qualitative study (Chapter 2) echo existing research related to TTM in that those who exercise very little have a limited range of motives that are usually more controlled (Ingledew, Markland, & Medley, 1998). Conversely those who are primarily active and identify as having exercised for most of their life describe a wider variety of motives and gains, and their motives are mixed but primarily autonomous.

The relationship between motives and gains could suggest that gains play a role in this shift over time. There are two ways in which gains might do this. One way is by fulfilling motives, where the overall effect on autonomous motivation is positive. Alternatively, or perhaps additionally, it could be speculated that gains are a potential mechanism by which people develop new motives altogether. If a person experiences a gain and appreciates it, they are likely to seek it out in the future. In so doing gains foster the process of internalization and integration of values as the activity itself may become more important to the person as it gives them something they value.

The TTM also encompasses processes of change, which denote means of supporting progression through the different stages of change. Gains present a potential mechanism by which some of these means work, and could be utilised in understanding progression through the stages in more detail. For example, experiencing specific gains for a behaviour (e.g., going for a walk with a friend) could help individuals to create emotional experiences associated with change (had an enjoyable walk with friend, good conversation, felt refreshed), assess their self-image and fostering the belief that they can change (The walk was relaxing and revitalising and enjoyed time with friend, could see

yourself doing that more often), commitment to that belief (I want to experience those things again so will arrange to go on another walk).

Although the main focus in the literature is predominantly the journey from precontemplation to maintenance (Buchan, Ollis, Thomas, & Baker, 2012) and how motivation changes during that transition, the stages of change model has a cyclical element to it, where it is recognised that relapse is a common occurrence and that several attempts at change are likely before maintenance is reached (Marcus & Forsyth, 2003). Perhaps then the motivational processes being mapped onto the stages of change should accommodate for this cyclical format of the model. Gains may help in progressing through the earlier stages of the model after a relapse. Recalling gains from previous attempts at change may encourage seeking those gains again, and thus boost the associated motives and potentially increase autonomous motivation for the change.

Social cognitive theories. Many behaviour change theories such as TPB (e.g., Ajzen, 1991), SCT (e.g., Bandura, 1998; 2004) are linear in nature and pertain to the psychological determinants of behaviour. Cognitive theories recognise antecedents of behaviour and a process by which those determinants predict behaviour and how behaviour leads to some outcomes, usually goal attainment. Social cognitive theories recognize outcomes of behaviour, and that many determinants of behavioural decisions are at least partly influenced by past experiences. Two issues prevail: first, the theories continue to focus primarily on expectations of outcomes, not actual outcomes. Second, the feedback link between the actual consequences and behavioural determinants is missing from the literature. There seems to be very little in the way of recognising that outcomes and consequences of behaviour, over time, become past experiences.

The research presented here suggests that gains are a valuable mechanism that may bridge the gaps in the existing literature. Gains are in essence the consequences of behaviour (whether subjectively perceived or objectively assessed) and it can be speculated that over time, gains shape experiences and in so doing may feed back into future behaviour. Overall, a consideration of gains could contribute to a better understanding of behaviour and behaviour change by shifting the focus from linear models of behaviour to more cyclical ones. These models would benefit from a feed-back loop that recognises that the outcomes and consequences of behaviour becomes a past experience over time and in so doing may influence the determinants of future behaviour.

Regulatory focus theory. The existing literature on health behaviour goal striving is also characterised by the differentiation between approach and avoidance type

orientations to goals (e.g., Austin and Vancouver, 1996). For example, regulatory focus theory distinguishes between two regulatory orientations: promotion (striving to get something) and prevention (striving to avoid something) (Higgins, 2000; 2005). The theory proposes that the regulatory orientation determines how people experience the outcomes of their actions. The pleasure of succeeding in a promotion attempt (e.g., a person wins a race) is considered greater than that of a prevention success (e.g., a person avoids coming last in a race). In this thesis, gains are conceptualised as what we have attained or avoided from behaviour. Gains therefore represent outcomes of both types of orientations. The findings emphasize that people may have a variety of reasons for engaging in exercise behaviour, both to attain something (e.g., affiliation, recognition) as well as avoid something (e.g., avoid ill health).

The distinction of the regulatory focus theory is similar to the distinction between autonomous and controlled motivation (Deci & Ryan, 2000), particularly in that prevention orientation, much like controlled motivation, is thought to stem from a sense of responsibility or "ought"; whereas approach orientation, like autonomous motivation, is thought to stem from satisfying personal needs. The idea of promotion and prevention orientations is perhaps linked to the SDT conceptualisation of motivation in a way that could be conceptualised two orthogonal dimensions. A person's motives can vary on one axis from more autonomous to more controlled, and on the other axis from promotion orientation to a prevention orientation. For example, a controlled promotion motive might be "I want to look good", whereas a controlled prevention motive might be "I want to avoid gaining weight". Conversely an autonomous promotion motive might be "I want to relax", whereas an autonomous prevention motive might be "I want to relieve stress".

The results presented in this thesis suggest overall that having various motives and making a variety of gains is preferable to having a limited range of motives and gains. Similarly, people can experience a variety of gains from a given activity, both related to fulfilling the motives people had for it, but also gains that were not initially sought. In addition to motive fulfilment, gains themselves can be motivating and encourage engagement in the activity. Regulatory focus theory also proposes that achieving a goal through either orientation will reinforce that orientation in the future. Regulatory orientations could be speculated to be affected by gains in a similar way to autonomous and controlled motivation. It is possible that having a variety of motives that represent a combination of regulatory orientations will lead to experiencing a variety of gains related to those motives, and perhaps additional, unsought gains. The combination

may, as suggested in the previous section, lead to an overall fostering of autonomous motivation, and perhaps also the approach regulatory orientation. An example of this comes from one of the participants in the intervention study (chapter 4): he began playing tennis to avoid gaining weight and particularly to avoid getting a pot belly, which he saw as an unpleasant characteristic of men in his age group. He later discovered that by having joined the local community tennis group he had connected with the people there and was now also enjoying the social aspects of the activity and even challenged himself by playing competitively. Such an example demonstrates the potential for developing both more autonomous motives, as well as developing promotion orientations over prevention.

The functionalist theory of motive fulfilment. The functionalist theory of motive fulfilment proposes that when motives are met with corresponding gains, in other words when motives are fulfilled, this will have beneficial effects on behavioural outcomes such as task satisfaction and intention to continue engaging with the task in the future (e.g., Clary et al., 1998; Snyder, 2009; Snyder & Cantor, 1998). The current findings regarding gains are in line with the functionalist theory view of motive fulfilment, but also add to this literature by suggesting that gains may also occur where there was no explicit initial motive. The present understanding of gains in relation to this literature highlights that it is important for us to develop further insight into the distinction between gains that fulfil motives and unsought gains. This distinction leads us to other questions, such as in what way gains have the potential to bring about new motives. Gains may have two roles: fulfilling motives and reinforcing those motives, as well as highlighting unsought benefits of behaviour and encouraging the adoption of new motives. Ultimately, the findings regarding gains suggest that there is more to fully understanding what we get from an activity than motive fulfilment or goal attainment alone.

Implications of Thesis Findings for Future Research

The current work and the hypothesised role of gains emphasises that gains warrant being researched. The current literature has not clearly defined the difference between motive fulfilment and gains, and that for one is an issue that should be addressed in future research. It is important to recognize that the outcomes and benefits of behaviour are not necessarily related to the reasons that we had for starting it. Additionally, this reality may explain how we are able to develop more motives for behaviour and to integrate an activity into a person’s self-image and develop more

autonomous motivation for it over time. As outlined previously, the findings of this thesis pertain primarily to students and generally healthy populations. Future research within each of the areas outlined in this section should be understood in a variety of populations but particularly in clinical populations so as to produce findings that can inform intervention development in populations that have the most need for them. The work presented in this thesis yields three main areas for suggested future research: the relationship between motives and gains, the effects of gains on various determinants and outcomes of behaviour, and the role of gains in behaviour change over time.

The relationship between motives and gains. Perhaps the most crucial dynamic that we need to better understand is the one between motives and gains. Motives and gains have been found to be highly correlated, which is both an encouraging piece of information, but also calls for further practical applications to strengthen the distinction between motives and gains. Firstly, further research is required to strengthen the integrity of the EMGI, particularly with regard to the discriminant validity between motive and gain constructs. Secondly, the measure should also be utilised to explore the relationship between gains and motives with regards to their interaction. As noted above, motives may lead to experiencing gains, and gains may lead to developing new motives.

Longitudinal studies represent a more naturalistic approach to examining the dynamic between motives and gains. Primarily, these studies would rely on actual lived experiences of gains over time. Laboratory studies could also be utilised in exploring the motive gain dynamic. Laboratory studies could, for example, utilise approaches similar to those applied in the research on outcome orientations. Emotional responses to different outcomes of behaviour have been studied by Idson, Liberman and Higgins (2000) where participants were presented with scenarios involving buying a book, doing anagram tasks, or paying for a meal at a restaurant with different outcomes. Examples of outcomes from the book buying scenario were: getting a discount (gain), not getting a discount (nongain), not paying penalty for using credit card (nonloss), or paying penalty (loss). In a similar format, participants could be presented with scenarios where they either fulfilled their motives (got what they wanted), made gains unrelated to their original motives (gained something, even if it was not what they originally wanted), or did not make any gains. Measuring their motives before and after the task may provide insight into whether those motives changed, or whether their importance changed as a result of each gain related experience.

Effects of gains on determinants and outcomes of behaviour. As has been outlined in the previous section, it is a necessary and natural extension to investigate the effects of gains on various determinants and outcomes of behaviour, such as autonomous motivation, outcome expectations, self-efficacy, satisfaction, intention, and regulatory orientations. The current research suggests that having a variety of motives and experiencing a variety of gains may together provide the most beneficial environment for fostering autonomous motivation. In this sequence of events, the effects of controlled goal contents are weakened whilst the effects of autonomous goal contents are strengthened by the experienced gains. This proposition could be studied in future research using the EMGI measure. First, the finding that multiple motives and multiple gains characterise lifelong exercisers, whilst a narrow range of motives and gains are described by primarily sedentary individuals, requires strengthening through quantitative assessment. Motives and gains should be studied in a variety of samples and they should be compared across their amount of exercise, stage of change, and various demographics.

Secondly, the effects of gains alone and in conjunction with motives on determinants such as autonomous motivation and regulatory orientations should be investigated. The same effort could also be applied to the SDT hierarchy of motives (Ingledew et al., 2009). As has been outlined in the previous section, it would be beneficial to investigate whether the effects of gains are the same at each level of the motive hierarchy, and whether gains have effects on the other levels. Investigating the role of motives and gains at each level of the motive hierarchy, as well as their effects on antecedents and outcomes of behaviour, would likely benefit from large scale regression analyses and structural equation modelling to examine potential causal relationships between the various theoretical constructs.

The role of gains in behaviour change over time. The final suggestion relates to examining the role of gains in behaviour and their potential for use in supporting behaviour change. Longitudinal studies would play a key role for better understanding how gains work over time, particularly how gains arise and how they potentially feed into new motives. Valuable insight could be gained by measuring stages of change, motives and gains, as well as behavioural regulations and psychological need satisfaction over time in people who are beginning the process of behaviour change. Such an investigation may be best applied alongside a behaviour change intervention or clinical trial. It is valuable to understand both the linear process of adopting behaviour, as well as the cyclical nature of health behaviours that involve relapse and beginning again (e.g.,

Prochaska, DiClemente, & Norcross, 1992). This type of study could also serve to reveal the influences of motive fulfilment and gains on actual behaviour. By examining the relationship between gains and other processes involved in behavioural decision making and the process of change, we can better understand how gains fit into the bigger picture. This will provide a stronger basis for their potential use in behaviour change interventions.

Implications of Thesis Findings for Practice

Ultimately, the value of research on gains lies in their potential practical applications. The work presented in this thesis demonstrates that gains have the potential to make a positive contribution to strategies for supporting behaviour change. The natural suggestion for their practical use is to encourage people to reflect on the gains they are experiencing, and specifically for exercise participation to possibly highlight a variety of activities in order to encourage a variety of gains to be available. As outlined earlier, as many as 83 theories of behaviour change have been identified in the literature with considerable overlap in the determinants they describe (Michie et al, 2014). The potential use of gains in health behaviour change interventions will be discussed based on taxonomies of behaviour change which have been devised by collating methods across various behaviour change theories and motivational interviewing as an example of physical activity counselling.

Taxonomies of behaviour change. Michie and colleagues (e.g., Michie, Johnston, Francis, Hardeman, & Eccles, 2008; Michie, Ashford, Sniehotta, Dombrowski, Bishop, & French, 2011) have developed a taxonomy of behaviour change techniques that are linked to theoretically-based behavioural determinants (such as motivation). In a recent systematic review, Michie and colleagues (2011) further developed the taxonomy by assessing interventions specifically aimed at increasing healthy eating and physical activity. Their review produced a comprehensive taxonomy of 40 behavioural change techniques: the Coventry, Aberdeen and London Refined taxonomy, or CALO-RE. Out of the techniques outlined in the CALO-RE, four could be considered compatible with incorporating gains into interventions: 1) review of outcome goals, 2) self-monitoring of behaviour, 3) self-monitoring of outcomes, and 4) reflection on past success.

Reviews of goals are assessments of the extent to which various goals have been fulfilled. As motives are conceptualised as the contents of goals, naturally goal fulfilment is parallel to motive fulfilment. Outcome goals represent specific sought consequences, such as weight loss, increased fitness, or muscle development. In this capacity, reviewing

outcome goals is a technique which lends itself well to reflecting on gains that fulfil motives. Gains could also contribute to interventions in that it is possible to make gains other than those that a person initially sought. Reflecting on unsought gains may lend itself well to techniques such as self-monitoring of outcomes and behaviour. The means by which gains may serve behaviour change is through self-monitoring, as the work in this thesis and the current understanding is specifically related to self-attributed gains. Naturally, someone else could highlight potential gains, but in order to tap into the gains that are the focus of this research, each individual must personally recognise those gains as having occurred. The intervention study (Chapter 4) also demonstrated, that self-monitoring gains could be utilised to support autonomous motivation. Finally, reflecting on past success is a technique which can be adapted to include gains as a focus. At the same time, more research is necessary to establish what happens to gains over time. The proposed mechanism is that gains may feedback to determinants of behaviour as gains become the past experiences of that behaviour. Gains are a part of past success, but not limited to personal achievements. Past success is often conceptualised as how well you performed previously (e.g., Hood, Creed, & Neumann, 2012; Sorge & Schau, 2002). It is important to highlight that gains can also pertain to positive experiences and benefits related to the activity and experience itself. For example, a person may appreciate social interaction they experienced, feeling revitalized or exercising in pleasant surroundings. By reflecting on gains, it is possible to move from focusing on past success to a broader view of what the activity can provide, encompassing personal achievements, physical changes, as well as more experiential elements.

Work by Michie and colleagues (2008) identified links between behaviour change techniques and behavioural determinants. In order to hypothesise a potential role for gains in such intervention taxonomies, it is necessary to identify the target determinants first. Michie and colleagues (2008) outline the following behavioural construct domains: social/professional role & identity, knowledge, skills, beliefs about capabilities, beliefs about consequences, motivation and goals, memory, attention, decision processes, environmental context and resources, social influences, emotion, and action planning. The current understanding of the role of gains is primarily related to their effects on motivation. As outlined in the previous section, future research could extend the concept of gains also to other theories of health behaviour change, and in such a capacity, gains could potentially lend themselves to influencing other determinants.

Motivation in the taxonomy and the role of gains. According to Michie and colleagues (2008) motivation and goals could be targeted with the following techniques: specifying target behaviour or outcome, written contracts, rewards or incentives (including self-evaluation), graded tasks which start easy and increase in difficulty, increasing skills through problem solving and decision making, social processes of encouragement and support, persuasive communication, information regarding behaviour and outcome, and motivational interviewing. Out of these techniques, motivational interviewing seems like the most likely candidate in terms of incorporating gains, the specifics of which will be discussed in the next section. Some of these techniques relate more to controlled behavioural goals than motivation, for example, written contracts.

It is important to note that the taxonomy of behaviour change techniques and related literature does not readily make the distinction between autonomous and controlled motivation, how the suggested techniques relate to them, or how to appeal to one over the other. As mentioned above, some of the suggested techniques can be considered more controlled, in that they may create internal or external pressures for change. Methods such as reviewing goals, self-monitoring of behaviour and outcomes, and reflection on past success, may benefit from a gains-focus in that it would shift the focus from potentially instrumental aspects of the behaviour to more experiential ones. For example, self-monitoring behaviour and outcomes can denote keeping track of how many times a person has exercised during the week, or how much weight they have lost, both of which may limit the potential of the approach to foster autonomous motivation and lasting behaviour change. Monitoring behaviour and outcomes can also involve reflecting on the experience, what was enjoyable, benefits that a client has noticed that may not relate to original goals, a sense of achievement from engaging in activity, etc. Considering gains highlights how some of the techniques may be adapted to align the focus with fostering autonomous motivation over controlled.

A take home message is that we need to better understand where gains fit into existing health behaviour models and how gains may affect causal determinants of behaviour. Establishing possible feedback loops from actual gains to antecedents of behaviour is a crucial first step in this line of research. The proposal here is that with the current understanding, gains represent a potential technique in targeting some determinants of behaviour, but that gains may specifically be useful in highlighting how we may support autonomous motivation in the context of the behaviour change taxonomy. The techniques that best serve the motive gain dynamic and their relationship

with motivation are self-reports of behaviour and outcomes, reviewing motive fulfilment, and reflecting on past behaviour. Gains may prove to have effects on other antecedents but that remains to be studied in future research.

Potential application of gains in behavioural counselling. Taxonomies of behaviour change recognise MI as a suitable technique for changing motivation, which supports compatibility with the gain concept. In this context MI is an example of physical activity counselling, and applying the approaches outlined in the following section, gains could also be used in conjunction with other forms of behavioural counselling. There are various ways in which gains could be utilised in MI in practice. For example, MI employs a decisional balance strategy to help clients consider the pros and cons of behaviour change. Commonly this involves clients evaluating their current behaviours by looking at the benefits and costs of their actions. In contrast, a similar assessment is often also conducted for the behaviour change of interest. The benefits of the current behaviour in these scenarios are similar to the idea of gains; they relate to what people are getting out of that behaviour. Conversely, benefits related to changing behaviour are more akin to perceived benefits. The concept of gains therefore already sits well with MI, but its purpose is mainly to acknowledge that we get things we appreciate from the less than desirable behaviours that are hard to give up.

The potential lies in also utilising gains to help solve ambivalence about change, evoke change talk, and support autonomous motivation. In the context of MI for adopting or increasing exercise, it is possible that clients have had at least some previous experience of exercising. At the early stages of MI, reflecting on gains that were experienced from those instances could be used to explore ambivalence about changing current behaviour. Once a client has taken steps towards changing their behaviour, asking the client to reflect on gains they are experiencing could be utilised to emphasise the positive aspects of the behaviour change the client has begun. Reflecting on gains at this stage may help reinforce changes and support commitment by reinforcing benefits the client is experiencing from the behaviour.

Once a client has begun changing their behaviour, and the focus becomes on maintaining the behaviour, making plans that enable this become an important part in preventing relapse. Making plans for maintaining a behaviour could also utilise gains. Simply reflecting on gains a client is making from their new behaviour may help in preventing relapse by reinforcing the benefits that behaviour is providing. Gains could also be used to broaden a client's horizons for potential related to themselves as well as

the activity in question. That is to say, asking clients to reflect on the gains they are making from an activity may open channels of exploring other things they might hope to gain in the future and possible plans of action for how to achieve them. Particularly in exercise related MI, reflecting on gains could also open up discussion of alternative types of activity that might provide similar gains.

Findings presented in this thesis provide two key findings that reinforce the potential for the compatibility of gains with MI: first, gains themselves can be motivating and may bring about new reasons to exercise, second, gains have the potential to foster autonomous motivation through their moderating effects in motive fulfilment, as well as their individual additive effects. The qualitative study (chapter 2) showed that those who are primarily active, engage in activity out of their own volition and describe exercise as congruent with their sense of self and their values. The same accounts also described a multiplicity of experiential motives and gains and having experienced gains which later became reasons to engage in the activity. Overall, gains may benefit MI in that they have the potential to support autonomous motivation and bring about new motives, which in turn may foster an openness to engaging in activity, and support integrating behavioural regulation.

Conclusion

Many authors have focused on understanding the determinants and correlates of physical activity, particularly psychosocial influences and phases people go through in adopting a new behaviour. Literature on goal directed behaviours has also recognised that we have various reasons for engaging in any given behaviour. If people are asked what they want from a behaviour, it would then also be natural to ask them what they gained from that behaviour. Did they get things they wanted? Did they perhaps get things they did not expect to get? The existing literature has considered goal attainment, and recognises that behaviours have outcomes and consequences. The literature does not distinguish between fulfilling motives (making gains that correspond to original motives), and gains in their own right, regardless of whether an initial motive exists. Additionally, the existing social cognitive models of health behaviour are largely linear, with the exception of the stages of change model. The theoretical frameworks recognise antecedents to behaviour, but do not consider that outcomes and consequences of behaviour may feedback to those determinants. Additionally, the literature recognises that people move through stages of readiness and behavioural regulation as they progress

in changing their behaviour. The exact mechanisms by which this transition is proposed to come about do not consider what people get from behaviour.

The research presented in this thesis extends the existing literature on exercise motives by introducing the concept of gains, developing a measure of exercise gains that complements an existing measure of motives that can be used to further study their nature and relationship with other determinants of exercise behaviour, and exploring the role and potential of exercise gains through people's personal stories and by piloting them in an intervention design. The findings of the studies point to gains having a natural place in the processes that underlie exercise adoption and behaviour change. This place is potentially in creating a better understanding of cyclical models of behaviour change. Further research is required to establish the exact role gains play in behaviour, and how gains interact with other determinants of heath behaviour change. Their true potential lies in utilising them in interventions and public health programmes aimed at supporting exercise adoption and maintenance.

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References

Aarts, H., Paulussen, T., & Schaalma, H. (1997). Physical exercise habit: On the conceptualisation and formation of habitual health behaviours. *Health Education Research, 12*, 363-374. doi: 10.1093/her/12.3.363

Active UK (2014). Turning the tide of inactivity. London: UK Active. retrieved from http://www.ukactive.com/turningthetide/

Ajzen, I. (1991). The theory of planned behaviour. Organizational behaviour and human decision processes, 50(2), 179-211. doi:10.1016/0749-5978(91)90020-T

Ashford, S., Edmunds, J., & French, D. P. (2010). What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. British journal of health psychology, 15(2), 265-288. doi: 10.1348/135910709X461752

Asparouhov, T., & Muthén, B. (2009). Exploratory structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 16*, 397-438. doi:10.1080/10705510903008204

Atkinson, J. W. (Ed.) (1958). *Motives in Fantasy, Action, and Society*. Princeton, NJ: Van Nostrand.

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin, 120*, 338-375. doi: 10.1037/0033-2909.120.3.338

Baird, J., Jarman, M., Lawrence, W., Black, C., Davies, J., Tinati, T., ... & Inskip, H. (2014). The effect of a behaviour change intervention on the diets and physical activity levels of women attending Sure Start Children's Centres: Results from a complex public health intervention. *BMJ Open*, 4, e005290. doi:10.1136/bmjopen-2014-005290

Beck, F., Gillison, F., & Standage, M. (2010). A theoretical investigation of the development of physical activity habits in retirement. *British Journal of Health Psychology, 15*, 663-679. doi: 10.1348/135910709X479096

Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health, 13,* 623-649. doi: 10.1080/08870449808407422

Bandura, A. (2004). Health promotion by social cognitive means. Health education & behaviour, 31(2), 143-164. doi: 10.1177/1090198104263660

Bandura, A., & McClelland, D. C. (1977). Social learning theory. Oxford, England: Prentice-Hall.

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., Martin, B. W., & Group, L. P. A. S. W. (2012). Correlates of physical activity: why are some people physically active and others not? The Lancet, 380(9838), 258-271. doi:10.1016/S0140-6736(12)60735-1

Bélanger, M., Casey, M., Cormier, M., Filion, A. L., Martin, G., Aubut, S., ... & Beauchamp, J. (2011). Maintenance and decline of physical activity during adolescence: Insights from a qualitative study. International Journal of Behavioural Nutrition and Physical Activity, 8, 117. doi: 10.1186/1479-5868-8-117

Bélanger-Gravel, A., Godin, G., & Amireault, S. (2013). A meta-analytic review of the effect of implementation intentions on physical activity. Health Psychology Review, 7(1), 23-54. doi:10.1080/17437199.2011.560095

Bellg, A. J., Borrelli, B., Resnick, B., Hecht, J., Minicucci, D. S., Ory, M., ... & Czajkowski, S. (2004). Enhancing treatment fidelity in health behaviour change studies: best practices and recommendations from the NIH Behaviour Change Consortium. Health Psychology, 23(5), 443. doi: 10.1037/0278-6133.23.5.443

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-101. doi:10.1191/1478088706qp063oa

Breckon, J. D. (2014) Motivational Interviewing to promote physical activity and nutrition behaviour change. In, Doing Exercise Psychology (M. Anderson & S. Hanrahan, Eds.). Human Kinetics, Champaign, Ill.

Breckon, J. D., Johnston, L. H., & Hutchison, A. (2008). Physical activity counseling content and competency: a systematic review. Journal of physical activity & health, 5(3), 398. retrieved from: http://shura.shu.ac.uk/id/eprint/2587

Brooks, F., & Magnusson, J. (2007). Physical activity as leisure: The meaning of physical activity for the health and well-being of adolescent women. *Health Care for Women International, 28*, 69-87. doi: 10.1080/07399330601003499

British Heart Foundation National Centre (BHFNC) for Physical Activity and Health (2013). Making the case for physical activity. retrieved from: http://www.bhfactive.org.uk/resources-and-publications-item/40/419/index.html

British Heart Foundation National Centre (BHFNC) for Physical Activity and Health (2014). Economic costs of physical inactivity. retrieved from: http://www.bhfactive.org.uk/resources-and-publications-item/40/420/index.html

Buchan, D. S., Ollis, S., Thomas, N. E., & Baker, J. S. (2012). Physical activity behaviour: an overview of current and emergent theoretical practices. Journal of obesity, 2012:546459. doi: 10.1155/2012/546459

Bulley, C., Donaghy, M., Payne, A., & Mutrie, N. (2009). Personal meanings, values, and feelings relating to physical activity and exercise participation in female undergraduates: A qualitative exploration. *Journal of Health Psychology, 14*, 751-760. doi: 10.1177/1359105309338896

Buman, M. P., Giacobbi, P. R., Yasova, L. D., & McCrae, C. S. (2009). Using the constructive narrative perspective to understand physical activity reasoning schema in sedentary adults. *Journal of Health Psychology, 14*, 1174-1183. doi: 10.1177/1359105309342303

Caldarella, P., Gomm, R. J., Shatzer, R. H., & Wall, D. G. (2010). School-Based Mentoring: A Study of Volunteer Motivations and Benefits. *International Electronic Journal of Elementary Education, 2*, 199-216. retrieved from http://eric.ed.gov/?id=ED509194

Carr, A. (2004). *Positive Psychology*. New York: Brunner-Routledge.

Carraça, E. V., Silva, M. N., Markland, D., Vieira, P. N., Minderico, C. S., Sardinha, L. B., & Teixeira, P. J. (2011). Body image change and improved eating self-regulation in a weight management intervention in women. *International Journal of Behavioural Nutrition and Physical Activity, 8*, 75. doi:10.1186/1479-5868-8-75.

Carver, C. S., & Scheier, M. F. (2001). *On the self-regulation of behaviour*. Cambridge University Press.

Chatzisarantis, N., Hagger, M., Biddle, S., & Smith, B. (2005). The stability of the attitude-intention relationship in the context of physical activity. Journal of sports sciences, 23(1), 49-61. doi:10.1080/02640410410001730070

Chatzisarantis, N., Hagger, M. S., Biddle, S. J., Smith, B., & Wang, J. C. (2003). A meta-analysis of perceived locus of causality in exercise, sport, and physical education contexts. Journal of Sport and Exercise Psychology, 25(3), 284-306. retrieved from http://hdl.handle.net/10497/14303

Chatzisarantis, N. L., Frederick, C., Biddle, S. J., Hagger, M. S., & Smith, B. (2007). Influences of volitional and forced intentions on physical activity and effort within the theory of planned behaviour. Journal of sports sciences, 25(6), 699-709. doi:10.1080/02640410600818523

Chatzisarantis, N. L., Hagger, M. S., Biddle, S. J., & Karageorghis, C. (2002). The cognitive processes by which perceived locus of causality predicts participation in physical activity. Journal of Health Psychology, 7(6), 685-699. doi: 10.1177/1359105302007006872

Chemolli, E., & Gagné, M. (2014). Evidence against the continuum structure underlying motivation measures derived from self-determination theory. Psychological assessment, 26(2), 575. doi: 10.1037/a0036212

Cizek, G. J. (2012). Defining and distinguishing validity: Interpretations of score meaning and justifications of test use. *Psychological Methods, 17*, 31-43. doi:10.1037/a0026975

Clary, E. G., & Snyder, M. (1999). The motivations to volunteer theoretical and practical considerations. *Current directions in psychological science, 8*, 156-159. doi: 10.1111/1467-8721.00037

Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J., & Miene, P. (1998). Understanding and assessing the motivations of volunteers: a functional approach. *Journal of personality and social psychology*, *74*, 1516-1530. doi: 10.1037/0022-3514.74.6.1516

Coleman, L., Cox, L., & Roker, D. (2008). Girls and young women's participation in physical activity: Psychological and social influences. *Health Education Research, 23*, 633-647. doi: 10.1093/her/cym040

Craig, R., Mindell, J., & Hirani, V. (2008). Physical activity and fitness. Health Survey for England. retrieved from: http://www.hscic.gov.uk/pubs/hse08physicalactivity

Dacey, M., Baltzell, A., & Zaichkowsky, L. (2008). Older adults' intrinsic and extrinsic motivation toward physical activity. *American Journal of Health Behaviour, 32*, 570-582. Retrieved from http://www.ajhb.org

Davis, M. H., Hall, J. A., & Meyer, M. (2003). The first year: Influences on the satisfaction, involvement, and persistence of new community volunteers. *Personality and Social Psychology Bulletin, 29*, 248–260. doi:10.1177/0146167202239050

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. Journal of research in personality, 19(2), 109-134. doi:10.1016/0092-6566(85)90023-6

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behaviour. *Psychological Inquiry, 11*, 227-268. doi: 10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. Canadian Psychology/Psychologie canadienne, 49(1), 14. doi: 10.1037/0708-5591.49.1.14

Department of Health (2011). Physical Activity Guidelines in the UK: Review and Recommendations. School of Sport, Exercise and Health Sciences, Loughborough University.

Dishman, R. K., Dunn, A. L., Sallis, J. F., Vandenberg, R. J., & Pratt, C. A. (2010). Social-cognitive correlates of physical activity in a multi-ethnic cohort of middle-school girls: two-year prospective study. Journal of Pediatric Psychology, 35(2), 188-198. doi: 10.1093/jpepsy/jsp042

Dombrowski, S. U., Sniehotta, F. F., Avenell, A., & Coyne, J. C. (2007). Current issues and future directions in psychology and health: Towards a cumulative science of behaviour change: Do current conduct and reporting of behavioural interventions fall short of best practice? *Psychology and Health, 22*, 869–874. doi: 10.1080/08870440701520973

Duda, J. L., & Tappe, M. K. (1989). The personal incentives for exercise questionnaire: Preliminary development. *Perceptual and Motor Skills, 68*, 1122-1122. doi: 10.2466/pms.1989.68.3c.1122

Eccles , J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., & Midgley, C. (1983). Expectancies, values, and academic behaviours. In J. T. Spence (Ed.), *Achievement and Achievement Motivation* (pp. 75–146). San Francisco: W. H. Freeman.

Edmunds, J., Ntoumanis, N., & Duda, J. L. (2008). Testing a self-determination theory-based teaching style intervention in the exercise domain. European Journal of Social Psychology, 38(2), 375-388. doi: 10.1002/ejsp.463

Egli, T., Bland, H. W., Melton, B. F., & Czech, D. R. (2011). Influence of age, sex, and race on college students exercise motivation of physical activity. *Journal of American College Health*, 59, 399-406. doi:10.1080/07448481.2010.513074

Eime, R. M., Payne, W. R., Casey, M. M., & Harvey, J. T. (2010). Transition in participation in sport and unstructured physical activity for rural living adolescent girls. *Health Education Research, 25*, 282-293. doi: 10.1093/her/cyn060

Finch, H. (1997). *Physical activity 'at our age': Qualitative research among people over the age of 50*. London: Social & Community Planning Research. Retrieved from http://www.nice.org.uk/aboutnice/whoweare/aboutthehda/hdapublications/hda_publications.jsp

Finch, H., & White, C. (1998). *Physical activity 'what we think': Qualitative research among women aged 16 to 24*. London: Social & Community Planning Research. Retrieved from http://www.nice.org.uk/aboutnice/whoweare/aboutthehda/hdapublications/hda_publications.jsp

Finkelstein, M. A. (2006). Dispositional predictors of organizational citizenship behaviour: Motives, motive fulfillment, and role identity. *Social Behaviour and Personality, 34*, 603–616. doi:10.2224/sbp.2006.34.6.603

Finkelstein, M. A. (2007). Correlates of satisfaction in older volunteers: A motivational perspective. *International Journal of Volunteer Administration*, *24*(5), 6–12. Retrieved from http://www.ijova.org/PastIssues/xxiv_5.htm

Finkelstein, M. A. (2008). Volunteer satisfaction and volunteer action: A functional approach. *Social Behaviour and Personality*, *36*, 9-18. doi:10.2224/sbp.2008.36.1.9

Fishbein, M., & Cappella, J. N. (2006). The role of theory in developing effective health communications. Journal of Communication, 56(s1), S1-S17. doi: 10.1111/j.1460-2466.2006.00280.x

Flick, U., von Kardorff, E., & Steinke, I. (2004). *A Companion to Qualitative Research*. London: SAGE publications.

Ford, E. S., & Caspersen, C. J. (2012). Sedentary behaviour and cardiovascular disease: a review of prospective studies. International journal of epidemiology, 41(5), 1338-1353. doi: 10.1093/ije/dys078

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39-50. doi: 10.2307/3151312

Fortier, M. S., Sweet, S. N., O'Sullivan, T. L., & Williams, G. C. (2007). A self-determination process model of physical activity adoption in the context of a

randomized controlled trial. *Psychology of Sport and Exercise, 8*, 741-757. doi:10.1016/j.psychsport.2006.10.006

Funk, D., Jordan, J., Ridinger, L., & Kaplanidou, K. (2011). Capacity of mass participant sport events for the development of activity commitment and future exercise intention. *Leisure Sciences, 33*, 250-268. doi:10.1080/01490400.2011.564926

Gillison, F., Sebire, S., & Standage, M. (2012). What motivates girls to take up exercise during adolescence? Learning from those who succeed. *British Journal of Health Psychology, 17*, 536-550. doi: 10.1111/j.2044-8287.2011.02053.x

Grieser, M., Vu, M. B., Bedimo-Rung, A. L., Neumark-Sztainer, D., Moody, J., Young, D. R., & Moe, S. G. (2006). Physical activity attitudes, preferences, and practices in African American, Hispanic, and Caucasian girls. *Health Education and Behaviour, 33*, 40-51. doi: 10.1177/1090198105282416

Grogan, S., Conner, M., & Smithson, H. (2006). Sexuality and exercise motivations: Are gay men and heterosexual women most likely to be motivated by concern about weight and appearance? *Sex Roles, 55*, 567-572. doi:10.1007/s11199-006-9110-3

Guay, F., Morin, A. J. S., Litalien, S., Valois, P., Vallerand, R. J. (2015). Application of exploratory structural equation modeling to evaluate the academic motivation scale. The Journal of Experimental Education, 83, 51-82. doi: 10.1080/00220973.2013.876231

Hagger, M., & Chatzisarantis, N. (2005). The social psychology of exercise and sport: McGraw-Hill Education (UK).

Hagger, M., Chatzisarantis, N. L., & Biddle, S. J. (2002). A meta-analytic review of the theories of reasoned action and planned behaviour in physical activity: Predictive validity and the contribution of additional variables. Journal of sport & exercise psychology, 24(1). retrieved from: http://journals.humankinetics.com/jsep-back-issues/jsepvolume24issue1march/ametaanalyticreviewofthetheoriesofreasonedactionandplannedbehaviorinphysicalactivitypredictivevalidityandthecontributionofadditionalvariables?aoCookiePolicy=1&ActionType=2_SetCurrency&CurrencyCode=7

Hagger, M. S., Chatzisarantis, N., Barkoukis, V., Wang, J. C., Hein, V., Pihu, M., . . . Karsai, I. (2007). Cross-cultural generalizability of the theory of planned behaviour among young people in a physical activity context. Journal of Sport and Exercise Psychology, 29(1), 1-20. retrieved from: http://hdl.handle.net/10497/14304

Hagger, M. S., & Luszczynska, A. (2014). Implementation intention and action planning interventions in health contexts: State of the research and proposals for the way forward. Applied Psychology: Health and Well-Being, 6(1), 1-47. retrieved from: http://espace.library.curtin.edu.au:80/R?func=dbin-jump-full&local_base=gen01-era02&object_id=199541

Halliwell, E., Dittmar, H., Orsborn, A. (2007). The effects of exposure to muscular male models among men: Exploring the moderating role of gym use and exercise motivation. *Body Image, 4*, 278-287. doi: 10.1016/j.bodyim.2007.04.006

Hardy, S., & Grogan, S. (2009). Preventing disability through exercise: Investigating older adults' influences and motivations to engage in physical activity. *Journal of Health Psychology, 14*, 1036-1046. doi: 10.1177/1359105309342298

Harley, A. E., Buckworth, J., Katz, M. L., Willis, S. K., Odoms-Young, A., & Heaney, C. A. (2009). Developing long-term physical activity participation: A grounded theory study with African American women. *Health Education and Behaviour, 36*, 97-112. doi: 10.1177/1090198107306434

Heckhausen, H. (1977). Achievement motivation and its constructs: A cognitive model. *Motivation and emotion, 1*, 283-329. doi: 10.1007/BF00992538

Heckhausen, J. E., & Heckhausen, H. E. (2010). *Motivation and Action* (2nd ed.). Cambridge: Cambridge University Press

Higgins, E. T. (2000). Making a good decision: value from fit. American psychologist, 55(11), 1217. doi: 10.1037/0003-066X.55.11.1217

Higgins, E. T. (2005). Value from regulatory fit. Current directions in psychological science, 14(4), 209-213. doi: 10.1111/j.0963-7214.2005.00366.x

Hood, M., Creed, P. A., & Neumann, D. L. (2012). Using the expectancy value model of motivation to understand the relationship between student attitudes and achievement in statistics. *Statistics Education Research Journal, 11,* 72-85. Retrieved from: http://iase-web.org/Publications.php?p=SERJ_issues

Hsiao, E. T., & Thayer, R. E. (1998). Exercising for mood regulation: The importance of experience. *Personality and Individual Differences, 24*, 829–836. doi:10.1016/S0191-8869(98)00013-0

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1-55. doi:10.1080/10705519909540118

Idson, L. C., Liberman, N., & Higgins, E. T. (2000). Distinguishing gains from nonlosses and losses from nongains: A regulatory focus perspective on hedonic intensity. *Journal of Experimental Social Psychology, 36*, 252-274. doi: 10.1006/jesp.1999.1402

Ingledew, D. K., & Markland, D. (2008). The role of motives in exercise participation. *Psychology and Health, 23*, 807-828. doi: 10.1080/08870440701405704

Ingledew, D. K., Markland, D., & Ferguson, E. (2009). Three levels of exercise motivation. *Applied Psychology: Health and Well-Being, 1*, 336-355. doi :10.1111/j.1758-0854.2009.01015.x

Ingledew, D. K., Markland, D., & Medley, A. R. (1998). Exercise motives and stages of change. *Journal of health psychology, 3*, 477-489. doi: 10.1177/135910539800300403

Ingledew, D. K., Markland, D., & Strömmer, S. T. (2014). Elucidating the roles of motives and gains in exercise participation. *Sport, Exercise, and Performance Psychology, 3*, 116. doi: 10.1037/spy0000004

Ingledew, D. K., & Sullivan, G. (2002). Effects of body mass and body image on exercise motives in adolescence. *Psychology of Sport and Exercise, 3*, 323-338. doi: 10.1016/S1469-0292(01)00029-2

Isen, A. (2000). Positive affect and decision making. In M. Lewis & J. Haviland Jones (eds), *Handbook of Emotions* (2nd ed,, pp. 417-426). New York: Guilford.

Izquierdo-Porrera, A. M., Powell, C. C., Reiner, J., & Fontaine, K. R. (2002). Correlates of exercise adherence in an African American church community. *Cultural Diversity and Ethnic Minority Psychology, 8*, 389-394. doi:10.1037//1099-9809.8.4.389

Ketteridge, A., & Boshoff, K. (2008). Exploring the reasons why adolescents participate in physical activity and identifying strategies that facilitate their involvement in such activity. *Australian Occupational Therapy Journal, 55*, 273-282. doi: 10.1111/j.1440-1630.2007.00704.x

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54*, 87-94. doi:10.3200/JACH.54.2.87-94

Kirk, A., Mutrie, N., MacIntyre, P., & Fisher, M. (2004). Effects of a 12-month physical activity counselling intervention on glycaemic control and on the status of

cardiovascular risk factors in people with Type 2 diabetes. Diabetologia, 47(5), 821-832. doi 10.1007/s00125-004-1396-5

Knowles, A. M., Herbert, P., Easton, C., Sculthorpe, N., & Grace, F. M. (2015). Impact of low-volume, high-intensity interval training on maximal aerobic capacity, health-related quality of life and motivation to exercise in ageing men. AGE, 37, 1-12. doi: 10.1007/s11357-015-9763-3

Kulavic, K., Hultquist, C. N., McLester, J.R. (2013). A comparison of motivational factors and barriers to physical activity among traditional versus nontraditional college students, Journal of American College Health, 61, 60-66. doi: 10.1080/07448481.2012.753890

Landry, J. B., & Solmon, M. A. (2002). Self-determination theory as an organizing framework to investigate women's physical activity behaviour. Quest, 54(4), 332-354. doi:10.1080/00336297.2002.10491782

Landry, J. B., & Solmon, M. A. (2004). African American women's self-determination across the stages of change for exercise. *Journal of Sport and Exercise Psychology*, *26*, 457-469. retrieved from http://journals.humankinetics.com/jsep-back-issues/JSEPVolume26Issue3September/AfricanAmericanWomensSelfDeterminationAcrosstheStagesofChangeforExercise

Leary, M. R., & Kowalski, R. M. (1990). Impression management: A literature review and two-component model. *Psychological Bulletin*, *107*, 34-47. doi: 10.1037/0033-2909.107.1.34

Lewin, K. (1935). *A dynamic theory of personality*. New York: McGraw-Hill

Maltby, J., & Day, L. (2001). The relationship between exercise motives and psychological well-being. *Journal of Psychology*, *135*, 651-660. doi:10.1080/00223980109603726

Marcus, B. H., & Forsyth, L. (2003). Motivating people to be physically active: Human Kinetics.

Markland, D., & Ingledew, D. K. (1997). The measurement of exercise motives: Factorial validity and invariance across gender of a revised Exercise Motivations Inventory. *British Journal of Health Psychology, 2*, 361-376. doi: 10.1111/j.2044-8287.1997.tb00549.x

Markland, D., & Ingledew, D.K. (2007). Exercise participation motives: A self-determination theory perspective. In M. S. Hagger & N. L. D. Chatzisarantis

(Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 23-34). Champaign, IL: Human Kinetics.

Markland, D., Ryan, R. M., Tobin, V. J., & Rollnick, S. (2005). Motivational interviewing and self–determination theory. *Journal of social and clinical psychology, 24*, 811-831. doi: 10.1521/jscp.2005.24.6.811

Markland, D., & Tobin, V. (2004). A modification to the behavioural regulation in exercise questionnaire to include an assessment of amotivation. *Journal of Sport and Exercise Psychology, 26*, 191-196. Retrieved from http://journals.humankinetics.com/jsep

Matsumoto, H., & Takenaka, K. (2004). Motivational profiles and stages of exercise behaviour change. International Journal of Sport and Health Science, 2, 89-96. doi: 10.5432/ijshs.2.89

McAuley, E., Jerome, G. J., Marquez, D. X., Elavsky, S., & Blissmer, B. (2003). Exercise self-efficacy in older adults: Social, affective, and behavioural influences. Annals of Behavioural Medicine, 25(1), 1-7. doi: 10.1207/S15324796ABM2501_01

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50*, 741-749. doi:10.1037/0003-066X.50.9.741

Michie, S., Ashford, S., Sniehotta, F. F., Dombrowski, S. U., Bishop, A., & French, D. P. (2011). A refined taxonomy of behaviour change techniques to help people change their physical activity and healthy eating behaviours: the CALO-RE taxonomy. *Psychology & Health*, *26*, 1479-1498. doi: 10.1080/08870446.2010.540664

Michie, S., Johnston, M., Francis, J., Hardeman, W., & Eccles, M. (2008). From theory to intervention: mapping theoretically derived behavioural determinants to behaviour change techniques. *Applied psychology*, *57*, 660-680. doi: 10.1111/j.1464-0597.2008.00341.x

Michie, S., West, R., Campbell, R., Brown, J., & Gainforth, H. (2014). ABC of behaviour change theories. Sutton, Surrey, UK: Silverback Publishing.

Miller, N. E. (1959). Liberalization of basic S–R concepts: Extensions to conflict behaviour, motivation and social learning. In S. Kock (Ed.), *Psychology: A study of a science* (pp. 198–292). New York: McGraw-Hill.

Miller, W. R. (1983). Motivational interviewing with problem drinkers. Behavioural Psychotherapy, 11, 147–172. doi: http://dx.doi.org/10.1017/s0141347300006583

Miller, W. R., & Rollnick, S. (2009). Ten things that motivational interviewing is not. Behavioural and cognitive psychotherapy, 37(02), 129-140. doi: http://dx.doi.org/10.1017/s1352465809005128

Miller, R. W., & Rollnick, S. (2013). *Motivational Interviewing: Preparing People for Change* (3rd ed.). New York: Guilford Press.

Mullan, E., & Markland, D. (1997). Variations in self-determination across the stages of change for exercise in adults. *Motivation and Emotion, 21*, 349-362. doi: 10.1023/A:1024436423492

Mulvihill, C., Rivers, K., & Aggleton, P. (2000). *Physical activity 'at our time': Qualitative research among young people aged 5 to 15 years and parents*. London: Health Education Authority. Retrieved from Mulvihill, C., Rivers, K., & Aggleton, P. (2000). Physical activity 'at our time': Qualitative research among young people aged 5 to 15 years and parents. London: Health Education Authority. Retrieved from http://www.nice.org.uk/aboutnice/whoweare/aboutthehda/hdapublications/hda_publications.jsp

Munroe-Chandler, K. J. (2005). A discussion on qualitative research in physical activity. *Athletic Insight, 7*, 67-81. Retrieved from http://athleticinsight.com/Back_Issues.htm

Muthén, L. K., & Muthén, B. O. (2012). *Mplus (Version 7)*. [Computer Software]. Los Angeles, CA: Muthén & Muthén.

Myers, N. D., Chase, M. A., Pierce, S. W., & Martin, E. (2011). Coaching efficacy and exploratory structural equation modeling: A substantive-methodological synergy. *Journal of Sport and Exercise Psychology, 33,* 779. Retrieved from http://journals.humankinetics.com/jsep-back-issues/jsep-volume-33-issue-6-december/coaching-efficacy-and-exploratory-structural-equation-modeling-a-substantive-methodological-synergy

Nigg, C. R., Borrelli, B., Maddock, J., & Dishman, R. K. (2008). A theory of physical activity maintenance. Applied Psychology, 57(4), 544-560. doi: 10.1111/j.1464-0597.2008.00343.x

NVivo (Version 9) [Computer Software]. (2010). Victoria: QSR International Pty Ltd.

Olander, E. K., Fletcher, H., Williams, S., Atkinson, L., Turner, A., & French, D. P. (2013). What are the most effective techniques in changing obese individuals' physical activity self-efficacy and behaviour: a systematic review and meta-

analysis. *International Journal of Behavioral Nutrition and Physical Activity, 10(1)*, 29-29. doi: 10.1186/1479-5868-10-29

Olinsky, A., Chen, S., & Harlow, L. (2003). The comparative efficacy of imputation methods for missing data in structural equation modeling. *European Journal of Operational Research, 151*, 53-79. doi:10.1016/S0377-2217(02)00578-7

Pavlov, I. (1927). *Conditioned reflexes: An investigation into the physiological activity of the cortex* (Trans. G. Anrep). New York: Dover.

Price, A. E., Greer, B., & Tucker, A. (2013). Older black women's experiences initiating and maintaining physical activity: Implications for theory and practice. Journal of Aging and Physical Activity, 21, 348-366. Retrieved from http://journals.humankinetics.com/japa-back-issues/japa-volume-21-issue-3-july/older-black-womenrsquos-experiences-initiating-and-maintaining-physical-activity-implications-for-theory-and-practice

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: applications to addictive behaviours. *American psychologist, 47*, 1102. doi: 10.1037/0003-066X.47.9.1102

Prochaska, J. O., Redding, C. A., & Evers, K. E. (2008). The transtheoretical model and stages of change. In K. Glanz, B. K. Rimer & K. viswanath (Eds.), Health behaviour and health education: Theory, research, and practice (4th ed., pp. 97-121). San Fransisco: Jossey-Bass.

Quindry, J. C., Yount, D., O'Bryant, H., & Rudisill, M. E. (2011). Exercise engagement is differentially motivated by age-dependent factors. *American Journal of Health Behaviour, 35*, 334-345. doi:10.5993/AJHB.35.3.7

Riemsma, R., Pattenden, J., Bridle, C., Sowden, A. J., Mather, L., Watt, I., & Walker, A. (2002). A systematic review of the effectiveness of interventions based on a stages-of-change approach to promote individual behaviour change in health care settings. Health technology assessment, 6(24), 1-242. retrieved from: http://wrap.warwick.ac.uk/46347/

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1994). The health belief model and HIV risk behaviour change Preventing AIDS (pp. 5-24): Springer.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist, 55*, 68. doi: 10.1037/0003-066X.55.1.68

Ryan, R.M., Frederick, C.M., Lepes, D., Rubio, N., & Sheldon, K.M. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology*, *28*, 335–354. Retrieved from http://www.ijsp-online.com/

Santos, I., Mata, J., Silva, M. N., Sardinha, L. B., & Teixeira, P. J. (2015). Predicting long-term weight loss maintenance in previously overweight women: A signal detection approach. Obesity, 23, 957-964. doi: 10.1002/oby.21082

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.) *Latent variables analysis: Applications for developmental research* (pp. 339-419). Thousand Oaks, CA: Sage.

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66,* 507-514. doi:10.1007/BF02296192

Scholes, S., & Mindell, J. (2012). Physical activity in adults. Health Survey for England. retrieved from: http://www.hscic.gov.uk/pubs/hse08physicalactivity

Schwarzer, R. (1999). Self-regulatory processes in the adoption and maintenance of health behaviours. Journal of Health Psychology, 4(2), 115-127. doi: 10.1177/135910539900400208

Schwarzer, R. (2008). Modeling health behaviour change: How to predict and modify the adoption and maintenance of health behaviours. Applied Psychology, 57(1), 1-29. doi: 10.1111/j.1464-0597.2007.00325.x

Sebire, S. J., Standage, M., & Vansteenkiste, M. (2008). Development and validation of the goal content for exercise questionnaire. *Journal of Sport and Exercise Psychology, 30,* 353-377. Retrieved from http://journals.humankinetics.com/jsep

Segar, M. L., Eccles, J. S., Peck, S. C., & Richardson, C. R. (2007). Midlife women's physical activity goals: Sociocultural influences and effects on behavioural regulation. Sex Roles, 57(11-12), 837-849. doi: 10.1007/s11199-007-9322-1

Segar, M. L., Eccles, J. S., & Richardson, C. R. (2008). Type of physical activity goal influences participation in healthy midlife women. *Women's Health Issues, 18*, 281–291. doi:10.1016/j.whi.2008.02.003

Shen, B., & Xu, C. (2008). Effects of self-efficacy, body mass, and cardiorespiratory fitness on exercise motives in chinese college students. *Journal of Physical Activity and Health, 5,* 706-718. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18820345

Sibley, B. A., & Bergman, S. M. (2016). Relationships among goal contents, exercise motivations, physical activity, and aerobic fitness in university physical education courses. Perceptual and Motor Skills. doi: 0031512516639802.

Silberstein, L. R., Striegel-Moore, R. H., Timko, C., & Rodin, J. (1988). Behavioural and psychological implications of body dissatisfaction: Do men and women differ? *Sex roles, 19*, 219-232. doi: 10.1007/BF00290156

Snyder, M. (2009). In the footsteps of Kurt Lewin: Practical theorizing, action research, and the psychology of social action. *Journal of Social Issues, 65*, 225–245. doi:10.1111/j.1540-4560.2008.01597.x

Snyder, M., & Cantor, N. (1998). Understanding personality and social behaviour: A functionalist strategy. In D.T. Gilbert, S.T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (4th ed.): Vol. 1 (pp. 635–679). Boston, MA: McGraw Hill.

Sorge, C., & Schau, C. (2002, April). Impact of engineering students' attitudes on achievement in statistics: A structural model. *Annual meeting of the American Educational Research Association. New Orleans*, USA. Retrieved from: http://evaluationandstatistics.com/references.html

Strong, H. A., Martin Ginis, K. A., Mack, D. E., & Wilson, P. M. (2006). Examining self-presentational exercise motives and social physique anxiety in men and women. *Journal of Applied Biobehavioural Research, 11*, 209-225. doi: 10.1111/j.1751-9861.2007.00006.x

Ström, F. (1981). *Svenska Ordspråk.* Stockholm: Bokförlaget Prisma.

Sutton, S. (2008). How does the health action process approach (HAPA) bridge the intention–behaviour gap? An examination of the model's causal structure. Applied Psychology, 57(1), 66-74. doi: 10.1111/j.1464-0597.2007.00326.x

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. International Journal of Behavioural Nutrition and Physical Activity, 9(1), 78. doi: 10.1186/1479-5868-9-78

Thøgersen-Ntoumani, C., & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. Journal of sports sciences, 24(4), 393-404. doi:10.1080/02640410500131670

Townsend, N., Wickramasinghe, K., Williams, J., Bhatnagar, P., & Rayner, M. (2015). Physical Activity Statistics. British Heart Foundation. retrieved from: https://www.bhf.org.uk/publications/statistics/physical-activity-statistics-2015

van Sluijs, E. M. F., van Poppel, M. N. M., Twisk, J. W. R., & van Mechelen, W. (2006). Physical activity measurements affected participants' behaviour in a randomized controlled trial. Journal of clinical epidemiology, 59(4), 404-411. doi: http://dx.doi.org/10.1016/j.jclinepi.2005.08.016

Vansteenkiste, M, Lens, W., & Deci, E.L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist, 41,* 19-31. doi: 10.1207/s15326985ep4101_4

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070. doi:10.1037/0022-3514.54.6.1063

Webb, T. L., & Sheeran, P. (2006). Does changing behavioural intentions engender behaviour change? A meta-analysis of the experimental evidence. Psychological bulletin, 132(2), 249-268. doi: 10.1037/0033-2909.132.2.249

Weinstein, N. D., & Sandman, P. M. (2002). The precaution adoption process model and its application. Emerging theories in health promotion practice and research. Jossey-Bass, San Francisco, 16-39.

Williams, G. C., Minicucci, D. S., Kouides, R. W., Levesque, C. S., Chirkov, V. I., Ryan, R. M., & Deci, E. L. (2002). Self-determination, smoking, diet and health. Health education research, 17(5), 512-521. doi: 10.1093/her/17.5.512

Williams, S., & French, D. (2011). What are the most effective intervention techniques for changing physical activity self-efficacy and physical activity behaviour—and are they the same? Health education research, 26(2), 308-322. doi: 10.1093/her/cyr005

Wilson, P. M., Rodgers, W. M., Blanchard, C. M., & Gessell, J. (2003). The relationship between psychological needs, self-determined motivation, exercise attitudes, and physical fitness. *Journal of Applied Social Psychology, 33,* 2373-2392. doi: 10.1111/j.1559-1816.2003.tb01890.x

Wilson, P. M., Rodgers, W. M., & Fraser, S. N. (2002). Examining the psychometric properties of the behavioural regulation in exercise questionnaire. *Measurement in Physical Education and Exercise Science, 6,* 1-21. doi: 10.1207/S15327841MPEE0601_1

Wininger, S. R. (2007). Self-determination theory and exercise behaviour: An examination of the psychometric properties of the exercise motivation scale. Journal of Applied Sport Psychology, 19(4), 471-486. doi:10.1080/10413200701601466

World Health Organization (2010). Global recommendations on physical activity for health. retrieved from http://www.who.int/dietphysicalactivity/factsheet_recommendations/en/

Zajac, A. U., & Schier, K. (2011). Body image dysphoria and motivation to exercise: A study of Canadian and Polish women participating in yoga and aerobics. *Archives of Psychiatry and Psychotherapy, 4*, 67-72. Retrieved from http://www.archivespp.pl/2011-13-4.htm

Appendix A
Application for Ethical Approval: Qualitative Study

Application for Ethical Approval

Project Title: Personal Experiences of Exercise

Principal investigator: Strommer, Sofia

Other researchers: Ingledew,David, Markland,David

Pre-screen Questions

Type of Project
PhD

What is the broad area of research
Clinical/Health

Funding body
Internally Funded

Type of application (check all that apply)
A new application that does not require sponsorship or scrutiny from an outside body?

Proposed methodology (check all that apply)
Questionnaires and Interviews

Do you plan to include any of the following groups in your study?

Does your project require use of any of the following facilities and, if so, has the protocol been reviewed by the appropriate expert/safety panel? If yes please complete Part 2:B

If your research requires any of the following facilities MRI, TMS/ tCS, Neurology Panel, has the protocol been reviewed by the appropriate expert/safety panel?
Not applicable (the research does not require special safety panel approval)

Connection to Psychology, (i.e. why Psychology should sponsor the question)
Investigator is a student in Psychology (including the North Wales Clinical Psychology Programme)

Does the research involve NHS patients? (NB: If you are conducting research that requires NHS ethics approval make sure to consult the Psychology Guidelines as you may not need to complete all sections of the Psychology online application)
No

Has this proposal been reviewed by another Bangor University Ethics committee?
No

Part 1: Ethical Considerations

Will you describe the main experimental procedures to participants in advance, so that they are informed about what to expect?
Yes

Will you tell participants that their participation is voluntary?
Yes

Will you obtain written consent for participation?
Yes

If the research is observational, will you ask participants for their consent to being observed?
N/A

Will you tell participants that they may withdraw from the research at any time and for any reason?
Yes

With questionnaires, will you give participants the option of omitting questions they do not want to answer?
Yes

Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?
Yes

Will you debrief participants at the end of their participation (i.e. give them a brief explanation of the study)?
Yes

Will your project involve deliberately misleading participants in any way?
No

Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? If *Yes* , give details and state what you will tell them to do should they experience any problems (e.g., who they can contact for help)
No

Is there any realistic risk of any participants experiencing discomfort or risk to health, subsequent illness or injury that might require medical or psychological treatment as a result of the procedures?
No

Does your project involve work with animals? If *Yes* please complete Part 2: B
No

Does your project involve payment to participants that differs from the normal rates? Is there significant concern that the level of payment you offer for this study will unduly influence participants to agree to procedures they may otherwise find unacceptable? If *Yes* please complete Part 2: B and explain in point 5 of the full protocol
No

If your study involves children under 18 years of age have you made adequate provision for child protection issues in your protocol?
N/A

If your study involves people with learning difficulties have you made adequate provision to manage distress?
N/A

If your study involves participants covered by the Mental Capacity Act (i.e. adults over 16 years of age who lack the mental capacity to make specific decisions for themselves) do you have appropriate consent procedures in place? NB Some research involving participants who lack capacity will require review by an NHS REC. If you are unsure about whether this applies to your study, please contact the Ethics Administrator in the first instance
N/A

If your study involves patients have you made adequate provision to manage distress?
N/A

Does your study involve people in custody?
No

If your study involves participants recruited from one of the Neurology Patient Panels or the Psychiatry Patient Panel then has the protocol been reviewed by the appropriate expert/safety panel?
N/A

If your study includes physically vulnerable adults have you ensured that there will be a person trained in CPR and seizure management at hand at all times during testing?
N/A

Is there significant potential risk to investigator(s) of allegations being made against the investigator(s). (e.g., through work with vulnerable populations or context of research)? No

Is there significant potential risk to the institution in any way? (e.g., controversiality or potential for misuse of research findings.)
No

Part 3: Risk Assessment

Is there significant potential risk to participants of adverse effects?
No

Is there significant potential risk to participants of distress?
No

Is there significant potential risk to participants for persisting or subsequent illness or injury that might require medical or psychological treatment?
No

Is there significant potential risk to investigator(s) of violence or other harm to the investigator(s) (e.g., through work with particular populations or through context of research)?
No

Is there significant potential risk to other members of staff or students at the institution? (e.g., reception or other staff required to deal with violent or vulnerable populations.)
No

Does the research involve the investigator(s) working under any of the following conditions: alone; away from the School; after-hours; or on weekends?
Yes

Further details: The investigator will work alone with each participant. However: a) she will work in a known location either within the School or at local health clubs or other public buildings, never in a private home or other private premises; b) other people will be around in the building; c) the researcher will leave details with the department and a friend when she is interviewing and where;

d) she will "check in" with a friend/colleague/supervisor by phone at regular intervals.

Does the experimental procedure involve touching participants?
No

Does the research involve disabled participants or children visiting the School?
No

Part 2: A

The potential value of addressing this issue

Further details: Participatory motives are what individuals seek to attain or avoid by engaging in a particular domain of behaviour. The study of such motives has become an important cornerstone of exercise participation research (Ingledew Markland, 2008). However, whereas motives have received ample attention, gains have not. By gains, we mean what people perceive they have actually attained or avoided through exercise. Arguably, motives (what people want) and gains (what they get) should be studied in parallel, because they are likely to influence each other and jointly influence outcomes. We have recently developed a questionnaire measure of exercise motives and gains (Strommer, Ingledew, Markland, under review) and begun to examine the joint effects of motives and gains on exercise (Ingledew, Strommer, Markland, in preparation). However, before embarking on further quantitative research, we need better insight into possible psychological processes. This study will examine the roles of motives and gains in people's personal experiences of exercise. Findings will inform the design of future quantitative research as well as possibly being publishable in their own right.

Hypotheses

Further details: We expect that different people will have different reasons (motives) for exercising and will have experienced different benefits (gains) from exercising. Some people will have gained what they orginally sought, whereas others will not. Some people will have experienced benefits that they had not originally sought. These experiences will affect people's motivation.

Participants recruitment. Please attach consent and debrief forms with supporitng documents

Further details: Approximately 20 adults aged 18 years or older with current or past experience of exercising will be recruited. Potential participants will be recruited by advertising the study using standard text (Promotional Text in Supporting Documents). This standard text will be used in the following channels: leaflets, posters, emails (including via BU Head of Communications), websites, press publicity, and SONA. Recruitment will be within the University and outside the University (e.g., local recreational facilities with the agreement of management). At all times, the targeting and scale of publicity will be cautious, so as to gauge potential interest and manage recruitment. It is in the nature of the methodology employed (Grounded Theory) that analysis of early interviews can lead to targeted recruitment for later interviews. In such circumstances, the inclusion criteria will not be changed, nor will the channels. Rather, the publicity will be reoriented within the agreed channels. For example, if we needed more representation of older participants, we would channel the publicity more towards non-University outlets. The recruitment material will invite individuals to e-mail or call the researcher for further information. If an individual expresses provisional interest in participating, a meeting will be arranged. This will be in the University, or outside the University. If outside the University, it would be in a mutually agreed place (e.g., recreational facility) that presents no risk to the interviewer or participant. At the beginning of the meeting, the participant will be given an Information Sheet (in Supporting Documents) and the opportunity to ask questions and discuss the study with the researcher. If they are happy to proceed, they will be given a Consent Form (in Supporting Documents) to sign and date. At the end of the interview, the participant will be thanked and given a Debrief Sheet (in Supporting Documents) and chance to ask further questions. Payment (£6 and travelling expenses) will be arranged.

Research methodology

Further details: The interview will follow a Semi-Structured Interview Plan (in Supporting Documents). The interview will be audio recorded, and the interviewer will take notes. After the interview, the consent form will be filed in a locked cabinet. The audio recording will be stored on a secure computer. The audio recording will be transcribed onto the same secure computer. A backup of the audio recording and transcription will be stored in a different locked cabinet, along with any notes. The consent form and data will be connectable by a participant number known only to the PhD student and her first supervisor. Data will be analysed using thematic analysis. This entails extracting themes from participants' accounts, looking for

common themes, and arranging the themes into an overarching theory.

Estimated start date and duration of the study.
Further details: Data collection will be from beginning November 2012 to end of June 2013.

For studies recruiting via SONA or advertising for participants in any way please provide a summary of how participants will be informed about the study in the advertisement. N.B. This should be a brief factual description of the study and what participants will be required to do.
Further details: Please see Promotional Text in Supporting Documents.

Part 4: Research Insurance

Is the research to be conducted in the UK?
Yes

Research that is based solely upon certain typical methods or paradigms is less problematic from an insurance and risk perspective. Is your research based solely upon one or more of these methodologies? Standard behavioural methods such as questionnaires or interviews, computer-based reaction time measures, standardised tests, eye-tracking, picture-pointing, etc; Measurements of physiological processes such as EEG, MEG, MRI, EMG, heart-rate, GSR (not TMS or tCS as they involve more than simple 'measurement'); Collections of body secretions by non-invasive methods, venepuncture (taking of a blood sample), or asking participants to consume foods and/or nutrients (not including the use of drugs or other food supplements or caffine).
Yes

Appendix B
Information Sheet and Debrief Form: Qualitative Study

Experiences of Motives and Gains:

Personal Accounts of Exercise Participation

Names and Positions of Investigators

Senior Lecturer:	Dr. David Ingledew	**d.k.ingledew@bangor.ac.uk**
Senior Lecturer:	Dr. David Markland	**d.a.markland@bangor.ac.uk**
PhD Student:	Sofia Strömmer	**pspca5@bangor.ac.uk**

- This project is being conducted by Sofia Strömmer, PhD student, under the supervision of Dr David Ingledew, Senior Lecturer, from the School of Psychology, Bangor University, and Dr David Markland, Senior Lecturer, from the School of Sport, Health and Exercise Sciences.

- The project is about people's personal experiences of exercise, their motivations and what they gained from it. We are inviting adults aged 18 years or older to take part. You can take part whether or not you currently exercise.

- If you decide to take part, you will be asked to attend an interview about your experiences of exercising, in English, taking about 60 minutes. You will be asked about your reasons for exercising, amount of exercise, and personal experience of exercising.

- Your consent form will be confidential and stored in a locked cabinet. The data will not be linked to your name. Your name and the names of other people and/or places you may mention will be changed for the write up of this study. You will not be identifiable in any report of this research.

- Your participation in this research is entirely voluntary. If you do not wish to answer a particular question you can abstain. You can withdraw completely any time, without penalty, and without giving a reason. If you withdraw, the written up version and audio file of your interview will be destroyed.

- I will be pleased to answer any questions you may have about the research, before you decide to take part, while you are taking part, or after you have taken part. I can be contacted by email: Sofia Strömmer (pspca5@bangor.ac.uk); Or by telephone: 01248 388343. Or you can write to me at the School of Psychology, Bangor University LL57 2DG.

- If you have any complaints about the conduct of the research, you can write to Professor Oliver Turnbull, Head of School, School of Psychology, Bangor University, LL57 2DG, UK (o.turnbull@bangor.ac.uk).

Experiences of Motives and Gains:

Personal Accounts of Exercise Participation

Thank you for taking part in this research.

Previous research has identified different motives (reasons) for exercise participation. For example, some people exercise for enjoyment or social reasons, others to lose weight or improve their appearance, and others to improve their fitness or health.

In our research, we are particularly interested in whether individuals fulfil their motives. For example, do people who want to lose weight find that they actually lose weight? And what effect does this have on their motivation and exercise behaviour? In this study we were interested in hearing people's own accounts of exercise. This includes reasons they had for starting to exercise, whether exercise has been a good experience for them, and also if it has been a bad experience. Therefore, in this study you were asked to share your personal experiences of exercise. We will combine the interview data of all the people who took part in the study. We will then be able to gain insight into how people experience exercise participation and whether there are recurring trends in the accounts of motives and gains for exercising.

We will be glad to answer any questions you may have regarding the research, and we would welcome any feedback about your experience as a participant. You are welcome to request a copy of the findings of the research.

Further information about exercise and health is available from NHS Direct (http://www.nhsdirect.nhs.uk/).

Sofia Strömmer (pspca5@bangor.ac.uk), telephone 01248 388343
School of Psychology, Bangor University, LL57 2DG, UK

Appendix C
Semi-Structured Interview Schedule

Setting the Scene

Introduction of interviewer, introducing the purpose of the interview: “During the interview I would like to discuss you experiences of exercising. This can include anything you want and anything you deem important. I will have a few general questions, but feel free to tell me anything that you think is relevant to your exercise experiences”.

Remind participant that interview is confidential and aliases will be used in write up. Remind participant that they can refuse to answer any question, and can terminate the interview at any time, without giving a reason and without penalty. Remind participant that interview will be recorded.

Starter Questions

- Can you tell me what kind of exercise you do or have done in the past?
- How did you get involved in this kind of exercise?
- Can you tell me about your reasons for exercising?
- In your experience, what have you got out of exercising?
- Can you tell me, in general, how exercise has been for you?

Examples of Possible Follow-Up Questions

- What led you to give up that kind of exercise?
- What keeps you going with this exercise?
- Have your reasons for exercising changed since you started?
- Was that something you planned or did it just happen?
- What has been good and not so good about exercising?
- What does losing weight mean to you?
- What do the social aspects mean to you?

Clarifying Questions

- Can you expand a little on that?
- Can you tell me anything else?
- Can you give me some examples?
- Why do you think that might be?
- Is that always the case?

Conclusion of Interview

Thank participant for taking part in the study, provide and briefly discuss debrief form.

Appendix D
Hierarchy Of Categories And Themes With Quotes

Identifier	Quote
	OPENNESS TO GAINS
	Instrumental Activity
	Weight management motive
Participant 1 Page 22 Lines 535-539	"One thing I… hate is a… big stomach, you know… I love food, you know, and uhm… I'm thinking of exercise now as not wanting to put weight on."
Participant 8 Page 8 Lines 186 - 191	"You see these guys with the little pot bellies and you think 'ah no I don't want to end up like that'… When I was younger, a lot of the time I used to, sort of, sit around and just read books and I was a bit kind of heavier and, err, I don't I don't really want to go back to being like that."
Participant 15 Page 6 Lines 130-135	"I'd say, it's trying to keep fit and to try and keep my weight down. I take medication, and unchecked, it tends to, I tend to put on weight fairly easily, just wanting to eat all the time. So that's my main motivation in terms of running and, uhm, the fitness class, I want to get fitter in terms of really want to lose weight."
	Burning Calories
Participant 14 Page 8 Lines 200-202	"I really like eating and cooking and baking and all that, so I'm like, 'well, if I do some exercise then I can also continue to eat a lot'."
Participant 19 P. 2, Lines 39	"Also to just keep fit, and so I can eat as much as I want."

Means to an end

Participant 6 Page 5 Lines 138 - 139	"I think the jogging and the gym would be the same for just like, like toning up, but I think the martial arts was more because I enjoyed it."
Participant 11 Page 1 Lines 19-25	"Swimming I've always done. I had swimming lessons when I was a child, and I enjoy swimming so that's something that I enjoy. I find quite relaxing, so I like swimming. The gym I do, erm, to keep the weight off to be honest. I don't particularly like it but I live quite close to DW Sports, so it's, it's convenient for me to go there and it helps keep my fitness levels up."
Participant 14 Page 8 Lines 199-200	"I don't have any health motivations particularly. In like, I don't think, oh look my hearts stronger, or I won't get cancer, or anything like that, uhm, it's, it's vanity purposes."
Participant 15 Page 11 Lines 254-258	"The fitness things, similar to running, it's hard work. Physically hard. But it's, it's worth doing, but uhm, I could easily stop doing it. But then I, then I'd know, I'd get, uhm, put on weight."
Participant 16 P. 20 Lines 432-434	"I think in dance there is, I think, you know, there are, there's the social aspect, and, and everything else that goes along with it, whereas kind of gymming and running is almost purely for fitness."
Participant 18 P. 6 Lines 105-109	"Just as a means to an end, really, to be honest. I don't find [the gym] very exciting, uhm, everybody seems very self-obsessed, kind of pretty and friendly sort of, you just get on with it, it's not quite a chore but not much more."
Participant 20 P. 2 Lines 34-38	"I mainly just go to the gym, it's really bad, I only go like towards the summer, or if I've got an aim, to like, for the summer ball, I went to try and lose weight. Yeah, and then usually for summer holidays."

Appearance Motive

Participant 5 P. 2, Lines 38 - 39	"To be honest it wouldn't have been about the 'ooh I'll get healthier' it would've been about 'ooh I'll get slimmer' or more toned'."

Participant 6 P. 3, Line 72	"So like get rid of fat and look good in summer basically."
Participant 14 P. 8, Lines 196 - 197	"Entirely vanity for me, I feel that I just, exercise will help me look good… It just might make my tummy a bit flatter."
Participant 19 P. 2-3, Lines 41 - 47	"Keeping fit can be your appearance as well, like keeping it to a standard you want."
Participant 20 P. 3, Lines 44 - 45	"To look good, rather than yeah, anything. To try and lose weight basically. To get in shape."
	Supporting another activity
Participant 2 P. 8, Lines 171-174	"I'd go into the gym get one of those fit balls, put it up, elevate it a bit, just sit on that and exercise my 'ductors and all this. So I mean that's purely that was an exercise that was, it wasn't hard work, uhm, so, it didn't have all the intrinsic challenges of a lot of stuff, but it was simply and purely a functional thing: trying to prepare myself for an activity."
Participant 18 P. 5, Lines 99 - 101	"I mean the gym and the jogging I always thought was just a means to, uhm, keep yourself fit enough to get out and do other things like walking, climbing."
	Activity to overcome Injury
Participant 2 P. 2, Lines 43-45	"I had a lot of trouble, uhm, uhh, with hamstrings... that, uhm, restricted the sort of sports that I could play. Uhm, eventually I pretty well got over that, I got into yoga, and then, uhm, that fixed up most of the hamstring problems."
Participant 4 P. 27-28, Lines 615 - 626	"[Back injury] was really painful so I got this exercise ball and basically I sat on that for 6 months and did the little exercises and what it was what I was actually doing or what the pilates does is it strengthens the core muscles…and erm and that kind of fixed it."

Participant 18 P. 21, Lines 411 - 413	"I have to do some exercise for my leg, and that's a right bore. But if I go for a walk, which also helps, that's ok, so I, somehow it's making me, it's fun, isn't it, I suppose."

Practical activity

Participant 8 P. 2, Lines 27 - 35	"I also ride a bike, sort of to and from Bangor all the time. Like, I sort of see that as exercise 'cause its sort of down hills all the time… If I don't actually get to play any sport I sort of think, well, at least I am doing this every day so I am kind of keeping fit."
Participant 9 P. 1, Lines 10 - 12	"Recently I walk a lot because I live a long way away from work, erm, so I walk for quite a distance each day."
Participant 12 P. 11-12, Lines 282 - 289	"Often I've just seen it as a way to way to A to B… So now I can walk to work on some days and therefore I walk to work on the days I don't need my car."
Participant 14 P. 1, Lines 17 - 21	"I go through phases, I cycle sometimes, I cycle quite a lot. I don't do anything sports or anything, I tend to just use exercise as a means of transport. I'll walk or cycle, uhm, places."
Participant 17 P. 12, Lines 241 - 248	"I walk to my lectures and I walk up to like dancing every day and, OK, so I mean, ten, fifteen minutes, but if you're walking there and back. That's like twenty minutes to half an hour of exercise a day. And like I do walk fast, and I would be doing that twice a day, so that's like an hour, and then if I'm walking down to judo, that's on normal site, so that's like half an hour walk from where I live there and then you've got another half an hour back. So, like, randomly walking to Menai Bridge at the weekend and stuff like that."
Participant 19 P. 12-13, Lines 242 - 251	"It feels like I'm exercising every day, like climbing up like to upper Bangor. Uhm, the fact that you've gotta walk everywhere anyway, everything's so close. I think you do feel like you're doing something, going from A to B."

Weight and Appearance Gains

Weight management gain

Participant 1 P. 7, Lines 153 - 155	"I'm starting to lose a little bit of weight, I'm starting to feel, you know, lose a bit of my stomach, which is quite an incentive in itself, you know, when you start, when you see something happening."
Participant 14 P. 9, Lines 213 - 215	"I lost a pile of weight and I got really strong and I had really impressive muscles for a while. Uhm, and I, I loved it, I used to get enormous amounts of satisfaction."
Participant 20 P. 4, Lines 70 - 73	"I suppose when, 'cause I go to the gym in order to like, for a target, so it makes you feel good, like you weigh yourself that week and you've lost like 2 lbs and yeah."

Appearance gains

Participant 6 P. 13, Lines 376 - 378	"It's not really about like not too bothered about the weight because, like, when I was running my stomach flattened but I didn't actually lose any weight because it went to muscle."
Participant 9 P. 12, Lines 290 - 292	"I suddenly realised, 'ooh, I lost weight', and then was like, 'well, let's jump on this band wagon', erm, so yeah, health wise but also appearance wise."
Participant 10 P. 9, Lines 275 - 281	"I have a six pack… I've got quite nice muscles erm like yeah erm yeah I've definitely got a good body… shape like toned…and I'm quite fit"
Participant 17 P. 18, Lines 375 - 382	"I wasn't confident in my body before. I wouldn't have gone out in like a, a bikini. But now because of like belly dancing, I'm confident enough to do that. And I know that I have got a good body, and it's not just comparing myself to other people, it's just like, noticing it, you notice the improvements."

Gains too slow

Participant 1 P. 27, Lines 655 - 660	"That is hard going and, uhh, nothing's happening and you're aching and you can't do as half the amount of, that you used to be able to. Uhm, so that is a downside, losing your fitness very, very quickly, and gaining it is hard… I'm half way to where I want to get right now I think, uhm, after being, three months or to the gym."
Participant 5 P. 3, Lines 93 - 94	"I just think, like, I'd be too impatient to wait for, wait for the effects to take place."
Participant 14 P. 12, Lines 300 - 303	"I can kind of reduce my calories a bit and go to the gym, but that's a much, much slower process because you're building muscle, like you're doing yourself a favour long term, you'll look a lot better pretty quickly, but I look at the scales and I'm like, why is the number not going down."

Multiple Motives

Escape Route

Participant 3 P. 8, Lines 186 - 190	"I kind of took that aspect of it, it was: right ok, this is my escape route, I'm going to exercise. And that's why it's always been part of my life; because it's always been a great form of like a cathartic escape route."
Participant 4 P. 15, Lines 325 - 331	"Is more like an hour block of that relaxation and clearing my mind and things. It's like a whole day of it… It's a bit of an escape really, you know, just get away from it all get out in the mountains, go for a walk."
Participant 7 P. 12, Lines 353 - 356	"Having run, run a lot, uhm, has helped me to get through this, this ten months. It really has helped, it really, really helps kind of, clear your, clear your mind as well."
Participant 12 P. 9, Lines 206 - 212	"Especially in terms of walking, it can be, relaxation, or maybe in a way that head space, if that makes sense, that you can, uhm, put other things to one side almost, when you're walking. And to some extent circuits as well, 'cause actually, when you're working quite seriously, or quite hard, you don't have the head space to think of other stuff. And I'm great for ruminating so anything that is a distraction."

Challenge

Participant 2 P. 4, Lines 82-92	"A lot of the exercise I do is very high intensity. Say, interval training. And I do it as a test, you know, it's purely, can I still you know, push myself. Uhm, and even though I do it sort of, virtually every day, uhm, it's harder as you get older, as you recover a lot slower. So, say I have four really hard sessions a week, where I flunk myself, and ask, you know you ask yourself questions: are you, can you take it, and are you prepared to push yourself? And although you come up with exactly the same answer every time, you know, I feel that every few days I've 'gotta test myself"
Participant 3 P. 12, Lines 280 - 290	"With bodybuilding, you're forcing your body to do something that's unnatural for it. It doesn't want to support big muscles because it's difficult. I think it takes, I read somewhere, it takes from about four calories per pound of lean muscle over and above what you'd normally have. So it's, your body's having to work against it's natural instincts."
Participant 4 P. 14, Lines 318 - 320	"When I go hiking in the mountains, I go because I enjoy the views, because I enjoy being out in the mountains, erm, and because I enjoy, I suppose… a bit of a challenge really sometimes."
Participant 7 P. 17, Lines 514 - 518	"I hadn't really run beyond, like a 10k let's say, and I used to do, you know, the occasional uh, foot races and things like that, prior to this, this training programme. Uhm, so I thought, oh, this is kind of a way to challenge yourself and you know, see if you could do it."
Participant 15 P. 16, Lines 383 - 388	"You know, you've done the harrowing work. You've maybe, if I got a better time than I did last time, that's a good feeling, that I've run harder and, uhm, strongly, and I've pushed myself. 'Cause during the running, the last few runs, I've been pushing myself through the run 'go on, keep going, keep going, keep going', uhm, 'you can do it, you can do it', and I think that's helped in terms of pushing myself a little bit harder, sort of got a few more seconds."
Participant 16 P. 16, Lines 348 - 350	"I like being able to take on a challenge and being challenged, and kind of being able to overcome that, and doing well for myself."
Participant 17 P. 8, Lines 155 - 162	"I got into refereeing and did refereeing awards and I wanted to do coaching awards as well. I just, uhm, I dunno, like as a girl, also, like, I'm the kind of person that's like, I like to be able to do boy stuff, just to prove that girls can do it, so, I did, and I proved them right."

Revitalisation

Participant 4 P. 13-14, Lines 300 - 311	"I enjoy the walk to and from work because it gives me an hour to clear my head get some fresh air and just kind of, so when I arrive in work I'm nice relaxed and calm, blood circulated had loads of fresh air, going to stand in the warehouse for 8 hours and pack boxes. And after standing in the warehouse packing boxes for 8 hours I'll walk out of the warehouse and I'll have an hour of nice gentle walking."
Participant 7 P. 12-13, Lines 355 - 366	"It really, really helps kind of, clear your, clear your mind as well, and the stress reduction too! Particularly in PhD studies I think, uhm, you know, you go through those ups and downs, right, and sometimes just like going outside, going for a walk or run, you know, before I was pregnant, uhm, is really helpful to just either take your mind off things, or help you actually focus on thinking about something."
Participant 10 P. 9, Lines 283 - 288	"And I think also mentally it's, it's helped a lot mentally, you know. Like, whenever you feeling down it's like, let's go and do some pole dancing and then it kind of like. They always say that exercise gives out the happy hormones and makes you feel better, so I think, yeah I'm getting happiness from exercise."
Participant 11 P. 2, Lines 41 - 44	"It makes me feel better I always feel better. If I, especially swimming, if, I find that very relaxing in the evenings. I tend to go after work and uh I always feel better after a swim it's quite refreshing."
Participant 13 P. 11-12, Lines 227 - 231	"I think from the cycling thing it's more like a way to relax and you just, kind of, after you cycle you just feel like, 'ahh' very calm kind of thing."
Participant 16 P. 6, Lines 117 - 118	"It's almost like a form of expression. I get everything off my chest, just through that."
Participant 17 P. 18, Lines 386 - 388	"It's like letting off steam as well, judo definitely, is like, really good anger management. So, like a really good way to let off steam, if I'm angry or frustrated, dance is not as good at that but, judo definitely is."
Participant 19 P. 10, Lines 189 - 190	"Seeing the difference in, say, either your physical health, if you're more like, if you have more energy to do things, that kind of keeps you going."

More than just exercise

Participant 1 P. 20, Lines 479 - 486	"Without exercise and sport, I think my life would be boring. Uhm, I wouldn't have any excitement in it. Uhm, the amount of things and situations and places I've been because of sport, uhm, is absolutely amazing. I can, you know, talk all day about what's happened in my life with sport and fantastic experiences and that…that's why I think, you know, the glass is always full with me."
Participant 2 P. 14, Lines 304-313	"I just like spending time with horses, I like being around horses, uhm, really like riding them. Uhm, that's what was so much fun in morocco, you know, we just did heaps and heaps of galloping, we you know, had beaches, which were just completely empty and, you know, there were ten of us in the group and just racing over a couple of miles… my motivation for doing the polo, there's a whole lot of things, there's the love of animals, there's the challenge of learning a new sport, there's the adrenalin buzz, of galloping around."
Participant 3 P. 23, Line 565 - 566	"It suits me. It suits my personality. It suits me as a person. It gives me everything I could ever want."
Participant 4 P. 4, Lines 80 - 85	"It's been more kind of, erm, how can I appreciate the generally outdoors by way of exercise? So erm from that point of view the exercise isn't necessarily the main incentive, the main incentive is just to get outside and enjoy."
Participant 9 P. 5, Lines 108 - 113	"It's hard to say what's enjoyable about it, just, it's just something enjoyable, err, about it, erm, and the exercise part is more of a secondary thing. I just enjoy dancing and I enjoy music and of it is quite a sociable thing as well dancing."
Participant 11 P. 2, Lines 49 - 58	"Walking is kind of, erm, probably what I enjoy most out of everything, because that's not just the good feeling of having exercise, and doing your body good, it's being outside all day, and being with friends, really socializing. So you know you're exercising without feeling that you are exercising really. It's just a day out with friends you just happen to be enjoying it."
Participant 12 P. 3, Lines 60 - 63	"I think for me, for walking, 'cause a part of walking isn't, the exercise as such, it's more, I guess relaxation but also walking somewhere nice. So I don't get the same enjoyment walking through central London, as I do walking here in the mountains or by the coast or just out in the countryside."

Participant 13 P. 8-9, Lines 164 - 169	"I think that, kind of the cycling was more than anything, just kind of like a hobby. Uhm, with sort of, nice added bonus of, 'ooh, I've lost a bit of weight', or something like that. Yeah, I guess the original motivation was to lose weight, but then it was just to do something for fun."
Participant 16 P. 21, Lines 439 - 446	"I will have this forever. It's a skill that I will have, and hopefully will never lose. Uhm, I have friends like I hope that I will, I have friends across the world that I've met through dancing, and like I've said I've, my best friends, my partner, they are much more important to me than how much I weigh. And when it comes into dancing, the only time that my weight will matter is if I feel flabby enough that I don't look good when I'm dancing, or if I'm so fat I actually can't physically dance."
Participant 17 P. 13, Lines 276 - 280	"I genuinely don't see it as exercise. People are like, 'you exercise all the time', I'm like, 'no I don't, being lazy', 'you don't, you do judo', 'ooh, yeah', but they're just hobbies. It's like some people like reading, some people like watching TV, some people like playing computer games. I like dancing, I like doing judo, they're hobbies."
Participant 18 P. 10, Lines 190 - 195	"It's almost, meaning for life, it's just, something that's just, I don't remember ever going on a walk in the countryside that I haven't enjoyed. You know, it's that level of, you know, I don't know if I can talk about spiritual, but it's uhm, it's just, intense enjoyment I think."

Environment

Participant 4 P. 14, Lines 318 - 323	"I go because I enjoy the views, because I enjoy being out in the mountains, erm, and because I enjoy… a bit of a challenge really sometimes. But I think that's I think what actually, erm, the kind of, erm, subconscious motivation to get out into the mountains."
Participant 7 P. 8, Lines 221- 228	"because I have moved and lived in different places… it's helped me to, uhm, get to know the place where I've… moved to. Uhm, particularly with like walking and running, you know, you get out and you see the, your surroundings and everything."
Participant 12 P. 3, Lines 60 - 63	"I think for me, for walking, 'cause a part of walking isn't, the exercise as such, it's more, I guess relaxation but also walking somewhere nice. So I don't get the same enjoyment walking through central London, as I do walking here in the mountains or by the coast or just out in the countryside."
Participant 18 P. 18, Lines 358 - 360	"I think it can come back, I'm afraid, to just enjoying, uh, this total experience of, uh, being outside, and the environment, I think."

Recognition

Participant 1 P. 17, Lines 412-418	"I'll come across somebody that I've played football with, it's such a nice feeling… and not just people I've played, supporters as well, and people come up to, to me and, uhh, ask what I'm doing now and it's fantastic, so, uhm, as regards to that… I have so many, you know, I can't go anywhere, that someone knows me, and it's, it's, uhh, a lovely feeling"
Participant 3 P. 18-19, Lines 447 - 449	"I think particularly males will, they'll admire what you've done. Because they'll go: 'ok, I couldn't do that'."
Participant 15 P. 12, Lines 273 - 275	"I think when I was younger, I was a bit of a show off. So, I wanted to, uhm, show that I was good at things, to people, and that's why I exercised."
Participant 16 P. 16, Lines 337 - 339	"I like to be seen as the person who can do this. I mean not because I get, if I get compliments because of it, then great, but it's more about being good at it myself."
Participant 17 P. 14, Lines 287 - 292	"People are like, 'oh well done, that's really good' I'm like 'yey!'. I'm still like a toddler at heart. If I got stickers for everything that I did I would be very dedicated. Uhm, uhm, being good at it, uhm, thinking that it's something that people don't usually do."

Developing your abilities

Participant 6 P. 8, Lines 231 - 236	"I think winning and also like progressing up through the belts, and when you get another one you're like yes… and then there was like awards like best student things different sort of medals you could get."
Participant 10 P. 2-3, Lines 64 - 72	"They kind of have like bronze moves and then bronze routines, and I'd done all the bronze moves in an hour: 'right, okay, a bronze routine, right, okay, great, now silver moves, oh silver routine, gold moves', so I just kind of like moved through fairly quickly."
Participant 17 P. 23, Lines 363 - 488	"I did judo 'cause I was still doing it at home and I loved it, and I really want my black belt more than anything, so I'm like 'I am gonna get my black belt'… being able to do something new, like, accomplish things."

Health and balance

Participant 2 P. 4, Lines 74 - 77	"Certainly as I get older, the health benefits of exercise, as more and more of a motivation. Say 15 years ago, I certainly wasn't considering reducing cardiovascular risk. Uhm, risk of hypertension, diabetes, osteoporosis, all those sorts of things, uh, whereas now I do."
Participant 4 P. 6, Lines 123 - 126	"I think, erm, I think now as I've got older, erm, I started to think more about my health and things like that. And just kind of keeping myself fit and healthy really."
Participant 7 P. 7, Lines 178 - 186	"Well, the first reasons are the health reasons, I have to say. That's definitely the first and foremost. Just keeping good balance, and, you know, not just doing one thing like, not just studying or working all the time, or, another leisurely thing, you know. I do it for the health reasons first."
Participant 9 P. 13, Lines 309 - 312	"I think both like, for health reasons, erm, it's definitely helped and will hopefully help me to live a bit longer and not get all these potential hereditary health problems that I'll probably get at some point, but I guess I can fight them off for a bit longer."
Participant 19 P. 3, Lines 41 - 44	"Keeping fit, uhm, so maintaining a healthy lifestyle, so like a balance between uh, sort of a diet plus, uhm, keeping your body, like, moving and things, I guess."
	Competition
Participant 3 P. 7, Lines 156 - 159	"The competitive aspect comes out when you're training with someone else, 'cause, alright, he just lifted eighty…I'm going for ninety, or I'm gona do more reps, or I'm gona do it better than him."
Participant 6 P. 7 – 8, Lines 205 - 216	"I like the sparring. As in, like, you know, fighting with someone else. 'Cause we did like a lot of practices and like patterns and stuff but then when we actually got to fight. It was pretty good 'cause I went to like I went to three classes that were a general training, and there was a bit of fighting in that but then I went to a class that was just fighting, and that was pretty cool I liked to fight."
Participant 10 P. 11, Lines 349 - 355	"I think it's another added bonus like knowing that I can hold myself out horizontally. Like, when a lot of guys couldn't do that. I like having that kind of 'ha! I'm better than you' kind of that kind of attitude. I suppose it's kind of the competitive attitude, wanting to be the best again."
	Social aspects

Participant 7 P. 7-8, Lines 201 - 210	"I started doing long distance running. I, I also joined a running group, and then it was for like a fundraising, uhm, effort as well, for AIDS research, and that was with a group as well… That was really fun, to meet some other people in, in the city I was living in. So there is that aspect too where you know, you meet different people, 'cause I've moved around quite a lot of different places."
Participant 8 P. 24, Lines 574 - 582	"I think one things I quite like about, erm, tennis is the… social side of it a little bit. Like, here, you know, we've, I went to the university tennis sort of team thing and I really didn't like it, it was all these, kind of, young kids who just like charged up on testosterone and it was just really annoying. So then I went to the local tennis club and it's all like retired folk but they're all just really kind of nice and friendly and I've, I've really enjoyed that sort of meeting this group of people that I never would have really encountered in any other way."
Participant 10 P. 9-10, Lines 294 - 302	"I mean if all my friends didn't pole dance, it was just me, I'd still want to do it, but I think having like the social side of it, it kind of improves the experience. Like, it, it doesn't like make it more fun because pole dancing in itself is fun on it's own, but it's nice to like share it."
Participant 12 P. 3, Lines 70 - 72	"When you move to a new place, that I've done quite a bit in my life, it's quite a good way of getting to meet people who are similar to you in some way or other."
Participant 15 P. 5, Lines 114 - 124	"I started thinking, 'alright, now let's go out', uhm, 'get to know people'. And then, in the Greek, uhh, the local tavern, there was a salsa night on, and I' done a bit of salsa before, and then… snowballed it from there."
Participant 16 P. 8, Lines 160 - 164	"I think all of my closes friends are people that I dance, my partner is my dance partner and I met him through dance, and yeah, my closest friends are, I'm more, I'm much closer with people I have met through the dance society and dance events than I am with people in my own department."
Participant 17 P. 16, Lines 339 - 344	"If you get on with people, you have a laugh and a joke with them, it just makes it so much more enjoyable. I mean, I don't like running, occasionally I'll go for a run, if I've got like nothing else to do with my day, like, if I'm home, I'll go for a run, but it's not enjoyable 'cause I'm just doing it on my own."
Participant 18 P. 6, Lines 117 - 121	"There's a, friendships, uhm, it's quite, uhm, close if you're, that's not quite the word, close, but, it's, uhm, relatively intense. If you're sailing with somebody and you're dependent on each other, certainly with climbing, your life depends on the other person, so uhh, you have a good friend."

Participant 19 P. 6-7, Lines 121 - 123	"I think it was just a class that was on, it was offered and, there was probably a social aspect as well, actually, a big social aspect."

Multiple Gains

Fitness gains

Participant 10 P. 11, Lines 349 - 355	"I think it's another added bonus like knowing that I can hold myself out horizontally. Like, when a lot of guys couldn't do that. I like having that kind of 'ha! I'm better than you' kind of that kind of attitude. I suppose it's kind of the competitive attitude, wanting to be the best again."
Participant 12 P. 6, Lines 140 - 146	"The other reason I like to keep walking is, 'cause then when I go out on a walk and if you haven't walked for even a small amount of time, you really notice the difference, so kind of keeping at a level of fitness is important. And with circuits, I guess it's more, I guess, it's not so much I important in the long term, but in the short term, I like being able to do that type of activity."

Confidence

Participant 3 P. 18, Lines 433 - 443	"Exercising's given me a confidence definitely, definitely a confidence. Uhm, 'cause I can talk to people, 'cause I, I'm generally shy. I don't, I don't like talking to new people, new people are quite odd for me. I think that's based on obviously, childhood, if I'm honest. But I don't, I don't like talking to new people. With exercise… I can talk to someone at the gym."
Participant 8 P. 11, Lines 253 - 257	"I'd say, erm, increased confidence I think is probably the biggest thing I've got out of it. Just, err, just the feeling of doing anything you know. Err, especially now, I feel like I am a very you know sort of fit, I mean I'm not super fit but I feel kind of fit and strong that my body I capable of anything really. It just, I feel like I can push myself pretty hard and I'll be fine, which is, which is good for your confidence I think."
Participant 9 P. 10, Lines 237 - 240	"I could still overtake most people on a hill, you know. But yeah, I noticed I just feel so much healthier most of the time you know, erm, which makes you feel more confident in yourself. Erm, I know you've not, but if you'd asked me I would have said I didn't feel confident, but now I would positively say that I do."
Participant 13 P. 11, Lines 219 - 221	"What have I gotten out of exercising? I think, definitely, uhm, definitely when I went to the gym, at least, I think I had a, more kind of self-confidence, in myself after exercising, uhm, so that was good."

Participant 15 P. 12, Lines 288 - 290	"When you've got an illness, it can affect your confidence and it can affect kind of the way you think about yourself. And these exercises do help in terms of confidence, getting out there."
Participant 16 P. 20, Lines 424 - 426	"It means I can do what I enjoy anywhere in the world, and feel confident enough to go and do it, because I, I feel like I've worked for it."
Participant 17 P. 18, Lines 375 - 376	"You know, I wasn't confident in my body before, I wouldn't have gone out in like a, a bikini."

Social Gains

Participant 1 P. 14, Lines 329-337	"You play together, you socialize together after the game, you sort of… I know some teams right, they play football and they don't go to the pub after yeah, uhh, and that's where you build up a relationship, you know, that's where you start getting to know that person you're playing with, uhm, by that you'll do, help each other a lot more on the field, consequently the team will play better together."
Participant 7 P. 7-8, Lines 201 - 210	"I mean when I started doing long distance running, I, I also joined a running group. And then it was for like a fundraising, uhm, effort as well, for AIDS research, and that was with a group as well... That was really fun, to meet some other people in.. in the city I was living in."
Participant 8 P. 24, Lines 574 - 582	"I think one things I quite like about, erm, tennis is the… social side of it a little bit. Like, here, you know, we've, I went to the university tennis sort of team thing and I really didn't like it, it was all these, kind of, young kids who just like charged up on testosterone and it was just really annoying. So then I went to the local tennis club and it's all like retired folk but they're all just really kind of nice and friendly and I've, I've really enjoyed that sort of meeting this group of people that I never would have really encountered in any other way."

Achievement

Participant 3 P. 19, Lines 456 - 464	"It gives me a great sense of achievement to know when someone, when someone compliments what I've done. If someone says: 'ah, your abs looking good' or 'you've put on a bit of size'. For me that's better than saying 'that's a really good trophy'."
Participant 7 P.19, Lines 577 - 580	"I think it was, just this past year, I mean I've been playing then for five or six years, and then finally, it was like, winning my first set against him. That was like my big thing."
Participant 8 P. 13, Lines 309 - 312	"I was nervous to the point where I could barely play, but afterwards I still sort of felt good that I had done it, which was nice."
Participant 9 P. 4, Lines 87 - 94	"Like the other day, I hadn't been running for ages, and I finally like did it when I got home from work and I was like, 'right, I'm not gonna sit and put some trainers on and I'm just gonna leave the house really quickly'. And I did like a five-mile run! And I didn't have to stop to walk and I was like, 'oh!' Like it felt really good 'cause I was fitter than I thought I was. Erm, so that was not something enjoyable, but it was a sense of achievement, a sense of having completed something."
Participant 12 P. 9, Line: 215 - 219	"That you can see you have, are doing some a bit easier, or you choose a heavier weights, than you were before, so it gives you, a kind of, small sense of achievement."
Participant 14 P. 9, Lines 217 - 223	"I loved doing weights and stuff like that, feel, really kind of feeling it, and seeing it. And then, I, you would use a cross trainer for, it was like 40-45 minute program every time I went there, and just seeing the minutes tick away, and the calorie counter counting up, was really rewarding, satisfying as well. And then you feel good about yourself for the day after you've done it."
Participant 17 P. 17 Lines 362 - 363	"Being able to do something new, like, accomplish things."

Satisfaction after pushing yourself

Participant 2 P. 10, Lines 204 - 206	"I'd probably put satisfaction as the number one thing. Uhm, I don't enjoy, typically, I don't enjoy the exercise whilst I'm doing it. It's too hard. Uhm, but after, the harder it is, the more satisfaction you get afterwards."
Participant 15 P. 10, Lines 235 - 239	"I get a sense of achievement from the running, uhm, and trying to run as quickly as I can, in those four, four miles. Uhhh… and like yesterday, I didn't really, I felt very weak and I was just like, 'argh, I don't want to do it, I don't wanna do it', but I got home and I thought, 'alright, just get changed and go out and you'll be alright after you start'."

Feeling good afterwards

Participant 4 P. 13, Lines 289 - 292	"You always feel better after doing some exercise, or I do anyway. You know, you feel like you've done something, or I feel like I've done something positive after I've done some exercise."
Participant 6 P. 4, Lines 101 - 102	"You go to the gym you always feel better afterwards."
Participant 11 P. 2, Lines 44 - 49	"I tend to go after work, and, uh, I always feel better after a swim it's quite refreshing. Even the gym, even though I don't like going, I always force myself to go to the gym once a week, but I feel better after that, knowing I've achieved something."

Feeling good about yourself

Participant 15 P. 13, Lines 296 - 299	"Gone from an external, uhm, motivation, I'd say, getting compliments and people saying, 'oh you're good', and things, to internal, feeling good about yourself."
Participant 18 P. 18, Lines 348 – 354	"Keeping fit is also about feeling reasonable about yourself. In my case, it's not something you boast about, or anything, you know, not a lot of people are interested in anyway, so uh, uhm, so it's a self-contained thing."

Enjoyment

Participant 1 P. 15, Lines 349 - 350	“The enjoyment is more, more importantly, is if I’ve done my best and played quite well, you know, the enjoyment is, you know, better.”
Participant 2 P. 11, Lines 231- 233	“I love harrowing around on a horse. I love belting around, galloping on a horse is fantastic fun. Uhm, and then you’re hitting the ball as well, so it’s doubly fun! So there’s plenty of things I do, uhm, because I really enjoy them.”
Participant 4 P. 12, Lines 271 - 274	“I suppose it’s kept me healthy. Erm, yeah I suppose I’ve got that out of it, and basically the pleasure of doing it really.”
Participant 6 P. 2, Lines 34 - 35	“I think I was doing both and then, I think, I just enjoyed it more and as I progressed, I trained more, so I didn’t really have time to do both.”
Participant 15 P. 6, Lines 139 - 140	“I enjoy dancing. Uhh, I’ve always enjoyed dancing, even when I was younger. Uhm, just messing about.”
Participant 16 P. 22, Lines 469 - 470	“I think I found kind of, my niche, my specialism, what I enjoy doing, what I enjoy dancing the most.”
Participant 17 P. 26, Lines 544 - 549	“I still dance ’cause I wanna dance. I did judo ’cause I didn’t wanna be bored, that first time, and then I carried on ’cause I enjoyed it. Still doing it ’cause I enjoy it, well, not doing it at the moment ’cause I don’t enjoy it, but when I’m club captain, I will enjoy it again, uhm, just ’cause I enjoy it.”
Participant 18 P. 10, Lines 190 - 195	“It’s almost, meaning for life, it’s just, something that’s just, I don’t remember ever going on a walk in the countryside that I haven’t enjoyed. You know, it’s that level of, you know, I don’t know if I can talk about spiritual, but it’s uhm, it’s just, intense enjoyment I think.”

PAST EXPERIENCES

Past Experiences of Inactivity or Disengagement

Used to Enjoy activity, not sure why stopped

Participant 5 P. 6, Lines 179 - 190	"Ah! I've done badminton actually, I quite enjoyed that, I don't know why I stopped that, that's something I actually enjoyed doing… I would've been in Primary School, so I'd have been between 8 and 10, something like that. But I think, thinking about that actually, I, that'd actually be the only time I'd done something and actually enjoyed it… something I actually chose to do. But that was a long time ago and I've not, you know, it's not something I could do now I couldn't say oh I'm going to join the badminton team. I wouldn't do it."
Participant 14 P. 15, Lines 363 - 370	"I've just remembered what it was! When we were in primary school, we had, like we started playing tennis. I was put in the top seats on my first go. I was like 'Yes, I'm brilliant at this!'"

Bad experiences of trying a new activity

Participant 6 P. 11, Lines 320 - 326	"Me and one of my flatmates did go to canoe club. But that was a bit of a disaster 'cause we fell in the lake and stuff. It was freezing and we never went back so we haven't joined any societies."
Participant 14 P. 6, Lines 129 - 133	"I went to a salsa dancing class one time, because, I get, I've tried like probably everything, in an effort to enjoy it. But I found it really intimidating, 'cause they paired you with men that I'd never met before and they were men who'd been doing it for a while. So, they were familiar with the steps and I felt really like uncomfortable, because I felt like, uhm, not like I was being laughed at, but they were like, 'oh come on, do a better job' and it's quite intimate thing as well, being pressed against a stranger."
Participant 14 P. 6, Lines 151 - 160	"I always used to think, oh I'll take up kick boxing or tae kwon do or something! Again, you know, it's just, either classes were too expensive, and my parents, knowing how I quite everything, wouldn't pay, or I went once or twice, found it hard and stopped."

Negative past experiences from school

Participant 11 P. 20, Lines 605 - 612	"You know, you're kind of forced in school by all P.E. teachers. If you haven't got your kit with you, oh you have to do this sort of thing, and that's not really good basis to, you know. I obviously enjoy I enjoyed exercising all my life, but I it wasn't because of school, in fact that could have put me off."
Participant 13 P. 19, Lines 382 - 391	"When I was a kid I always used to hate, like really hate things like sports day and P.E. and stuff like that. I think it was mainly because, I'm not sure if it was for the actual things that they made you do, so the actual activities, or if it's the fact that they kind of made you do it. Like, 'oh, go in here and get changed and then run around', and it's a bit like, 'oh, screw you I don't want to do that', so maybe it was that kind of thing with authority or something. I don't like that, and maybe that's what's always made me think, you know, like 'ugh!'."

Negative past experiences of physical pain

Participant 13 P. 18, Lines 354 - 366	"I started off running, and ran around, kind of, Bangor, and then, and then ended up in like the most severe splints ever! And yeah so that, that happened and that just really hurt. 'Ahhh well, screw it! I can't really, don't want to do running again'."
Participant 16 P. 14, Lines 302 - 306	"I did the sports day in kind of year eight ish, and uhm, it was a really, really hot day, and I hadn't drank a lot of water, and I blacked out whilst running, and I kind of had a panic attack effectively. And I was just like, 'yeah, I'm not gonna run again', I knew that it was because of this."

Too late to start

Participant 5 P. 3, Lines 71 - 78	"I've always wanted to do things like, horse riding, has always been something I'd really love to do. But, I think, suppose now it's my age as well, I think getting into something like that I'm a bit old,'cause usually people get into it when they're children don't they? And, get better."
Participant 19 P. 6, Lines 106 - 110	"I did do trampolining. I'd quite like to try that again. But I don't know if I'm too old for it now, that, quite used to enjoy that."
Participant 20 P. 2, Lines 19 - 26	"I've never done any clubs or anything. I think originally it was because of money; you had to pay to join the clubs. And then it felt like as I got older, I'd missed out on it as a kid so I never joined in. Everyone seemed more experienced."

Self-consciousness

Participant 13 P. 3, Lines 46 - 48	"I don't like gyms very much I don't think, I always feel sort of very self-conscious when I'm in there running on the treadmill and things."
Participant 14 P. 6, Lines 131 - 133	"I felt really like uncomfortable, because I felt like, uhm, not like I was being laughed at, but they were like, 'oh come on, do a better job'."
Participant 20 P. 11, Lines 208 - 212	"I feel really silly if I'm running outside, unless I'm with somebody. Like when my mum's at home, so if I'm running with her that's ok, but if I run on my own, I know this isn't true, but I feel like everyone's staring at me, and they're like, 'oh look at her'."

Positive Past Experiences

Done sport and exercise from a young age

Participant 1 P. 5, Lines 109 - 111	"From a young age, it was uhm, you know… I played for north wales rugby, was captain of north wales rugby, cricket… I could play squash to a high standard, county standard, badminton."
Participant 3 P. 7-8, Lines 173 - 182	"We trained together quite regularly and I suppose I just kind of, for me that was what men do. It was just kind of engrained from such a…young age… my dad will go out and he will train whether it'd be in the gym or whether it be in the garage, or whether it'd be out on the bike. That's your release."
Participant 7 P. 20-21, Lines 610 - 614	"I think it probably comes from when I was younger, 'cause I played team sports and things, you know. It was competitive levels, and so, you know, when you get older, you're not kind of, in those situations any more. I've been trained, I feel, like to work and improve towards something.
Participant 10 P.1, Lines 11-16; P.6, Lines 171-176	"I've always danced since I was four... I started dancing because my sister was dancing and I wanted to dance too…[gymnastics] I started when I was four, again, because my sister was doing gymnastics and I wanted to do gymnastics too, to be like my sister. So I started going along and yeah, erm, I had a very flexible back, which, I've always had a flexible back and, you know, everyone always picked up on that like, 'aw you've got such a beautiful bridge'."

Childhood activity for the enjoyment of it

Participant 6 P. 5, Lines 141 - 145	"Because that was why I started, when I was, when did I start? When I was 8 I think, so I wasn't really, yeah I wasn't really conscious of it I think it was more of enjoyment that side of it."
Participant 8 P. 6, Lines 124 - 131	"I wasn't into team sport so we just started skateboarding, me and a few, you know some other kinds the same age. And it was, you know, you just got out on the street and you're just riding around, you know, you don't need anything, you just need your skateboard and that's it. So it was just easy to do and that, and that is quite social in a way because you just like a gang of sort of teenagers."
	Carrying on an enjoyable childhood acitivity
Participant 11 P. 1, Lines 19 - 20	"Swimming I've always done. I had swimming lessons when I was a child, and I enjoy swimming so that's something that I enjoy. I find quite relaxing, so I like swimming."
Participant 13 P. 4-5, Lines 80 - 89	"I always really enjoyed cycling as a kid actually. Uhm, my parents bought me a bike when I was very young, and I would cycle around a lot, and I just thought, I thought: I did enjoy cycling. And you know, since I am in Bangor now, and this was last year so the summer of PhD when it was really quiet with work, I thought it would be nice to go out basically and I had a bit of money left over, so I bought a bike."
Participant 16 P. 21-22, Lines 460 - 468	"I've always liked dancing, stage coach was acting, singing and drama, and I was always best at dancing regardless of the fact that I'm a singer,'cause it's different kind of singing. Uhm, and my mum, my mum has always been like, 'oh yeah, you danced before you could walk', kind of thing, and, 'you've always been active', and she's always say things like that."
Participant 17 P. 6, Lines 123 - 133	"When I was younger, I did dancing. I've got a younger brother and uhm, he didn't do anything. He went to a karate club sort of thing, mixed martial arts club for about six weeks and he really, really enjoyed it, and then he stopped going. I don't really know why. But my dad really wanted to get him back into something so he had like something to do and it was on Friday evening and I was like, well, I may as well join in, would be bored otherwise, for an hour so, I did, and I got off the matt and I thought, 'hated that'. I went back the next week and I loved it. And I'm still doing it and my brother is not."

Activity from childhood became a habit

Participant 10 P. 8, Lines 235 - 243	"As I got older it was my choice do I want to keep going. I think once you've done something from a young age it becomes almost a habit and not doing it feels wrong, like when I when I had to stop doing gymnastics, I was kind of at a loss at a loose end just like oh well what should I do now."
Participant 12 P. 2, Lines 50 - 52	"The walking side, I guess I've just always enjoyed, my parents were walkers, they, they still are, so, it's just something I was brought up doing."

Convenient ways to get around

Participant 12 P. 11-12, Lines 282 - 289	"Often I've just seen it as a way to way to A to B. 'Cause I was brought in a, up in a family of: if the shops were near enough to walk to, you didn't get in your car, you walked there. So now I can walk to work on some days and therefore I walk to work on the days I don't need my car."
Participant 14 P. 3, Lines 60 - 66	"Well I've cycled since I can remember. My house is relatively isolated, as in, I don't live, my parents don't live in a park, so I didn't have any friends immediately nearby, and they were always also very encouraging of me being independent. So I'd probably say from the age of 7, I used to get on my bike and just cycle to friends houses and, like, always, I'd cycle to school."

GAINS AS MOTIVATORS

Focus on Barriers

Hassle involved in activity

Participant 9 P. 2, Lines 32 - 39	"I guess running is something that kind of takes a little bit more motivation, preparation to begin than other things 'cause you, it's not something you do in a group so you don't sort of say, 'heyy, let's all go and do this'. And then there's a commitment there. It's just generally something you do by yourself and you have to kind of figure out when you're going to do it and you have to make sure that you've got the time and kind of get changed, which is such a hassle, and then you've got to shower afterwards if you want to see anyone else that day 'cause you gonna smell. And, erm, well, yeah I guess there's a lot of effort there and I'm just quite lazy really."

Participant 12 P. 1-2, Lines 26 - 31	"The pool became far from where I used to live, from where I could walk to the pool, so it just made it easy. I guess I'm not motivated enough to get in a car and drive there, and all the faff with changing and brushing your hair after and stuff."
Participant 13 P. 6, Lines 112 - 118	"It's very inconvenient and I only ever, you know, if I go out on it, I need to, I think, I need to set aside like a few hours really. Warrant putting it, take the wheel off, take it downstairs, put the wheel back on and then go out, for a couple of hours."
	Time related barriers
Participant 11 P. 15, Lines 435 - 441	"I did yoga for maybe two years, again, again, that was having to be there at a certain time every week and I think that's what, err, puts me off sometimes, especially in the evenings. You know, I think, I don't feel like going this week, whereas with a swim I'll go tomorrow night instead."
Participant 16 P. 11, Lines 223 - 226	"I was like "yeah, you know, I need to be at school for 12, so what I'll do is I'll go to the 9 o clock spin class and then 10 o' clock aerobics, and then I'll have a shower there and I'll be back in time, and it'll be great', and I just didn't want to get out of bed."
	Burden
Participant 11 P. 18-19, Lines 558 - 563	"I don't think I've had bad, I mean, I've, I might've tried something out and not liked it. I just don't go again. If I don't like something then, erm, like I say it, it, probably like yoga was one of the things that I went to and that became a bit of a burden."
	Boring
Participant 5 P. 5, Lines 143 - 148	"Going out walking for me, is like a nightmare, I wouldn't wanna do it. Like, I'll go up there in the car and sit and look at the view, but, I don't know, I think it's because, you, you do get bored. And if you go out for a walk, and you get bored, like, you're stuck aren't you?"
Participant 11 P. 14, Lines 429 - 433	"I did yoga for a bit. I don't know if you'd class that as exercise. Erm, yeah I did that for a few years and, I don't mean, I get bored after a while."

Participant 20 P. 7, Lines 123 - 126	"I suppose we didn't have the drive to do it, if we really, really, wanted to do it, I'm sure parents could have found a way to keep on financing it, but yeah, I think we just got a bit, bored."

No longer making gains

Participant 3 P. 26, Lines 634 - 640	"With regards to swimming, I dunno, I think, I think I stopped because there was no aspect of competition left for me. I didn't have the dedication for swimming to go to a national level, or a county level. I competed, uhm, for my town, so I kind of just… I lost the challenge."
Participant 6 P. 7-12 Lines 184-341	"I did do quite a lot of competitions and my instructor was on the Dutch Olympic squad and it was sort of like motivating, like if I'd carried on I don't know where I would've ended up. But I guess that would've sort of if you do go professional with it… I know that sounds really bad like but like some instructors are better than others."
Participant 17 P. 22, Lines 466 - 472	"My coach, he retired so I guess that wasn't as fun. I stopped doing gymnastics 'cause it got like, we got like new teachers and stuff and they weren't as fun and also, a lot of like gymnastics was at my friends dropping out of it 'cause they wanted to go get pregnant, at like, 14. That's wrong, but, it's like: 'oh, I got nobody to do it with now'."

Comparing to others

Participant 5 P. 4, Lines 114 - 119	"It's all she talks about, which is fine, but I don't think she's intentionally making me feel bad because I don't do it. But it makes me feel bad because I don't do it. 'Cause it makes me feel even more lazy when somebody else is going out and doing it every day."
Participant 13 P. 3, Lines 54 - 58	"I think, especially for men, it's very kind of, like a, it's very much like a competition type thing in the gyms, and it's pretty ridiculous. I'm like, I can stay on the treadmill longer, I can lift all these weight and it's yeah, it's a bit silly, uh, so yeah, primarily that's probably why I don't go to the gym very much."
Participant 14 P. 12, Lines 312 - 313	"I know that everyone starts off from scratch but all you could see around you is really fit people doing a good job."

Not Good at Activity

Participant 3 P. 23-24, Lines 573 - 582	"I was never that good. I was alright… but I was better at the basics, I could, I could do the basics; I could shoot, I could tackle, I could dribble, I could do all those. I just couldn't do anything fancy and that annoyed me. I didn't like not being able to do that. I hadn't got the coordination to do it and I just didn't like it. So that led me to withdraw from that."
Participant 10 P. 9, Lines 269 - 272	"I mean it's mainly that and it is mainly just dance and stuff, erm, I've got no hand eye co-ordination, I can't catch a ball or anything, so no I'm not very good at that sort of stuff."
Participant 14 P. 5-8, Lines 119 - 189	"Most sports don't interest me… It's something I see as being necessary but not enjoyable… I think I don't cope well with not being good at things… seems to be the same story with everything I start and quit… I'm not good at it, and then I just give up."
Participant 16 P. 2, Lines 31 - 36	"I think I enjoy it because I think it's a certain type of, especially the kind of the latin and ballroom, I actually think I'm, without being too arrogant, like, I think I'm OK at it, I'm good at it. Whereas, uhm, I did, I kind of did a lot of, the latter half of first year I tried out contemporary, and ballet, and jazz and, and it was, I never felt as fluid in them, or uhm, as good in them, uh, good at them."
Participant 18 P. 20, Lines 402 - 404	"Obviously I'm absolutely rubbish at something uh, I was never, I quite enjoyed football and cricket when I was young, but I wasn't much good so I didn't bother to go along with it."

Limitations

Age

Participant 1 P. 7, Lines 151 - 153	"It takes a long time to get fit as you get older, and you lose it so much quicker. So yes, uhm, as an individual, uhm, I try and do things."
Participant 2 P. 7, Lines 138 - 144	"I couldn't do, uhm, things that I used to be able to do. And, I mean, and, and that's the hardest bit about aging, not just injuries but, uhm, you know, the inability to do things that you used to be able to do. That's the pisser about getting old, yeah. I mean there's things I just miss being able to do."

Participant 18 P. 11, Lines 208 - 216	"I suppose I've been frightened at times. I've been near the edge on a few occasions, and some not so long ago, uhh, I really felt, 'ahh, what are you doing? And what about your girlfriend your grandchildren and so on?', uhm, it didn't materialise, but you know, it can be in quite a risky situation and you've gotta' understand as you get older that you don't necessarily have the capabilities to get yourself out of situations, which, when you were younger you perhaps wouldn't have worried so much about."

Injuries

Participant 2 P. 2, Lines 39 - 40	"I got injuries that wouldn't allow me to play anymore, I tried a couple of comebacks and just, just couldn't do it. Uhm, just chronic injuries."
Participant 3 P. 24-25, Lines 582 - 604	"Rugby I withdrew 'cause I injured myself… Another player… he drove his rear stud into my toe, which forced my nail into my toe. And I was, I was in a lot of pain, and I had to have my whole toe nail removed, uhh, and six stitches down my toe… so I couldn't run properly on it, and that, that was a bit bad… I did go back to rugby straight after it, after I'd healed and after I could run again. But I was always a bit more, well, I'm not going, close to him, so it kind of ruined my rugby career in that respect"
Participant 4 P. 25, Lines 563 - 568	"I did do a bit of yoga previously but I injured my back quite badly, years ago, erm, and I was trying everything to get it back."
Participant 6 P. 9, Lines 250 - 255	"I did, err, tear my Achilles when I was doing tae kwon do so I had to like get out of that for a while and have physio and stuff. I did something to my ligaments in my knee."
Participant 8 P. 20, Lines 474 - 477	"The bad things are just injuries, I think, when if you injure yourself and then it stops you from, stops you from exercising. And also can just sort of stop you from doing all sorts of other things which can be quite depressing I think."
Participant 10 P. 7, Lines 209 - 215	"It was just like a repetitive strain injury almost, and it just got worse, and worse, and worse… Occasionally I have had problems with it, and it's like, 'ergh!', and I do have to kind of be careful and very conscious of how much strain I'm putting through the shoulder."

Participant 17 p. 19, Lines 399-408	"I mean I injure myself quite a lot but, awh, a bit of rough and tumble never hurt anyone, well, it did hurt me but… what's the point like in wrapping yourself in bubble wrap and not enjoying life? I'd rather get out there and like, 'ergh, that wasn't a good day', or like, 'that was a really good fight, really enjoyed that, even though I broke my collar bone'."
Participant 18 P. 11, Lines 218 - 220	"When I was running, I used to get the odd Achilles tendon, and it was more about frustration that you couldn't keep going, rather than it was just a damn nuisance."
	Finding alternatives
Participant 2 P. 2, Lines 43 - 45	"I had chronic hamstring problems. So I had a lot of trouble, uhm, uhh, with hamstrings… that, uhm, restricted the sort of sports that I could play. Uhm, eventually I pretty well got over that, I got into yoga, and then, uhm, that fixed up most of the hamstring problems."
Participant 7 P. 16, Lines 463 - 478	"I was quite depressed when I, for some time, uhm, well, not very long, but coming to terms with the fact that, uhh, 'OK, that I'm not 'gona be, you know, running very hard to go and get that ball that I just missed. You know, normally, I, like really dash for it, and it took me some, you know a little bit to kind of get over that, and say 'oh well'… 'every giant doesn't need to be slain right now', you know, there's other things you can do."
Participant 10 P. 6-7, Lines 197 - 206	"I was basically told that if you don't stop gymnastics you're going to get what's called frozen shoulder, which basically means you won't be able to move your shoulder. So it was like, 'oh, okay, let's quit gymnastics so I can still dance', otherwise I'd have kept going and then it would have hurt. Probably wouldn't have been able to do anything."
Participant 17 P. 30, Lines 636 - 640	"I don't really wanna leave university because then I know that'll kill my social life. I know that I won't be able to dance for 8 hours a week or whatever, uhm, I won't be as active, I don't think, but I'll be active differently."
	Prioritising other things
Participant 6 P. 2, Lines 40-43	"I was doing A-Levels, so I was studying more and taking out like 2 hours every night it was getting in the way. Like my grades were dropping so I stopped that and to bring them up."
Participant 13 P. 15, Lines 292-298	"When term started again, it was more of, cycling would kind of be relegated to the weekends. And now that Christmas has passed, kind of every day, every day counts. It's sort of, weekend rolls around, it's like, 'Oh I'd like to go cycling but I've got all these other things to do'."

Activity That Fits You

Finding your thing

Participant 3 P. 27, Lines 662 - 667	"I kind of progressed through my sports looking for something that suited me. And each one I dropped, I thought well ok, I liked the sport, wasn't perfect for me."
Participant 13 P. 15-16, Lines 309 - 316	"I think the cycling thing fits my personality just a bit better, in that, it's very, you know, you're kind of on your own. You don't have any, all the pressures of anything, of going to the gym, and it doesn't cost anything, I mean apart from the initial cost of the bike."
Participant 15 P. 10, Lines 222 - 229	"I'm sustaining what I enjoy. And, uhm, I'm more coherent in the sense that I, I'm now much more confident, confident in what I like doing and what I don't like doing. I can say no a bit better, rather than thinking, 'aww, I used to enjoy that, I wanna do it again', and now it's, 'I enjoy doing that, now', so I carry on doing it, rather than going back on things, uhm, I used to like."
Participant 16 P. 22, Lines 469 - 470	"I think I found kind of my niche, my specialism, what I enjoy doing, what I enjoy dancing the most."

Freedom of Choice

Participant 7 P 22, Lines 644 - 654	"When you're, kind of, in school, you're confined to these things that they have. And so it kind of opened my eyes to 'oh, there's this, and this, and this'. No there's, uhm, whatever that cardio boxing, you know, and then all these different names and I just though 'oh, is this fun!' and try different things and then golf and then… I think it has changed, because, as you become more independent, you know, you realise 'oh, there's this whole world of other sports and exercises that you can do'."
Participant 13 P. 16, Lines 314 - 321	"You're kind of on your own, you don't have any, all the pressures of anything, of going to the gym, and it doesn't cost anything, I mean apart from the initial cost of the bike, you know, once that's done, once you've paid that, it's all. You can go anywhere, you can do whatever you want, you can go on it whatever time you like."

Participant 17 P. 9-10, Lines 192 - 200	"I saw… a belly dancing class was like, 'Oh, that looks really good! It looks just like a circus! I wanna join in!', so I joined that, and then that's really good. And then at the beginning of this year, like, I did loads of belly dancing stuff. Like, I feel really included in that group. I feel really involved, and then, uhm, this year, as I was doing beginners and advanced latin and ballroom and belly dancing, and then uhm, I joined jazz as well."
	Focus and Control
Participant 3 P. 7, Lines 151-156	"Here I'm more focused , 'cause I can just put my ear phones in, block out the world and that's it; It's me and the weights, that's it, nothing else, so, I don't, I don't know… he focus aspect of training by yourself is unrivalled."
Participant 8 P. 4, Lines 82 - 89	"I'd rather play singles. I don't like the fact that they are relying on my, I kind of feel it, it's painful when I lose a point or something. I kind of think 'aah, no! I've let them down', you know, not, I just rather it was all under my own control I think."
Participant 13 P. 16, Lines 314-315	"You're kind of on your own, you don't have any, all the pressures of anything, of going to the gym."
Participant 19 P. 9, Lines 171 - 173	"[I] like not seeing people. But uhm, I guess you're working towards like your own goal, you're not competing with someone else, you've got your own standards and your own targets and things."
	Being Good at Activity
Participant 1 P. 5, Lines 106 - 107	"I think it was an interest I, football is just one thing I was, uh, I, uhm, was captain, I played, uh, lots of different sports, but I probably had, uhm, I was good at it."
Participant 3 P. 29, Lines 709 - 712	"That's what got me interested then, and once I, that's what got me hooked, knowing I was good at it. And then once I was hooked, it just, that was it, I was like 'oh this is brilliant'."

Participant 9 P. 3-4, Lines 75 - 86	"I'm quite good at running… and I'm, it's kind of self in, no that not quite the word, self-indulgent, there's a better word for it, but, uhm, I quite enjoy doing things I'm good at. Like, no one likes doing things they are not good at, erm, and I'm actually quite good at running, like I'm not good at sprinting, but long distance running, I just keep going and it's quite satisfying just kind of pushing through."
Participant 10 P. 2-3, Lines 64 - 72	"I took to it quite easily like I think, uhm, the way my pole school back home does it, they kind of have like bronze moves and then bronze routines, and I'd done all the bronze moves in an hour: 'right, okay, a bronze routine, right, okay, great, now silver moves, oh silver routine, gold moves', so I just kind of like moved through fairly quickly."
Participant 14 P. 15, Lines 363 - 370	"I've just remembered what it was. When we were in primary school, we had, like we started playing tennis, and we had an instructor who mainly shoed us the basics of what you do. And then you had to play a game with another person, you were kind of like rated, or seated or something like that, I was put in the top seats on my first go. I was like 'Yes!, I'm brilliant at this'."
Participant 16 P. 16, Lines 345 - 348	"I just want to feel that I'm good at something, and because I like being good at things and no one likes being bad at things, uhm, and I like being able to see improvement."
Participant 17 P. 13, Lines 283 - 285	"Being good at it [makes it enjoyable]. And like, being recognised, or having something to work on, so I really like it when people give me feedback, and, so I can improve."
	Special Role
Participant 1 P. 3, Lines 71-73	"I used to be in the leisure industry, err, my first job was working in a leisure centre. I used to take, uhm, qualified coaching a lot of different sports, so I used to take classes."
Participant 10 P. 14, Lines 448 - 456	"I was like an assistant coach, so like, the, the main coach would teach all the things and I'd just kind of go to the kids that were struggling with some of the moves and help them with that. And then, erm, I did a coaching course to be assistant club coach, and that again was just me helping out having my own little group and doing little things."
Participant 16 P. 4, Lines 80 - 82	"I was in, for my first show, I was in both the beginners and advanced latin and ballroom, and I kind of have been ever since, and in the last year, uhh, a friend of mine and I have taught it."

Participant 17 P. 7, Lines 148 - 153	"I got really good at coaching, and so when I got to a really advanced level and was the same grade as my coaches, I was allowed to like, coach my own lessons. And I've coached loads of lessons, I love teaching, mainly kids, but I've taught anybody from the age of 2 years old to 40+ years old."
	Unsought Gains
	Social Engagement Bonus
Participant 10 P. 9-10, Lines 294 - 302	"I mean if all my friends didn't pole dance, it was just me, I'd still want to do it, but I think having like the social side of it, it kind of improves the experience. Like, it, it doesn't like make it more fun because pole dancing in itself is fun on it's own, but it's nice to like share it."
Participant 11 P. 8, Lines 222 - 225	"Walking is quite social, the social part is quite big, which I didn't realise when I first joined to be honest. Erm, but you do, it's amazing how many friends you do make."
	Weight Control
Participant 9 P. 7, Lines 161 - 164	"I've tried to lose weight before and it's difficult to lose that first bit, but I've kind of lost that first bit accidentally, which is kind of cheating unfortunately but I wasn't complaining. And when I realised, well, I was like, 'yeah, yeah, let's keep on at this."
	Competition
Participant 8 P. 12, Lines 293 - 298	"I'm surprised that like I've actually kind of enjoyed the competition as much as I have 'cause I've sort of always, I don't think of myself as very competitive so I've always stayed away from the competition. But, but, now I'm actually thinking 'ahh yeah this is, this is quite rewarding', you know, 'this is good fun'."
	Confidence
Participant 3 P. 18, Lines 433 - 445	"I think exercising's given me a confidence definitely, definitely a confidence. 'Cause I can talk to people, 'cause I, I'm generally shy…with exercise… I can talk to someone at the gym 'cause I've got a common interest."
Participant 9 P. 10, Lines 237 - 240	"I could still overtake most people on a hill, you know. But yeah, I noticed I just feel so much healthier most of the time you know, erm, which makes you feel more confident in yourself. Erm, I know you've not, but if you'd asked me I would have said I didn't feel confident, but now I would positively say that I do."

Note: **THEME** ***Subtheme*** *Category*.

Appendix E
Application for Ethical Approval: EMGI Study

Application for Ethical Approval

Project Title: The role of motive fulfilment in exercise participation

Principal investigator: Ingledew, David

Other researchers: Strommer,Sofia

Pre-screen Questions

Type of Project
MSc/MRes

What is the broad area of research
Clinical/Health

Funding body

Type of application (check all that apply)
A new application that does not require sponsorship or scrutiny from an outside body?

Proposed methodology (check all that apply)
Questionnaires and Interviews

Do you plan to include any of the following groups in your study?

Does your project require use of any of the following facilities and, if so, has the protocol been reviewed by the appropriate expert/safety panel? If yes please complete Part 2:B

Part 1: Ethical Considerations

Will you describe the main experimental procedures to participants in advance, so that they are informed about what to expect?
Yes

Will you tell participants that their participation is voluntary?
Yes

Will you obtain written consent for participation?
Yes

If the research is observational, will you ask participants for their consent to being observed?
N/A

Will you tell participants that they may withdraw from the research at any time and for any reason?
Yes

With questionnaires, will you give participants the option of omitting questions they do not want to answer?
Yes

Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?
Yes

Will you debrief participants at the end of their participation (i.e. give them a brief explanation of the study)?
Yes

Will your project involve deliberately misleading participants in any way?
No

Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? If *Yes* , give details and state what you will tell them to do should they experience any problems (e.g., who they can contact for help)
No

Is there any realistic risk of any participants experiencing discomfort or risk to health, subsequent illness or injury that might require medical or psychological treatment as a result of the procedures?
No

Does your project involve work with animals? If *Yes* please complete Part 2: B
No

Does your project involve payment to participants that differs from the normal rates? Is there significant concern that the level of payment you offer for this study will unduly influence participants to agree to procedures they may otherwise find unacceptable? If *Yes* please complete Part 2: B and explain in point 5 of the full protocol
No

If your study involves children under 18 years of age have you made adequate provision for child protection issues in your protocol?
No

If your study involves people with learning difficulties have you made adequate provision to manage distress?
No

If your study involves participants covered by the Mental Capacity Act (i.e. adults over 16 years of age who lack the mental capacity to make specific decisions for themselves) do you have appropriate consent procedures in place? NB Some research involving participants who lack capacity will require review by an NHS REC. If you are unsure about whether this applies to your study, please contact the Ethics Administrator in the first instance
No

If your study involves patients have you made adequate provision to manage distress?
No

Does your study involve people in custody?
No

If your study involves participants recruited from one of the Neurology Patient Panels or the Psychiatry Patient Panel then has the protocol been reviewed by the appropriate expert/safety panel?
No

If your study includes physically vulnerable adults have you ensured that there will be a person trained in CPR and seizure management at hand at all times during testing?
No

Is there significant potential risk to investigator(s) of allegations being made against the investigator(s). (e.g., through work with vulnerable populations or context of research)? No

Is there significant potential risk to the institution in any way? (e.g., controversiality or potential for misuse of research findings.)
No

Part 3: Risk Assessment

Is there significant potential risk to participants of adverse effects?
No

Is there significant potential risk to participants of distress?
No

Is there significant potential risk to participants for persisting or subsequent illness or injury that might require medical or psychological treatment?
No

Is there significant potential risk to investigator(s) of violence or other harm to the investigator(s) (e.g., through work with particular populations or through context of research)?
No

Is there significant potential risk to other members of staff or students at the institution? (e.g., reception or other staff required to deal with violent or vulnerable populations.)
No

Does the research involve the investigator(s) working under any of the following conditions: alone; away from the School; after-hours; or on weekends?
Yes

Further details: The investigator will work in the University outside the School of Psychology, but

(a) she will work only in communal areas of the University, and (b) she will send text messages detailing her whereabouts to a friend at regular intervals.

Does the experimental procedure involve touching participants?
No

Does the research involve disabled participants or children visiting the School?
No

Part 2: A

The potential value of addressing this issue
Further details: This is a study of how motive fulfilment (i.e., gains consistent with motives) affects exercise participation. The findings will have implications for the design of exercise promotion interventions.

Hypotheses
Further details: It is hypothesised that motives for exercising and perceived gains from exercising will have interactive effects on behavioural regulation of exercise, amount of exercise, and general affect.

Participants recruitment. Please attach consent and debrief forms with supporitng documents
Further details: Approximately 200 adults aged 18 years or older will be recruited. They will be students at Bangor University. Potential participants will be approached in communal areas of halls of residence (e.g., kitchens, lounges) and other communal areas of the university (e.g., cafeterias, seating areas). They will be asked if they might be willing to participate in a study of exercise behaviour, using the following script: "I am a postgraduate Psychology student conducting a research project. I wonder if you might consider taking part. The project is about motivation for exercise. Taking part would mean filling in a questionnaire about your reasons for exercising, amount of exercise, personal experience of exercising, and how you have felt recently. It will take about 20 minutes. I have here an information sheet that explains the project more fully. Would you be willing to read this information sheet before deciding whether or not to take part?" If they say yes, they will be provided with the information sheet and given a chance to ask questions. If they give verbal consent to take part, they will be given the questionnaire. At the beginning of the questionnaire, they will be asked to affirm that "having read the information sheet and had a chance to ask questions, I consent to participating in this study", by ticking a box. Thus they will give written consent but not give their name. By this means, data can be truly anonymous, which is preferable for data of a personal nature. Participants will complete the questionnaire on their own or, if they prefer, in the company of others but without collaborating. They will do this in a communal area or, if they prefer, in a private place. The investigator will remain in communal areas. The investigator will be available to answer questions, receive completed questionnaires, and give participants the debriefing sheet. This recruitment procedure has been successful in the past. If we do not on this occasion obtain the full sample by this procedure, the sample may be supplemented from SONA, using the same introductory script as above. We are not using SONA as our primary source of recruitment because of the need for a large number of participants, the need for fairly equal numbers of males and females, and the need to avoid satisficing. The information sheet, questionnaire, and debrief form are attached.

Research methodology
Further details: This is a cross-sectional questionnaire survey. The booklet comprise questions about age, gender, ethnic background, height and weight, exercise participation, motives for exercise participation (Exercise Motivations Inventory 2 and Behavioural Regulation of Exercise Questionnaire 2), perceived gains from exercising (adaptation of the EMI-2), general affect (PANAS), satisfaction with exercise, and intention to continue exercising. Data will be analysed by factor analysis, and by moderated multiple regression incorporating product terms to represent the interactive effects of motives and perceived gains.

Estimated start date and duration of the study.
Further details: Data collection will be from March to June 2011.

For studies recruiting via SONA or advertising for participants in any way please provide a summary of how participants will be informed about the study in the advertisement. N.B. This should be a brief factual description of the study and what participants will be required to do.

Part 4: Research Insurance

Is the research to be conducted in the UK?
Yes

Is the research based solely upon the following methodologies? Psychological activity, Questionnaires, Measurements of physiological processes, Venepuncture, Collections of body secretions by non-invasive methods, The administration by mouth of foods or nutrients or variation of diet other than the administration of drugs or other food supplements
Yes

Appendix F
Motive and Gain Items in the EMGI

The instructions for motives were "Following are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, or *would be true* for you personally if you did exercise ...". The stem was "Personally, I exercise (or might exercise) ...".

The instructions for gains were "This section of the questionnaire can only be completed by people who have some current or recent experience of exercise. So if you have not exercised within the last twelve months, please just put a cross here and skip this section. The questions are about what you have actually gained from exercise. This may be the same or different from what you originally wanted or hoped to gain. Please tell us your personal experience of exercise using the following scale ...". The stem was "My personal experience of exercise has been that ...".

Concept	Motive item	Gain item
Affiliation	To spend time with friends	It has allowed me to spend time with friends
	To enjoy the social aspects of exercising	I have enjoyed the social aspects of exercising
	To have fun being active with other people	I have had fun being active with other people
	To make new friends	I have made new friends through exercise
Appearance	To help me look younger	It has helped me to look younger
	To have a good body	It has helped me to have a better body
	To improve my appearance	I have been able to improve my appearance
	To look more attractive	It has helped me to look more attractive
Challenge	To give me goals to work towards	It has given me goals to work towards
	To give me personal challenges to face	It has given me personal challenges to face
	To develop personal skills	I have been able to develop personal skills
	To measure myself against personal standards	It has allowed me to measure myself against personal standards
Competition	Because I like trying to win in physical activities	I have liked trying to win in physical activities
	Because I enjoy competing	I have been able to enjoy competing
	Because I enjoy physical competition	I have been able to enjoy physical competition

Concept	Motive item	Gain item
	Because I find physical activities fun, especially when competition is involved	I have found physical activities fun, especially when competition was involved
Enjoyment	Because I enjoy the feeling of exerting myself	I have enjoyed the feeling of exerting myself
	Because I find exercising satisfying in and of itself	I have found exercising satisfying in and of itself
	For enjoyment of the experience of exercising	I have found the experience of exercising enjoyable
	Because I feel at my best when exercising	I have felt at my best when exercising
Health Pressures	Because my doctor advised me to exercise	I have followed my doctor's advice by exercising
	To help prevent an illness that runs in my family	It has helped reduce the risk of an illness that runs in my family
	To help recover from an illness/injury	It has helped me to recover from an illness/injury
Ill Health Avoidance	To avoid ill-health	I have been able to avoid ill-health
	To prevent health problems	I have been able to prevent health problems
	To avoid heart disease	It has reduced my risk of heart disease
Nimbleness	To stay/become more agile	I have stayed/become more agile through exercise.
	To maintain flexibility	It has helped me to maintain flexibility
	To stay/become flexible	I have been able to stay/become flexible
Positive Health	To have a healthy body	It has helped me to have a healthy body
	Because I want to maintain good health	It has helped me to maintain good health
	To feel more healthy	I have felt more healthy
Revitalization	Because it makes me feel good	I have felt good through exercising
	Because I find exercise invigorating	I have found exercise invigorating
	To recharge my batteries	It has helped me to recharge my batteries
Stress Management	To give me space to think	It has given me space to think
	Because it helps to reduce tension	It has helped me to reduce tension
	To help manage stress	I have been able to manage stress through exercising
	To release tension	I have released tension by exercising
Social Recognition	To show my worth to others	I have been able to show my worth to others

Concept	Motive item	Gain item
	To compare my abilities with other peoples'	It has allowed me to compare my abilities with other peoples'
	To gain recognition for my accomplishments	I have gained recognition for my accomplishments
	To accomplish things that others are incapable of	It has allowed me to accomplish things that others are incapable of
Strength and Endurance	To build up my strength	I have built up my strength through exercising
	To increase my endurance	I have increased my endurance
	To get stronger	It has helped me to get stronger
	To develop my muscles	I have been able to develop my muscles
Weight Management	To stay slim	It has enabled me to stay slim
	To lose weight	I have lost weight through exercising
	To help control my weight	It has helped control my weight
	Because exercise helps me to burn calories	It has helped me to burn calories

Appendix G

Questionnaire: EMGI Study

Information Sheet for Research Project on Exercise Motivation

- This project is being conducted by Sofia Strommer, MSc student, under the supervision of Dr David Ingledew, Senior Lecturer, from the School of Psychology, Bangor University.

- The project is about people's motivation for exercise. We are inviting adults aged 18 years or older to take part. You can take part whether or not you currently exercise.

- If you decide to take part, you will be asked to complete a questionnaire, in English, taking about 20 minutes. You will be asked about your age, sex, ethnic background, height and weight, reasons for exercising, amount of exercise, personal experience of exercising, and how you have felt.

- The information you give will be anonymous. You will not be asked to put your name on the questionnaire. You can confirm your consent just by ticking a box. You will not be identifiable in any report of this research.

- Your participation in this research is entirely voluntary. If you do not wish to answer a particular question you can leave it blank. You can withdraw completely any time before submitting the questionnaire. If you withdraw, your questionnaire will be destroyed.

- We will be pleased to answer any questions you may have about the research, before you decide to take part, while you are taking part, or after you have taken part. We can be contacted by email: Sofia Strommer (pspca5@bangor.ac.uk); David Ingledew (d.k.ingledew@bangor.ac.uk). Or by telephone: 01248 382623 (David Ingledew). Or you can write to us at the School of Psychology, Bangor University LL57 2DG.

- If you have any complaints about the conduct of the research, you can write to Professor Oliver Turnbull, Head of School, School of Psychology, Bangor University, LL57 2DG, UK (o.turnbull@bangor.ac.uk).

Background Information

Throughout this questionnaire, please answer the questions in sequence, without referring back. Try to not let your answers to one question influence your answers to the other questions. There are no correct or incorrect answers. First, please tick the following declaration to show you consent to participating in this study.

	Please tick
Having read the information sheet and had a chance to ask questions, I consent to participating in this study.	☐

Please give the following background information.

What is your age? _____years

Your gender? Male/Female

How would you describe your ethnic background?_____

_____

_____

What is your height? _____feet _____inches OR _____centimetres

Your weight (lightly dressed)? _____stones _____pounds OR _____kilograms

Are you a member of any club, in order to participate in sport or recreational physical activity?

_____Yes

_____No

Please continue to the next section.

What Are Your Reasons for Exercising?

Following are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, or *would be true* for you personally if you did exercise. If you do not consider a statement to be true for you at all, circle the '0'. If you think that a statement is very true for you indeed, circle the '4'. If you think that a statement is partly true for you, then circle the '1', '2', or '3', according to how strongly you feel that it reflects why you exercise or might exercise. Please remember, we want to know why *you personally* choose to exercise or might choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
1.	Because other people say I should	0	1	2	3	4
2.	To maintain flexibility	0	1	2	3	4
3.	Because it helps to reduce tension	0	1	2	3	4
4.	Because I feel guilty when I don't exercise	0	1	2	3	4
5.	Because I enjoy competing	0	1	2	3	4
6.	To help manage stress	0	1	2	3	4
7.	Because I feel at my best when exercising	0	1	2	3	4
8.	Because I value the benefits of exercise	0	1	2	3	4
9.	To feel more healthy	0	1	2	3	4
10.	To give me space to think	0	1	2	3	4
11.	To build up my strength	0	1	2	3	4
12.	Because it's fun	0	1	2	3	4
13.	To enjoy the social aspects of exercising	0	1	2	3	4
14.	To give me goals to work towards	0	1	2	3	4
15.	Because I enjoy the feeling of exerting myself	0	1	2	3	4
16.	I don't see why I should have to exercise	0	1	2	3	4
17.	To measure myself against personal standards	0	1	2	3	4
18.	To help me look younger	0	1	2	3	4
19.	Because my friends/family/partner say I should	0	1	2	3	4
20.	To compare my abilities with other peoples'	0	1	2	3	4
21.	To give me personal challenges to face	0	1	2	3	4

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
22.	To gain recognition for my accomplishments	0	1	2	3	4
23.	Because I feel ashamed when I miss an exercise session	0	1	2	3	4
24.	Because exercise helps me to burn calories	0	1	2	3	4
25.	To help control my weight	0	1	2	3	4
26.	Because I find exercising satisfying in and of itself	0	1	2	3	4
27.	Because it's important to me to exercise regularly	0	1	2	3	4
28.	For enjoyment of the experience of exercising	0	1	2	3	4
29.	To look more attractive	0	1	2	3	4
30.	I can't see why I should bother exercising	0	1	2	3	4
31.	Because I find physical activities fun, especially when competition is involved	0	1	2	3	4
32.	To get stronger	0	1	2	3	4
33.	To develop my muscles	0	1	2	3	4
34.	Because I enjoy my exercise sessions	0	1	2	3	4
35.	To develop personal skills	0	1	2	3	4
36.	Because my doctor advised me to exercise	0	1	2	3	4
37.	Because I find exercise invigorating	0	1	2	3	4
38.	Because others will not be pleased with me if I don't	0	1	2	3	4
39.	To have a good body	0	1	2	3	4
40.	To make new friends	0	1	2	3	4
41.	Because I want to maintain good health	0	1	2	3	4
42.	I don't see the point in exercising	0	1	2	3	4
43.	To spend time with friends	0	1	2	3	4
44.	To have fun being active with other people	0	1	2	3	4
45.	To improve my appearance	0	1	2	3	4
46.	Because I feel like a failure when I haven't exercised in a while	0	1	2	3	4
47.	To increase my endurance	0	1	2	3	4
48.	Because it makes me feel good	0	1	2	3	4
49.	Because I think it is important to make the effort to exercise regularly	0	1	2	3	4

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
50.	To stay/become flexible	0	1	2	3	4
51.	To recharge my batteries	0	1	2	3	4
52.	To help recover from an illness/injury	0	1	2	3	4
53.	Because I find exercise a pleasurable activity	0	1	2	3	4
54.	To stay/become more agile	0	1	2	3	4
55.	To prevent health problems	0	1	2	3	4
56.	To release tension	0	1	2	3	4
57.	Because I feel under pressure from my friends/family to exercise	0	1	2	3	4
58.	To accomplish things that others are incapable of	0	1	2	3	4
59.	To have a healthy body	0	1	2	3	4
60.	To show my worth to others	0	1	2	3	4
61.	Because I get restless if I don't exercise regularly	0	1	2	3	4
62.	To help prevent an illness that runs in my family	0	1	2	3	4
63.	To lose weight	0	1	2	3	4
64.	To stay slim	0	1	2	3	4
65.	Because I get pleasure and satisfaction from participating in exercise	0	1	2	3	4
66.	To avoid heart disease	0	1	2	3	4
67.	Because I enjoy physical competition	0	1	2	3	4
68.	To avoid ill-health	0	1	2	3	4
69.	I think exercising is a waste of time	0	1	2	3	4
70.	Because I like trying to win in physical activities	0	1	2	3	4

Please continue to the next section.

What Are Your Exercise Habits?

Regular exercise in your leisure time means	
exercise	e.g., aerobics, weights for at least 2 sessions per week, or hill walking for at least 2 hours per week
or sport	e.g., golf, hockey, football, netball, athletics, swimming for at least 2 sessions per week
or general	e.g., walking, cutting the grass, vacuuming, washing the car, for at least 30 minutes on at least 4 days per week

Using the definition of regular exercise above, the following best describes me ...	**Please tick one**
I currently do not exercise regularly, and I am not thinking of doing so for at least the next 6 months	☐
I currently do not exercise regularly, but I am thinking of doing so sometime in the next 6 months	☐
I currently do not exercise regularly, but I am taking active steps to do so in the very near future	☐
I currently exercise regularly, but I have only begun doing so within the last 6 months	☐
I currently exercise regularly, and have done so for longer than 6 months	☐

During the past 7 days, how many times did you do each of the following types of exercise for at least 30 minutes?

	Please write in how many times
Vigorous exercise, for example: running, jogging, squash, swimming lengths, aerobics, fast cycling, football	_____ times in the past 7 days
Moderate exercise, for example: fast walking, dancing, gentle swimming, golf, heavy housework, heavy gardening (e.g. digging)	_____ times in the past 7 days
Light exercise, for example: walking at an average pace, table tennis, light housework, light gardening (e.g. weeding)	_____ times in the past 7 days

On a scale from 0 to 10, how strongly do you intend to exercise regularly in the future?

Absolutely no intention 0 1 2 3 4 5 6 7 8 9 10 **Strongest possible intention**

If you do exercise, even occasionally, what are you main activities? _____

_____

_____

Please continue to the next section.

How Have You Felt Recently?

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past few weeks. Use the following scale to record your answers:

0 = very slightly or not at all
1 = a little
2 = moderately
3 = quite a bit
4 = extremely

	During the past few weeks, I have felt ...	**Not at all**				**Extremely**
1.	scared	0	1	2	3	4
2.	proud	0	1	2	3	4
3.	hostile	0	1	2	3	4
4.	inspired	0	1	2	3	4
5.	irritable	0	1	2	3	4
6.	alert	0	1	2	3	4
7.	strong	0	1	2	3	4
8.	excited	0	1	2	3	4
9.	attentive	0	1	2	3	4
10.	ashamed	0	1	2	3	4
11.	guilty	0	1	2	3	4
12.	interested	0	1	2	3	4
13.	nervous	0	1	2	3	4
14.	upset	0	1	2	3	4
15.	active	0	1	2	3	4
16.	distressed	0	1	2	3	4
17.	afraid	0	1	2	3	4
18.	determined	0	1	2	3	4
19.	enthusiastic	0	1	2	3	4
20.	jittery	0	1	2	3	4

Please continue to the next section.

What Have You Actually Gained From Exercise?

This section of the questionnaire can only be completed by people who have some current or recent experience of exercise. So if you have not exercised within the last twelve months, please just put a cross here and skip this section ☐

The questions are about what you have actually gained from exercise. This may be the same or different from what you originally wanted or hoped to gain. Please tell us your personal experience of exercise using the following scale:

0 = Not at all true for me
2 = Somewhat true for me
4 = Very true for me

	My personal experience of exercise has been that ...	**Not at all true for me**				**Very true for me**
1.	I have lost weight through exercising	0	1	2	3	4
2.	I have found the experience of exercising enjoyable	0	1	2	3	4
3.	I have been able to develop personal skills	0	1	2	3	4
4.	I have found exercising satisfying in and of itself	0	1	2	3	4
5.	I have stayed/become more agile through exercise	0	1	2	3	4
6.	It has allowed me to accomplish things that others are incapable of	0	1	2	3	4
7.	It has helped me to maintain flexibility	0	1	2	3	4
8.	I have found physical activities fun, especially when competition was involved	0	1	2	3	4
9.	I have made new friends through exercise	0	1	2	3	4
10.	It has helped me to have a better body	0	1	2	3	4
11.	It has helped me to get stronger	0	1	2	3	4
12.	It has enabled me to stay slim	0	1	2	3	4
13.	It has given me personal challenges to face	0	1	2	3	4
14.	I have felt at my best when exercising	0	1	2	3	4
15.	It has reduced my risk of heart disease	0	1	2	3	4
16.	It has helped me to reduce tension	0	1	2	3	4
17.	I have followed my doctor's advice by exercising	0	1	2	3	4
18.	I have been able to enjoy competing	0	1	2	3	4
19.	It has helped me to have a healthy body	0	1	2	3	4
20.	I have been able to develop my muscles	0	1	2	3	4
21.	I have been able to manage stress through exercising	0	1	2	3	4
22.	I have increased my endurance	0	1	2	3	4

	My personal experience of exercise has been that ...	**Not at all true for me**				**Very true for me**
23.	I have been able to stay/become flexible	0	1	2	3	4
24.	I have been able to avoid ill-health	0	1	2	3	4
25.	It has allowed me to compare my abilities with other peoples'	0	1	2	3	4
26.	It has given me space to think	0	1	2	3	4
27.	It has allowed me to spend time with friends	0	1	2	3	4
28.	It has helped me to look more attractive	0	1	2	3	4
29.	It has given me goals to work towards	0	1	2	3	4
30.	I have built up my strength through exercising	0	1	2	3	4
31.	It has allowed me to measure myself against personal standards	0	1	2	3	4
32.	I have been able to enjoy physical competition	0	1	2	3	4
33.	It has helped me to maintain good health	0	1	2	3	4
34.	I have been able to prevent health problems	0	1	2	3	4
35.	I have liked trying to win in physical activities	0	1	2	3	4
36.	It has helped control my weight	0	1	2	3	4
37.	It has helped me to recharge my batteries	0	1	2	3	4
38.	It has helped me to recover from an illness/injury	0	1	2	3	4
39.	I have felt more healthy	0	1	2	3	4
40.	I have had fun being active with other people	0	1	2	3	4
41.	I have gained recognition for my accomplishments	0	1	2	3	4
42.	I have been able to improve my appearance	0	1	2	3	4
43.	I have been able to show my worth to others	0	1	2	3	4
44.	I have released tension by exercising	0	1	2	3	4
45.	I have felt good through exercising	0	1	2	3	4
46.	It has helped me to burn calories	0	1	2	3	4
47.	I have enjoyed the feeling of exerting myself	0	1	2	3	4
48.	It has helped me to look younger	0	1	2	3	4
49.	It has helped reduce the risk of an illness that runs in my family	0	1	2	3	4
50.	I have found exercise invigorating	0	1	2	3	4
51.	I have enjoyed the social aspects of exercising	0	1	2	3	4

Overall, on a scale from 0 to 10, how satisfied are you with your experience of exercise?

Not at all satisfied 0 1 2 3 4 5 6 7 8 9 10 **Completely satisfied**

Thank you for completing the questionnaire

Debrief Sheet for Research Project on Exercise Motivation

Thank you for taking part in this research.

Previous research has identified different motives (reasons) for exercise participation. For example, some people exercise for enjoyment or social reasons, others to lose weight or improve their appearance, and others to improve their fitness or health.

In our research, we are particularly interested in whether individuals fulfil their motives. For example, do people who want to lose weight find that they actually lose weight? And what effect does this have on their feelings and behaviour? Therefore, in the study, you were asked about your motives for exercise, your exercise behaviour, what you have actually gained from exercising, and how you have felt. We will combine the data of all the people who took part in the study. We will then be able to see how motive fulfilment influences how people feel and behave.

We will be glad to answer any questions you may have regarding the research, and we would welcome any feedback about your experience as a participant. You are welcome to request a copy of the findings of the research.

Further information about exercise and health is available from NHS Direct (http://www.nhsdirect.nhs.uk/).

Sofia Strommer (pspca5@bangor.ac.uk)
David Ingledew (d.k.ingledew@bangor.ac.uk), telephone 01248 382623
School of Psychology, Bangor University, LL57 2DG, UK

Appendix H
Application for Ethical Approval: Intervention Study

Application for Ethical Approval

Project Title: The Effects of Reflecting on Progress on Exercise Motivation

Principal investigator: Strommer, Sofia

Other researchers: Ingledew,David, Markland,David

Pre-screen Questions

Type of Project
PhD

What is the broad area of research
Clinical/Health

Funding body
Internally Funded

Type of application (check all that apply)
A new application that does not require sponsorship or scrutiny from an outside body?

Proposed methodology (check all that apply)
Questionnaires and Interviews

Do you plan to include any of the following groups in your study?

Does your project require use of any of the following facilities and, if so, has the protocol been reviewed by the appropriate expert/safety panel? If yes please complete Part 2:B

If your research requires any of the following facilities MRI, TMS/ tCS, Neurology Panel, has the protocol been reviewed by the appropriate expert/safety panel?

Not applicable (the research does not require special safety panel approval)

Connection to Psychology, (i.e. why Psychology should sponsor the question)
Investigator is a student in Psychology (including the North Wales Clinical Psychology Programme)

Does the research involve NHS patients? (NB: If you are conducting research that requires NHS ethics approval make sure to consult the Psychology Guidelines as you may not need to complete all sections of the Psychology online application)
No

Has this proposal been reviewed by another Bangor University Ethics committee?
No

NHS checklist. Does your study involve any of the following?

Part 1: Ethical Considerations

Will you describe the main experimental procedures to participants in advance, so that they are informed about what to expect?
Yes

Will you tell participants that their participation is voluntary?
Yes

Will you obtain written consent for participation?
Yes

If the research is observational, will you ask participants for their consent to being observed?
N/A

Will you tell participants that they may withdraw from the research at any time and for any reason?
Yes

With questionnaires, will you give participants the option of omitting questions they do not want to answer?
Yes

Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?
Yes

Will you debrief participants at the end of their participation (i.e. give them a brief explanation of the study)?
Yes

Will your project involve deliberately misleading participants in any way?
No

Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? If *Yes* , give details and state what you will tell them to do should they experience any problems (e.g., who they can contact for help)
No

Further details: It is not likely that participants would experience physical of psychological distress. Participants are informed that we are not in a position to determine their fitness for exercise and if they are concerned about their health they should contact their GP. Participants are directed to NHS direct for more information about exercise and health.

Is there any realistic risk of any participants experiencing discomfort or risk to health, subsequent illness or injury that might require medical or psychological treatment as a result of the procedures?
No

Does your project involve work with animals? If *Yes* please complete Part 2: B
No

Does your project involve payment to participants that differs from the normal rates? Is there significant concern that the level of payment you offer for this study will unduly influence participants to agree to procedures they may otherwise find unacceptable? If *Yes* please complete Part 2: B and explain in point 5 of the full protocol

No

If your study involves children under 18 years of age have you made adequate provision for child protection issues in your protocol?

N/A

If your study involves people with learning difficulties have you made adequate provision to manage distress?

N/A

If your study involves participants covered by the Mental Capacity Act (i.e. adults over 16 years of age who lack the mental capacity to make specific decisions for themselves) do you have appropriate consent procedures in place? NB Some research involving participants who lack capacity will require review by an NHS REC. If you are unsure about whether this applies to your study, please contact the Ethics Administrator in the first instance

N/A

If your study involves patients have you made adequate provision to manage distress?

N/A

Does your study involve people in custody?

No

If your study involves participants recruited from one of the Neurology Patient Panels or the Psychiatry Patient Panel then has the protocol been reviewed by the appropriate expert/safety panel?

N/A

If your study includes physically vulnerable adults have you ensured that there will be a person trained in CPR and seizure management at hand at all times during testing?

N/A

Is there significant potential risk to investigator(s) of allegations being made against the investigator(s). (e.g., through work with vulnerable populations or context of research)? No

Is there significant potential risk to the institution in any way? (e.g., controversiality or potential for misuse of research findings.)

No

Part 3: Risk Assessment

Is there significant potential risk to participants of adverse effects?
No

Is there significant potential risk to participants of distress?
No

Is there significant potential risk to participants for persisting or subsequent illness or injury that might require medical or psychological treatment?
No

Is there significant potential risk to investigator(s) of violence or other harm to the investigator(s) (e.g., through work with particular populations or through context of research)?
No

Is there significant potential risk to other members of staff or students at the institution? (e.g., reception or other staff required to deal with violent or vulnerable populations.)
No

Does the research involve the investigator(s) working under any of the following conditions: alone; away from the School; after-hours; or on weekends?
Yes
Further details: The investigator will work alone with each participant. However: a) she will work in a known location within the School; b) other people will be around in the building; c) the researcher will leave details with the department and a friend when she is interviewing and where; d) she will "check in" with a friend/colleague/supervisor by phone at regular intervals.

Does the experimental procedure involve touching participants?
No

Does the research involve disabled participants or children visiting the School?
No

Declaration

Declaration of ethical compliance: This research project will be carried out in accordance with the guidelines laid down by the British Psychological Society and the procedures determined by the School of Psychology at Bangor. I understand that I am responsible for the ethical conduct of the research. I confirm that I am aware of the requirements of the Data Protection Act and the University's Data Protection Policy, and that this research will comply with them.
Yes

Declaration of risk assessment The potential risks to the investigator(s) for this research project have been fully reviewed and discussed. As an investigator, I understand that I am responsible for managing my safety and that of participants throughout this research. I will immediately report any adverse events that occur as a consequence of this research.
Yes

Declaration of conflict of interest: To my knowledge, there is no conflict of interest on my part in carrying out this research.
Yes

Part 2: A

The potential value of addressing this issue

Further details: The aim is to examine the effects of focusing on gains on behavioural regulation. The study at hand seeks to answer the question: How useful is focusing on gains for supporting autonomous motivation? Participatory motives are what individuals seek to attain or avoid by engaging in a particular domain of behaviour. Ingledew and Markland (2008) showed that the effects of participatory motives on exercise participation are mediated by behavioural regulation. Behavioural regulations are a subcomponent of the self-determination theory framework (Deci Ryan, 2000), and can be understood as the perceived locus of causality of the goal. According to this framework, motivation resides on a continuum ranging from external regulation ("people say I should"), through introjected ("I feel guilty when I don't"), identified ("I value the benefits"), and integrated regulation ("it's a part of who I am"), to being intrinsically motivated ("because it's fun"). As a person progresses along this continuum, their motivation becomes less controlled and more autonomous. Generally, more autonomous motivation is associated with sustained engagement in exercise participation (e.g. Landry Solomon, 2004; Mullan Markland, 1997, Wilson, Rodgers, Blanchard, Gessell, 2003; Wilson, Rodgers, Fraser, 2002). Whereas motives are what people seek to attain or avoid through engagement, gains are what they have attained or avoided through engagement (Ingledew, Markland, Strömmer, 2013). We recently developed a measure of gains corresponding to an existing measure of exercise motives; the combination of the two was branded the Exercise Motives and Gains Inventory (Strömmer, Ingledew, Markland, 2012). Using this measure, we showed that gains had the potential to attenuate effects of motives on controlled regulation, and augment effects on autonomous regulation. Gains also had the potential to have effects in their own right. By including gains, it was possible to get a fuller picture, and to better understand additional factors that affect behavioural regulation. In order to better understand the role of gains in behavioural regulation, experimental designs are needed. Changing peoples' perception of gains would be expected to change their behavioural regulation. Additionally, it could change their motives for exercise. For instance, by highlighting a range of possible gains, it may be possible to appeal to a range of possible motives. If individuals recognise some of the other highlighted gains as being relevant to them, they may acquire new motives that are more conducive to autonomous regulation. In this study, participants will be asked to reflect on the exercise related progress each week for 4 weeks. The study will examine the differences between reflecting on gains (experimental group), and reflecting on the types of exercise they have done (control group). Behavioural regulation will be measured before and after the intervention, and will be compared between the two groups. The study will also examine motives and gains longitudinally, and assess whether motives change when participants reflect on gains in the short term. The findings will have implications for the content of health promotion programmes to encourage exercise.

Hypotheses

Further details: The aim is to examine the effects of focusing on gains on autonomous and controlled motivation. The primary research questions are: 'how will reflecting on gains on a weekly basis affect behavioural regulation?' And 'how will reflecting on gains on a weekly basis affect motives?'. We expect that reflecting on gains will have effects above those of reflecting on types of activity. We expect that reflecting on gains will increase autonomous motivation, and reduce controlled motivation, that is to say have beneficial effects. We expect that people will have different reasons for exercising and will also have different experiences of what they gain from exercising. We expect that reflecting on gains will result in an increase in the number of motives and gains reported at follow up.

Participants recruitment. Please attach consent and debrief forms with supporitng documents

Further details: Approximately 50 participants aged 18 years or older will be recruited. The

sample size is designed to detect a large effect size (.91) based on previous studies with similar designs and outcome variables (Hsu, Buckworth, Focht, O'Connell, 2012). Potential participants will be recruited by advertising the study using standard text (please see supporting documents). This standard text will be used in the following channels: leaflets, posters, emails (including via BU Head of Communications), websites, press publicity, the Community Research Panel, and SONA. Recruitment will be within the University and outside the University (e.g., local community venues, such as libraries and community centres, with the agreement of management). Participants must be currently doing little or no exercise, and be contactable by e-mail. Participants will receive a combined information sheet and consent form (please see supporting documents) and they will be asked to give written consent by printing their name, signing and dating the document. They will also receive a personal copy of the information sheet. The consent form will be filed in a locked cabinet. Participants will be allocated to groups using stratified randomisation, where the stratification variable is sex. For smaller samples, the CONSORT suggests the use of some restricted randomisation procedures that help achieve balance between groups. Stratified randomisation is achieved by performing a separate randomisation procedure for each subset of participants (i.e. males and females). It may not be possible to ensure equal numbers of males and females, but the stratification aims to ensure that numbers of participants for each sex are equally distributed between groups. The allocation procedure will be done using a computer program (Random Allocation Software; Saghaei, 2004). The principal investigator of this study will only obtain the assignment of the participant after baseline contact in order to avoid having any foreknowledge of treatment assignment. Couples will be allocated as one person to ensure participant blindness to the study conditions and to minimise travel demands for these participants.

Research methodology

Further details: Design. The study will adopt a parallel-groups experimental trial design. The total duration of the study is 6 weeks, including 1 week testing, 4 weeks intervention through e-mail contact, and 1 week follow-up. Participants will come into the university and meet with the principal investigator at week 1 and week 6. During week 1 contact, baseline data will be collected.

Participants will be asked to complete in a printed baseline questionnaire (please see supporting documents). The questionnaire will measure demographic information, exercise motives, behavioural regulation, and amount of exercise. Participants will not use their name on the questionnaires. The investigator will assign participants a participant number, which will be used to match follow-up and baseline measures. After completing the baseline questionnaire, participants will be asked to take part in a one-time motivational interviewing session conducted by the principal investigator, lasting for approximately 30 minutes. The session will be consistent with motivational interviewing (MI) as outlined by Miller and Rollnick (2013). The principal investigator has received formal training in this this technique. An example schedule for a session is attached in supporting documents. For present purposes, the MI is not the intervention as such; rather it is to create a common motivational basis against which to consider the effect of the gains intervention. For present purposes, the MI is also not data collection; however, the content may be treated as data for other research purposes. To monitor that the interview is delivered in line with the MI principles, sessions will be recorded in audio format only, and reviewed by one of the principal investigator's supervisors. Recordings will not be mounted onto web systems or computers, and they will not be duplicated. They will be stored onto CD/DVD and stored in a locked cabinet. After the initial contact, participants will receive a weekly e-mail from the principal investigator. The main body of the e-mail contains a standard text, and is the same for all participants. The two groups will receive a different question about progress in the body of the e-mail in plain text format (please see supporting documents). The experimental group will receive a structured question about exercise gains. This will be in the form of a list of statements representing possible gains they may have made, the list will include the option for 'other' to allow the inclusion of any additional gains participants may have experienced. They will respond by indicating which statements apply to them by deleting 'yes' or 'no' as appropriate. They will also be asked to elaborate on their

choices by giving examples. The control group will be asked about the type of activity they have done that week. They will respond by describing the types of exercise they have done. Participants respond to the question on the e-mail and reply to sender to submit their responses. The questions used in the e-mails are primarily a tool for delivering the intervention, they also serve as a manipulation check, to see whether participants have engaged with the intervention. In the event that participants do not respond to the weekly e-mail in 48 hours, they will receive no more than two
e-mails reminding them to respond. Participants will begin receiving weekly e-mails after 1 week on the day of their baseline visit. Contents of emails will be printed out replacing identifying information with participant number. The anonymised printouts will be stored with the anonymised questionnaires. Original emails will be deleted as soon as data entry and checking is complete.

After 4 weeks, participants will receive an e-mail with an invitation for a follow-up (please see supporting documents). Participants will be asked to come into the university for a debrief meeting with the principal investigator, in the event that participants cannot come to the university, alternative methods will be offered, such as an online questionnaire and e-mail debrief, telephone contact or post. Participants will be asked to complete a questionnaire asking about their motives for exercise, behavioural regulation, exercise amount, intention to exercise in the future, gains they made from exercising, and satisfaction with exercising. They will be given a debrief form (please see supporting documents) and verbal debrief. Participants will have a chance to ask questions and they will be compensated for their time. Participants will receive a compensation of £12 plus travel expenses. They will receive £6 for baseline contact and £6 for follow-up contact. All procedures will be piloted before full implementation. Blinding. The e-mails will address the participants by name, so as to ensure personal contact. The e-mails will be sent by the principal investigator, who will ipso facto not be blind to participant allocation to study groups. The allocation to groups will occur after baseline testing so as to not affect baseline contact between the investigator and participants, which is more substantial than follow up contact. The intervention itself consists of e-mails, which will use a standard script. At follow-up, participants will only be asked to fill in a questionnaire, which is followed by a debriefing by the principal investigator.

Participants will not know which experimental condition they are in; they will be informed that all participants will receive weekly questions about progress. Manipulation Check. In order to check whether the intervention had the intended effect on the participants (i.e. actually reflecting on gains), participants' adherence to the intervention will be verified by checking whether participants reply to weekly e-mails and responded to the question. The content of the e-mails will be converted to text documents which are only identifiable by participant numbers, printed and stored in locked cabinets with questionnaires. The e-mails may also be used as qualitative data by a researcher other than the primary investigator to see whether participants in the experimental group report gains beyond those available in the provided list of gains. All participants will also receive a gains questionnaire at the end of the study (after the intervention), so that differences in gains can be examined across groups. Analysis. The study will compare the effects of the experimental and control conditions on relative autonomy using general linear models for magnitude based inferences. The participants' scores on behavioural regulation will be combined to produce two outcome statistics: Controlled Regulation, and Autonomous Regulation. The main analysis will be done using ANCOVAs using SPSS. Correlations between baseline variables (age, sex, motives, activity level, and baseline behavioural regulation) and the outcome variable (follow up behavioural regulation) will be assessed. Any variables with high correlations with the outcome variable ($r > .5$) will be included in the ANCOVA as covariates. As a manipulation check, differences between groups on follow-up gain scores will be assessed using MANOVA. Participants' responses will also be qualitatively assessed to determine whether participants reported additional gains to those available in the list of statements. Results will be described with reference to the magnitude of the effects.

Estimated start date and duration of the study.

Further details: Data collection will be from beginning April 2014 to end of September 2014.

For studies recruiting via SONA or advertising for participants in any way please provide a summary of how participants will be informed about the study in the advertisement. N.B. This should be a brief factual description of the study and what participants will be required to do.

Further details: Please see Promotional Text in Supporting Documents.

Part 4: Research Insurance

Is the research to be conducted in the UK?

Yes

Research that is based solely upon certain typical methods or paradigms is less problematic from an insurance and risk perspective. Is your research based solely upon one or more of these methodologies? Standard behavioural methods such as questionnaires or interviews, computer-based reaction time measures, standardised tests, eye-tracking, picture-pointing, etc; Measurements of physiological processes such as EEG, MEG, MRI, EMG, heart-rate, GSR (not TMS or tCS as they involve more than simple 'measurement'); Collections of body secretions by non-invasive methods, venepuncture (taking of a blood sample), or asking participants to consume foods and/or nutrients (not including the use of drugs or other food supplements or caffine).

Yes

Appendix I
Questionnaire: Intervention Study

INFORMATION SHEET AND CONSENT FORM
The Effects of Reflecting on Progress on Exercise Motivation

- This project is being conducted by Sofia Strömmer, PhD student in the School of Psychology, Bangor University, under the supervision of Dr David Ingledew in the School of Psychology and Dr David Markland in the School of Sports Health and Exercise Sciences.

- The project is about the effects of reflecting on progress on people's motivation to exercise. We are inviting adults aged 18 years or older to take part, who currently do little or no exercise. The length of the study is 6 weeks.

- If you decide to take part, you will be asked to complete a questionnaire, in English, taking about 10 minutes. You will be asked about your age, sex, ethnic background, height and weight, reasons for exercising, and amount of exercise. We will ask you to take part in a physical activity motivational interview, in English, taking about 30 minutes, which will be audio-recorded. One of the study supervisors may review the recording to assess the practice of the researcher. After the interview, for 4 weeks, you will receive a weekly e-mail from us, asking about your progress that week. At the end of the study, you will be asked to attend a follow-up session at the university. You will be asked to complete a questionnaire, in English, taking about 20 minutes. You will be asked about your reasons for exercising, amount of exercise, and your personal experience of exercising.

- Your consent form will be confidential and stored in a locked cabinet. The data will be anonymised so that it is not linked to your name. You will not be identifiable in any report of this research.

- Your participation in this research is entirely voluntary. You can decline to answer any question. You can withdraw from the study any time, without penalty, and without giving a reason. If you withdraw, your interview, questionnaires and e-mails will be destroyed. Otherwise, your anonymised data will be analysed for this project and may also be reanalysed for future research purposes.

- We are not in a position to determine your fitness for exercise. Therefore, if you have any concerns about your health, or whether you should be exercising, please consult your GP before agreeing to take part in this study.

- We will be pleased to answer any questions you may have about the research, before, during, or after you have taken part. We can be contacted by email: Sofia Strömmer (pspca5@bangor.ac.uk); David Ingledew (d.k.ingledew@bangor.ac.uk); David Markland (d.a.markland@bangor.ac.uk). Or by writing to us at Bangor University LL57 2DG. Or by telephoning Sofia Strommer on 01248 388343.

- If you have any complaints about the conduct of the research, you can write to Mr Hefin Francis, School Manager, School of Psychology, Bangor University, LL57 2DG, UK (h.francis@bangor.ac.uk).

Having read this information sheet, and had a chance to ask questions, I consent to participating in this study

Name (printed): _____ Signature: _____

Date: _____

I would like to receive a summary of the study results when the research is complete. Please e-mail this to me at: _____

Baseline Questionnaire

Throughout this questionnaire, please answer the questions in sequence, without referring back. Try to not let your answers to one question influence your answers to the other questions. There are no correct or incorrect answers.

Please give the following background information.

What is your age? _____years

Your gender? Male/Female Other:_____

How would you describe your ethnic background?_____

_____

_____

What is your height? _____feet _____inches OR _____centimetres

Your weight (lightly dressed)? _____stones _____pounds OR _____kilograms

Are you a member of any club, in order to participate in sport or recreational physical activity?

_____Yes

_____No

What Are Your Exercise Habits?

1. During a typical **7-day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

	Times per week
STRENUOUS EXERCISE (HEART BEATS RAPIDLY) (e.g., running, jogging, hockey, rugby, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
MODERATE EXERCISE (NOT EXHAUSTING) (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
MILD EXERCISE (MINIMAL EFFORT) (e.g., yoga, archery, fishing from river bank, bowling, snooker, golf, snow mobiling, easy walking)	_____

Please continue to the next section.

What Are Your Reasons for Exercising?

Following are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, or *would be true* for you personally if you did exercise. If you do not consider a statement to be true for you at all, circle the '0'. If you think that a statement is very true for you indeed, circle the '4'. If you think that a statement is partly true for you, then circle the '1', '2', or '3', according to how strongly you feel that it reflects why you exercise or might exercise. Please remember, we want to know why *you personally* choose to exercise or might choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
1.	To maintain flexibility	0	1	2	3	4
2.	Because it helps to reduce tension	0	1	2	3	4
3.	Because I enjoy competing	0	1	2	3	4
4.	To help manage stress	0	1	2	3	4
5.	Because I feel at my best when exercising	0	1	2	3	4
6.	To feel more healthy	0	1	2	3	4
7.	To give me space to think	0	1	2	3	4
8.	To build up my strength	0	1	2	3	4
9.	To enjoy the social aspects of exercising	0	1	2	3	4
10.	To give me goals to work towards	0	1	2	3	4
11.	Because I enjoy the feeling of exerting myself	0	1	2	3	4
12.	To measure myself against personal standards	0	1	2	3	4
13.	To help me look younger	0	1	2	3	4
14.	To compare my abilities with other peoples'	0	1	2	3	4
15.	To give me personal challenges to face	0	1	2	3	4
16.	To gain recognition for my accomplishments	0	1	2	3	4
17.	Because exercise helps me to burn calories	0	1	2	3	4
18.	To help control my weight	0	1	2	3	4
19.	Because I find exercising satisfying in and of itself	0	1	2	3	4
20.	For enjoyment of the experience of exercising	0	1	2	3	4

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
21.	To look more attractive	0	1	2	3	4
22.	Because I find physical activities fun, especially when competition is involved	0	1	2	3	4
23.	To get stronger	0	1	2	3	4
24.	To develop my muscles	0	1	2	3	4
25.	To develop personal skills	0	1	2	3	4
26.	Because my doctor advised me to exercise	0	1	2	3	4
27.	Because I find exercise invigorating	0	1	2	3	4
28.	To have a good body	0	1	2	3	4
29.	To make new friends	0	1	2	3	4
30.	Because I want to maintain good health	0	1	2	3	4
31.	To spend time with friends	0	1	2	3	4
32.	To have fun being active with other people	0	1	2	3	4
33.	To improve my appearance	0	1	2	3	4
34.	To increase my endurance	0	1	2	3	4
35.	Because it makes me feel good	0	1	2	3	4
36.	To stay/become flexible	0	1	2	3	4
37.	To recharge my batteries	0	1	2	3	4
38.	To help recover from an illness/injury	0	1	2	3	4
39.	To stay/become more agile	0	1	2	3	4
40.	To prevent health problems	0	1	2	3	4
41.	To release tension	0	1	2	3	4
42.	To accomplish things that others are incapable of	0	1	2	3	4
43.	To have a healthy body	0	1	2	3	4
44.	To show my worth to others	0	1	2	3	4
45.	To help prevent an illness that runs in my family	0	1	2	3	4
46.	To lose weight	0	1	2	3	4
47.	To stay slim	0	1	2	3	4

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
48.	To avoid heart disease	0	1	2	3	4
49.	Because I enjoy physical competition	0	1	2	3	4
50.	To avoid ill-health	0	1	2	3	4
51.	Because I like trying to win in physical activities	0	1	2	3	4

Thank you for completing the questionnaire

Follow-Up Questionnaire

Throughout this questionnaire, please answer the questions in sequence, without referring back. Try to not let your answers to one question influence your answers to the other questions. There are no correct or incorrect answers.

What Are Your Reasons for Exercising?

Following are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, or *would be true* for you personally if you did exercise. If you do not consider a statement to be true for you at all, circle the '0'. If you think that a statement is very true for you indeed, circle the '4'. If you think that a statement is partly true for you, then circle the '1', '2', or '3', according to how strongly you feel that it reflects why you exercise or might exercise. Please remember, we want to know why *you personally* choose to exercise or might choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
1.	To maintain flexibility	0	1	2	3	4
2.	Because it helps to reduce tension	0	1	2	3	4
3.	Because I enjoy competing	0	1	2	3	4
4.	To help manage stress	0	1	2	3	4
5.	Because I feel at my best when exercising	0	1	2	3	4
6.	To feel more healthy	0	1	2	3	4
7.	To give me space to think	0	1	2	3	4
8.	To build up my strength	0	1	2	3	4
9.	To enjoy the social aspects of exercising	0	1	2	3	4
10.	To give me goals to work towards	0	1	2	3	4
11.	Because I enjoy the feeling of exerting myself	0	1	2	3	4
12.	To measure myself against personal standards	0	1	2	3	4
13.	To help me look younger	0	1	2	3	4
14.	To compare my abilities with other peoples'	0	1	2	3	4

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
15.	To give me personal challenges to face	0	1	2	3	4
16.	To gain recognition for my accomplishments	0	1	2	3	4
17.	Because exercise helps me to burn calories	0	1	2	3	4
18.	To help control my weight	0	1	2	3	4
19.	Because I find exercising satisfying in and of itself	0	1	2	3	4
20.	For enjoyment of the experience of exercising	0	1	2	3	4
21.	To look more attractive	0	1	2	3	4
22.	Because I find physical activities fun, especially when competition is involved	0	1	2	3	4
23.	To get stronger	0	1	2	3	4
24.	To develop my muscles	0	1	2	3	4
25.	To develop personal skills	0	1	2	3	4
26.	Because my doctor advised me to exercise	0	1	2	3	4
27.	Because I find exercise invigorating	0	1	2	3	4
28.	To have a good body	0	1	2	3	4
29.	To make new friends	0	1	2	3	4
30.	Because I want to maintain good health	0	1	2	3	4
31.	To spend time with friends	0	1	2	3	4
32.	To have fun being active with other people	0	1	2	3	4
33.	To improve my appearance	0	1	2	3	4
34.	To increase my endurance	0	1	2	3	4
35.	Because it makes me feel good	0	1	2	3	4
36.	To stay/become flexible	0	1	2	3	4
37.	To recharge my batteries	0	1	2	3	4
38.	To help recover from an illness/injury	0	1	2	3	4
39.	To stay/become more agile	0	1	2	3	4
40.	To prevent health problems	0	1	2	3	4
41.	To release tension	0	1	2	3	4

	Personally, I exercise (or might exercise) ...	**Not at all true for me**				**Very true for me**
42.	To accomplish things that others are incapable of	0	1	2	3	4
43.	To have a healthy body	0	1	2	3	4
44.	To show my worth to others	0	1	2	3	4
45.	To help prevent an illness that runs in my family	0	1	2	3	4
46.	To lose weight	0	1	2	3	4
47.	To stay slim	0	1	2	3	4
48.	To avoid heart disease	0	1	2	3	4
49.	Because I enjoy physical competition	0	1	2	3	4
50.	To avoid ill-health	0	1	2	3	4
51.	Because I like trying to win in physical activities	0	1	2	3	4

What Are Your Exercise Habits?

1. During a typical **7-day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

	Times per week
STRENUOUS EXERCISE (HEART BEATS RAPIDLY) (e.g., running, jogging, hockey, rugby, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
MODERATE EXERCISE (NOT EXHAUSTING) (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
MILD EXERCISE (MINIMAL EFFORT) (e.g., yoga, archery, fishing from river bank, bowling, snooker, golf, snow mobiling, easy walking)	_____

On a scale from 0 to 10, how strongly do you intend to exercise regularly in the future?

Absolutely no intention 0 1 2 3 4 5 6 7 8 9 10 **Strongest possible intention**

Please continue to the next section.

What Have You Gained From Exercise?

The questions are about what you have gained from exercise over the past month. This may be the same or different from what you originally wanted or hoped to gain. Please tell us your personal experience of exercise using the following scale:

0 = Not at all true for me
2 = Somewhat true for me
4 = Very true for me

	My personal experience of exercise has been that ...	**Not at all true for me**				**Very true for me**
1.	I have found the experience of exercising enjoyable	0	1	2	3	4
2.	I have stayed/become more agile through exercise	0	1	2	3	4
3.	It has helped me to have a better body	0	1	2	3	4
4.	It has given me personal challenges to face	0	1	2	3	4
5.	It has helped me to reduce tension	0	1	2	3	4
6.	It has helped me to have a healthy body	0	1	2	3	4
7.	I have been able to manage stress through exercising	0	1	2	3	4
8.	I have increased my endurance	0	1	2	3	4
9.	I have been able to stay/become flexible	0	1	2	3	4
10.	I have been able to avoid ill-health	0	1	2	3	4
11.	It has allowed me to spend time with friends	0	1	2	3	4
12.	It has given me goals to work towards	0	1	2	3	4
13.	I have built up my strength through exercising	0	1	2	3	4
14.	I have been able to enjoy physical competition	0	1	2	3	4
15.	I have been able to prevent health problems	0	1	2	3	4
16.	I have liked trying to win in physical activities	0	1	2	3	4
17.	It has helped control my weight	0	1	2	3	4
18.	It has helped me to recharge my batteries	0	1	2	3	4
19.	It has helped me to recover from an illness/injury	0	1	2	3	4
20.	I have felt more healthy	0	1	2	3	4
21.	I have gained recognition for my accomplishments	0	1	2	3	4
22.	I have been able to improve my appearance	0	1	2	3	4
23.	I have been able to show my worth to others	0	1	2	3	4
24.	It has helped me to burn calories	0	1	2	3	4
25.	I have enjoyed the feeling of exerting myself	0	1	2	3	4

	My personal experience of exercise has been that ...	**Not at all true for me**				**Very true for me**
26.	It has helped reduce the risk of an illness that runs in my family	0	1	2	3	4
27.	I have found exercise invigorating	0	1	2	3	4
28.	I have enjoyed the social aspects of exercising	0	1	2	3	4

Overall, on a scale from 0 to 10, how satisfied are you with your experience of exercise over the past month?

Not at all satisfied	0	1	2	3	4	5	6	7	8	9	10	**Completely satisfied**

Thank you for completing the questionnaire

DEBRIEF SHEET

The Effects of Reflecting on Progress on Exercise Motivation

Thank you for taking part in this research.

Previous research has identified different motives (reasons) for exercise participation. For example, some people exercise for enjoyment or social reasons, others to lose weight or improve their appearance, and others to improve their fitness or health. It has also been shown that people can experience different gains (benefits) from exercise. These gains can be consistent with original motives, or they can be unsought gains.

In this study we were particularly interested in whether reflecting on gains would be helpful to individuals when trying to increase the amount of exercise they do. The study involved two groups. Both groups were asked about their progress on a weekly basis. Both groups were asked about the amount of exercise they had done each week. Additionally, one group was asked to describe exercise gains they made each week. The other group was asked to describe the types of activity they did each week. Both groups were asked to reflect on the gains they made over the course of the study in the follow-up session.

We will compare the questionnaire data from the two groups. We will then be able to better understand what kind of effects reflecting on gains has on exercise motivation.

We will be glad to answer any questions you may have regarding the research, and we would welcome any feedback about your experience as a participant. You are welcome to request a copy of the findings of the research.

Further information about exercise and health is available from NHS Direct (http://www.nhsdirect.nhs.uk/).

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Appendix J
Motivational Interview Schedule (example session)

Introduction of interviewer, introducing the purpose of the interview: "During the interview I would like to discuss your thoughts about exercising. This can include anything you want and anything you deem important. I will have a few general questions but feel free to tell me anything that you think is relevant".

Remind participant that interview is confidential. Remind participant that they can decline to answer any question, and can end the interview at any time, without giving a reason and without penalty. Remind participant that interview will be audio-recorded and one of the study supervisors may review the recording to assess the practice of the researcher. Ask for verbal consent to recording: "Is it OK with you that this session is recorded?"

Setting the agenda – introducing the topic of the interview

- Can you tell me what made you want to get involved with this study?
- Can you tell me about your current exercise habits?
- How do you feel about the idea of increasing the amount of exercise you do?

Asking about the positive aspects of exercising/change

- What would be the good things about being more active?
- How would things be different if you exercised more?

→ *Explore using reflections and open questions, summarise positive aspects*

Asking about the negative aspects of exercising/change

- Can you tell me about the down side of exercising more?
- What are some of the aspects you are not very excited about?

→ *Explore using reflections and open questions, summarise negative aspects*

Exploring life goals and values

- What sorts of things are important to you?
- If things worked out in the best possible way for you, what would life be like in a year from now?

→ *Use affirmations to emphasise participant's strengths ("positive" goals and values)*

Asking for a decision

- Where will you go from here in terms of your exercise habits?
- After our discussion, how do you feel about increasing your exercise?

Goal setting – Using SMART goals (specific, meaningful, assessable, realistic, timed)

- What will be your next step?
- What will you do in the next few days?
- On a scale of 1 to 10, how confident are you that you will take these steps?
  - What would help you move up on that scale?

→ If there is no decision to change behaviour (increase exercise) or a lot of ambivalence
- Empathise with difficulty of ambivalence
- Is something else that might help you make a decision?
- What will life be like a year from now if you don't change?

Conclusion of interview: Thank participant for sharing their thoughts with you. Give a brief summary of the session using affirmations to emphasise participant's strengths and decisions.

Appendix K
Motivational Interviewing Supervision and Training Scale Revised

Motivational Interviewing Supervision and Training Scale Revised

1. Questions

1	2	3	4	5	6	7
Relies on closed questions for information gathering			Balanced use of questions, but timing and wording do not fully facilitate client exploration			Good facilitation of client exploration through the use of primarily open questions

2. Simple Reflection

1	2	3	4	5	6	7
Primarily repeats client's statements to keep client talking			Mainly uses paraphrase to clarify information			Used to reinforce and emphasize important statements

3. Complex Reflection

1	2	3	4	5	6	7
Adds no meaning to what client said			Adds some, but not substantial meaning			Adds substantial meaning to what client has said

4. Affirming

1	2	3	4	5	6	7
Focuses solely on client weaknesses and problems			Acknowledges strengths but still emphasizes problems and weaknesses			Appropriately elicits and reinforces strengths

5. Summarization

1	2	3	4	5	6	7
Used simply to clarify information			Primarily used to track the session			Used to link and reinforce material that has been discussed during and between sessions

Appendix L
Intervention Study E-mails

Control group e-mail:

Dear [name],

Thank you for continuing to participate in this study. We would like to ask you about your progress during the past week. Please reply to this e-mail and respond to the questions below simply by typing after them.

How many times did you exercise?……
On average, for how long did you exercise each time (in minutes)?……
Typically, how intense was the exercise (please tick one)?

Strenuous (heart beats rapidly) ……
Moderate (not exhausting) ……
Low intensity (minimal effort) ……

What kind of activity did you take part in? As well as naming the activity, please give as much detail as possible. For example, tell us whether it was a competitive activity, whether you did it alone or with other people etc.

…….
…….

Experimental group e-mail:

Dear [name],

Thank you for continuing to participate in this study. We would like to ask you about your progress during the past week. Please reply to this e-mail and respond to the questions below simply by typing after them.

How many times did you exercise?……
On average, for how long did you exercise each time (in minutes)?……

What have you gained from exercising in the past week? Please consider the following list of possible gains and indicate whether they apply to you (by deleting 'yes' or 'no' as appropriate). For each of the gains that you have made, please give a specific example from your own experience in the last week.

I have enjoyed exercising……..	yes / no	Example:
I have challenged myself……..……..	yes / no	Example:
I have been able to manage stress…….	yes / no	Example:
I have improved/maintained flexibility…….	yes / no	Example:
I have been able to avoid ill health……	yes / no	Example:
I have built up my strength……	yes / no	Example:
I have improved my endurance…….	yes / no	Example:
I have enjoyed competing…….	yes / no	Example:
I have been able to control my weight……..	yes / no	Example:
I have been able to recover from injury……	yes / no	Example:
I have felt healthier……	yes / no	Example:
I have gained recognition for my accomplishments..	yes / no	Example:
I have been able to improve my appearance…….	yes / no	Example:
I have found exercise revitalising……..	yes / no	Example:
I have enjoyed the social aspects……..	yes / no	Example:
Other: ……	yes / no	Example: