# A social identity approach to understanding physical activity

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## Copyright Statement

## Abstract

Against the backdrop of a global physical inactivity crisis, prevailing approaches to understanding physical activity behaviours are characterised by a predominant focus on individual-level factors (e.g., cognitions, attitudes, motivations). These approaches largely fail to account for the possibility that these factors—that is, our individual psychology—are not only influenced by us (i.e., as individuals) but also by the groups we belong to. Drawing on an approach that provides a comprehensive analysis of how people's individual psychology is structured by group life, this thesis outlines, and tests, a fresh perspective from which to understand the pervasive problem of high, and largely stagnant, physical inactivity levels. More specifically, this *social identity approach* suggests that the groups to which people belong can be, and often are, incorporated into their sense of self and, through this, are powerful determinants of behaviour. Four empirical studies (two-cross sectional, one over time, and one experimental, with a total of 1130 participants) are reported in which the efficacy of the social identity approach, and associated social identity approach to leadership—a perspective which considers leaders' effectiveness contingent on the extent to which they *represent*, *advance*, *create*, and *embed* a shared sense of identity among group members—are tested in various physical activity settings. Study 1 provided initial real-world evidence that forming a strong social identity as a member of a particular exercise group (i.e., as a parkrunner) is associated with greater group-relevant participation, more positive experiences of participation, and broad health-related outcomes. Study 2 provided initial evidence for positive relationships between group members' perceptions of their sport or exercise leader's engagement in social identity leadership, members' group identification, and members' group-relevant attendance. Extending findings from study 2, study 3

provided evidence for positive relationships between identity leadership, group identification, and group-relevant attendance in the context of a two-wave design. Study 4 provided experimental evidence for the positive impact of leaders engaging in identity leadership on individuals' effort during, and performance of, an exercise task. Overall, findings provide consistent support for the efficacy of the social identity approach, and social identity approach to leadership, in physical activity settings. As such, the thesis makes an important contribution to the physical activity literature by highlighting the impact that individuals' identification—and perceptions of their leaders' capacity to foster a strong sense of identification within their physical activity groups—can have on their behaviour. More broadly, this thesis indicates the need for research to consider the psychology of both individuals as *individuals* and as *group members* in efforts to understand physical activity behaviour.

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## Author's declaration

This thesis includes two published manuscripts (with some minor changes), while also drawing heavily on the contents of a third published manuscript during the literature review. It also includes a manuscript currently under review and a manuscript that will be submitted in early September. Aspects of the research have also been presented at institutional and international conferences. Full details of the outputs resulting from this PhD are presented below. These outputs were produced in collaboration with my supervisors (Professors Tim Rees and Remco Polman), and were also supported by a wider research team that included a researcher from the University of Stirling (Dr Pete Coffee) and two from the University of Queensland (Professor S. Alexander Haslam and Dr Niklas K. Steffens). However, I, the PhD candidate, undertook the lead role on all research projects throughout the set-up, data collection, analysis, and write up phases. This is reflected by my position as first author on all papers.

**Peer-reviewed articles**

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***In preparation:***

Stevens, M., Rees, T., Steffens, N. K., Haslam, S. A., Coffee, P., & Polman, R. (to be submitted September 2018). The effect of leader identity entrepreneurship on effort and performance: Evidence from an exercise task (intended journal *Plos One).*

***Additional published manuscript:***

The following manuscript—which has been published as a 'leading article' in *Sports Medicine*—includes arguments and assertions that underpin much of the research conducted throughout this PhD. Given the greater space available here, many of the points raised and discussed in the published article are further developed in the literature review. As such, this article is not included in full in the thesis.

Stevens, M., Rees, T., Coffee, P., Steffens, N. K., Haslam, S. A., & Polman, R. (2017). A social identity approach to understanding and promoting physical activity, *Sports Medicine*, 47 (10), 1911-1918.

**Conference proceedings**

Stevens, M., Rees, T., Coffee, P., Haslam, S. A., Steffens, N. K., & Polman, R. (2017). Social identity leadership promotes health-related outcomes in sport and exercise settings. Presentation delivered at the International Conference on Social Identity and Sport, Leuven, Belgium.

Stevens, M. (2017). Social identities and social identity leadership promote health-related outcomes in exercise settings: Evidence from parkrun. Poster presented at the 14th International Society of Sport Psychology World Congress, Seville, Spain.

Stevens, M. (2017). Advancing a social identity approach to understanding physical activity: Preliminary evidence from parkrun. Presentation delivered at the Bournemouth University Postgraduate Research Conference.*

Stevens, M., Rees, T., Coffee, P., Haslam, S. A., Steffens, N. K., & Polman, R. (2018). Leading 'us' to be active: The positive relationship between social identity leadership, group identification, and physical activity participation**.** Presentation delivered at the 17th meeting of the International Society of Behavioral Nutrition and Physical Activity, Hong Kong.

*I was awarded 1st prize for the best oral presentation at the conference for this presentation.

## Structure of the thesis

This thesis is comprised of six primary chapters. Chapter one is a broad review of literature related to the PhD topic. Chapters 2, 3, 4, and 5 represent stand-alone empirical articles that test one of the aims of the thesis. Each article has either been published in a peer-reviewed journal, submitted for publication, or is in preparation (see above). As such, there is a degree of repetition within the thesis, particularly within the introduction sections of these chapters. The main body of the thesis ends with chapter 6, which comprises a general discussion regarding the findings of all studies conducted in the PhD.

# Chapter 1: Literature Review

## 1.1 Introduction

The influence of physical activity on health and well-being is well documented. Physiological benefits include reduced risk of contracting coronary heart disease (Berlin and Colditz 1990; Sattelmair et al. 2011), developing certain types of cancers (Lee 2003), and suffering a stroke (Do Lee et al. 2003); psychological benefits include reduced anxiety (Petruzzello et al. 1991; Taylor 2003), reduced likelihood of depression (Dunn et al. 2001; Teychenne et al. 2008), and improved self-esteem (Ekeland et al. 2005). Conversely, physical *in*activity has been identified as the fourth leading cause of death worldwide (Kohl et al. 2012), with estimates suggesting that, of all deaths from non-communicable diseases, 6–10% can be attributed to physical inactivity (Lee et al. 2012). Moreover, beyond the substantial impact of physical inactivity on individuals' health, it also exerts a considerable and growing financial burden on governments in both developed and developing countries (Li 2014). Indeed, direct global healthcare costs associated with physical inactivity are conservatively estimated to be approximately INT$53.8 billion per year (Ding et al. 2016).[1] Enhancing long-term participation in physical activity has consequently been identified as a key objective for researchers, government-funded organisations, and public health agencies. For example, World Health Organization member states have agreed a plan to target a 10% reduction in physical inactivity by 2025 (World Health Organization 2013) and a 15% reduction by 2030 (World Health Organization 2018). However, notwithstanding attempts to improve physical activity levels, participation rates remain poor; global data from 146 countries suggest that almost one-quarter of adults (23.3%) worldwide are

[1] INT$ refers to international dollars. Costs of inactivity for all countries were converted to this hypothetical unit of currency by Ding et al. (2016) using purchasing power parity conversion factors.

insufficiently active (Sallis et al. 2016), while substantially higher rates of insufficient activity (>90%) have been reported based on objective accelerometer data (Tucker et al. 2011).

Against the backdrop of this 'physical inactivity pandemic' (Kohl et al. 2012; Sallis et al. 2016), the overarching aim of this PhD was to explore a fresh approach to understanding physical activity. Originating in social psychology, this *social identity approach* (Tajfel 1972, 1974; Tajfel and Turner 1979; Turner 1982, 1985; Turner et al. 1987; Turner 1991) has been applied to various settings including politics (Reicher and Hopkins 1996, 2001; Augoustinos and De Garis 2012; Steffens and Haslam 2013), business and organisations (Ashforth and Mael 1989; Haslam 2004), and health (Jetten et al. 2012; Greenaway et al. 2016a; Haslam et al. 2016; Steffens et al. 2016b). A key proposition of the social identity approach is that psychology and behaviour are both heavily structured by the group memberships that individuals internalise as part of their sense of self (Tajfel and Turner 1979; Turner et al. 1994). Given that physical activity is often conducted in group environments (e.g., exercise groups, sports teams, Nordic walking groups), this represents a domain to which the social identity approach could have particular relevance. A key aim of this chapter is, therefore, to provide a rationale for this new approach to understanding physical activity. A more detailed outline of the chapter's structure is presented below. First, however, it is important to clarify definitions of some key terms that will be used throughout the thesis.

**1.2 Key terms**

In line with Caspersen et al.'s (1985) widely cited definition, 'physical activity' is used to describe all bodily movements that result in energy expenditure. Everyday household tasks (e.g., gardening and home repair) and day-to-day

activities (e.g., walking or cycling for travel purposes) are therefore classified as physical activity. Exercise and sport are considered subcategories of physical activity. The term ‘exercise’ is used within the thesis when referring specifically to physical activity that is planned, structured, and repetitive, with the aim of maintaining or improving physical fitness (Caspersen et al. 1985). Current guidelines refer to recommended levels of physical activity and state that, each week, all adults aged 19–64 should engage in a minimum of either 150 minutes of moderate intensity aerobic activity, 75 minutes of vigorous intensity aerobic activity, or a combination of the two (World Health Organization 2010; Department of Health 2011).

Relatedly, although the term ‘participation’ is predominantly used when referring to people’s holistic engagement in physical activity (e.g., when discussing participation rates), the term ‘attendance’ is used in preference to participation when referring to a measure used in studies 2 and 3. This is because it was felt that attendance would be a more appropriate term for this measure—which was derived by dividing the number of sport or exercise sessions participants attended with their group by the total number of available sessions. Nevertheless, the implications of findings from studies 2 and 3 for individuals’ physical activity participation (more broadly) are discussed.

### 1.3 Structure of the literature review

The starting point for the remainder of this chapter is to examine the current state of research surrounding physical activity behaviour change. Both traditional and emerging approaches to understanding and promoting physical activity (and other health-related behaviours) are explored. It is, however, beyond the scope of this chapter to provide an exhaustive review of this vast literature. As such, the primary aim of the proceeding two sections is to illustrate commonalities among

existing approaches to understanding and promoting physical activity (and behaviour change more broadly), and, in the process, to demonstrate how the social identity approach offers a different (and potentially valuable) perspective. Following this, a summary of the theoretical underpinnings of the social identity approach is provided, along with some examples of how its insights may be applied to physical activity. Then, drawing on research exploring the applicability of the social identity approach to domains of sport, exercise, and health, the potential of the approach to help understand physical activity behaviours is considered more closely. In particular, discussion focuses on (1) the potential for social identity to be harnessed to promote engagement in physical activity, (2) evidence suggesting that social identity underpins physical activity and exercise group behaviour, and (3) the possibility that social identity underpins effective leadership in physical activity settings. Here, evidence from various domains is considered as the social identity approach to leadership (Hogg 2001; Haslam et al. 2011) is considered in parallel with other dominant leadership theories. Finally, the objectives and hypotheses of the thesis are presented.

### 1.4 Current approaches to understanding and promoting physical activity

Research concerning the correlates and determinants of physical activity has accelerated in the past two decades (Bauman et al. 2012). Concentrating largely on demographic or individual factors such as age, sex, health status, cognitions, attitudes, and motivation (Bauman et al. 2012), this research has often explored the capacity for theories that predominantly focus on individuals *as individuals*, such as self-determination theory (Deci and Ryan 1985), the theories of reasoned action (Ajzen and Fishbein 1980) and planned behaviour (Ajzen 1991), the health action process approach (Schwarzer 1992), the health belief model (Rosenstock 1974), and

self-efficacy theory (Bandura 1977) to predict and explain behaviours and behaviour change (e.g., see Hagger et al. 2002; Armitage 2005; Blanchard et al. 2007; Renner et al. 2007; Caudroit et al. 2011; Teixeira et al. 2012; Mo et al. 2016; see Rhodes and Nigg, 2011; Rhodes et al. 2018 for overviews). Self-determination theory and the theory of planned behaviour (an extension of the earlier theory of reasoned action) have proved particularly popular. A systematic review (conducted six years ago) limited to studies concerning the relationship between self-determination theory constructs and physical activity and exercise behavioural outcomes identified 66 studies (Teixeira et al. 2012). Demonstrating its even greater popularity, the most recent meta-analysis of studies drawing on the theory of planned behaviour (or preceding theory of reasoned action) in exercise settings identified 111 studies (Downs and Hausenblas 2005). More recent estimates (still seven years ago) suggest that the number of studies drawing on the theory of planned behaviour to predict and explain physical activity is now in excess of 200 (Rhodes and Nigg 2011).

Both the theory of planned behaviour and self-determination theory do acknowledge the influence of social factors on behaviour. For example, the theory of planned behaviour identifies three key determinants of peoples' behavioural intentions, and ultimately behaviours: their attitudes (i.e., the degree to which they possess a favourable perception of the behaviour in question and, for example, believe it will lead to desired outcomes), their perceived sense of behavioural control (i.e., their perception of the ability they have to perform the behaviour and, for example, overcome barriers), and, of particular relevance to the discussion of social factors, subjective norms (Ajzen 1991; see also Hagger et al. 2002; Hagger and Chatzisarantis, 2014). Subjective norms refer to individuals' evaluation of whether behaviours will be consistent with the desires of significant others (e.g., family,

friends, their doctor). That is, whether these significant others want them to engage in the particular behaviour and their motivation to comply with these others (Ajzen, 1991; Hagger et al. 2002; Hagger and Chatzisarantis, 2014). However, despite accounting for the role of others in determining peoples' behaviour (and even for the potential for those to which we feel stronger connections to have greater influence), the theory is nevertheless based on an assumption that our attitudes, and crucially behaviours, are determined by our sense of self as an *individual*.

The propositions self-determination theory makes regarding the self are more explicit. At its core, the theory proposes the existence of a true self with fundamental psychological needs for autonomy, competence, and relatedness. That is, needs (1) to self-organize experience and behaviour and perceive activity to align with interests, values, and goals, (2) to feel effective and capable of meeting challenges, and (3) to feel connected to, and cared for, by other people (Deci and Ryan, 2000). The theory further proposes that, to the extent that these needs are satisfied, people are more likely to develop higher quality and more sustainable forms of motivation (i.e., motivations derived from internal choice or personal volition, rather than external pressure or a sense of obligation) to engage in particular behaviours, such as physical activity (Deci and Ryan, 2000; see also Ntoumanis et al., 2016). These *autonomous* rather than *controlled* forms of motivations are, in turn, proposed to be associated with more adaptive behaviours, such as greater adherence to exercise programmes, with a body of evidence now supporting these claims (see Ng et al. 2012; Teixeira et al. 2012 for reviews).

Despite the contribution that the theory of planned behavior and self-determination theory have made to our understanding of the processes that lead people to engage (or not engage) in physical activity, a key (and shared) limitation of

these, and other prevailing theories (e.g., self-efficacy theory, the health-action process approach), is that they lack of an analysis of the self as derived from social groups in a social context (Terry et al. 1999; Cruwys et al. 2015). That is, they fail to consider the potential for individuals to possess *multiple selves* that correspond to the identities they possess as members of various social groups, and, crucially, for these identities to play a fundamental role in determining behaviour. It is in this regard that the social identity approach offers a novel, and potentially valuable, contribution (see also sections 1.6 and 1.7 below).

The tendency to focus on physical activity behaviour at an individual level is also apparent within interventions that have typically been employed to promote physical activity, with individual-level psychological and cognitive–behavioural strategies, such as education, self-monitoring, cognitive restructuring, and goal setting often used (Greaves et al. 2011; Tully and Hunter 2015; Speake et al. 2016). Indeed, these strategies have often been deployed in attempts to target components of the behaviour change theories described above. For example, setting achievable goals has been used in the context of self-determination theory-based interventions with the objective of satisfying peoples' proposed need for competence (e.g., see Silva et al. 2008, 2010). Benefits associated with these techniques include improved physical activity programme attendance and adherence, and reduced dropout (e.g., see Annesi 2002; Duncan and Pozehl 2002; Annesi 2007). Their capacity to improve physical activity behaviours has, however, typically been demonstrated in the short, rather than long-term (Schultz 1993; Bull et al. 2001; Jiryaee et al. 2015), while some studies have failed to find any significant effects (e.g., Cobb et al. 2000; McKay et al. 2001). Indeed, efforts to change behaviour by targeting elements of the theory of planned behaviour have, in particular, demonstrated minimal success, even

in instances where positive post-intervention changes in participants' attitudes and subjective norms have been observed (Sniehotta 2009). This has led to researchers to question the suitability of the theory of planned behaviour as a model of behaviour *change* (Sniehotta et al. 2014)

Efforts to promote physical activity often also involve attempts to progress individuals through specified stages of behaviour change—for example, as described in the transtheoretical model (TTM; Prochaska and DiClemente 1983). The TTM argues that individuals cycle both forwards and backwards through a series of stages ranging from 'precontemplation' to 'maintenance' when undergoing behaviour change.[2] In the context of physical activity, precontemplation is characterised by an absence of regular exercise with no intention to change current behaviour, while to demonstrate 'maintenance' an individual must have engaged in regular exercise for more than six months (Marshall and Biddle 2001). Again though, despite some evidence for the TTM's predictive utility (Marshall and Biddle 2001; Wilson et al. 2016), overall support for the model is relatively weak (National Institute for Health and Care Excellence 2014), with mixed findings emerging from studies examining its utility as a predictor of behaviour change and as a basis for intervention (Adams and White 2005; Bridle et al. 2005). The applicability of the TTM to the physical activity domain has also been a longstanding concern, with researchers arguing that it has a greater capacity to track and explain single health-related behaviours (e.g., smoking), than multiple behaviours, such as those encapsulated by the umbrella term 'physical activity' (Adams and White 2005).

Meta-analyses of physical activity interventions provide further evidence that prevailing approaches to promoting physical activity could, at the very least, be

[2] A sixth stage, 'termination', defined as 5 years of exercise adherence, 100% self-efficacy in all previously tempting situations, and 0% temptation not to exercise, has also been proposed (Prochaska and Velicer 1997).

improved, with small overall effect sizes (Conn et al. 2002; Harris et al. 2009) and large heterogeneity in effect size strength (Conn et al. 2009) often reported. Indeed, although a recent meta analysis of randomised controlled trial interventions based on behaviour change theories (e.g., self-determination theory and the theory of planned behaviour) indicated that these do significantly impact the physical activity behaviour of participants, a small to medium effect size (Cohen's $d = 0.31$) was again observed. Methodological concerns (e.g., a failure to report both the number of participants included in each analysis and the calculation technique used to determine sample size) were also raised with regard to several of the studies included (Gourlan et al. 2016). More broadly, and arguably more importantly, trends over time indicate that, at a population level, physical activity levels remain stagnant at best and may even be decreasing. In the USA, for example, physical *in*activity rates among people aged ≥6 years increased by 0.9% between 2010 and 2015 (Physical Activity Research Council 2016), while the latest data suggest that worldwide physical activity levels are not increasing, despite many countries having a national physical activity policy or plan (Sallis et al. 2016). All these findings suggest that, despite the considerable volume of research that has been conducted, further work is still required to improve understanding of physical activity behaviours, and to identify—and mobilise—the most effective strategies for behaviour change in this domain.

### 1.5 Recent advances in understanding behaviour change

Perhaps acknowledging (to some extent at least) this lack of understanding and success in changing behaviour, researchers have recently explored various new avenues in attempting to advance understanding of behaviour change. For example, Michie and colleagues have developed taxonomies of the numerous strategies that

have been employed in the context of smoking cessation (Michie et al. 2011b), alcohol consumption (Michie et al. 2012), and healthy eating and physical activity (Abraham and Michie 2008; Michie et al. 2011a). Among other things, researchers have also explored (1) how best to frame behaviour change messages (Gerend and Maner 2011; Gerend and Shepherd 2016), (2) the utility of new mobile and sensing technologies (King et al. 2008; King et al. 2013), and (3) the relationship between affective responses to exercise and exercise adherence (Ekkekakis et al. 2011; Rhodes and Kates 2015).

Perhaps more importantly, however, researchers have also begun to acknowledge the importance of moving beyond an exclusive focus on individual-level approaches to behaviour change to ecological models that consider the numerous individual, environmental, policy, and social determinants of health behaviours (e.g., Sallis et al. 2008; Bauman et al. 2012; Ding et al. 2012; Garcia et al. 2016). In contrast to traditional theoretical approaches, the assumption at the heart of these models is that understanding behaviour change at different levels (e.g., both individual and collective) is critical for the development of successful interventions (Sallis et al. 2008).

Although in many areas research remains in its infancy, various new lines of research examining a wide range of previously unexplored correlates and determinants have produced promising findings. For example, a growing body of research has highlighted the impact of the built environment on individuals' physical activity behaviours (Farley et al. 2007; Ferdinand et al. 2012), with emerging evidence indicating that promoting physical activity in urban green space may be particularly effective (Hunter et al. 2015). Of particular relevance to the present thesis, initial findings regarding the influence of social factors on physical activity

behaviours have also been encouraging. For example, studies have begun to indicate the physical activity benefits associated with attending to, and engaging with, a person's social support and social capital (Resnick et al. 2002; Beets et al. 2010; Broyles et al. 2011; Laird et al. 2016). Along similar lines, research has also shown that when people possess more favourable perceptions regarding 'protective social factors' in their communities (e.g., in relation to the quality of social networks, the degree of social cohesion, and the level of trust in neighbours) they are more likely to engage in physical activity (Brennan et al. 2003; Kaczynski and Glover 2012).

Similar findings have been documented in the broader health domain, with research consistently demonstrating the positive impact of social factors on individuals' mental and physical health (Holt-Lunstad et al. 2010; Wong et al. 2014; Ho 2016). Of particular relevance to the present discussion, research informed by the social identity approach has emphasised the health benefits (both mental and physical) that accrue from people possessing, maintaining, and developing *social identities* derived from meaningful memberships of social groups (Jetten et al. 2012). More specifically, this 'social cure' (Jetten et al. 2012) research has shown that internalised social group memberships have positive effects on health in a range of contexts—including choirs (Dingle et al. 2013), care homes (Haslam et al. 2014), and, of most interest to this thesis, sports teams (Jones and Jetten 2011). In these various settings, increased social identification has also been shown to have positive consequences for mental health-based indicators of self-esteem (Jetten et al. 2015), quality of life (Steffens et al. 2016a), depression (Cruwys et al. 2014), and stress (Haslam and Reicher 2006).

To provide some theoretical grounding to these findings, and lay the foundation for the subsequent analysis of how the social identity approach may

contribute to the understanding of physical activity behaviours, an introduction to the approach is provided below. As this section demonstrates, the broad goal of the social identity approach is to offer a comprehensive analysis of the way in which individual psychology is structured by group life. In contrast to traditional approaches to understanding physical activity behaviour, it therefore offers a perspective that deviates from a predominant focus on individuals *as individuals* to consider how our group memberships, and the corresponding different selves that emerge when these group memberships become salient, influence our behaviours. As indicated above, it is partly for this reason that it may have such potential in this domain.

### 1.6 The social identity approach

The social identity approach is comprised of two theories: social identity theory (SIT; Tajfel 1972, 1974; Tajfel and Turner 1979) and self-categorization theory (SCT; Turner 1982, 1985; Turner et al. 1987; Turner 1991). Originally designed to explain discrimination between social groups, SIT was developed following a series of studies by Tajfel and colleagues (Tajfel et al. 1971) that sought to identify the minimal conditions under which members of one group would discriminate against an outgroup in favour of a group to which they belonged. Across these 'minimal group studies', participants were required to distribute rewards (representing small sums of money) to others having been previously placed into groups based on arbitrary criteria. Findings revealed that, even in conditions where a number of factors previously implicated in inter-group discrimination, such as a history of conflict, personal animosity, and interdependence (e.g., Sherif 1956; Sherif et al. 1961) were eliminated, participants consistently favoured the ingroup in their allocation of rewards. Moreover, rather than acting to maximise overall ingroup

gain, participants opted for a strategy in which they maximised *relative* gain over the outgroup.

Subsequently, Tajfel (1972) argued that when individuals categorise themselves as members of a group this gives their behaviour a distinct meaning. Building on this assertion, Tajfel (1972) forwarded his widely cited definition of a social identity: "the individual's knowledge that he [or she] belongs to certain social groups together with some emotional value and significance to him [or her] of this group membership" (p. 292). SIT represented an expansion of this initial premise. In essence, it suggests that if individuals are categorised in terms of a specific group membership (rather than as individuals), and they define themselves in terms of that social categorisation, then they will seek to positively differentiate their ingroup from a comparison outgroup on a valued dimension in order to achieve positive self-esteem. That is, when an individual's sense of who they are is defined in terms of 'we' rather than 'I' they want to see 'us' as different from, and better than, 'them' (Haslam 2004).

SIT also considers the role of three elements in structuring social identification and therefore group behaviour: the perceived permeability of group boundaries and the perceived stability and legitimacy of an ingroup's position in relation to other groups (Tajfel and Turner 1979). SIT argues that, if group members perceive boundaries between groups to be permeable, then members of low-status groups may engage in a strategy of social mobility. That is, they may seek to move between groups in order to improve or maintain their social standing and maximise personal outcomes. For example, a footballer with the goal of progressing from the second or 'reserve' team to the first team may work hard in training sessions and attempt to demonstrate his or her abilities to the team's manager. Conversely, SIT

proposes that if group members perceive group boundaries to be impermeable then this encourages them to perceive themselves, and act, as group members (Wright et al. 1990; Ellemers 1993). Taking the same example, if the footballer did not believe that progression to the first team was possible, they may invest less effort in training and adopt a more relaxed attitude in line with that which may be typical of their second team teammates.

With regard to stability and legitimacy, SIT suggests that if status relations between groups are perceived to be insecure (i.e., unstable or illegitimate) group members will often engage in social competition in an attempt to define themselves as superior on status-defining dimensions. For example, members of two closely matched local football teams may separately attempt to define themselves as superior to the other based on different criteria (e.g., their head-to-head record or league table position), depending on which criteria portrays their group in the most favourable way. If status relations are perceived to be secure then members of high-status groups will again tend to define their group based on status-defining dimensions. Members of low status groups will, however, often utilise a strategy of social creativity, in which they define themselves based on status-irrelevant dimensions (e.g., see Terry and Callan 1998). For example, members of a running club who consistently finish in low positions in races may emphasise the great camaraderie and relations between club members, rather than the club members' performance (e.g., 'we may not win too often but we are a friendly group who enjoy training and racing together').

These key assertions of SIT concerning the processes that people engage in to feel good about who they are and what they do have received considerable empirical support (e.g., Howarth 2002; Cikara et al. 2011; Amiot et al. 2014). A

weaknesses of the theory, however, is its somewhat limited explanatory scope (Haslam 2004). Although the construct of social identity is clearly integral to SIT, the theory fails to answer questions such as 'what is the relationship between personal and social identity?' and 'what makes a person define themselves in terms of one group membership rather than another?' (Haslam 2004). The subsequent development of SCT supplemented SIT and strengthened the social identity approach by providing answers to questions such as these.

One of the key insights offered by SCT stems from Turner's (1982) assertion that "social identity is the cognitive mechanism that makes group behaviour possible" (p.21). Turner (1982) claimed that the 'switching on' of social identity allows intergroup behaviour to take place, labeling this process depersonalisation: a process of self-stereotyping through which the self comes to be perceived as categorically interchangeable with other group members. SCT therefore argues that group behaviour is associated with a change in the structure of the self, a change in self-categorisation. That is, when an individual defines him or herself as a group member, the self is defined stereotypically in terms of attributes shared by others who are perceived to be representative of the same social category, rather than the individual's personal attributes (e.g., 'I am a parkrunner, therefore I run parkruns myself and support other parkrunners at the same time').

Subsequent developments of SCT have provided a greater insight into the circumstances under which such a shift in psychology may occur. That is, the circumstances under which a particular social identity will be activated. Of particular note, the meta-contrast principle (Turner 1985) states that an individual is likely to define him or herself in terms of a particular social identity (and therefore demonstrate ingroup favouritism towards those that share that social identity) if the

differences between the members of that category are perceived to be smaller than the differences between members of that category and others that are salient in a particular context. For example, a runner and a cyclist are more likely to share a higher-level social identity as 'exercisers' when they encounter each other in a context that includes inactive people. In broader and simpler terms, SCT theorising suggests that an individual may possess multiple concepts of the self, yet the saliency of a particular self-concept is situation-specific.

An additional assertion of SCT is that the dynamic process of self-categorisation described above has ongoing consequences for the active co-ordination of individuals' perceptions and behaviours (Haslam 2004). More specifically, SCT suggests that self-categorisations provide the basis for mutual social influence (Turner and Oakes 1989; Turner 1991; Turner and Oakes 2015). Individuals who perceive themselves to share category membership with another person in a given context not only expect to agree with that person on issues relevant to their shared identity but they will actively strive to reach agreement on those issues. Strategies such as specifying frames of reference, identifying shared beliefs, and clarifying points of disagreement can be used to achieve this co-ordination (Haslam 2004). Social reality testing—testing and validating one's own views through collaboration and interaction with others who are perceived to share the same group membership—also represents an important part of this process (Turner 1991). Ultimately, through the identification of, and conformity to, norms that are perceived to be shared with other group members in a particular context, individual views are converted into shared values, beliefs and behaviours.

This drive to co-ordinate behaviours with other group members is one reason why benefits may result from developing strong social identities in physical activity

settings. The stronger the social identity an individual forms as a member of a group, the more their perceptions, attitudes, and, most importantly, behaviours become governed by the group membership (Turner et al. 1987). So, for example, the more a person identifies as a member of a gym class or exercise group (e.g., as a CrossFit exerciser), a running group (e.g., as a parkrunner), or a team (e.g., as a rugby player of Team X), the more that person will be motivated to discover and align themselves with the norms, values, and ideals of what it means to be a member of that group. This may result in (1) a desire to take part in group sessions to gain a better understanding of the group's norms, values, and ideals, and (2) greater long-term participation, particularly in groups where regular participation is itself a group norm. To extend these ideas, and begin to focus in on the key aims of this thesis, evidence for the efficacy of the social identity approach to help understand physical activity behaviours is provided in the following sections through three broad examples.

## 1.7 The social identity approach applied to physical activity

### 1.7.1 Social identity can be harnessed to promote engagement in physical activity

In line with the foregoing arguments, Terry and Hogg (1996) found that individuals who identified strongly with a group in which exercise was normative reported greater intentions to engage in regular exercise than those who identified weakly with the group. These findings have subsequently been supported by a body of experimental research in the broader health domain, which has shown that people are more likely to engage in healthy behaviours if, and to the extent that, these are congruent with the content of a salient social identity (Oyserman et al. 2007; Tarrant and Butler 2011). For example, young adults report weaker intentions to reduce

alcohol consumption when their social identity as a ‘university student’ rather than as a ‘British person’ is made salient (Tarrant and Butler 2011). Showing too that identity-based intentions translate into identity-congruent behaviour, Strachan et al. (2012) found that runners who identified more strongly with their running group completed a greater proportion of their runs with the group but were less confident they would continue running should the group disband. Complementing the theory of planned behaviour (Ajzen 1991), these findings reinforce the notion that intentions predict behaviour. Crucially, however, they extend this proposition by demonstrating that this effect is particularly strong when those intentions are structured by internalised social identities.

Other research informed by the social identity approach has extended these ideas by highlighting the importance of the structure of exercise environments in fostering identity development. Across multiple studies, Beauchamp and colleagues (Beauchamp et al. 2007a; Beauchamp et al. 2012) and Dunlop and Beauchamp (2011a, 2011b) have shown that people feel more inclined to exercise with others with whom they share membership in a particular social category (e.g., as ‘us women’). Among other things, these researchers found that age and sex are particularly common markers of shared social identity in exercise settings and that participants who perceived themselves to be similar to other group members in terms of physical characteristics (i.e., age, physical appearance, and physical condition) displayed greater levels of adherence to an exercise programme than those who perceived themselves to be dissimilar to other group members (Dunlop and Beauchamp 2011a). Indeed, a recent randomised controlled trial provided particularly strong evidence for the potential benefits of attending to individuals’ age-related identities. Participants ($N$=627) completed a programme of group-based

exercise classes (lasting 50-60 minutes) three times a week in either a similar age same gender, similar age mixed gender, or mixed age mixed gender group. Participants in the similar age mixed gender and similar age same gender groups demonstrated greater exercise adherence over 12 and 24-week periods than participants in the mixed age mixed gender groups (Beauchamp et al. 2018).

Such findings suggest that people seek out and create ingroups (and outgroups) in exercise settings (Bruner et al. 2014) and that the opportunity to exercise with other ingroup (rather than outgroup) members is therefore an important determinant of their continued engagement in exercise (Beauchamp et al. 2015). They also suggest that people who design exercise programmes need to attend to both (1) the opportunities these provide for emergent social identities and (2) the ways in which the programme allows these identities to be enacted and maintained (e.g. through interaction with ingroup members).

Supporting these assertions, a randomised controlled trial of the Football Fans in Training (FFIT) programme revealed a significant 4.36% difference in percentage weight loss between intervention and control groups at 12-month follow-up (Hunt et al. 2014). FFIT is a 12-week programme delivered exclusively to overweight male football fans to improve their diet and physical activity. Indeed, building on the success of the FFIT programme, further programmes—embedded in other sports—have shown promising initial findings (Petrella et al. 2017), with other programmes on going (Gill et al. 2016). Crucially, within these programmes participants share a common social identity as fans of the same team, with interaction between ingroup members assured. Such interaction is also facilitated within many other recently developed exercise programmes (e.g. ‘Baby Bootcamp’,

'Karate 4 Kids', 'Swimming for Seniors'), suggesting the value of social identities is already well understood (albeit implicitly) by their initiators.

These various lines of research all speak to the idea that social identities can have profound implications for participation in, and adherence to, physical activity. To date, however, the body of research that supports such claims is relatively small. Accordingly, one of the key aims of this thesis is to extend understanding in this area by further exploring the relationship between the strength of individuals' social identification as a member of their sport or exercise group and their participation in group relevant activity (as well as other related outcomes; see chapters 2, 3, and 4)

### 1.7.2 Social identity underpins exercise group behaviour

Examination of the benefits of group exercise environments, where multiple individuals undertake the same structured exercise activity, is not new. Indeed, the effectiveness of interventions that involve individual- and group-based exercise environments have been studied extensively, with good evidence that group environments are more effective than individual environments in promoting adherence. Efforts to develop cohesiveness within exercise groups have proved particularly effective (Burke et al. 2006). Research across multiple settings and populations has demonstrated a range of positive outcomes from exercising in so-called 'true groups' where group dynamics principles have been used to increase cohesiveness (Burke et al. 2006). Most notably, these benefits include long-term increases in physical activity (Rejeski et al. 2003; Estabrooks et al. 2008; Estabrooks et al. 2011; for recent reviews see Estabrooks et al. 2012; Harden et al. 2015).

Research examining the effectiveness of these 'true groups' also reveals that successful interventions foster the development of social identity. For example, the influential model by Carron and Spink (1993) proposes that a sense of

distinctiveness plays an important role in motivating members of exercise groups to engage in group-relevant activity (see also Bruner and Spink 2010, 2011). Clarifying the causal role of social identification in these outcomes, experimental research that enhanced social identification by providing group t-shirts and encouraging participants to develop a group name found this led to greater subsequent effort in a group task (Høigaard et al. 2013).

Such findings suggest that social identity is a key mechanism that underpins the effectiveness of group-based programmes in exercise settings. Again, though, this hypothesis is yet to be extensively tested. In particular, there is a need for much more empirical research to explore the role that social identities play in the effectiveness of various forms of exercise groups, interventions, and programmes in the world at large (e.g., gym membership, CrossFit, parkrun). One of the primary aims of the present thesis is, therefore, to enhance understanding in this area. The capacity of exercise groups, interventions, and programmes to promote participation, positive affective exercise experiences, and, ultimately, improved health and well-being among participants, are key indicators of their effectiveness. As such, the relationship between the strength of individuals' social identification as a member of their physical activity group and these key outcomes are examined in various physical activity contexts in this thesis (see chapters 2, 3, and 4).

### 1.7.3 Social identity underpins effective leadership in physical activity and exercise settings

The social identity approach has been applied to a broad range of phenomena including motivation (van Knippenberg 2000; Ellemers et al. 2004), productivity (Worchel et al. 1998; Greenaway et al. 2016b), organisational mergers and restructuring (Gaertner et al. 1996; Terry et al. 2001), and stress (Haslam and

Reicher 2006). Perhaps the phenomenon to which it has been most commonly applied, however, is leadership (e.g., Ellemers et al. 2004; Reicher et al. 2005; Haslam et al. 2011). As previously alluded to, the social identity approach asserts that individuals' capacity to categorise themselves in terms of a shared social identity (e.g., as a member of a particular exercise group) lays the foundation for processes of social influence (Turner 1991). Social identity theorising further suggests, however, that the capacity for any given individual to exert influence varies as a function of his or her ability to represent and embody the meaning of the group in a given social context. With leadership widely defined as a *process of influence* whereby one individual mobilises a group towards a common goal (Chemers 2000; Northouse 2016), in slightly differently terms this means that any individual group member's ability to exert leadership depends on his or her *ingroup prototypicality* (Hogg 2001; Haslam et al. 2011; van Knippenberg 2011).

More generally, from a social identity perspective, successful leadership depends on a leader's ability to *create*, *represent*, *advance*, and *embed* a shared sense of identity among group members (Haslam et al. 2011; Steffens et al. 2014c). A substantial body of research, spanning contexts including business and organisations (e.g., Pierro et al. 2005; Cicero et al. 2008; Steffens et al. 2014a), politics (e.g., Reicher and Hopkins 1996; Augoustinos and De Garis 2012; Steffens and Haslam 2013), and sport (Slater et al. 2015; Fransen et al. 2016), supports this assertion. As yet, however, the efficacy of the social identity approach to leadership has yet to be examined in relation to health-related behaviours and outcomes in physical activity settings. The four principles of identity leadership (as proposed by Haslam et al. 2011) are now, therefore, considered in turn, with particular focus on their applicability to this domain.

#### 1.7.3.1 Leaders as in-group prototypes

The first, and most extensively researched, principle of social identity leadership states that leaders are more effective to the extent that they are perceived to be representative or 'prototypical' of the group (Haslam et al. 2011). That is, the extent to which they embody the core attributes of the group that make it special and distinct from other groups (Steffens et al. 2014c). Group prototypes do not necessarily include physical or demographic attributes. Rather, they encapsulate the socially shared reality of the group, and therefore include what the group believes, values, and considers important, and what are seen as appropriate and desirable behaviours and courses of action (van Knippenberg 2011).

Following a review, van Knippenberg (2011) stated that the extant literature has unequivocally demonstrated a positive relationship between leaders' prototypicality and effectiveness. Indeed, research across multiple countries and settings, and using a variety of research designs, has demonstrated the positive influence of leaders' perceived prototypicality on numerous constructs including followers' creativity (Hirst et al. 2009), trust in the leader (Giessner and van Knippenberg 2008), endorsement of the leader (Ullrich et al. 2009), and perceptions of the leader's charisma (Platow et al. 2006).

Most notably, in organisational contexts leader prototypicality has also been linked to greater self-reported work effort levels (Cicero et al. 2008; León et al. 2009), and job satisfaction (Pierro et al. 2005; Cicero et al. 2007, 2010), and lower turnover intentions (Pierro et al. 2005; Cicero et al. 2010). Such findings appear to have clear relevance to physical activity settings. Maximising group members' effort is highly desirable in physical activity settings, with research demonstrating the increased physiological benefits that result from exercising at higher intensities

(DiPietro et al. 2006; Swain and Franklin 2006). Similarly, satisfaction represents an influential determinant of adherence to health regimens (Spernak et al. 2007; Tak et al. 2012), and is therefore commonly assessed in physical activity intervention studies (Munneke et al. 2003; Nyrop et al. 2014). Finally, turnover in physical activity settings may best be conceptualised as either switching to a different physical activity setting or opting to pursue other (potentially less health-benefiting) pastimes. As illustrated by the high levels of drop out from physical activity programmes (e.g., Arikawa et al. 2012; Taylor et al. 2013), and longitudinal attendance data from gyms and fitness clubs showing substantial decreases in regular attendance over time (e.g., DellaVigna and Malmendier 2006; Middelkamp et al. 2016), this is a key issue in the physical activity domain.

#### 1.7.3.2 Leaders as in-group champions

The second principle of social identity leadership proposes that leaders will be more effective to the extent that they are perceived to behave in ways that advance the ingroup's interests over and above both personal interests and those of other outgroups (Haslam et al. 2011; Steffens et al. 2014c). A substantial volume of research, primarily examining the concept of fairness, underpins this notion (e.g., Platow et al. 1997; Jetten et al. 2002; Duck and Fielding 2003; see Haslam et al., 2011 for a review). For example, across a series of studies, Platow et al. (1997) demonstrated that fair leaders received stronger endorsement than unfair leaders in interpersonal situations. In intergroup scenarios, however, this affect was consistently either attenuated or reversed. Taking the third of Platow et al.'s (1997) experiments as an example, New Zealand University students were presented with a memorandum supposedly written by the chief executive officer (CEO) of a local hospital outlining proposed procedures for dividing time on a kidney dialysis

machine between two equally needy patients. Results revealed that when both patients were described as life-long New Zealanders (i.e., ingroup members), the CEO received stronger endorsement when he recommended an equal distribution of time on the machine. When one patient was described as a recent immigrant (i.e., an outgroup member), however, the CEO received greater endorsement when he recommended that the New Zealander received a greater proportion of time on the machine.

In a separate study, conducted during the 2000 Sydney Olympics, a survey of Australians revealed that leaders who treated ingroups and outgroups equally were endorsed more than leaders who favoured the ingroup (Platow et al. 2003). Appreciation of context is vital when interpreting these results. Norms of respect, consideration and fairness lay at the heart of the Olympic spirit. Thus, in this instance, the researchers argued that the leader needed to act in a fair manner in order to be perceived as enhancing group interests.

In short, and as Haslam et al. (2011) noted, this research has shown that the extent to which leaders are both endorsed by, and able to exert influence over, group members is not determined by whether they act fairly or in an ingroup or outgroup favouring manner. Rather, it is determined by whether or not they are seen to promote the group interest in a way that is perceived as most appropriate by group members in the situation at hand. Haslam et al.'s (2011) assertion that "for would-be leaders, nothing can substitute for understanding the social identity of the groups they seek to lead" (p.133) may, therefore, represent the most appropriate advice for leaders in physical activity settings. Leaders with this understanding will be best placed to promote the core interests of the group and, providing they engage in this

process, are more likely to successfully influence group members and receive their support.

To illustrate this, let us take a running group to which a new leader has been appointed as a practical example and assume that the common goal of group members is to improve general fitness in a sociable and relaxed group environment. In one group, the new leader takes time to learn about group members' concerns and goals. In another, the leader does not, and instead assumes that members have similar goals to another running group to which the leader was affiliated (say in which competing seriously against other running clubs was the goal). Clearly, the first leader would be better positioned to promote the interests of the group and may do so by, for example, emphasising members' improvements rather than drawing comparisons between members.

#### 1.7.3.2 Leaders as entrepreneurs of identity

The third principle of social identity leadership concerns the leader's ability to actively create a sense of shared identity among followers. That is, their ability to craft a sense of 'us' by defining both the boundaries and content of the group's identity (Reicher et al. 2005; Haslam et al. 2011; Steffens et al. 2014c). Reicher et al. (2005) proposed that strong entrepreneurs of identity seek to create an inclusive category for the group's identity that incorporates all those they seek to mobilise and of which they themselves are representative. Research in political contexts provides an excellent illustration of this process. Reicher and Hopkins (1996, 2001) and Augoustinos and De Garis (2012) have argued that, in order to win votes, political leaders strategically construct and utilise social identities in political discourse that the majority of their constituents can identify with. For example, appeals to the

category of ‘nation’ or ‘nationhood’ are common because this incorporates the entire voting public.

One way leaders can demonstrate they are an entrepreneur of identity is through the use of appropriate language (Haslam et al. 2011). Based on this premise, a growing body of evidence has emerged demonstrating the value of *group-oriented* language. For example, Steffens and Haslam (2013) retrospectively examined the use of personal (‘I’ and ‘me’) and collective (‘we’ and ‘us’) pronouns in the official speeches of all Australian Prime Ministerial candidates since 1901. Across all elections, findings revealed that victorious candidates made 61% more references to ‘we’ and ‘us’ and used these words with greater regularity than unsuccessful candidates (once every 79 words versus once every 136 words). Slater et al. (2015) provided further support for the value of group-oriented language in a sporting context. Following an analysis of the media data emanating from six prominent leadership figures at the London 2012 Olympic games, these researchers noted the diverging fortunes of the leaders they focused on. While the cycling and rowing teams achieved great success at the games, the swimming team performed below expectations and the leader subsequently left his position. Slater et al. (2015) observed that, in contrast to the other more successful leaders, the swimming team leader commonly referred to the swimmers as ‘they’ rather than ‘we’ or ‘us’.

These findings suggest that the extent to which leaders act as entrepreneurs of identity influences both (1) their capacity to mobilise support from potential followers, and (2) their ultimate success in the role. Both of these outcomes are of clear relevance to physical activity leaders. Moreover, there are numerous situations in which physical activity leaders may benefit from engaging in identity entrepreneurship. First, in many physical activity contexts (e.g., recreational sports

teams) group members elect leadership roles. Based on findings from other settings, individuals seeking to engender the support of group members to fill these roles would be well advised to engage in strategies such group-oriented language to demonstrate their ability to engage with, and shape, the group's collective identity. Second, given the observed benefits for group effectiveness, those holding leadership roles in these settings would also be wise to engage in such strategies. This improved effectiveness could manifest as improved team or group results (as demonstrated by Slater et al. 2015), improved cohesion among group members (following suggestions that the development of social identities may, to some extent, underpin improvements in exercise groups' cohesiveness, see section 1.7.2), or even as improved group member participation. Although these possibilities await research, the present thesis advanced understanding in this area by examining the effect of leaders' identity entrepreneurship (including their use of group-oriented language) on group members' effort during, and performance of, a physical exercise task (see chapter 5).

Further evidence of the potential value of leaders acting as entrepreneurs of identity in physical activity contexts emanates from two recent studies in organisational settings (Steffens et al. 2014a; Steffens et al. 2017). In a first attempt to explore the role of social identity as a lynchpin between leadership and health, Steffens et al. (2014a) examined the relationship between leaders' perceived identity entrepreneurship and group members' work engagement, burnout, and perceptions of group performance. A sample of 641 workers from the United States were asked to reflect on their current workgroup and workgroup leader while completing questionnaires measuring these four variables. Results revealed that perceived leader identity entrepreneurship was positively related to work engagement and perceptions

of group performance and negatively related to burnout. Building upon this, Steffens et al. (2017) examined the lagged effects of identity entrepreneurship in a two-wave field study. Steffens et al. (2017) found that perceived identity entrepreneurship predicted (1) greater subsequent work engagement, and (2) lower subsequent burnout and turnover intentions.

Findings from Steffens and colleagues' two studies speak to the potential value of identity leadership for promoting group members' participation in physical activity settings. The relevance of turnover intentions has already been discussed (see section 1.7.3.1), while findings relating to burnout are equally noteworthy. Higher levels of burnout have been extensively linked to motivation loss and dropout among sports team players (Smith 1986; Coakley 1992; Raedeke et al. 2002; Gustafsson et al. 2011), emphasising the value of minimising its occurrence in physical activity settings. As such, Steffens and colleagues research provides an initial indication of the positive effect that physical activity leaders engaging in this facet of social identity leadership may have on promoting and, crucially, *sustaining* participation.

#### 1.7.3.2 Leaders as embedders of identity

Finally, Haslam et al. (2011) proposed that, in addition to representing, advancing, and creating shared identities, leaders must also ensure that these shared identities become embedded in reality. That is, they should develop and promote structures, events, and activities that enable the group's shared identity to be lived out and orient these in such a way to allow the group as a whole to be effective and successful (see also Steffens et al. 2014c). Haslam et al. (2011) identified three broad ways through which a leader can embed the values they put forth in reality: by acting as artists, impresarios and engineers of identity. More specifically, Haslam et al.'s

(2011) analysis yielded an extensive list of desirable skills that leaders would ideally possess in order to facilitate this process including linguistic prowess, poetic expression, rhetorical sophistication, and social insight (see section 1.7.3.2 for an illustration of the power of language).

An example of the value of leaders acting as embedders of identity was provided within the seminal BBC prison study (Haslam and Reicher 2006; Reicher and Haslam 2006; Haslam and Reicher 2007). This experimental case study examined the consequences of randomly dividing men into groups of prisoners and guards within a specially constructed institution. At one stage a prisoner stole a bunch of keys from the guards. This individual argued that the prisoners should demand specific resources in exchange for the keys and encouraged other prisoners to engage in similar acts of defiance. A second potential leader for the prisoner group proposed, however, that the keys should instead be exchanged for the creation of a forum through which the prisoners could present their demands to the guards. In social identity terms he proposed a *structure* in which the group, and his own vision for its democratic identity, could be promoted. This approach was endorsed by the other prisoners and quickly agreed to by the guards. When the experimenters subsequently removed this individual (an experienced trades unionist) from the study, however, they found that the remaining prisoners did not have the skills to implement his ideas and quickly returned to using conflict to challenge the guards. Haslam and Reicher (2007) argued that this example highlights that the long-term success (or failure) of leadership depends on the creation of structures and processes that allow identity-based projects to be realised. More broadly, these findings suggest that the sustained attainment of positive group outcomes is dependent on leaders acting as embedders of identity.

To illustrate the applicability of this facet of identity leadership to physical activity leaders, let us return to the earlier example of the newly appointed running group leader (see section 1.7.3.2). To recap, in an ideal scenario the new leader would have dedicated time to understanding the sociable and relaxed identity of the group. Following on from this, they would now be well placed to provide practical structures to allow the group's identity to be enacted in the real world. For example, they could ensure that training sessions are non-competitive and organise club social events.

#### 1.7.3.5 Identity leadership summary

Overall, the identity leadership approach demonstrates clear applicability to the physical activity domain. Moreover, evidence from other (mainly organisational) settings suggests that there may be several positive outcomes associated with physical activity leaders engaging in the four facets of identity leadership. The list of potential benefits that can be abstracted from the preceding discussion includes improvements in the satisfaction (Pierro et al. 2005; Cicero et al. 2007, 2010), effort (Cicero et al. 2008; León et al. 2009), and engagement (Steffens et al. 2014a; Steffens et al. 2017) levels of group members, in addition to reductions in their turnover intentions (Pierro et al. 2005; Cicero et al. 2010; Steffens et al. 2017) and likelihood of experiencing burnout (Steffens et al. 2014a; Steffens et al. 2017). These benefits are further supplemented by potential increases in group performance (Steffens et al. 2014a; Slater et al. 2015) and group members' endorsement of leaders (Haslam and Reicher 2007; Steffens and Haslam 2013).

Despite the approach's seemingly substantial potential, however, and as alluded to previously, no attempts have yet been made to directly examine the efficacy of the identity leadership approach in relation to health-related behaviours

or outcomes in physical activity settings. Empirical tests of the identity leadership approach in this domain are, therefore, sorely needed. As such, a primary aim of the present thesis was to address this lacuna. Chapter 3 documents a first (cross-sectional) examination of the relationship between identity leadership and group members' sport and exercise session attendance, while chapter 4 documents a first exploration of the relationship between identity leadership and group members' attendance over time. Finally, the research reported in chapter 5 represented the first attempt to examine the causal effects of manipulating one facet of identity leadership (identity entrepreneurship) on individuals' effort during, and performance of, an exercise task.

Given the focus on leadership in several sections of the thesis, and in order to further demonstrate why the identity leadership approach may represent such a valuable framework in the physical activity domain, it is useful at this stage to consider existing approaches to studying leadership in physical activity settings, and to compare these approaches to the identity leadership framework. The following section is therefore dedicated to this endeavour.

## 1.8 Comparing the identity leadership approach with existing approaches to studying leadership in physical activity contexts

Despite the long history of leadership research dating back to 'great man' theorising in the 1940s (Weber 1946), the study of leadership remains as popular as ever, with Dinh et al. (2014), for example, identifying 752 original research articles across just 10 top-tier journals with leadership as the primary focus between 2000 and 2012. Leadership research in physical activity settings has, however, been sporadic and failed to keep pace with the advances made in other domains. Indeed, research has predominantly been based on early behavioural theorising, which—

following the failure of ‘great man’ research to identify any traits consistently associated with effective leadership (Stogdill 1948)—suggested that leadership can be developed through observing and subsequently adopting universally effective leadership behaviours (Northouse 2016). For example, research has examined the preferred leadership behaviours of exercise group members (Hannus and Laev 2011) and the relationship between exercise leaders’ behaviours and group members’ affective states (Turner et al. 1997; Fox et al. 2000; Loughead et al. 2008). Although some support for the benefits of an ‘enriched’ (i.e., energetic, pleasant, and socially interactive) rather than ‘bland’ (i.e., technique focused with vague feedback and no individual encouragement or support given to group members) leadership style has emerged (Turner et al. 1997; Fox et al. 2000), this behavioural approach is limited by its failure to consider situational variables and take into account leader-group member relationships.

In recent times, the transformational approach (Bass 1985; Bass and Riggio 2006) has become the most popular approach to the study of leadership across all contexts (Dinh et al. 2014). Building on Burns’ (1978) transactional leadership theory, the emphasis of this approach is on building interpersonal relationships between leaders and followers based on personal, emotional, and inspirational exchanges, with the intention of developing followers to their full potential (Bass 1985). Transformational leadership encapsulates four leader behaviours that are proposed to influence followers’ values, needs, awareness, and performance: idealised influence, inspirational motivation, intellectual stimulation, and individualised consideration (Bass and Riggio 2006). Idealised influence refers to behaviours that allow leaders to serve as role models by acting fairly, consistently, and in line with their values. Inspirational motivation involves behaviours that

convey optimism and enthusiasm and inspire followers to work towards the shared vision that leaders articulate. Intellectual stimulation incorporates behaviours that encourage followers to take an innovative and creative approach to solving problems without fear of criticism. Finally, individualised consideration involves the leader considering and attending to each individual's needs for achievement and growth.

The emergence of the transformational approach—with its greater emphasis on the leader-follower relationship—represented a vital step forward for leadership research, and the approach has since received empirical support in various domains including business and organisations (e.g., Ejere and Abasilim 2013), education (e.g., Leithwood and Jantzi 2000), and the armed forces (e.g., Hardy et al. 2010). Of greater relevance to the present thesis, however, research in sporting settings remains in its infancy (Arthur et al. 2017), and has largely concentrated on performance-related outcomes (e.g., Charbonneau et al. 2001; Bormann et al. 2016), with initial research concerning the impact of transformational leadership on key health-related variables in physical activity settings producing equivocal findings. Stenling and Tafvelin (2014) documented a positive relationship between the perceived levels of transformational leadership demonstrated by floorball coaches and their players' well-being. Beauchamp et al. (2007b), on the other hand, found that transformational leadership was not associated with the exercise related self-efficacy beliefs of a group of female exercisers participating in a structured 10-week exercise programme. More specifically, Beauchamp et al.'s (2007b) results revealed that efficacy in relation to scheduling, overcoming barriers, and completing within-class tasks were not significantly affected by the perceived frequency of instructors' use of transformational leadership behaviours, regardless of participants' exercise experience. Findings to date therefore fail to provide conclusive evidence for the

value of physical activity leaders engaging in transformational leadership with regard to promoting health-related outcomes among group members.

More broadly, the transformational approach has also been criticised for (1) its vague theoretical underpinnings (van Knippenberg and Sitkin 2013), and (2) its lack of consideration for the influence of both follower characteristics and the situation (Ehrhart and Klein 2001; Avolio 2007). A further criticism of the approach relates to charisma. Echoing great man theorising, the transformational leadership approach conceptualises charisma as a special aspect of personality. Experimental research has, however, cast considerable doubt over this standpoint (Platow et al. 2006; van Dijke and De Cremer 2010). Across two studies, Platow et al. (2006) manipulated the extent to which a target individual—who participants were told was a student leader at their university—was *prototypical* of a group to which the participants belonged (i.e., students at their university). Results revealed that participants perceived the leader as significantly more charismatic in the high prototypicality condition, compared to the low prototypicality condition, leading Platow et al. (2006) to conclude that: "charisma may, indeed, be a special gift, but it is one bestowed on group members by group members for being representative of, rather than distinct from, the group itself" (p.317). That is, Platow et al.'s (2006) findings suggest that leaders may be able to inspire group members to work towards the shared vision that they create (as the transformational approach suggests), but only when they are perceived to be representative of, rather than superior to, the group and its members. Similarly, van Dijke and De Cremer (2010) found that individuals who identified more strongly with their in-group (in this case their work organisation) perceived prototypical leaders as more charismatic than non-prototypical leaders.

Collectively, these findings therefore speak to the efficacy of the identity leadership approach, with its emphasis on the importance of leaders' representativeness of the group. More broadly, and as the preceding sections demonstrate, the identity leadership approach offers a contrasting perspective on leadership in physical activity settings that moves beyond prevailing approaches which focus on the psychology of the leader *as an individual*, to a fresh approach based on an understanding of the psychology of the leader *as a group member.*

**1.9 Literature review summary and the contribution and aims of the thesis**

With physical activity levels a substantial and persistent concern, and current approaches to understanding and promoting physical activity demonstrating, at best, mixed success, fresh perspectives on this pervasive problem are sorely needed. Against this backdrop, the preceding literature review has highlighted the potential of applying the social identity approach to efforts to understand and promote physical activity. Crucially, this approach diverges from the predominant focus on individuals *as individuals* within prevailing models (e.g., the theory of planned behaviour and self-determination theory) to consider the role that group and identity dynamics play in shaping physical activity behaviours. That is, while these prevailing theoretical models are built on the assumption that individuals' cognitions, attitudes, motivations, and ultimately behaviours are determined at an individual level, the social identity approach demonstrates how our group memberships—and the social identities that underpin them—also exert a salient impact on these factors. As such, the approach has the potential to add a new layer to our understanding of physical activity behaviours. Its potential in this regard has been illustrated through three broad examples, with evidence considered from the various domains in which the approach has been fruitfully applied. In short, evidence

suggests that social identities, and physical activity leaders' engagement in social identity leadership, may have profound implications for individuals' physical activity behaviours and experiences. As intimated throughout the preceding discussion, however, direct attempts to test this proposal have been sparse. Drawing on various research designs, this thesis therefore sought to advance understanding by examining the efficacy of the social identity approach, and social identity approach to leadership, in a range of physical activity contexts.

At this stage it should be noted, however, that although this literature review has discussed the potential for the social identity approach to make a substantial and fresh contribution to both understanding and, to some extent, promoting physical activity, the empirical studies that this thesis comprises were primarily concerned with determining the extent to which the approach offers a useful framework for *understanding* physical activity behaviours. Discussion within the proceeding chapters continues, at times, to explore how results may be used as a basis for programmes and interventions designed to promote positive outcomes in physical activity settings (e.g., greater group member participation and effort). Testing these ideas was, however, beyond the scope of this thesis, with the studies included here laying a foundation for such efforts in the future. In broad terms, the overarching aim of the thesis was, therefore, to examine the efficacy of a social identity approach to understanding physical activity. This includes physical activity behaviours (e.g., participation and effort) and experiences (e.g., satisfaction). As such, the thesis makes a number of important contributions to knowledge.

First, the thesis involved the first attempt to examine relationships between the strength of individuals' sense of social identity as a member of a physical activity group (i.e., their group identification) and a range of desirable outcomes in a real-

world setting (parkrun). More specifically, outcomes included participants' parkrun participation, affective physical activity experiences (i.e., their sense of satisfaction), and overall well-being (i.e., their life satisfaction).

Second, the thesis includes a first examination of the relationship between perceptions of sport and exercise leaders' engagement in social identity leadership and group members' attendance. More specifically, it was hypothesised that group members' perceptions of their leader's engagement in identity leadership would be positively associated with members' own group identification, and members' group identification would, in turn, be positively associated with their sport or exercise attendance. Building on these hypotheses, a significant indirect effect of perceptions of leader engagement in identity leadership on members' attendance through members' group identification was also hypothesised.

Third, the thesis includes the first study to test relationships between (1) members' perceptions of their leader's engagement in identity leadership and members' group identification, and (2) members' group identification and their group-relevant attendance *over time*. That is, this two-wave study provided a more rigorous test of these relationships than afforded by the preceding cross-sectional studies (Ployhart and Ward 2011), and enabled the directionality of relationships to be assessed (Selig and Little 2012). It also afforded a more robust test of the mediation model first tested in the preceding study (see above) in which a significant indirect effect of members' perceptions of their leader's engagement in identity leadership on members' attendance through their group identification was hypothesised.

Fourth, the thesis includes the first study testing the causal effects of identity leadership on individuals' exercise behaviours. More specifically, to further

understand the potential of the identity leadership approach to contribute to our understanding of physical activity behaviours, a laboratory experiment is presented in which the effect of manipulating one facet of identity leadership (identity entrepreneurship) on individuals' effort during, and performance of, a physical exercise task was examined. Stated in full, the overarching aim, objectives, and hypotheses of the thesis were as follows:

### 1.9.1 Overarching aim

To examine the efficacy of a social identity approach to understanding physical activity.

### 1.9.2 Objectives and hypotheses

(1) To examine relationships between group identification, participation, and key exercise-specific and broad health-related outcomes in a real-world exercise setting (chapter 2, study 1). Specifically, positive relationships were hypothesised between participants' group identification as a parkrunner and their parkrun participation (H1), satisfaction with their parkrun experiences (H2), and sense of group cohesion (H3). A positive relationship was also hypothesised between participants' parkrun participation and their life satisfaction (H4).

(2) To examine relationships between members' perceptions of their physical activity leader's engagement in identity leadership, members' group identification, and members' attendance in various sport and exercise settings (chapter 3, study 2). Specifically, positive relationships were hypothesised between participants' (sport and exercise group members) perceptions of their leader's engagement in identity leadership and participants' group identification (H1) and between participants' group identification and their

attendance (H2). A significant indirect effect of participants' perceptions of their leader's engagement in identity leadership on participants' attendance through their group identification was also hypothesised (H3).

(3) To examine relationships between members' perceptions of their physical activity leaders' engagement in identity leadership, members' group identification, and members' attendance over time (chapter 4, study 3). Specifically, it was hypothesised that participants' perceptions of their leader's engagement in each of the identity leadership facets at Time 1 would predict their subsequent greater group identification at Time 2, controlling for their initial group identification at Time 1 (H1); and that participants' group identification at Time 2 would be associated with their greater group-relevant attendance at Time 2, controlling for their attendance at Time 1 (H2). A significant indirect effect of participants' perceptions of their leader's engagement in each of the identity leadership facets at Time 1 on participants' attendance at Time 2 through their group identification at Time 2, controlling for their initial levels of group identification and attendance at Time 1, was also hypothesised (H3).

(4) To examine the causal effects of manipulating a leader's engagement in identity entrepreneurship on group members' effort during, and performance of, an exercise task (chapter 5, study 4). Specifically, it was hypothesised that leaders' identity entrepreneurship would have a positive impact on group members' effort during a 5km cycling time trial task (H1), and performance of a 5km cycling time trial task (H2).

# Chapter 2: Social identification, exercise participation, and positive exercise experiences: Evidence from parkrun

## 2.1 Introduction

Physiological benefits of physical activity include a reduced risk of stroke, hypertension, and contracting non-communicable diseases such as diabetes, ischaemic heart disease, and certain types of cancer (World Health Organization 2017). Psychological benefits include improved self-esteem, cognitive functioning, and mood, as well as reductions in both the symptoms and incidence of anxiety and depression (Biddle et al. 2015). Nevertheless, almost a quarter of adults (23.3%) worldwide remain insufficiently active, with the latest data further suggesting that global physical activity levels are not improving, despite many countries having a national physical activity policy or plan (Sallis et al. 2016). To address this problem, researchers have recently begun to emphasise the need to adopt broader approaches to promoting physical activity, which consider the numerous individual, environmental, policy, and social determinants (e.g., Sallis et al. 2006; Ding et al. 2012; Garcia et al. 2016). In line with these proposals, evidence suggests that social factors—and in particular the development of *social identities*—may have profound implications for participation in physical activity (Terry and Hogg 1996; Strachan et al. 2012; see also Stevens et al., 2017). Building on this promising research, the present study sought to advance understanding by testing relationships between group identification, participation, and a range of previously unexplored exercise-specific outcomes and broad health indicators in a real-world setting (i.e., moving beyond a focus on the hypothetical effects of group identification; Terry and Hogg 1996; Strachan et al. 2012).

### 2.1.1 Social Identity and Exercise

According to the *social identity approach* (Tajfel and Turner 1979; Turner et al. 1987), defining (or *self-categorising*) oneself in terms of a specific social identity (e.g., as a parkrunner) is associated with a desire both to discover the meaning of that identity, and to align one's attitudes and behaviours with others who share it (Turner et al. 1987). Put slightly differently, this means that the stronger an individual's sense of identification as a member of a group (and therefore the stronger that social identity's contribution to their sense of self), the more motivated the individual will be to engage in behaviours normative of *in-group* members. Evidence from various domains supports these suggestions. For example, Tarrant and Butler (2011) found that university students reported greater intentions to reduce alcohol consumption when their social identity as a 'British person' rather than a 'university student' was made salient. Similarly, Falomir-Pichastor, Toscani and Despointes (2009) demonstrated that the strength of nurses' identification as a member of their professional group was significantly and positively associated with their likelihood of having received a flu vaccination the previous year, and intention to be vaccinated the following year.

Along similar lines, and of particular relevance to the present study, evidence also suggests that, in group exercise settings—where exercise behaviour is likely to be a group norm—high levels of group identification may promote greater exercise participation. Terry and Hogg (1996) found that individuals who identified more strongly as a member of a group in which exercise was normative reported greater intentions to engage in regular exercise than those who identified weakly as a member of the group. Similarly, Strachan et al. (2012) found that runners who had formed a stronger identity as a member of their running group completed a greater

proportion of their runs with the group and were less confident they would continue running should the group disband. Given the well-documented (and often considerable) gap between individuals' exercise intentions and behaviours (e.g., see Sniehotta et al. 2005; Rhodes and de Bruijn 2013), however, exploring the relationship between group identification and individuals' actual (rather than intended) exercise participation is a vital next step for research.

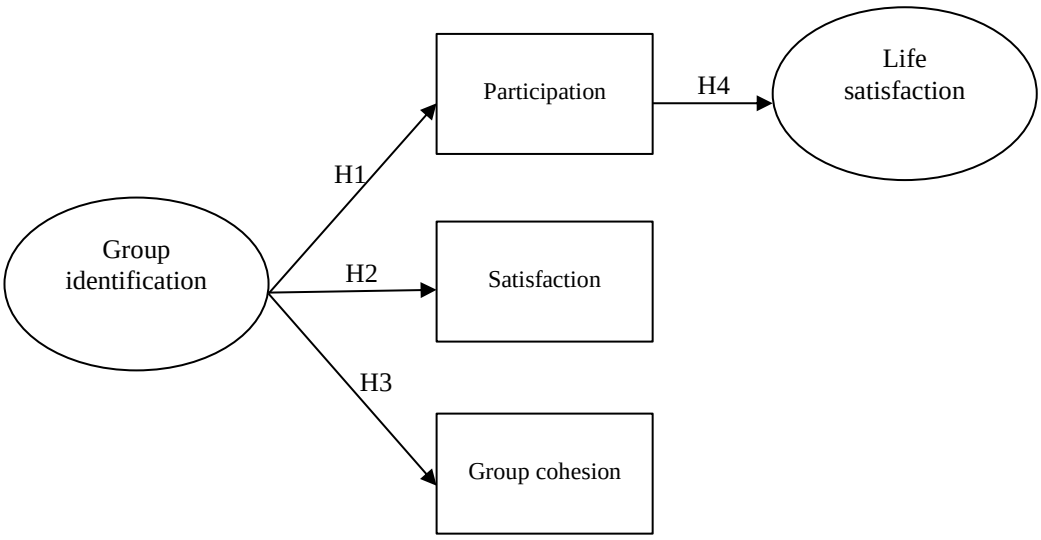
### 2.1.2 The Present Study

Building on the foregoing discussion, the first aim of this study was, therefore, to explore the relationship between group identification and participation in a real-world exercise setting (parkrun). To further extend understanding in this area, we also examined relationships between group identification and an exercise-specific affective outcome (individuals' satisfaction with their parkrun experiences) and a key group construct (group cohesion), and between participation and a broad health indicator (life satisfaction).

All hypotheses are represented schematically in Figure 2.1. First, building on previous research (Terry and Hogg 1996; Strachan et al. 2012), and a fundamental assertion of the social identity approach that self-categorisation as a member of a specific group is associated with a desire to co-ordinate one's own behaviours with those normative of in-group members (Turner et al. 1987), we hypothesised that higher levels of group identification (i.e., stronger identification as a parkrunner) would be associated with higher levels of parkrun participation (H1).

Second, extending this, we hypothesised that individuals who possess a greater sense of shared identity or, in slightly different terms, a greater sense of social connectedness (Greenaway et al. 2015) with those they exercise with, would report more positive exercise experiences. Specifically, we hypothesised a positive

Figure 2.1 Hypothesised model of the relationship between group identification, behavioural, affective, and group-related outcomes, and life satisfaction. Ellipses denote latent variables and rectangles observed variables.




relationship between individuals' group identification and their satisfaction with their parkrun experience (H2).

With regard to group cohesion, Carron and Spink's (1993) influential model suggests that strategies targeting the group's environment, processes, and structure will be most effective for its development, with research demonstrating the benefits (including increases in group members' physical activity) of interventions based on this premise (e.g., Estabrooks et al. 2008; Estabrooks et al. 2011). Proposed strategies for targeting the group environment (i.e., promoting a sense of distinctiveness by, for example, having group t-shirts) have also been used to promote group identification in experimental social identity research (Høigaard et al. 2013). Indeed, distinctiveness is a key concept of social identity theorising, with the social identity approach suggesting that self-categorisation as a group member is associated with a desire to see the in-group as positively distinct from rival out-

groups (Haslam 2004). To date, the relationship between group identification and group cohesion has not been explored in an exercise setting. Based on the preceding observations, we hypothesised a positive relationship between the two variables (H3).

Finally, we hypothesised a positive relationship between participation and life satisfaction (H4). Considerable evidence (spanning various forms of physical activity) points to a positive relationship between physical activity participation and individuals' subjective mental well-being. In particular, this research has indicated (1) a positive relationship between individuals' overall participation levels and their mental well-being (including their sense of life satisfaction; e.g., see Grant et al. 2009; Eime et al. 2010; Huang and Humphreys, 2012; Wang et al. 2012; Dolan et al. 2014), (2) that one-off distance running events can improve participants' life satisfaction (Sato et al. 2015, 2016), and (3) that more sociable forms of physical activity where there are opportunities for interaction with others (e.g., club sport rather than gym activities and walking) have greater benefits for individuals' life satisfaction (Eime et al. 2010; Downward and Rasciute, 2011). The relationship between participation and life satisfaction has, however, yet to be explored in the parkrun setting, where there are opportunities for weekly participation. We therefore took the opportunity to advance understanding in this area and explore whether these previously demonstrated effects translate to this popular form of physical activity (that over 3 million people have now participated in).

## 2.2 Methods

### 2.2.1 Participants

Our sample consisted of 289 participants (130 males; 159 females, aged 18 to 78, $M_{age}$ = 43.90, *SD* = 10.96; 94.1% White British) all of whom had completed at least one parkrun in the six months prior to completing the study measures.

### 2.2.2 Procedure

Following clearance from parkrun UK, we contacted parkrun event teams in the South of England to request that a link to our online questionnaire be placed alongside a brief description of the study on parkrun event websites and social media pages. Visitors to these sites who wished to take part were then able to follow the link and complete the questionnaire. The study received ethical approval from the first author's institutional human research ethics board on 15th March 2016 (project reference ID 11153). Anonymity was assured and the decision of participants to complete the questionnaire represented their provision of informed consent.

### 2.2.3 Measures

***Group identification.*** Participants' identification as a parkrunner was measured using a four-item scale (Postmes et al. 2013; e.g., "Being part of this running group is an important part of how I see myself"). To encourage participants to answer these items in relation to their social identity as 'a parkrunner', the question stem "please indicate the extent to which you agree with the following statements" was prefixed with "Thinking about parkrun as a whole". Items were scored on a scale ranging from 1 (fully disagree) to 7 (fully agree). In line with previous research (Haslam et al. 2017), this measure demonstrated good internal consistency (Cronbach's $\alpha$ = .94).

***Participation.*** For the purposes of this study we were solely interested in participants' parkrun participation (i.e., their participation in the group that we measured their identification as a member of). As such, two objective measures of participation were obtained: the number of parkruns completed in the six months prior to, and following, completing the study measures. Each parkrunner registers once and is provided with a unique barcode. They take a copy of this barcode to all events to be scanned when they finish their run (and are reminded to do so at every event). All results are then uploaded to the parkrun website (www.parkrun.org.uk). Participants were, therefore, asked to provide their name and barcode to indicate their consent to their questionnaire data being matched to the parkrun data available online.

***Exercise-specific satisfaction.*** Exercise-specific satisfaction was measured using a single item adapted from Moen, Hoigaard and Peters (2014): "Overall, how satisfied are you with the parkrun experience". The item was scored on a scale ranging from 1 (extremely dissatisfied) to 7 (extremely satisfied).

***Group cohesion*.** Group cohesion was assessed using a single item: "Members of your running group all stick together" scored on a scale ranging from 1 (do not agree at all) to 7 (completely agree). Although developed from Carron, Brawley, and Widmeyer's (1998) influential definition of cohesion, we eschewed use of the 18-item Group Environment Questionnaire (GEQ; Carron et al. 1985) to keep the burden of measurement to a minimum, but also because some GEQ (and Physical Activity Group Environment Questionnaire; Estabrooks and Carron 2000) items (e.g., "I am not going to miss the members of this team when the season ends") were not relevant to parkrun. Furthermore, notwithstanding questions regarding the

construct validity of the GEQ (Whitton and Fletcher 2014), specific hypotheses regarding the GEQ's four factors were not a key focus of our study.

***Life satisfaction*.** Life satisfaction was measured using the five-item Satisfaction With Life Scale (Diener et al. 1985). In contrast to the parkrun-specific satisfaction measure, this scale measured participants' global life satisfaction (an aspect of their overall well-being). An example item is: "I am satisfied with my life". Answers were provided on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). In line with previous research (Diener et al. 1985), the scale demonstrated good internal consistency (Cronbach's $\alpha = .92$).[3]

### 2.2.4 Analytic Procedures and Preliminary Analyses

Data were screened for missing values, outliers, and indices of non-normality. The measurement models for the two multiple-item psychological instruments (group identification and life satisfaction) were then tested using confirmatory factor analysis (CFA), before using structural equation modeling. We adopted a data-driven, exploratory approach to model testing in which modification indices and parameter estimates were used to identify the cause of any model misspecification and guide changes. Changes were, however, only made if they

[3] We also measured enjoyment, via Raedeke's (2007) 8-item version of Kendzierski and DeCarlo's (1991) 16-item Physical Activity Enjoyment scale, hypothesising a positive association between this variable and group identification. However, confirmatory factor analysis (see Analytic Procedures and Preliminary Analyses section) demonstrated poor fit for this scale: $\chi^2[20] = 253.829$, $p < 0.001$, B-S $p = 0.004$, CFI = 0.870, SRMR = 0.072, RMSEA = 0.201 (90% CI .180; .224), PCLOSE < 0.001. Alternative models (e.g., covarying error terms for which large modification indices were observed), while significantly improving model fit (e.g., by $\Delta\chi^2$)—by way of example, after covarying the two pairs of items with the largest modification indices, the model improved to: $\chi^2[18] = 145.706$, $p < 0.001$, B-S $p = 0.008$, CFI = 0.929, SRMR = 0.051, RMSEA = 0.157 (90% CI .134; .181), PCLOSE < 0.001), ECVI = .631 (90% CI .510, .778), BIC = 247.701, CAIC = 265.701—still resulted in models with some unacceptably poor fit indices. Furthermore, neither models with items removed, nor two- and three-factor models demonstrated acceptable fit. Thus, given warnings about including poorly fitting measurement models in structural models (e.g., see Bowen and Guo 2011), we removed enjoyment from all subsequent analyses.

made theoretical sense (Byrne 2016). All models were tested in AMOS 23.0 (Arbuckle 2014).

Due to the process of online data collection, no data were missing. Examination of Mahalanobis distances revealed two potential outliers (i.e., cases with squared Mahalanobis distance values that stood distinctively apart from other values; Byrne 2016). Further examination of these potential outliers (Osborne and Overbay 2004) revealed atypically high or low responses (compared to the sample mean) to multiple questionnaire items. In both cases, however, there was no evidence of a systematic pattern of responses. Given this evidence, and repeated warnings about the risks associated with removing outliers (e.g., see Osborne and Overbay 2004; Ghosh and Vogt 2012), these cases were retained. Univariate skewness values for questionnaire items (including the two participation measures) ranged from -4.432 to -0.087 (only 7.7% of items were below the cut-off value of -2; West et al. 1995) and univariate kurtosis values ranged from -1.138 to 28.353 (only 7.7% of items were above the cut-off value of 7; West et al. 1995). Mardia's coefficient was 63.496, indicating a departure from multivariate normality (Bentler 2005). Steps were therefore taken to address this non-normality.

First, maximum likelihood estimation was used, because non-normality has negligible effects on model parameters estimated by this method (Nevitt and Hancock 2001; Lei and Lomax 2005). Second, because the chi-square ($\chi^2$) statistic is influenced by multivariate non-normality (Lei and Lomax 2005), the Bollen-Stine (B-S) bootstrapping procedure was employed. This adaptation of $\chi^2$ provides an adjusted *p*-value correcting for non-normality (Bollen and Stine 1992). Two hundred and fifty resamples were used because greater numbers of bootstrap replications

have been shown to have minimal impact on model rejection rates (Nevitt and Hancock 2001). As with $\chi^2$, non-significant B-S *p*-values indicate better model fit.

Consistent with recommendations (Hu and Bentler 1999; Kline 2005; Hooper et al. 2008), various additional absolute and incremental fit indices were used to examine the adequacy of our models: the Comparative Fit Index (CFI), the Standardised Root Mean Square Residual (SRMR), and the Root Mean Squared Error of Approximation (RMSEA) and its associated *p*-value (PCLOSE; $p > 0.05$ for close fit). CFI values > 0.90 and > 0.95 indicate good and excellent fit respectively (Hu and Bentler 1999), while values < 0.08 for SRMR and < 0.06 for RMSEA are desirable as they provide optimal protection against type I and II errors (Hu and Bentler 1999). Additionally, given (1) our data-driven approach to model testing, and recommendations for modified models to be evaluated in an independent sample (MacCallum and Austin 2000), and (2) our intention to assess competing models, we also used the Expected Cross-Validation Index (ECVI) and two information criteria: the Bayes Information Criteria (BIC) and the Consistent Akaike's Information Criteria (CAIC). In the absence of an independent sample in which to test our modified models, the ECVI offers a means of assessing the likelihood that a model's covariance matrix would cross-validate to similar size samples from the same population; the BIC and CAIC indicate the extent to which parameter estimates from the original sample would cross-validate to future samples (Byrne 2016). For these three additional indicators of fit, smaller values when comparing two or more models indicate the greatest potential for replication in an independent sample (Byrne 2016). The ECVI, BIC, and CAIC are also particularly useful when assessing non-nested models, such as in the present study. Of all available information criteria, the BIC

and CAIC were chosen because they have been shown to perform well under conditions of non-normality (Whittaker and Stapleton 2006).

## 2.3 Results

### 2.3.1 Confirmatory Factor Analysis

The single factor group identification model demonstrated the following fit: $\chi^2[2] = 85.935$, $p < 0.001$, B-S $p = 0.004$, CFI = 0.926, SRMR = 0.036, RMSEA = 0.382 (90% CI .315; .453), PCLOSE < 0.001, ECVI = .354 (90% CI .261, .472), BIC = 131.267, CAIC = 139.267. Modification indices suggested that model fit would be (most) improved by covarying the error terms of items 3 ("being part of this running group is an important part of how I see myself") and 4 ("I identify with my running group"). With these items both designed to capture individuals' investment in their group membership (Postmes et al. 2013), covarying these error terms made substantive sense and we proceeded with this change. The subsequent model demonstrated an excellent ($\chi^2[1] = .685$, $p = 0.408$, B-S $p = 0.594$, CFI = 1.000, SRMR = 0.002, RMSEA = 0.000 (90% CI .000; .145), PCLOSE = 0.555, ECVI = .065 (90% CI .066, .087), BIC = 51.683, CAIC = 60.683), and significantly improved ($\Delta\chi^2(1) = 85.250$, $p < .001$), fit and was used for subsequent analyses.

The single factor life satisfaction model demonstrated the following fit: $\chi^2[5] = 24.198$, $p < 0.001$, B-S $p = 0.016$, CFI = 0.984, SRMR = 0.024, RMSEA = 0.115 (90% CI .072; .163), PCLOSE = 0.009, ECVI = .153 (90% CI .113, .220), BIC = 80.863, CAIC = 90.863. Modification indices suggested that model fit would be (most) improved by covarying the error terms of items 2 ("the conditions of my life are excellent") and 4 ("so far I have gotten the important things I want in life"). Given that it makes theoretical sense for people to consider the conditions of their life to be excellent if they have got the important things they want from life, we

proceeded with this change. The subsequent model demonstrated a good ($\chi^2$[4] = 9.203, $p$ = 0.056, B-S $p$ = 0.163, CFI = 0.996, SRMR = 0.017, RMSEA = 0.067 (90% CI .000; .125), PCLOSE = 0.252, ECVI = .108 (90% CI .090, .153), BIC = 71.534, CAIC = 82.534), and significantly improved ($\Delta\chi^2$(1) = 14.995, $p$ < .001), fit and was used for subsequent analyses.

### 2.3.2 Structural Equation Modeling

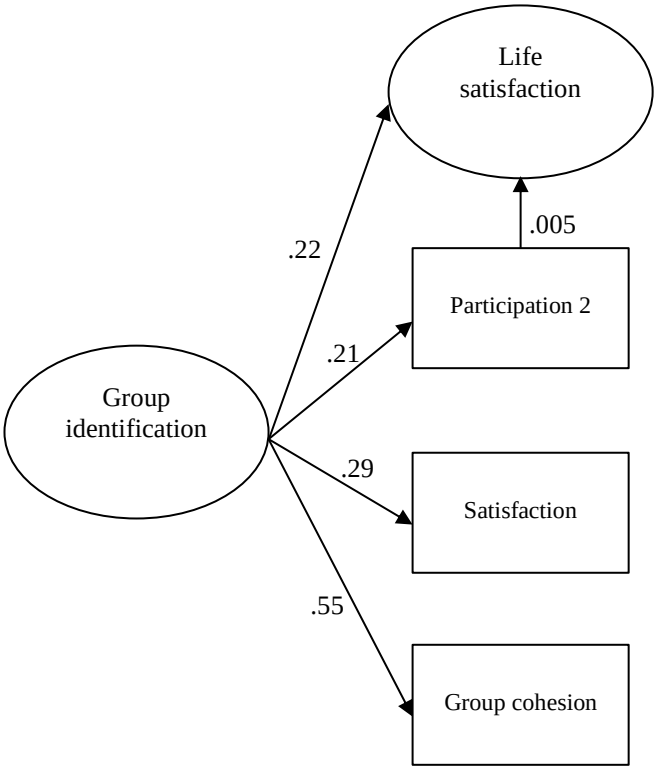
Means, standard deviations, and correlations are presented in Table 2.1. The hypothesised model (Model 1, see Figure 2.1) demonstrated a good fit: $\chi^2$[51] = 71.392, $p$ = 0.031, B-S $p$ = 0.135, CFI = 0.992, SRMR = 0.089, RMSEA = 0.037 (90% CI .012; .056), PCLOSE = 0.852, ECVI = .435 (90% CI .372, .527), BIC = 224.385, CAIC = 251.385. Modification indices suggested that model fit would be (most) improved by specifying an additional path from group identification to life satisfaction. Given evidence for a positive association between individuals possessing multiple meaningful social identities and their global well-being (e.g., Jetten et al. 2015), estimation of this path was theoretically justified and, in the interest of model parsimony (Byrne 2016), we proceeded with this change. The resulting model (Model 2, see Figure 2.2) demonstrated an excellent fit: $\chi^2$[50] = 59.115, $p$ = 0.177, B-S $p$ = 0.311, CFI = 0.996, SRMR = 0.038, RMSEA = 0.025 (90% CI .000; .048), PCLOSE = 0.969, ECVI = .400 (90% CI .368, .481), BIC = 217.774, CAIC = 245.774, which was significantly better than Model 1 ($\Delta\chi^2$(1) = 12.277, $p$ < .001). Modification indices suggested that model fit would not be substantially improved by estimating any additional paths. Hypotheses 1-3 were supported, with group identification significantly and positively associated with participation (β = .21, $p$ < 0.001; H1), exercise-specific satisfaction (β = .29, $p$ < 0.001; H2), and group cohesion (β = .55, $p$ < 0.001; H3). Group identification was

Table 2.1. Means, standard deviations, and correlations between all study variables.

| Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Group identification | 5.82 | 1.39 | - | | | | | |
| 2. Group cohesion | 4.49 | 1.84 | .548** | - | | | | |
| 3. Exercise-specific satisfaction | 6.67 | 0.74 | .280** | .185* | - | | | |
| 4. Participation 1 | 14.25 | 7.45 | .310** | .215** | .106 | - | | |
| 5. Participation 2 | 12.79 | 7.35 | .204** | .175** | .067 | .790** | - | |
| 6. Life satisfaction | 4.96 | 1.30 | .167** | .168** | .164** | .115 | .045 | - |

Notes: * $p<0.05$, ** $p<0.01$. Participation 1 = parkruns in six months prior to questionnaire completion; Participation 2 = parkruns in six months following questionnaire completion

Figure 2.2 The final model including the standardised regression path coefficients. Ellipses denote latent variables and rectangles observed variables.




also significantly and positively associated with life satisfaction ($\beta = .22$, $p < 0.001$). Hypothesis 4 was not supported, with the path from participation to life satisfaction non-significant ($\beta = .005$ $p = .936$).[4] In this model, group identification accounted for 4.6%, 8.4%, and 30.5% of the variance associated with participation, satisfaction, and group cohesion respectively, while group identification and participation accounted for 4.9% of the variance associated with life satisfaction.[5]

[4] A subsequent model in which the path from participation to life satisfaction was removed in the interest of model parsimony produced a very similar fit: $\chi^2[51] = 59.121$, $p = 0.203$, B-S $p = 0.323$, CFI = 0.997, SRMR = 0.038, RMSEA = 0.024 (90% CI .000; .046), PCLOSE = 0.976, ECVI = .393 (90% CI .365, .474), BIC = 212.114, CAIC = 239.114.

[5] Given our primary interest in participation as an outcome variable in our hypothesised model, we considered it most appropriate to use participation data for the six months following questionnaire completion throughout these analyses. A test of Model 2 with participation data for the six months prior to questionnaire completion also produced a good fit ($\chi^2[50] = 66.403$, $p = 0.060$, B-S $p = 0.199$, CFI = 0.993, SRMR = 0.039, RMSEA = 0.034 (90% CI .000; .054), PCLOSE = 0.903, ECVI = .425 (90% CI .368, .513), BIC = 225.063, CAIC = 253.063), while the same paths were significant in both instances.

To test our assumptions about variable order, we tested an additional model (Model 3) in which the paths in Model 2 were reversed. Although a $\chi^2$ difference test between Models 2 and 3 was not possible because the models were not nested, fit indices suggested that Model 3 did not fit the data as well as Model 2: $\chi^2[50] = 96.347$, $p < 0.001$, B-S $p = 0.020$, CFI = 0.981, SRMR = 0.080, RMSEA = 0.057 (90% CI .039; .074), PCLOSE = 0.244, ECVI = .529 (90% CI .446, .639), BIC = 255.007, CAIC = 283.007. In particular, the $\chi^2$, B-S *p*, SRMR, ECVI, BIC, and CAIC values were higher, indicating (1) a greater discrepancy between the sample and hypothesised covariance matrices, and (2) a greater likelihood that model 2 would cross-validate to an independent sample than model 3 (Byrne 2016). In Model 3, the paths from participation, satisfaction, group cohesion, and life satisfaction to group identification were all significant (suggesting some reciprocal effects). In all instances, however, the magnitudes of these paths were smaller than those found in Model 2 (β's: .20, .17, .49, and .10 respectively). These findings therefore provide support for our hypothesised theoretical sequence.[6]

**2.4 Discussion**

This study examined associations between group identification, participation, an affective exercise outcome, a key group construct, and an indicator of overall health in parkrun. Supporting hypotheses 1-3, results revealed an array of exercise-specific benefits associated with developing a strong social identity in this setting. Results failed to support hypothesis 4, with a non-significant relationship observed

[6] Given our primary interest in testing the potential for participation to act as a predictor variable in this model, we considered it most appropriate to use participation data for the six months preceding questionnaire completion for these analyses. A test of Model 3 with participation data for the six months following questionnaire completion produced a similar fit to that observed when it was tested with the participation data for the six months preceding questionnaire completion ($\chi^2[50] = 82.851$, $p = 0.002$, B-S $p = 0.064$, CFI = 0.987, SRMR = 0.079, RMSEA = 0.048 (90% CI .028; .066), PCLOSE = 0.559, ECVI = .482 (90% CI .409, .583), BIC = 241.511, CAIC = 269.511), while the same paths were significant in both instances.

between participation and life satisfaction. However, a positive relationship was observed between group identification and life satisfaction. Overall, findings extend the results of previous research that has focused on individuals' identity-based intentions (Terry and Hogg 1996; Strachan et al. 2012) by providing real-world evidence for numerous benefits associated with possessing a social identity as a member of an exercise group.

First, a significant relationship was observed between group identification and participation. This finding supports suggestions from organisational-based research that group identification is positively related to group commitment (Ellemers et al. 1997), with this commitment seemingly manifesting as more frequent participation in group activities in exercise settings. Evidence that this effect is particularly strong when people self-select their group memberships (Ellemers et al. 1999) may partially explain the transferability of these findings to exercise settings, given that people almost always have the opportunity to self-select groups in these contexts (and certainly do in parkrun). Broadly, and most importantly, this finding substantiates claims that social identities could be harnessed to promote participation in physical activity (Stevens et al. 2017). In particular, building on previous research (Terry and Hogg 1996; Falomir-Pichastor et al. 2009; Tarrant and Butler 2011; Strachan et al. 2012), this finding provides further evidence for a potentially powerful (and favourable) process of identity-based social influence whereby individuals' self-categorisation as a member of a particular group fosters their desire to engage in identity-congruent behaviour (Turner et al. 1987; Gaffney and Hogg 2017). Specifically, the present findings suggest that, in exercise groups where regular participation is a group norm (e.g., parkrun), individuals' desire to align their behaviour with this norm may have positive implications for their group-

relevant participation. Findings therefore strengthen the foundation for fresh interventions to improve individuals' participation in, and adherence to, physical activity by attending to their social identities. Furthermore, the reciprocal effects we observed between group identification and participation further speak to the potential of such interventions. Specifically, they suggest that, to the extent that individuals' participation increases, their sense of group identification should also increase, with a positive upward spiral potentially ensuing.

Second, the present findings suggest that the strength of individuals' identity as a parkrunner is associated with their satisfaction with their parkrun experiences. Previous research has shown that various factors, including the ability to exercise outdoors, and greater satisfaction with exercise instructors and the music used in exercise environments, contribute to positive affective exercise experiences (Wininger and Pargman 2003; Focht 2009). Group identification represents a novel and important additional correlate. Although many previously identified factors are external and changeable, social identities contribute to people's internal sense of 'who they are' (Haslam 2004). Strong identities in particular may therefore be relatively enduring, suggesting that promoting group identification may represent an effective long-term strategy for facilitating positive exercise experiences (and greater participation).

Findings relating to group cohesion also advance current understanding. Various benefits—including long-term increases in physical activity—have been documented following the implementation of interventions designed to increase cohesiveness in exercise groups (e.g., Estabrooks et al. 2008; Estabrooks et al. 2011). The present findings extend this by indicating that group identification is positively associated with group cohesion (and physical activity participation).

Although a marginally stronger path was observed from group identification to group cohesion in Model 2 compared to the reverse path in Model 3, the small difference in the magnitude of the path coefficients, coupled with the cross-sectional nature of our research, prevents definitive conclusions regarding the directionality of this relationship. Regardless, the association between the two variables has positive implications. Specifically, it suggests that improvements in at least one (and, given that reciprocal effects were observed, probably both) of the constructs will elicit improvements in the other, which will likely have the effect of promoting additional benefits for group members. Based on current understanding, using strategies that promote a sense of distinctiveness in exercise groups (e.g., providing group t-shirts or encouraging the group to select a group song) would be a shrewd approach for those seeking to improve participation and adherence rates, given the capacity of such strategies to promote increases in both group identification and group cohesion (Carron and Spink 1993; Høigaard et al. 2013).

Findings also extend previous research—collectively referred to as the 'social cure' (Jetten et al. 2012)—which has demonstrated the positive relationship between individuals' membership of multiple important social groups and their global well-being. Although previous research has demonstrated this relationship in various contexts, including care homes (Haslam et al. 2014) and choirs (Dingle et al. 2013), and with regard to various health indicators, including self-esteem (Jetten et al. 2015) and quality of life (Steffens et al. 2016a), this is the first study to demonstrate this relationship (1) in an exercise setting, and (2) in relation to individuals' life satisfaction.

Finally, although previous research has demonstrated that individuals' overall exercise participation and life satisfaction are positively associated (e.g., Grant et al.

2009; Dolan et al. 2014), the present findings indicate that participation in parkrun alone (at most a once-weekly activity) is not associated with greater life satisfaction. Sato et al. (2015) suggested that, for distance running events to enhance people's life satisfaction, participation must be accompanied by an increase in their weekly running, while further evidence speaks to the salience of both the overall volume of people's physical activity participation (Huang and Humphreys, 2012; Wang et al. 2012) and the intensity at which it is conducted (Wicker and Frick, 2015, 2016) in determining whether, and to what extent, physical activity has benefits for individuals' mental well-being. In line with these suggestions, two potential explanations emerge for the non-significant relationship observed among our participants: (1) a lack of additional running (or other physical activity) besides parkrun, and (2) a tendency for participants to complete parkruns at intensities that are less adaptive with regard to eliciting mental well-being benefits (moderate-intensity activity has typically been shown to be more adaptive than vigorous or light forms of activity; Wicker and Frick, 2015, 2016). Further research tracking the intensity at which people complete their parkruns, as well as the full range of their physical activity behaviours would, however, be required to test whether either (or both) of these explanations ring true.

### 2.4.1 Limitations and Future Research

The present study extended previous research by examining social identities in a specific real-world exercise setting. By solely recruiting parkrunners, we were able to examine the relationship between group identification and objectively assessed participation, as well as the relationship between group identification and several additional variables measured via self-report. This approach limited the generalisability of our findings, however, and further research is therefore required

in other exercise settings (e.g., Crossfit, SoulCycle, Orangetheory Fitness). Indeed, further research in these various settings is particularly important given our data-driven analytic strategy, with the post hoc model modifications requiring replication (MacCallum and Austin 2000). There is also a particular need for additional research examining the relationship between group identification and group cohesion. The present study provided an initial test of this relationship. The single-item measure of cohesion used could, however, be considered a limitation, and the strong association found between the two constructs should, therefore, be viewed as a foundation for further research.

Given the present findings, and the consistent trends displayed in previous cross-sectional research (Terry and Hogg 1996; Strachan et al. 2012), there is now also a need for (1) longitudinal studies to confirm the directionality of the relationships explored in the current research, and (2) experimental and intervention-based studies to test the causal effects of group identification on key outcomes such as participation, adherence, and effort. Such studies would yield an understanding of whether changes (particularly increases) in group identification lead to positive changes in key variables. Addressing a limitation of this study, future studies may also consider measuring the full range of individuals' physical activity behaviours (i.e., their engagement in physical activity outside, as well as within, the group setting) to determine whether group identification is (at least indirectly) associated with individuals' overall physical activity levels. Measuring the full range of individuals' physical activity behaviours would also improve our understanding of the relationship between individuals' participation in specific exercise programmes or initiatives (e.g., parkrun), their overall exercise participation, and their global well-being (e.g., their life satisfaction).

## 2.5 Conclusion

Our findings indicate positive relationships between individuals developing strong social identities in exercise settings and their participation in group-relevant exercise, as well as their sense of exercise-specific satisfaction, group cohesion, and life satisfaction. Although further research is required to determine the directionality of these relationships, our findings indicate that they may be reciprocal, with individuals' sense of social identity potentially representing both a cause and, to varying degrees, an effect of greater participation, exercise-specific satisfaction, group cohesion, and life satisfaction.

# Chapter 3: Leaders promote attendance in sport and exercise sessions by fostering social identity

## 3.1 Preface

Study 1 provided initial evidence for a positive association between the strength of individuals' identification as a member of their exercise group and positive exercise behaviours and experiences. The following study once again focuses on the relationship between group identification and group-relevant participation demonstrated in study 1, with participation in this instance conceptualised as rates of attendance at group sessions. Extending this, however, an additional relationship—between members' perceptions of their physical activity leader's engagement in social identity leadership and their own group identification—is also proposed and tested. Moreover, these two relationships are tested together for the first time in a mediation model where members' perceptions of their leader's engagement in identity leadership is proposed to impact their attendance through their greater group identification. Overall, the following study therefore represents the first attempt to explore the capacity for physical activity leaders to promote members' group-relevant participation by engaging in social identity leadership.

## 3.2 Introduction

Physical activity is associated with numerous physiological and psychological health benefits, including a reduced risk of developing cardiovascular disease, Type 2 diabetes, and certain types of cancer, as well as greater life satisfaction, self-esteem, and cognitive functioning (Warburton et al. 2006; Biddle et al. 2015). Despite these benefits, physical *in*activity levels remain high, with global data suggesting that almost a quarter of adults (23.3%) worldwide are insufficiently active (Sallis et al. 2016). In addition to contributing to approximately 9% of premature mortality (Lee et al. 2012), this 'physical inactivity pandemic' (Sallis et al. 2016), is also conservatively estimated to generate global healthcare costs of approximately INT$53.8 billion per year (Ding et al. 2016). Although physical activity encapsulates all bodily movements that result in energy expenditure (Caspersen et al. 1985), it is often conducted within structured sport and exercise settings. In such settings, sport and exercise leaders represent a potentially powerful source of influence on group members' behaviours (Fransen et al. 2016). However, current understanding of how they might facilitate individuals' positive health-related behaviours—in particular their participation—is limited. To address this, we examined associations between *social identity leadership*, group identification, and participants' attendance at sport and exercise sessions. While previous social identity leadership research in sport and exercise settings has focused on its potential to enhance performance (Slater et al. 2015; Fransen et al. 2016), this study offers a fresh perspective on the way that leaders might encourage participation in sport and exercise.

### 3.2.1 Leadership, Identity, and Participation

According to the *social identity approach* (Tajfel and Turner 1979; Turner et al. 1987), individuals can categorise themselves, and behave, both in terms of a personal identity (i.e., as 'I' and 'me') and a social identity (i.e., as 'we' and 'us'). The approach further asserts that individuals' capacity to categorise themselves in terms of a shared social identity (e.g., as a member of a particular exercise group or soccer team) underpins various group behaviours including collaboration (Turner 1982), social influence (Turner 1991), and, of particular relevance to the present article, *leadership* (Haslam et al. 2011). From a social identity perspective, leadership is a process of social influence, whereby a leader's effectiveness derives from his or her capacity to develop and promote a sense of shared social identity within the team they lead (Haslam et al. 2017). This centres on the leader's capacity to *represent*, *advance*, *create*, and *embed* a shared sense of 'us-ness' among members of that team (Haslam et al. 2011). More specifically, the approach asserts that leaders should (1) embody the attributes of the group that make it special and distinct from other groups, (2) advance and promote the interests of the group over and above their personal interests and those of other groups, (3) actively create a sense of 'we' and 'us' among group members by defining the boundaries and content of the group's identity, and (4) develop and consolidate structures, events, and activities that make the group matter and enable the group's shared identity to be lived out (Haslam et al. 2011; Steffens et al. 2014c). These four principles of identity leadership are termed prototypicality, advancement, entrepreneurship, and impresarioship (Steffens et al. 2014c).

A large body of empirical evidence now supports these ideas. Of particular relevance to the present research, recent studies in organisational settings focusing

on leaders' perceived identity entrepreneurship have found this to be positively associated with employees' engagement, and negatively associated with their burnout and turnover intentions (Steffens et al. 2014a; Steffens et al. 2017). These findings speak to the potential value of identity leadership (particularly identity entrepreneurship) as a means of promoting group members' participation in physical activity settings. In particular, they point to the potential benefits of leaders helping to create a sense of shared group identity, suggesting that this can help promote and sustain group members' involvement with, and commitment to, the group.

The nature of identities continues to attract research and debate. For example, although a motivational hierarchy of the personal, relational, and collective aspects of the self has been proposed (Gaertner et al. 2012), research also indicates that different identities can be interconnected (Gabriel et al. 2012). Indeed, there is evidence that shared social identity can strengthen and reinforce people's sense of personal identity (Baray et al. 2009), as well as their sense of relational identity with other members of their group (Steffens et al. 2014b). Notwithstanding these perspectives, a social identity approach offers a clear analysis of the consequences of individuals forming strong social identities. Specifically, the approach suggests that this has important consequences for the way people think and act, not least because it helps them to make sense of who they are and provides them with a model of how to relate to others and what to strive for (Ellemers 2012). That is, when people internalise a group (e.g., an exercise group) as part of their self-concept, this group becomes a basis for their attitudes and behaviours such that they are motivated to engage with that group, its members, and its activities and interests (Turner 1982; Turner et al. 1987). In line with these ideas, research has demonstrated the participation-related benefits of individuals possessing high levels of group

identification in physical activity settings. More specifically, research has supported a key assertion of the social identity approach that categorising oneself as a member of a specific group is associated with a desire to co-ordinate one's own behaviours with representative in-group members (Turner et al. 1987). Terry and Hogg (1996) found that individuals who identified more strongly as a member of a group in which exercise was normative reported greater intentions to engage in regular exercise than those who identified weakly as a member of the group. Similarly, Strachan et al. (2012) found that runners who possessed a stronger identity as a member of their running group completed a greater percentage of their runs with the group and were less confident in their ability to continue running should the group disband. Taken together, these various findings suggest that, by engaging in identity leadership—and thereby fostering members' sense of group identification—sport and exercise leaders might have a positive impact on members' participation in group-relevant activity.

### 3.2.2 The Present Research

The present research sought to test this idea. First, in line with identity leadership theorising (Haslam et al. 2011), we hypothesised that members' perceptions of their leader's engagement in identity leadership would be positively associated with their group identification (H1). Although previous research regarding the health-related benefits of identity leadership in organisational settings has focused specifically on identity entrepreneurship (Steffens et al. 2014a; Steffens et al. 2017), the identity leadership approach suggests that members' group identification should be greater to the extent that leaders engage in all four facets of identity leadership (Haslam et al. 2011). Given this, and evidence for the benefits associated with leaders engaging in each of the four facets (Haslam et al. 2011; Slater et al. 2015; Fransen et al. 2016), we measured all four facets of identity

leadership in the present study, rather than focusing on only one. Second, in line with a key proposition of the social identity approach that individuals' sense of social identification is positively associated with their desire to align behaviours with those who are representative of the in-group (Turner et al. 1987), and building on previous research supporting this proposition (Terry and Hogg 1996; Strachan et al. 2012), we hypothesised that there would be a positive relationship between sports team and exercise group members' group identification and the frequency of their team or group session attendance (H2). Finally, given evidence that group identification represents both a consequence of identity leadership (Haslam et al. 2011; Haslam et al. 2017) and an antecedent to participation (Terry and Hogg 1996; Strachan et al. 2012), we also hypothesised an indirect effect of perceptions of leader engagement in identity leadership on members' attendance through group identification (H3).

### 3.3 Method

#### 3.3.1 Participants

Our sample consisted of 583 participants (284 males, 299 females; aged 18 to 74, $M_{age}$=32.65, *SD*=14.91; 87.8% White British), drawn from sports teams, (*n*=307 from 37 different sports) and group exercise sessions (*n*=276). In total, 271 participants completed the questionnaire online and 312 in person, while 410 participants indicated that their leader was male and 172 that their leader was female. The sports teams sub-sample (210 males, 97 females; aged 18 to 74, $M_{age}$=23.10, *SD*=8.91; 84.7% White British) was drawn exclusively from amateur sports teams. In this sub-sample, 108 participants completed the questionnaire online and 199 in person, and 257 participants indicated that their leader was male and 50 that their leader was female. In the exercise group sub-sample (74 males, 202 females; aged 18 to 74, $M_{age}$=43.31, *SD*=12.89; 91.3% White British), 163 participants completed the

questionnaire online and 113 in person, and 153 participants indicated that their leader was male and 122 that their leader was female.

### 3.3.2 Procedure

Sports teams from sports of various types (e.g., team and individual, contact and non-contact) across the South of England were contacted via email and telephone to request permission for questionnaires to be distributed among team members. In line with each team's preference, the first author then attended training sessions to distribute paper copies or provided an online questionnaire link for electronic completion. Group exercisers were recruited from various exercise classes and groups (e.g., running groups, gym classes, spinning, aerobics, yoga, and Zumba). The same procedure was used to contact running groups across the South of England, while fitness managers at local leisure facilities were contacted to gain permission for the first author to distribute questionnaires at the beginning or end of exercise classes. Although participants were instructed to identify their sports team or exercise group, a high frequency of ambiguous responses (such that many participants simply wrote the name of their sport or activity rather than a specific team or exercise group) precludes a detailed breakdown of how participants were nested within teams and groups.

The study received ethical approval from the first author's institutional human research ethics board on 15th March 2016 (project reference ID 11153). Anonymity was assured and the decision of participants to complete the questionnaire represented their provision of informed consent.

### 3.3.3 Measures

***Identity leadership.*** The 15-item Identity Leadership Inventory (ILI; Steffens et al. 2014c) was used to measure participants' perceptions of their leader's

engagement in identity leadership. The ILI was developed from Haslam et al.'s (2011) identity leadership framework and includes four items measuring prototypicality (e.g., "This leader embodies what the group stands for"), advancement (e.g., "This leader stands up for the group"), and entrepreneurship (e.g., "This leader makes people feel as if they are part of the same group"), and three measuring impresarioship (e.g., "This leader devises activities that bring the group together"). Scales were anchored from 1 (not at all) to 7 (completely) and mean scores were obtained for the full inventory (resulting in a global identity leadership measure) and each subscale. A global identity leadership measure (comprised of all 15 items) demonstrated excellent internal consistency (Cronbach's $\alpha = .97$), as did each of the individual subscales (Cronbach's αs: prototypicality = .94; advancement = .92; entrepreneurship = .95; impresarioship = .93). Sports team players were asked to respond to items with reference to either (a) their team's coach or (b) their team's captain if their team did not have a coach. Exercise and running group members were asked to respond with reference to the designated leader of their group or class.

***Group identification.*** The strength of participants' identification as a member of their sports team or exercise group was measured using the four-item scale recommended by Postmes et al. (2013) (e.g., "I feel committed to my sports team/exercise group"). Items were scored on scales ranging from 1 (fully disagree) to 7 (fully agree). In line with previous research (Haslam et al. 2017), this measure demonstrated good internal consistency (Cronbach's $\alpha = .92$).

***Attendance.*** Having been asked to identify the sports team or exercise group with which they exercised most frequently, participants were asked: "In a typical week, how many times does the sports team/exercise class or group that you have

identified meet?" and "In a typical week how many of these sessions do you attend?" A measure of attendance was subsequently obtained by dividing the number of sessions attended by the total number of sessions.

## 3.4 Results

### 3.4.1 Preliminary Analysis

Data were screened for missing values and indices of non-normality. Less than 1% of the possible data points were missing, and Little's (1988) Missing Completely at Random test indicated that data were missing completely at random ($\chi^2[59] = 68.94$, $p = .18$). Mean values were therefore imputed to replace missing values (Schafer 1999). Univariate skewness values for questionnaire items across all participants ranged from -2.04 to 3.80 (only 14.3% of items were outside the cut-off range of -2 to 2; West et al. 1995) and univariate kurtosis values ranged from -.20 to 29.06 (only 9.5% of items were above the cut-off value of 7; West et al. 1995).

Means, standard deviations, and correlations for the sport and exercise groups are presented separately and together in Tables 3.1-3.3. As Tables 3.1-3.3 show, correlations between the four identity leadership dimensions were high ($r \geq .70$ and $p$s $< .01$), lending support to the strategy of basing analysis on the global identity leadership measure (calculated by averaging the 15 items of the ILI). This measure—presented in Tables 3.1-3.3 as 'Identity Leadership'—was used to provide a global test of our hypothesis. Nevertheless, we also report additional exploratory analyses for each of the four facets of identity leadership separately.

### 3.4.2 Main Analysis

#### Bivariate correlations

In line with H1, bivariate correlations demonstrated that identity leadership was significantly and positively associated with respondents' group identification in

Table 3.1. Means, standard deviations and correlations for the sport group.

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Identity leadership | 5.31 | 1.21 | - | .92** | .94** | .94** | .86** | .36** | .07 |
| 2. Prototypicality | 5.29 | 1.31 | | - | .83** | .80** | .70** | .32** | .05 |
| 3. Advancement | 5.47 | 1.24 | | | - | .87** | .70** | .38** | .07 |
| 4. Entrepreneurship | 5.37 | 1.30 | | | | - | .75** | .33** | .08 |
| 5. Impresarioship | 5.02 | 1.49 | | | | | - | .27** | .05 |
| 6. Identification | 5.97 | 1.08 | | | | | | - | .23** |
| 7. Attendance | .92 | .17 | | | | | | | - |

Note: * $p < 0.05$, ** $p < 0.01$.

Table 3.2. Means, standard deviations and correlations for the exercise group.

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Identity leadership | 5.96 | 1.20 | - | .94** | .94** | .96** | .88** | .40** | .12* |
| 2. Prototypicality | 5.98 | 1.23 | | - | .87** | .89** | .73** | .36** | .10 |
| 3. Advancement | 6.11 | 1.20 | | | - | .88** | .74** | .38** | .09 |
| 4. Entrepreneurship | 6.00 | 1.28 | | | | - | .81** | .39** | .14* |
| 5. Impresarioship | 5.67 | 1.51 | | | | | - | .38** | .13* |
| 6. Identification | 5.95 | 1.22 | | | | | | - | .16** |
| 7. Attendance | .74 | .31 | | | | | | | - |

Note: * $p < 0.05$, ** $p < 0.01$.

Table 3.3. Means, standard deviations and correlations for the two groups combined.

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Identity leadership | 5.61 | 1.25 | - | .93** | .94** | .95** | .87** | .37** | <.01 |
| 2. Prototypicality | 5.62 | 1.32 | | - | .86** | .85** | .73** | .32** | -.02 |
| 3. Advancement | 5.77 | 1.26 | | | - | .88** | .74** | .36** | -.02 |
| 4. Entrepreneurship | 5.67 | 1.33 | | | | - | .79** | .35** | .02 |
| 5. Impresarioship | 5.32 | 1.53 | | | | | - | .32** | .01 |
| 6. Identification | 5.96 | 1.15 | | | | | | - | .17** |
| 7. Attendance | .83 | .26 | | | | | | | - |

Note: * $p < 0.05$, ** $p < 0.01$

either a sports group ($r$ = .36, $p$ < .01), or an exercise group ($r$ = .40, $p$ < .01), and a group of either form (i.e., where data from sport and exercise groups were combined; $r$ = .37, $p$ < .01). Moreover, lending further support to H1, significant correlations (all $p$ < .01) were observed between each facet of identity leadership and respondents' group identification in a sports group or an exercise group, or when data from the two types of groups were combined (see Tables 3.1-3.3 for full details of these analyses). In line with H2, group identification was significantly and positively associated with attendance in a sports group ($r$ = .23, $p$ < .01), or an exercise group ($r$ = .16, $p$ < .01), and when data from the two groups were combined ($r$ = .17, $p$ < .01).[7]

**Mediation analysis**

To test the indirect effect proposed in H3, we used the PROCESS macro for SPSS (Preacher and Hayes 2008; Hayes 2013; Model 4), which uses bootstrapping to calculate confidence intervals (CIs) for the indirect effect of an independent variable on a dependent variable, through a mediating variable. This method is more powerful than the Sobel test (Zhao et al. 2010) and more robust to deviations from normality (Ng and Lin 2016). In the present instance, we used bias-corrected bootstrapping with 5000 resamples to calculate 95% CIs. A significant indirect (mediation) effect is indicated if the CI does not cross zero (Preacher and Hayes 2008; Zhao et al. 2010; Hayes 2013). Because our measure of attendance might have been prone to extreme values when group meetings were infrequent (e.g., if a group only met once per week, the attendance score could only be either zero or one), we

[7] Further supporting H1 and H2, similar results were observed when participants who completed the questionnaire online and in person were examined separately. In both instances, significant correlations (all $p$ < .01) were observed between perceptions of leader engagement in identity leadership and group identification (whether identity leadership was considered as a global construct or each facet of identity leadership was considered individually), and between group identification and attendance. Full details of these analyses can be viewed in Appendix 2.

controlled for the number of available group meetings, by entering this variable as a covariate (which was specified to influence attendance but not group identification). Relationships between the number of available group meetings and attendance were significant ($p < .01$ in all models) and are not reported individually.

Results from the indirect effect analysis demonstrated that, across both groups, and when the two data sets were combined, greater perceptions of leaders' engagement in identity leadership were associated with stronger group identification (sports teams: $\beta = .318$, CI [.224, .412], $p < .001$; exercise groups: $\beta = .410$, CI [.299, .520], $p < .001$; two groups combined: $\beta = .335$, CI [.266, .405] $p < .001$), and that this stronger group identification was, in turn, associated with greater attendance (sports teams: $\beta = .040$, CI [.021, .058], $p < .001$; exercise groups: $\beta = .043$, CI [.012, .074], $p = .007$; two groups combined: $\beta = .051$, CI [.031, .070], $p < .001$). Consistent with these effects, the confidence interval around the indirect effect of identity leadership on attendance through group identification did not include zero in any instance (sports teams: $\beta = .013$, CI [.005, .024], SE= .005, $R^2 = .080$, $F = 8.739$; exercise groups: $\beta = .018$, CI [.007, .034], SE= .007, $R^2 = .148$, $F = 15.739$; two groups combined: $\beta = .017$, CI [.009, .026], SE= .005, $R^2 = .070$, $F = 14.569$). In all instances, the direct effect of identity leadership on attendance was non-significant (sports teams: $\beta = -.001$, CI [-.018, .015], SE= .008, $p = .835$; exercise groups: $\beta = .016$, CI [-.015, .047], SE= .016, $p = .308$; two groups combined: $\beta = -.017$, CI [-.035, .001], SE= .009, $p = .067$). Further supporting H3, significant indirect effects were also observed for the relationship between perceptions of leader engagement in identity leadership on group members' attendance through group identification when each of the four facets of identity leadership were tested individually in separate

models.[8] These effects were observed in both the sport and exercise groups and when the two groups were combined (see Table 3.4 for full details of these analyses). As proposed by H3, there was thus consistent evidence for the positive indirect effect of perceptions of leader engagement in identity leadership on group members' attendance through group identification.

### 3.5 Discussion

This study examined the potential value of sport and exercise leaders engaging in identity leadership as a means of fostering greater group member attendance in sport and exercise sessions. Supporting our hypotheses, we observed positive associations between group members' perceptions of their leader's engagement in identity leadership and their own group identification (H1), and between group members' group identification and their sport or exercise session attendance (H2). Moreover, in line with H3, in all of our mediation models there were significant indirect effects for the relationship between perceptions of leader engagement in identity leadership and members' attendance through members' group identification.

These findings have several important theoretical and practical implications. First, the positive (albeit indirect) relationships that we observed between identity leadership (and its individual facets) and attendance indicates that (1) greater attention to the impact of sport and exercise leaders on group members' attendance is warranted, and (2) the identity leadership approach has the potential to make a

[8] Significant indirect effects were also observed for the relationship between perceptions of leader engagement in identity leadership on group members' attendance through group identification when participants who completed the questionnaire online and in person were examined separately, regardless of whether identity leadership was considered as a global construct or its individual facets were examined separately. Full details of these analyses can be viewed in Appendix 3. In these analyses, the number of group meetings was again entered as a covariate (specified to influence attendance but not group identification) and was significantly associated with attendance in all models ($p < .01$).

Table 3.4. Mediation analyses for the sport and exercise groups separately and combined with each facet of identity leadership considered individually.

| | Indirect effects | | | | | | Direct effects | |
|---|---|---|---|---|---|---|---|---|
| | ***β* [CI's]** | | | | **Model** | | ***β* [CI's]** | **SE** |
| | **IL facet → GI** | **GI → Att** | **Indirect effect** | **Bootstrap SE** | **$R^2$** | **F** | **IL facet → Att** | |
| *Both groups* | | | | | | | | |
| Prototypicality | .282** [.215, .349] | .051** [.031, .070] | .014 [.008, .023] | .004 | .072 | 14.991 | -.018* [-.035, -.001] | .009 |
| Advancement | .330** [.260, .399] | .052** [.032, .071] | .017 [.010, .027] | .005 | .073 | 15.113 | -.020* [-.038, -<.002] | .009 |
| Entrepreneurship | .299** [.233, .365] | .048** [.029, .068] | .014 [.008, .023] | .004 | .068 | 13.960 | -.011 [-.028, .006] | .009 |
| Impresarioship | .238** [.180, .296] | .047** [.028, .066] | .011 [.006, .018] | .003 | .067 | 13.755 | -.008 [-.022, .007] | .007 |
| *Sport group* | | | | | | | | |
| Prototypicality | .266** [.178, .354] | .040** [.022, .058] | .011 [.004, .022] | .004 | .080 | 8.782 | -.003 [-.018, .012] | .008 |
| Advancement | .329** [.238, .420] | .040** [.021, .059] | .013 [.005, .025] | .005 | .080 | 8.750 | -.002 [-.018, .014] | .008 |
| Entrepreneurship | .269** [.181, .357] | .039** [.021, .057] | .011 [.004, .021] | .004 | .080 | 8.729 | <.001 [-.015, .015] | .008 |
| Impresarioship | .199** [.120, .278] | .039** [.021, .057] | .008 [.003, .015] | .003 | .080 | 8.729 | -.002 [-.013, .013] | .007 |
| *Exercise group* | | | | | | | | |
| Prototypicality | .351** [.241, .461] | .045** [.015, .075] | .016 [.007, .030] | .006 | .146 | 15.542 | .011 [-.019, .041] | .015 |
| Advancement | .382** [.270, .495] | .046** [.016, .077] | .018 [.007, .034] | .007 | .146 | 15.444 | .008 [-.023, .039] | .016 |
| Entrepreneurship | .375** [.271, .479] | .041** [.011, .072] | .016 [.005, .029] | .006 | .150 | 15.946 | .019 [-.011, .048] | .015 |
| Impresarioship | .306** [.217, .395] | .042** [.011, .072] | .013 [.004, .025] | .005 | .150 | 15.935 | .016 [-.009, .040] | .013 |

Notes: * $p < 0.05$, ** $p < 0.01$; IL= Identity leadership; GI= Group identification; Att= Attendance

substantial contribution to knowledge in this regard. Indeed, findings provide initial evidence for a (perhaps *the*) key mechanism through which the positive relationship between leaders engaging in identity leadership and group members' attendance operates. The weak and, in all but two of our models (the prototypicality and advancement models when both groups were combined, see Table 3.4), non-significant, direct associations between identity leadership and attendance, coupled with the significant indirect effect observed when group identification was included as a mediator in each of our models, suggest that group identification underpins the positive relationship between identity leadership and attendance. Our models explained between 6.7% and 15.0% of the variance in attendance (i.e., low to moderate effects). Viewed in conjunction with previous research (Terry and Hogg 1996; Strachan et al. 2012), these findings indicate that further consideration of the potential participation-related benefits of greater group identification in physical activity settings is warranted. More broadly, given evidence that group identification mediates the relationship between identity leadership and sporting performance (Fransen et al. 2016), it would appear that, in physical activity settings at least, leaders' actions are associated with positive group member outcomes to the extent that these actions result in members' feeling a stronger sense of group identification.

Second, the current findings extend the growing body of evidence that highlights the benefits of identity leadership both within and outside the sport and exercise domain. Most notably, findings build upon growing evidence concerning (1) the positive relationship between identity leadership and group members' health and well-being in organisational settings (Steffens et al. 2014a; Steffens et al. 2017), and (2) the positive relationship between identity leadership and group members' performance in sporting settings (Fransen et al. 2016). Bridging the gap between

these two lines of research, the current findings are the first to reveal a positive relationship between identity leadership and health-related outcomes in sport and exercise settings.

Finally, the present findings extend previous research which has explored sport and exercise leaders' impact on various health-related group member outcomes. For example, research has indicated, (1) that facilitating positive coach-athlete relations is associated with reduced dropout in youth sports teams (Barnett et al. 1992), (2) that fitness class instructors' use of motivationally adaptive communication styles is positively associated with key outcomes including members' intentions to remain in the class (Ntoumanis et al. 2017), and (3) that an 'enriched' (i.e., energetic, pleasant, and socially interactive) rather than 'bland' (i.e., technique focused, with group members offered only vague feedback and no individual encouragement or support) leadership approach is preferable as a means of promoting positive affective states in fitness classes (Turner et al. 1997; Fox et al. 2000). Taken together, these findings point to the impact (both positive and negative) that sport and exercise leaders can have on group members' behaviours and experiences. Extending these insights, the present findings suggest that sport and exercise leaders who behave in a way that speaks to their capacity to *create*, *represent*, *advance*, and *embed* an identity that is shared by the particular group they wish to lead (i.e., leaders who engage in *social identity leadership*) may promote members' participation in group-relevant activity. Importantly, this complements evidence for the benefits of using groups as an active ingredient (rather than merely a setting) in attempts to promote physical activity participation (Burke et al. 2006; Estabrooks et al. 2012). Specifically, the present findings indicate that engaging in identity leadership may help create richer group environments, which, in turn,

encourage participation—an effect that has also been observed following interventions based on group dynamics principles such as promoting a sense of distinctiveness (Estabrooks et al. 2012). Indeed, to enhance leaders' capacity to facilitate positive group environments, the 5R program may represent an appropriate starting point. This tailored approach to leadership training and development, based on the core principles of the identity leadership approach, has already proved successful in organisational settings, with a first test of the program's effectiveness demonstrating its capacity to improve leaders' team goal clarity, team identification, and ability to engage in identity leadership (Haslam et al. 2017). Based on the initial evidence provided in this study, a similar program may prove beneficial in the physical activity domain.

### 3.5.1 Limitations and Future Research

Against the backdrop of this study's strengths, which included its novelty, sample size, and strong theoretical underpinning, some potential limitations should be noted. Moreover, several avenues for future research (many of which are closely related to these potential limitations) are apparent. First, although the broad range of contexts from which participants were recruited could be considered a further strength of the present research (in the sense that it enhanced the generalisability of our findings), this wide variety of contexts precluded an objective assessment of attendance. Instead, the measure used in this study relied on accurate (and honest) recall from participants and future research might therefore aim to adopt designs that enable attendance to be measured objectively, rather than via self-report. For example, leaders (coaches, captains, exercise group or class leaders) could be asked to take a register of participants' attendance at sessions over a designated period.

Further information regarding participants would also strengthen, and

potentially broaden the scope of, future research. In particular, addressing a limitation of this study, information regarding how participants are nested within groups and teams would allow this to be accounted for in analyses (e.g., using multilevel modeling). Similarly, further information regarding, for example, team or group size and the length of participants' tenure within their team or group would allow researchers to either control for these factors or draw comparisons based upon them.

To broaden our understanding of the various effects of identity leadership in sport and exercise settings, future research would also benefit from measuring (1) additional aspects of behaviour besides attendance (e.g., using accelerometers or pedometers), and (2) other variables associated with the health benefits people accrue from sport and exercise (e.g., effort). From a methodological perspective, research that uses longitudinal and experimental designs is also now needed to allow strong causal inferences to be drawn. Nevertheless, the cross-sectional evidence presented here lays the foundation for such efforts and provides empirical evidence that would appear to justify this investment of research resources.

Finally, the focus on formal leaders could also be considered a limitation of the present study. Recent research in sport indicates that, although formal leaders (e.g., captains) fulfill important leadership functions, leadership is often shared throughout the team (Fransen et al. 2014b). Indeed, among a sample of 4451 players and coaches, Fransen et al. (2014b) found that only 43.6% of participants perceived the team captain to be the best leader on any of the four established leadership roles (task, motivational, social, and external), and only 1% perceived their captain to be the best on all four. Rather than focusing solely on formal leaders, future research may therefore involve first identifying the most influential leaders within teams with

regard to these four roles, before going on to examine the relationship between these individuals' engagement in identity leadership and key health-related outcomes.

### 3.6 Conclusion

Our findings provide extended understanding of the impact that sport and exercise leaders can have on group members' sport and exercise session participation. More specifically, findings point to the efficacy of identity leadership as a basis for fostering greater attendance, with the positive association between members' perceptions of their leader's engagement in this type of leadership and members' group identification seemingly a key mechanism through which this positive relationship operates. The present study therefore lays a foundation for a fresh line of research into a largely overlooked, but potentially very significant, correlate of physical activity participation, and suggests that the identity leadership approach offers a strong theoretical framework for this research. Given the number of physical activity settings in which leaders are found (e.g., sports teams, exercise groups), targeting these individuals as the point of intervention could be a fruitful strategy with the potential for widespread impact.

### 3.7 Perspectives

Previous research has indicated that sport and exercise leaders can promote various positive outcomes among group members (Barnett et al. 1992; Turner et al. 1997; Fox et al. 2000; Ntoumanis et al. 2017). Our findings indicate that, with regard to promoting higher rates of attendance in sport and exercise sessions, leaders are effective when they are perceived to behave in a way that demonstrates their capacity to *create*, *represent*, *advance*, and *embed* an identity that is shared by the particular group they lead. In other words, our findings extend growing evidence from other domains for the value of leaders engaging in *identity leadership* (Haslam

et al. 2011; Steffens et al. 2014a; Steffens et al. 2017). As such, they add to growing evidence for the benefits of favorable group environments for promoting physical activity, and further demonstrate the impact of social factors on individuals' physical activity behaviours (Stevens et al. 2017). Our hope is that the findings reported here stimulate greater attention to the importance of leaders in physical activity settings, and, in particular, lay the foundation for (1) causal examinations of the effects of identity leadership in physical activity settings (e.g., using longitudinal and experimental designs), and (2) attempts to implement the principles of identity leadership in physical activity settings (e.g., through interventions).

# Chapter 4: Leading 'us' to be active: A two-wave test of relationships between identity leadership, group identification, and attendance.

## 4.1 Preface

Study 1 indicated positive relationships between the strength of individuals' sense of identification as a member of a particular exercise group (i.e., as a parkrunner) and (1) their participation in group-relevant exercise, and (2) their experiences of participation in group-relevant exercise. Study 2 also found a positive relationship between individuals' group identification and their group-relevant participation (this time in various sport and exercise settings, with participation conceptualised as attendance rates at group sessions), and extended upon this by demonstrating an additional positive association between the extent to which group members' perceive their physical activity leader to engage in social identity leadership and their own sense of group identification. Moreover, study 2 included the first attempt to test the indirect (mediated) effect of group members' perceptions of their leader's engagement in identity leadership on their attendance through their group identification, with findings indicating significant indirect effects in the sport and exercise groups, and when the two sets of data were combined. The following study builds on findings from studies 1 and 2 by examining relationships between (1) identity leadership and group identification, and (2) group identification and group-relevant participation (again conceptualised as attendance rates at group sessions) over time (i.e., using a two-wave design). Two wave designs afford a more robust test of relationships between variables (i.e., by enabling the use of cross-lagged analyses in which levels of the dependent variable at Time 1 can be controlled). They also allow the directionality of relationships to be assessed, and yield a more rigorous test of mediation models (in this instance the model outlined

above that was first proposed and tested in study 2), not least because they enable Time 1 scores for the proposed mediator and dependent variables to be included (i.e., controlled for) in mediation models.

## 4.2 Introduction

The physiological and psychological benefits of physical activity are well documented and include reduced risk of contracting several non-communicable diseases (e.g., heart disease, Type 2 diabetes, colon and breast cancers), and improved cognitive functioning, self-esteem, and mood (Biddle et al. 2015). Despite these benefits, and numerous public health campaigns to increase population awareness of physical activity benefits and guidelines (e.g., 'Change4Life' and 'Live Well'), physical *in*activity levels remain high. Recent global statistics indicate that almost a quarter of adults (23.3%) worldwide are insufficiently active (Sallis et al. 2016), while substantially higher rates of insufficient activity (>90%) have been reported based on objective accelerometer data (Tucker et al. 2011). Rates of participation in sport—a subcategory of physical activity (Caspersen et al. 1985)—further reinforce claims of a global physical inactivity pandemic (Kohl et al. 2012). For example, the most recent data from the United Kingdom suggest that only 34.7% of adults aged 16 and over participate in sport at least twice a month (28 days; Sport England 2018).

Recent attempts to understand and promote physical activity have been characterised by an increasingly broad approach, with various individual, environmental, policy, and social factors considered (e.g., see Bauman et al. 2012; Ferdinand et al. 2012; Garcia et al. 2016). Within this research, promising preliminary evidence has emerged for the benefits of individuals developing strong social identities in physical activity settings (Stevens et al. 2017). More specifically, research has observed a positive relationship between the strength of individuals' sense of social identity (or *group identification*) as a member of a particular physical activity group and their participation in group-relevant activities (e.g., their

participation in group training sessions and events; Strachan et al. 2012; Stevens et al. 2018b). Building on this, recent research further suggests that, by engaging in *identity leadership* (Haslam et al. 2011), physical activity leaders can foster group members' group identification and thereby facilitate greater rates of attendance in group sessions (Stevens et al. 2018a). The present study sought to build on this research—which, to date, has relied on cross-sectional designs—by examining relationships between identity leadership, group identification, and attendance over time.

### 4.2.1 Theoretical Framework

According to the *social identity approach* (Tajfel and Turner 1979; Turner et al. 1987), individuals can categorise themselves, and behave, in terms of both their personal identity (i.e., as 'I' and 'me') and their various social identities (i.e., as 'we' and 'us'). The consequences of individuals categorising themselves in terms of social identities (e.g., as a member of a particular sports team)—and, in particular, of developing a strong sense of *group identification*—have been the focus of considerable research. This has confirmed the importance of social identity and social identification for a range of behaviours including individuals' commitment to group projects (Haslam et al. 2006), productivity (Worchel et al. 1998), participation in collective action (Klandermans 2002), and engagement in various health-related behaviours (including physical activity; Terry and Hogg 1996; Falomir-Pichastor et al. 2009; Strachan et al. 2012; Stevens et al. 2018b). Much of this work speaks to a key assertion of the social identity approach that categorising oneself in terms of a particular social identity is associated with a desire to align personal behaviours with behaviours that are representative of in-group members (i.e., group norms; Turner et al. 1987).

For example, and of particular relevance in the present context, research has indicated that in physical activity groups—where regular participation is normative—individuals' desire to engage in identity-congruent behaviours may promote greater levels of participation in group-relevant activities. Strachan et al. (2012) found that the strength of runners' identification as members of a running group was positively associated with the percentage of total runs that they conducted with the group, and negatively associated with their confidence to continue running should their group disband. In a further cross-sectional study, Stevens et al. (2018b) also found a positive relationship between individuals' running group identification and their objectively assessed participation.

Building on these promising findings, recent research has examined the role that physical activity leaders can play in fostering members' group identification, and thus greater rates of attendance in group sessions (Stevens et al. 2018a). Extending growing evidence from organisational (Steffens et al. 2017), political (Steffens and Haslam 2013) and sports performance (Fransen et al. 2016) domains, this research points to the benefits of leaders engaging in *identity leadership* (Haslam et al. 2011). More specifically, in addition to providing further evidence of a positive relationship between individuals' sport or exercise group identification and their participation in group-relevant activity, research has found (1) a positive association between group members' perceptions of their leaders' engagement in identity leadership and their own group identification, and (2) that the positive relationship between members' perceptions of their leaders' engagement in identity leadership and members' attendance is mediated by their group identification (Stevens et al. 2018a). Moreover, these effects have been observed for multiple facets of identity leadership, providing preliminary evidence that physical activity leaders facilitate

greater group member participation to the extent that they are perceived to *represent*, *advance*, *create*, and *embed* an identity that is shared by members of the particular group they lead (Haslam et al. 2011; Steffens et al. 2014c). This suggests that physical activity leaders should strive (1) to represent and embody the particular qualities and attributes that define the group and set it apart from other groups (i.e., be seen as a *prototypical* group member), (2) to champion the group's identity and interests (i.e., to be seen to engage in identity *advancement*), (3) to play an active role in creating and shaping the group's identity and a collective sense of 'we' and 'us' (i.e., to act as *identity entrepreneurs*), and (4) to devise activities that make the group matter, and allow its shared identity to be lived out (i.e., to act as *identity impresarios*).

### 4.2.2 The Present Research

Given the promising findings summarised above, further tests of relationships between identity leadership, group identification, and participation are warranted. In the present study, we conducted the first examination of these relationships over time, extending previous cross-sectional research in several important ways. Although cross-sectional studies are useful for identifying associations, and often provide a valuable foundation for further research (Mann 2003), cross-sectional designs can produce biased estimates of effects in correlation (Lindell and Whitney 2001) and mediation (Maxwell and Cole 2007; Maxwell et al. 2011) analyses. Moreover, cross-sectional designs fail to take into account the (often strong) relationship between past and future behaviour (e.g., past and future physical activity participation; Gollob and Reichardt 1987). Two-wave designs provide a more rigorous analysis of causal relationships between variables than cross-sectional designs (Ployhart and Ward 2011), and a means of assessing the directionality of

relationships (Selig and Little 2012). Indeed, given indications that relationships between group identification and participation, in particular, may be reciprocal (Stevens et al. 2018b), a two-wave study represents an important advancement on current research in this area.

In this study, we therefore assessed identity leadership, group identification, and attendance at two time points. Building on the foregoing discussion, the research tested three hypotheses. First, in line with the social identity approach to leadership (Haslam et al. 2011), and extending previous research (Stevens et al. 2018a), we hypothesised that group members' perceptions of their leader's engagement in identity leadership at Time 1 would predict members' subsequent greater group identification at Time 2, controlling for their initial group identification at Time 1 (H1). To advance current understanding of the relative importance of the four facets of identity leadership, we examined each separately. Second, in line with a key assertion of the social identity approach that a strong sense of group identification is positively associated with a desire to align personal behaviours with those of representative group members (i.e., by participating in group sessions regularly; Turner et al. 1987), and previous research indicative of this effect (Strachan et al. 2012; Stevens et al. 2018b), we hypothesised that group members' group identification at Time 2 would be associated with their greater group-relevant attendance at Time 2, controlling for their attendance at Time 1 (H2).[9] Finally, extending previous research (Stevens et al. 2018a), we hypothesised an indirect effect of perceptions of leader engagement in each of the four identity leadership facets at Time 1 on members' attendance at Time 2 through group identification at

[9] We considered it most appropriate to test and report a model in which group identification and attendance were measured at the same time point because, from a theoretical perspective, we would expect individuals' attendance at any given time to be driven by their group identification at that same time (rather, or at least to a greater extent, than by their group identification at an earlier time).

Time 2, while controlling for initial levels of group identification and attendance at Time 1 (H3).

### 4.3 Methods

#### 4.3.1 Participants and Procedure

The sample consisted of 396 undergraduate university students (252 males, 144 females; aged 16 to 41, $M_{age}$= 18.83, *SD*= 2.40; 83.3% White British) recruited from first year sports courses at various universities in the United Kingdom. Participants were eligible for the study if they had joined at least one amateur sports team (either within or outside university) in the period between starting university and the start of the study (Time 1 data collection). Time 1 data collection took place in the third week of each university's first semester of the academic year (giving participants time to engage in team activities beforehand) and Time 2 data collection eight weeks later. This eight-week period represented the longest consistent time lag possible before the end of students' first semester (at which time, in most cases, team activities were suspended for approximately four weeks). In total, 209 participants completed the second set of measures, yielding a response rate of 52.7%. Non-responders at Time 2 did not differ significantly from those who completed both sets of measures on any of the study variables at Time 1 (all *p*s > .05). Of the 209 participants who completed the Time 2 measures, 23 indicated they were no longer a member of the sports team they had answered the Time 1 measures in relation to, leaving a final sample of 186 participants (107 males, 79 females; aged 16 to 41, $M_{age}$= 18.81, *SD*= 2.24; 78.0% White British; from 27 different sports).

All Time 1 measures were distributed during university lectures in paper form. At Time 1, participants were asked to identify a particular sports team they had joined, followed by an instruction to answer the remaining questions in relation to

that team. Time 2 measures were also distributed during university lectures in paper form (i.e., subsequent lectures for the same groups of students). At Time 2, a member of the research team or a fully briefed course leader was present (1) to ask participants to complete the measures in relation to the same team, and (2) to remind participants of their chosen team if necessary (using a list compiled after Time 1 data collection). Participants were also instructed to identify their sports team at Time 2, and responses were subsequently checked to ensure both sets of measures had been answered in relation to the same team. However, a high frequency of ambiguous responses—such that, although participants' responses at Times 1 and 2 matched, it was unclear whether different participants were referring to the same team (i.e., responses such as: 'Men's Football 1sts' were common)—precludes a detailed breakdown of how participants were nested within teams and groups. Participants were asked to provide their email address at Time 1 and those participants not present during Time 2 data collection were emailed (having given consent to be contacted for this purpose at Time 1) a request to complete the second set of measures electronically (i.e., to insert or highlight their responses in a Word processed version of the measures and return this via email).[10] Ethical approval for the study was obtained from the first author's institutional human research ethics board on 7th September 2016 (project reference ID 12699). Anonymity was assured and the decision of participants to complete the measures represented their provision of informed consent.

### 4.3.2 Measures

***Identity leadership.*** The 15-item Identity Leadership Inventory (ILI; Steffens et al. 2014c) was used to measure participants' perceptions of their sports team

[10] Only four participants completed the second set of measures electronically.

leaders' engagement in identity leadership. Given inconsistencies regarding the presence of coaches in amateur sports teams, and to ensure all participants responded in relation to an individual who held an identical leadership role, participants were asked to respond with reference to their team's captain. The ILI items were adapted to reflect this by replacing 'leader' with 'captain' in all question stems. The ILI includes four items measuring prototypicality (e.g., "This captain is a model member of the group"), advancement (e.g., "This captain acts as a champion for the group"), and entrepreneurship (e.g., "This captain develops an understanding of what it means to be a member of the group"), and three items measuring impresarioship (e.g., "This captain arranges events that help the group function effectively"). Scales were anchored from 1 (not at all) to 7 (completely) and mean scores were obtained for each subscale. Each of the subscales demonstrated good internal consistency across both time points (Time 1 Cronbach's αs prototypicality = .90; advancement = .79; entrepreneurship = .84; impresarioship = .83; Time 2 Cronbach's αs prototypicality = .95; advancement = .90; entrepreneurship = .94; impresarioship = .88).

***Group identification.*** Participants' identification as a member of their sports team was measured using the Four Item Social Identification scale (FISI; Postmes et al. 2013; e.g., "Being part of this sports team is an important part of how I see myself"). Items were scored on a scale ranging from 1 (fully disagree) to 7 (fully agree). In line with previous research (Haslam et al. 2017), the FISI demonstrated good internal consistency across both time points (Time 1 Cronbach's α = .86; Time 2 Cronbach's α = .92).

***Attendance.*** Having identified a particular sports team they had joined since starting university, participants were asked: "In a typical week, how many times does the sports team that you have identified meet?" and "In a typical week how

many of these sessions do you attend?" A measure of attendance was obtained by dividing the number of sessions attended by the total number of sessions (Stevens et al. 2018a).

## 4.4 Results

### 4.4.1 Analytic Strategy and Preliminary Analyses

Cross-lagged panel analyses offer a means of (1) assessing whether effects occur in both directions (i.e., $X_1$ to $Y_2$ and $Y_1$ to $X_2$), and (2) comparing the relative strength of cross-lagged effects (Selig and Little 2012). Lagged regression analyses are one form of cross-lagged panel analysis and have been widely used in applied psychology (e.g., Ganster et al. 2001; Baillien et al. 2011), including recently to study the unfolding effects of identity leadership (Steffens et al. 2017). An approach using latent variables would have been appropriate for testing some of our models. However, a minimum ratio of ten participants per parameter to be estimated is recommended in structural models with latent variables (Schreiber et al. 2006). In the present instance, there were 31 parameters to be estimated in models in which either Time 1 prototypicality, advancement, or entrepreneurship were proposed to predict Time 2 group identification, controlling for Time 1 group identification (30 parameters to be estimated in a model using Time 1 impresarioship as an independent variable as this has one fewer item). Thus, given our final sample size ($N$ = 186), and to maintain consistency throughout our analyses, we conducted a series of lagged linear regression analyses (Cohen et al. 2003) to test H1 and H2—that is, to assess the extent to which (1) participants' perceptions of their leader's engagement in identity leadership was related to their own subsequent group identification and, (2) participants' group identification was related to their

attendance. Prior to these analyses, data were screened for missing values and the assumptions of regression analyses were tested.

For participants who completed both Time 1 and Time 2 measures, although Little's (1988) Missing Completely at Random test was significant ($\chi^2[323] = 383.795$, $p = .011$), only 0.002% of all possible data points were missing and a maximum of 1.1% of values (i.e., two participant responses) were missing for any particular questionnaire item. Given this small number of missing values, listwise deletion was used to handle missing data (Schafer and Graham 2002).

Assumptions of regression analyses were satisfied as follows. Across all models there were never more than 12 standardised residuals greater than 2 in absolute value (6.5% of participants who completed Time 1 and Time 2 measures) and never more than 4 standardised residuals greater than 3 in absolute value (2.2% of participants who completed Time 1 and Time 2 measures). Moreover, across all models, only two cases had a Cook's distance greater than 1, suggesting that outlier cases did not have a substantial influence on our models (Field 2017). The assumption of independent errors was satisfied, with values for the Durbin-Watson statistic (1.843–2.062) all close to 2 (and well within the acceptable >1 and <3 range; Field 2017). The assumption of no multicollinearity was also met with no intercorrelations between independent variables greater than .404 (i.e., substantially less than the typical .80 cut-off; Berry and Feldman 1985), variance inflation factor values ≤1.119 (substantially below the recommended upper threshold of 10; Hair et al. 1995), and tolerance values ≥.834 (substantially above the minimum threshold of .2; Menard 1995). The assumptions of homoscedasticity, normally distributed errors, and linearity were satisfied with the residuals normally distributed, and randomly and evenly distributed, for each of our models.

Means, standard deviations, and correlations between all variables across the two time points are presented in Table 4.1. The inter-individual stability of variables was moderate to high, with correlations between variables at Time 1 and Time 2 ranging from .344 (for attendance) to .572 (for advancement). Correlations between identity leadership at Time 1 and group identification at Time 2 were significant for the prototypicality ($r$ = .360, $p$ < .001), advancement ($r$ = .303, $p$ < .001), and entrepreneurship ($r$ = .314, $p$ < .001) facets, but marginally non-significant for the impresarioship facet ($r$ = .143, $p$ = .069). The correlation between group identification at Time 2 and attendance at Time 2 was significant ($r$ = .482, $p$ < .001).

### 4.4.2 Main Analyses

**Tests of H1: Relationship between identity leadership and group identification**

As shown in Table 4.2, results indicated that, across all models, participants' group identification at Time 2 was associated with their prior group identification at Time 1 (prototypicality $\beta$ = .467, advancement $\beta$ = .466, entrepreneurship $\beta$ = .469, impresarioship $\beta$ = .470, all $ps$ < .001), with small differences due to slight variation in the sample (as a result of using listwise deletion to handle missing data). Results from lagged linear regression models for each identity leadership facet, controlling for Time 1 group identification, are presented in Table 4.2. As Table 4.2 shows, supporting H1, perceptions of leaders' engagement in identity prototypicality, advancement, and entrepreneurship at Time 1 significantly predicted members' greater group identification at Time 2 ($p$s = .004, .023, and .015), and accounted for 3.5%, 2.2% and 2.6% of additional variance above and beyond Time 1 group identification. Time 1 identity impresarioship did not significantly predict Time 2

Table 4.1. Means, standard deviations and correlations between variables at Time 1 and Time 2

| Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Time 1* | | | | | | | | | | | | | | |
| 1. Prototypicality | 6.05 | .91 | - | .76** | .80** | .59** | .40** | .12 | .50** | .52** | .47** | .38** | .36** | .13 |
| 2. Advancement | 6.01 | .83 | | - | .81** | .70** | .35** | .14 | .47** | .57** | .51** | .38** | .30** | .12 |
| 3. Entrepreneurship | 6.07 | .87 | | | - | .66** | .35** | .12 | .42** | .50** | .48** | .37** | .31** | .15* |
| 4. Impresarioship | 5.89 | 1.02 | | | | - | .23** | -.05 | .41** | .51** | .41** | .43** | .14 | <.01 |
| 5. Identification | 6.07 | .96 | | | | | - | .23** | .30** | .29** | .30** | .18** | .47** | .19** |
| 6. Attendance | .91 | .16 | | | | | | - | .03 | <.01 | <-.01 | -.02 | .16* | .34** |
| *Time 2* | | | | | | | | | | | | | | |
| 7. Prototypicality | 5.79 | 1.10 | | | | | | | - | .87** | .85** | .66** | .62** | .20** |
| 8. Advancement | 5.88 | 1.02 | | | | | | | | - | .84** | .72** | .58** | .16* |
| 9. Entrepreneurship | 5.86 | 1.09 | | | | | | | | | - | .74** | .59** | .19* |
| 10. Impresarioship | 5.64 | 1.13 | | | | | | | | | | - | .39** | .07 |
| 11. Identification | 5.96 | 1.10 | | | | | | | | | | | - | .48** |
| 12. Attendance | .88 | .20 | | | | | | | | | | | | - |

Notes: * $p < 0.05$, ** $p < 0.01$

Table 4.2. Results of linear regression (cross-lagged) analyses testing hypotheses 1 and 2.

| Relationship | $R^2$ | $\beta$ | $t$ | $p$ |
|---|---|---|---|---|
| *Prototypicality → group identification* | | | | |
| Step 1: Intra-individual stability (group identification T1) | .218 | .467 | 7.124 | <.001 |
| Step 2: Predictor (T1 prototypicality) | .253 | .203 | 2.894 | .004 |
| *Advancement → group identification* | | | | |
| Step 1: Intra-individual stability (group identification T1) | .217 | .466 | 7.106 | <.001 |
| Step 2: Predictor (T1 advancement) | .239 | .159 | 2.300 | .023 |
| *Entrepreneurship → group identification* | | | | |
| Step 1: Intra-individual stability (group identification T1) | .220 | .469 | 7.173 | <.001 |
| Step 2: Predictor (T1 entrepreneurship) | .246 | .170 | 2.467 | .015 |
| *Impresarioship → group identification* | | | | |
| Step 1: Intra-individual stability (group identification T1) | .221 | .470 | 7.195 | <.001 |
| Step 2: Predictor (T1 impresarioship) | .222 | .039 | .575 | .566 |
| *Group identification → attendance* | | | | |
| Step 1: Intra-individual stability (attendance T1) | .118 | .344 | 4.922 | <.001 |
| Step 2: Predictor (T2 group identification) | .305 | .438 | 6.960 | <.001 |

Notes: $N$ = 183–185; sample sizes—and therefore model statistics for step 1 intra-individual stability identity leadership models—vary slightly due to missing data; $\beta$ = standardized beta.

group identification over and above Time 1 group identification ($p$ = .566), accounting for only 0.1% of additional variance.

**Test of H2: Relationship between group identification and attendance**

As shown in Table 4.2, results indicated that participants' attendance at Time 2 was associated with their prior attendance at Time 1 ($\beta$ = .344, $p$ < .001). Supporting H2, participants' group identification at Time 2 was significantly associated with members' attendance at Time 2, and accounted for an additional 18.7% of total variance above and beyond Time 1 attendance ($\beta$ = .438, $R^2$ = .305, $\Delta R^2$ = .187, $p$ < .001).

**Tests of H3: Indirect effect of identity leadership on attendance through group identification**

To test the indirect effect proposed in H3, we examined the extent to which the impact of group members' perceptions of their leader's engagement in identity leadership at Time 1 on group members' attendance at Time 2 was mediated by their greater group identification at Time 2. For these analyses, we used the PROCESS macro for SPSS (Preacher and Hayes 2008; Hayes 2013; Model 4). This uses bootstrapping to calculate confidence intervals (CIs) for the indirect effect of an independent variable on a dependent variable, through a mediating variable, with a significant indirect effect indicated if the CI does not cross zero (Zhao et al. 2010). In the present instance, we used bias-corrected bootstrapping with 5000 resamples to calculate 95% CIs. In our analyses, we controlled for inter-individual stability in our mediator and dependent variables by entering Time 1 group identification and Time 1 attendance as covariates.

Supporting H3, the CI around the indirect effect of identity leadership at Time 1 on attendance at Time 2 through group identification at Time 2 did not

include zero in the prototypicality (*b*= .021, CI [.007, .046], SE= .009, $R^2$ = .313, *F*= 20.127), advancement (*b*= .018, CI [.001, .046], SE= .011, $R^2$ = .309, *F*= 19.825), or entrepreneurship (*b*= .018, CI [.002, .044], SE= .010, $R^2$ = .311, *F*= 19.983) models. A significant indirect effect was not observed for the impresarioship model (*b*= .004, CI [-.010, .022], SE= .008, $R^2$ = .313, *F*= 20.284). In all instances, the direct effect of Time 1 identity leadership on Time 2 attendance was non-significant (prototypicality: *b*= -.011, CI [-.040, .019], SE= .015, *p* = .483; advancement: *b*= -.009, CI [-.041, .022], SE= .016, *p* = .566; entrepreneurship: *b*= .002, CI [-.028, .032], SE= .015, *p* = .896; impresarioship: *b*= -.006, CI [-.030, .018], SE= .012, *p* = .625).[11]

### 4.4.3 Sensitivity Analyses

To explore the possibility of reverse causality, we examined pathways from Time 1 group identification to Time 2 perceptions of identity leadership, and from Time 2 attendance to Time 2 group identification. As shown in Table 4.3, results indicated inter-individual stability for each of the identity leadership facets such that participants' perceptions of their leader's engagement in identity leadership at Time 2 was associated with their prior perceptions of their leader's engagement in identity leadership at Time 1 (prototypicality $\beta$ = .499, advancement $\beta$ = .572, entrepreneurship $\beta$ = .479, impresarioship $\beta$ = .427, all *ps* < .001). With the exception of the entrepreneurship facet, when we controlled for perceptions of leaders' engagement in identity leadership at Time 1, members' group identification at Time 1 did not significantly predict perceptions of leaders' engagement in identity leadership at Time 2 (see Table 4.3). Thus, in general, despite some evidence of a

[11] Full details of relationships between all variables included in these analyses, but not reported in this section, are presented in Appendix 6 (many of these relationships were tested within the preceding lagged regression analyses).

Table 4.3. Results of linear regression (cross-lagged) analyses testing reverse causality.

| Relationship | $R^2$ | $\beta$ | $t$ | $p$ |
|---|---|---|---|---|
| *Group identification → prototypicality* | | | | |
| Step 1: Intra-individual stability (prototypicality T1) | .249 | .499 | 7.755 | <.001 |
| Step 2: Predictor (T1 group identification) | .260 | .112 | 1.593 | .113 |
| *Group identification → advancement* | | | | |
| Step 1: Intra-individual stability (advancement T1) | .327 | .572 | 9.402 | <.001 |
| Step 2: Predictor (T1 group identification) | .335 | .098 | 1.516 | .131 |
| *Group identification → entrepreneurship* | | | | |
| Step 1: Intra-individual stability (entrepreneurship T1) | .230 | .479 | 7.366 | <.001 |
| Step 2: Predictor (T1 group identification) | .249 | .147 | 2.141 | .034 |
| *Impresarioship → group identification* | | | | |
| Step 1: Intra-individual stability (impresarioship T1) | .183 | .427 | 6.378 | <.001 |
| Step 2: Predictor (T1 group identification) | .190 | .090 | 1.305 | .194 |
| *Attendance → group identification* | | | | |
| Step 1: Intra-individual stability (group identification T1) | .221 | .470 | 7.179 | <.001 |
| Step 2: Predictor (T2 attendance) | .379 | .406 | 6.800 | <.001 |

Notes: $N$ = 183–184; sample sizes vary slightly due to missing data; $\beta$ = standardized beta.

reciprocal relationship between group identification and perceptions of leaders' identity entrepreneurship, findings suggest that relationships between perceptions of leaders' identity leadership and members' group identification are predominantly in the hypothesised direction. Indeed, with regard to the relative strength of the hypothesised and reverse relationships, results showed that, with the exception of the impresarioship models (where effects were non-significant in both directions), standardised beta values in the second step of regression models, and $\Delta R^2$ values from the first to the second step of the regression models, were greater in hypothesised (than alternative reverse) models.

Regarding the relationship between Time 2 attendance and Time 2 group identification, as Table 4.3 shows, results indicated that participants' group identification at Time 2 was associated with their prior group identification at Time 1 ($\beta$ = .470, $p$ < .001). Controlling for members' group identification at Time 1, members' attendance at Time 2 was significantly associated with members' group identification at Time 2, and accounted for an additional 15.9% of total variance above and beyond Time 1 group identification ($\beta$ = .406, $R^2$ = .379, $\Delta R^2$ = .159, $p$ < .001). Thus, both the hypothesised and reverse relationships were significant. Results indicated, however, that effects in the hypothesised direction were stronger, with the standardised beta values in the second step of regression models, and $\Delta R^2$ values from the first to the second step of regression models, greater when effects were specified in the hypothesised direction.

**4.5 Discussion**

This study examined lagged relationships between (1) sports team members' perceptions of their leader's engagement in identity leadership and their subsequent group identification, and (2) members' group identification and their attendance.

Supporting H1, analyses indicated that, for the prototypicality, advancement, and entrepreneurship facets of identity leadership, sports team members' perceptions of their leaders' identity leadership at Time 1 predicted members' own subsequent greater group identification at Time 2, while controlling for their initial group identification at Time 1. Supporting H2, analyses further indicated that members' group identification at Time 2 was associated with their attendance at Time 2, while controlling for their initial attendance at Time 1. Moreover, for the prototypicality, advancement, and entrepreneurship facets, analyses indicated significant indirect effects for the relationship between perceptions of leader engagement in identity leadership at Time 1 and members' subsequent attendance at Time 2, through members' group identification at Time 2, while controlling for initial group identification and attendance at Time 1. Finally, sensitivity analyses indicated (1) that relationships between identity leadership and group identification predominantly occurred and (with the exception of the impresarioship facet) were consistently stronger, in the hypothesised direction, and (2) that the relationship between group identification and attendance was reciprocal but stronger in the hypothesised direction.

Our findings have important theoretical and practical implications, and lay a foundation for further research regarding identity leadership and group identification within and outside physical activity settings. First, in line with the identity leadership approach (Haslam et al. 2011), and building on previous research (Stevens et al. 2018a), findings further demonstrate the role that physical activity leaders can play in fostering members' group identification. In particular, findings point to the benefits of sports team leaders (in this case, captains) behaving in a way that is perceived to *create, represent,* and *advance* a shared group identity, with leaders'

perceived prototypicality emerging as the strongest predictor of members' subsequent group identification in the present study (as indicated by the largest standardised beta values in second step of regression models and $\Delta R^2$ values from the first to the second step of regression models). Results indicate, however, that the extent to which leaders are perceived to initiate activities that embed the group's identity in reality is not associated with members' greater subsequent group identification. This nuanced finding points to the need for further research to ascertain the relative importance of leaders engaging in the individual identity leadership facets across different contexts, with such research potentially informing the development of more effective context-specific leadership training programmes. For example, while the efficacy of the 5R programme—a leadership training programme based on the key principles of the identity leadership approach—to improve organisational leaders' capacity to engage in identity leadership has been demonstrated (Haslam et al. 2017), the programme's effectiveness (in this and other settings) may be improved by a greater understanding of the relative importance of the four identity leadership facets in the particular context in which the programme is being delivered. Specifically, the first 'Readying' phase of the 5R programme—in which leaders are informed about the importance of social identity processes for leadership—could be adjusted to reflect context-specific differences in the relative importance of the four facets, potentially resulting in more favourable outcomes for group members (i.e., that stem from their greater group identification).

Second, findings align with a large body of evidence indicating various benefits associated with individuals developing strong social identities (e.g., see Worchel et al. 1998; Haslam et al. 2006). Most notably, our findings extend indications of a positive relationship between members' greater group identification

and their engagement in health-related behaviours (Falomir-Pichastor et al. 2009), including group-relevant physical activity (Strachan et al. 2012; Stevens et al. 2018b). Indeed, by controlling for previous group-relevant attendance, the present study provides the most robust evidence to date of a positive relationship between group identification and group-relevant attendance. Findings therefore provide broad support for suggestions that the power of groups may be harnessed to promote physical activity participation (Estabrooks et al. 2012; Harden et al. 2015; Stevens et al. 2017), and particular support for the potential benefits of physical activity interventions that attend to individuals' identities (e.g., see Hunt et al. 2014; Beauchamp et al. 2018). They suggest too that devising ways to increase members' group identification within existing physical activity groups (e.g., by working with physical activity leaders to develop their capacity to foster members' identification) could be an effective way of promoting sustained physical activity participation. Indeed, evidence of reciprocity in the relationship between group identification and attendance further indicates the potential of such interventions, with greater attendance seemingly acting to reinforce and strengthen members' group identification as part of a virtuous upward spiral.

Results from our mediation analyses further emphasise the benefits of group identification in physical activity settings, and the potential value of efforts to increase members' group identification by targeting physical activity leaders as the point of intervention. Growing evidence points to the potential impact of physical activity leaders on group members' attendance. For example, Ntoumanis et al. (2017) found that fitness instructors' use of a motivationally adaptive communication style was positively associated with increases in group members' intentions to remain in fitness classes. Findings from our mediation analyses build

directly on evidence that physical activity leaders can promote group members' greater attendance by engaging in identity leadership (Stevens et al. 2018a), and point to improved group identification as a key mechanism through which this positive relationship operates (with significant indirect effects observed in three of our four mediation models and no significant direct effects observed). Moreover, our mediation analyses offer more nuanced guidance for physical activity leader training programmes. In particular, supporting indications from our lagged regression analyses, mediation analyses suggest that leaders' identity impresarioship has limited bearing on members' group identification and subsequent attendance. For physical activity leader training programmes based on social identity principles (e.g., following the 5R model; Haslam et al. 2017), the present findings therefore suggest that particular attention should be devoted to developing leaders' awareness of the importance of, and ability to engage in, identity prototypicality, advancement, and entrepreneurship.

### 4.5.1 Limitations and Future Research

Despite representing a clear advancement on previous physical activity research related to both identity leadership and group identification, some potential limitations of this study and (often closely associated) avenues for further research should be noted. First, although the present study provided the most rigorous test of relationships between identity leadership, group identification, and attendance to date, further time-series analyses (including studies conducted over periods longer than eight weeks), and research employing experimental and intervention designs, are needed to fully understand, and establish, the causal effects of identity leadership and group identification in physical activity settings.

Second, from a methodological perspective, future research should seek to obtain clear information regarding the teams or groups that participants are members of. This would allow the nested structure of data to be taken into account (e.g., using multilevel modelling), and thus the proportion of variance that can be accounted for at individual and team levels to be calculated.

Finally, it is important that future research examines the consequences of other formal and informal physical activity leaders (besides sports team captains) engaging in identity leadership. Although in the present instance ensuring all participants responded in relation to their captain yielded specific insights regarding leaders who hold this particular role, it is plausible that leaders in different roles (e.g., coaches, exercise group leaders, informal leaders) will exert varying degrees of influence on members' group identification and health-related outcomes. Indeed, further research is needed to examine the relative, and collective, consequences of formal leaders, and individuals who are viewed as leaders by their fellow members, engaging in identity leadership. This is especially the case in light of evidence from sports teams that (1) leadership is often shared between members, and (2) informal leaders within teams often fulfil important leadership roles (i.e., as a task, motivational, social, or external leader; Fransen et al. 2014b),

**4.6 Conclusion**

This study extends understanding regarding relationships between identity leadership, group identification, and group-relevant participation in physical activity settings. Specifically, the significant effects observed in our lagged regression analyses, and significant indirect effects observed in our mediation analyses point to the potential for leaders to promote increased group member attendance by fostering members' group identification. Findings also extend understanding regarding the

relative importance of the individual facets of identity leadership for promoting members' greater group identification (and thus group-relevant attendance) in physical activity settings. They point to the particular importance of leaders' perceived prototypicality, advancement, and entrepreneurship. To encourage group members to continue to take part in physical activity, it thus appears to be important for the leaders of those groups not only to create 'a sense of us' but also to be seen 'as one of us' and as 'doing it for us'.

# Chapter 5: The impact of leader identity entrepreneurship on effort and performance: Evidence from an exercise task

## 5.1 Preface

As stated in the literature review, the overarching aim of this thesis is to examine the efficacy of a social identity approach to understanding physical activity behaviours and experiences. The three studies reported thus far have explored relationships between (1) the strength of individuals' group identification, and (2) the extent to which individuals' perceive their physical activity leaders to engage in social identity leadership and individuals' group-relevant participation, affective exercise experiences (i.e., their satisfaction), sense of group cohesion, and global well-being (i.e., their life satisfaction). Individuals' participation is, therefore, the only aspect of behaviour that has been explored. Although in terms of the impact on health this is perhaps the most crucial aspect of physical activity behaviour to understand, others are nevertheless important. As such, and in line with the thesis' overarching objective, two additional (and related) aspects of behaviour are examined in this chapter: effort and performance. These are important for several reasons.

First, individuals' effort during physical activity is closely related to the physiological benefits they accrue from physical activity. For example, individuals will achieve greater weight loss when they consistently exercise within (and not below) 'fat burning' heart rate zones (Carey 2009), while exercising at higher (as opposed to moderate) intensities has been linked to a greater reduction in the risk of cardiovascular disease, and greater improvements in diastolic blood pressure, aerobic capacity, and glucose control (Swain and Franklin 2006). Put simply, the effort a person puts into physical activity is closely related to the benefits they get out of it.

Thus, understanding ways to encourage individuals to ‘put more into’ their physical activity represents an important avenue for research.

Second, individuals’ effort is closely associated with individual and, in many instances, group or team performance (e.g., in sports team environments), which, in turn, can have several important implications. For example, in competitive sport, various individual and group outcomes including results, prize money, league position, whether a player is transferred, and how much money they earn can all, to some extent, hinge on performance. Moreover, research has indicated positive relationships between people’s perceptions of their competence (Feltz and Petlichkoff 1983; Rottensteiner et al. 2015), success (McAuley and Jacobson 1991), and expectations of future success (Roberts et al. 1981) and their participation. Thus, although efforts to understand and promote participation and performance are often conducted separately, the two outcomes are in fact often related, with better performance potentially stimulating more regular, and more sustained, participation.

In the study reported below, the relationship between the extent to which a leader engaged in identity entrepreneurship and participants’ effort during, and performance of, a physical task (a 5km cycling time trial) was examined in a laboratory experiment. Laboratory experiments afford high replicability, and a high degree of control over confounding variables (Webster and Sell 2014)—most notably, the confounding effect of environmental factors such as temperature and wind were removed by conducting the present experiment in a laboratory (rather than field) setting. In the present instance too, the laboratory setting allowed effort and performance to be measured objectively using several indicators.

Identity entrepreneurship was chosen as the experiment’s independent variable (in preference to one or more of the other identity leadership facets) for

three primary reasons. First, recent studies have demonstrated promising relationships between organisational leaders' engagement in this facet of identity leadership and health-related group member outcomes (e.g., reductions in group members' experience of burnout; Steffens et al. 2014a; Steffens et al. 2017). Thus, although there may be health-related benefits associated with leaders engaging in the other facets of identity leadership, these remain largely untested. The foundation for research concerning the health-related benefits of identity leadership in physical activity settings—settings in which group members' health is even more centre-stage than it is in organisational settings—is therefore strongest for identity entrepreneurship.

Second, recent research in political contexts has demonstrated a positive association between leaders' identity entrepreneurship and other key outcomes related to those studied here. Specifically, Steffens and Haslam's (2013) analysis of the relationship between Australian Prime Ministerial candidates' identity entrepreneurship during their campaign speeches (conceptualised as the extent to which they engaged in group-oriented language) and their campaign's success (i.e., whether they won or lost the election), indicated that leaders' identity entrepreneurship is positively associated with followers' mobilisation. Again, empirical evidence for relationships between the remaining facets of identity leadership and followers' mobilisation is scarce, further indicating that the foundation, and justification for the investment of research resources, for testing the effect of identity leadership on group members' effort and performance is strongest for identity entrepreneurship.

Third, Steffens and Haslam's (2013) study provided a strong basis for the experimental manipulation of identity entrepreneurship. As Steffens and Haslam

(2013) noted, leaders' use of group-oriented language is indicative of their engagement in identity entrepreneurship (see also Haslam et al. 2011; Slater et al. 2015). Thus, by focusing on this facet of identity leadership, a manipulation could be created that (1) drew heavily on an established technique for demonstrating a leader's engagement in the facet, and (2) has been associated with positive outcomes in other contexts. Focusing on another identity leadership facet would have meant creating an experimental manipulation with limited empirical underpinning.[12]

[12] It is worth reiterating at this stage that the intended journal for the following study is *Plos One*—that is, a journal that accepts original research in all scientific disciplines and is aimed at a broader audience than sport and exercise psychology journals (which the preceding studies have either been published in, or submitted to). The style of the article's narrative is therefore slightly different to the preceding articles such that, among other things, literature surrounding leadership effectiveness in domains besides physical activity is discussed more extensively in the introduction.

## 5.2 Introduction

A key indicator of any leaders' effectiveness is their ability to elicit maximum effort and, ultimately, performance from those they lead. This ability is as relevant to the business CEO seeking to improve their company's turnover as it is to the football manager attempting to guide his or her team to a league championship. As a result, a considerable volume of research in a wide array of contexts (e.g., business, educational, military, and sporting) has been dedicated to understanding how leaders may achieve this (e.g., see Wong et al. 2003; Yukl 2013; Cotterill and Fransen 2016).

While research into leader effectiveness has traditionally concentrated on the traits and extraordinary abilities of 'great men' (with limited success; e.g., see Stogdill 1948; Andersen 2006), recent research has emphasised the importance of followers and the group in the leadership process (Bass and Riggio 2006; Yammarino et al. 2012; Slater et al. 2015). Speaking to the value of this approach, a large body of research has pointed to the role that a sense of shared group membership plays in allowing leaders to exert influence over a group (Ellemers et al. 2004; Haslam et al. 2011; van Knippenberg 2011). In particular, a body of recent research indicates that the extent to which leaders act as *entrepreneurs of identity* by actively cultivating a sense of 'we' and 'us' among group members (Reicher and Hopkins 2001; Steffens et al. 2014c) has positive implications for various outcomes including group members' engagement, burnout, and turnover intentions (Steffens et al. 2014a; Steffens et al. 2017) and their support for, and endorsement of, the leader (Augoustinos and De Garis 2012; Steffens and Haslam 2013).

Building on this promising research, in the present study, we explore the possibility that leaders' engagement in identity entrepreneurship may directly

influence group members' effort during a task, and therefore that, all else being equal, identity entrepreneurship is a precursor to improved task performance.

### 5.2.1 Leaders' promote positive group and individual outcomes by creating social identity

The social identity approach (Tajfel and Turner 1979; Turner et al. 1987) is built on the assertion that individuals can categorise themselves, and behave, both in terms of personal identity (i.e., as 'I' and 'me') and social identity (i.e., as 'we' and 'us'). The approach further suggests that when people categorise themselves, and others, in terms of a shared social identity (e.g., as a member of a particular exercise group or sports team) this lays the foundation for various group behaviours including social collaboration (Turner 1982), social influence (Turner 1991), and, of particular relevance to the present article, leadership (Reicher et al. 2005; Haslam and Reicher 2007; Haslam et al. 2011). According to social identity theorising, effective leadership is therefore considered contingent on the leader's capacity to create, represent, advance, and embed a shared sense of identity among group members (Haslam et al. 2011; Steffens et al. 2014c).

Supporting this assertion, empirical evidence suggests that the benefits associated with identity leadership include increases in group members' satisfaction (Pierro et al. 2005; Cicero et al. 2007, 2010) and support for leaders (Platow et al. 1997; Ullrich et al. 2009), as well reductions in their turnover intentions (Pierro et al. 2005; Cicero et al. 2010; Steffens et al. 2017) and experience of burnout (Steffens et al. 2014a; Steffens et al. 2017). Notably too, in line with social identity theorising (Haslam et al. 2011), identity leadership has also been associated with greater social identification (Fransen et al. 2016), with additional experimental research demonstrating, in turn, that this increased social identification is related to greater

productivity (Worchel et al. 1998), commitment (Haslam et al. 2006), and effort (Høigaard et al. 2013).

Previous research in the social identity tradition has also shown that leader effectiveness is contingent on leaders' ingroup prototypicality—that is, the extent to which they are perceived to embody the norms, beliefs, and values of a salient social identity (Haslam et al. 2011; van Knippenberg 2011; Barreto and Hogg 2017). As yet, though, we know little about the extent to which leader effectiveness is causally impacted by leaders' creation of shared identity through acts of identity entrepreneurship—a question that is particularly relevant in the case of new groups.

To address this issue, Steffens et al. (2017) administered a survey across two timepoints to examine the effect of identity entrepreneurship on manual workers' subsequent burnout, work engagement, and turnover intentions. In line with predictions, results showed that workers' perceptions of their leaders' identity entrepreneurship at Time 1 predicted greater work engagement and lower burnout and turnover intentions at Time 2 (while there was no evidence of the reverse path). But while these results provide some evidence of directionality, the longitudinal design is not able to rule out the possibility of alternative explanations—something that can only achieved through experimental research.

In line with the majority of leadership research in the social identity tradition, Steffens et al.'s (2017) study was conducted in an organisational setting. However, as we noted above, effective leadership is equally important in sport and exercise settings. In line with this point, there is evidence that fitness class leaders can influence (positively or negatively) group members' affective exercise experiences (Turner et al. 1997; Fox et al. 2000) and intentions to remain in the class (Ntoumanis et al. 2017), while formal and informal leaders of sports teams can influence various

outcomes including team confidence (Fransen et al. 2014a; Fransen et al. 2015c), team cohesion (Loughead et al. 2016), team member motivation (Fransen et al. 2018), and team and individual performance (Fransen et al. 2015a; Fransen et al. 2016).

Reflecting the growing influence of social identity theorising in this domain, research has also recently begun to indicate the positive impact of sport and exercise leaders engaging in identity leadership (Fransen et al. 2016; Stevens et al. 2017). In an experimental study using two interactive soccer tasks (that involved passing as well as dribbling and shooting), Fransen et al. (2016) found that group task performance was influenced by the confidence a confederate leader expressed in their teams. Of particular note, Fransen et al. (2016) also found that participants' (1) perceptions of confederate leaders' engagement in identity leadership, and (2) identification as a member of their newly formed team, mediated the relationship between the perceived confidence the leader showed in the team and participants' perceptions of their individual performance on the two soccer tasks. But while these findings indicate that identity leadership is positively related to group members' performance, to our knowledge no studies have examined causal relationships between leader identity entrepreneurship and either effort or performance.

### 5.2.2 The Present Research

The present research sought to address these lacunae. More specifically, our study extended previous research in at least three key ways. First, rather than assessing the mediating effect of identity leadership (Fransen et al. 2016) we manipulated this (or, more specifically, leader identity entrepreneurship) in order to examine the extent to which this has a causal impact on participants' behaviour. To achieve this, participants completed a baseline test before we randomly allocated

them to either a condition where a confederate leader displayed high identity entrepreneurship or a condition where a confederate leader displayed low identity entrepreneurship. Extending previous research on identity entrepreneurship (Steffens et al. 2014a; Steffens et al. 2017) and identity leadership in sport more broadly (Fransen et al. 2016), this allowed us to assess the causal effects of identity entrepreneurship on participants' effort and performance. Second, by using a simple individual exercise task—a 5km cycling time trial on a static cycling ergometer—we were able to examine the relationship between identity leadership and objectively-assessed group member effort and performance. This builds on previous evidence of a positive association between identity leadership and group members' perceptions of their own performance (i.e., a subjective performance measure; Fransen et al. 2016), and on qualitative research indicating a positive relationship between identity leadership and sporting performance (Slater et al. 2015). Third, by using this simple individual task (rather than, for example, an interactive skill-based task, such as those used by Fransen et al. 2016) we were able to remove (or at least minimise) the impact of factors on participants' performance that were unrelated to their effort (e.g., participants' technique, concentration, and co-ordination with other team members). As such, we were able to detect whether any performance improvements observed resulted from increases in group members' effort.

In line social identity reasoning, our hypotheses here were as follows:

**H1.** Leaders' identity entrepreneurship will have a positive impact on group members' effort during a physical exercise task.

**H2.** Leaders' identity entrepreneurship will have a positive impact on group members' performance of a physical exercise task.

## 5.3 Methods

### 5.3.1 Participants

We recruited a sample of 88 recreationally active participants from a British University (the first author's institution). Four participants withdrew between the two test sessions. As a result, in the second phase of the experiment—which involved a group-based manipulation (see below)—group size (excluding the confederate) was reduced from four to three participants in four instances. In order to rule out effects due to varying group size and to guarantee comparability of participant behaviour across groups (described in more detail below), these groups were excluded, leaving a final sample of 72 participants. Characteristics of the final sample are presented in Table 5.1. Height and weight were measured using a standard stadiometer (Seca 213, Germany) and scale (Seca 807, Germany).

Before participating in the study, all participants completed a health questionnaire to identify any contraindications to strenuous exercise (see appendix 7). Participants were told that the study's aim was to examine time trial performance under different conditions, and informed that participation would involve completing two 5km time trials on separate days. All participants gave written consent based on this information (see appendix 8). Ethical approval for the study procedures was obtained from the first author's institutional human research ethics board on 31st January 2017 (project reference ID 14123).

### 5.3.2 Power analysis

Given the novel paradigm and design of the present experiment, we could locate just two studies (with four effect sizes) to provide guidance regarding necessary sample size (and thus our sample size estimates should be considered vague approximations). The first (a small study; $N$=18) examined the effect of a

Table 5.1. Participant anthropometric data.

| | Male (*n*=40) | Female (*n*=32) | High identity entrepreneurship condition (*n*=36) | Low identity entrepreneurship condition (*n*=36) | Total (*n*=72) |
|---|---|---|---|---|---|
| Age (years) | 22.30±1.83 (19-31) | 21.22±1.74 (18-24) | 22.11±2.15 (18-31) | 21.53±1.48 (18-24) | 21.82±1.86 (18-31) |
| Height (cm) | 180.36±7.51 (166.50-194.00) | 170.57±7.14 (155.50-188.00) | 176.49±9.34 (163.00-194.00) | 174.53±8.06 (155.50-189.00) | 176.01±8.79 (155.50-194.00) |
| Weight (kg) | 79.39±10.94 (63.00-120.40) | 71.64±11.07 (50.00-97.90) | 77.78±13.42 (50.00-120.40) | 74.11±9.23 (52.20-91.60) | 75.94±11.58 (50.00-120.40) |

Notes: Data are presented as Mean ± SD (range); SD=standard deviation; the high and low identity entrepreneurship conditions both comprised 20 males and 16 females; all data were collected immediately prior to time trial 1.

manipulation to enhance participants' identification as members of a newly formed team on subsequent performance during one- and three-minute cycling time trials, reporting effect sizes equivalent to Cohen's *d*s of 1.19 and 2.11 (Høigaard et al. 2013); the second (*N*=80 across two experiments) examined the impact (within a dart-throwing task) of failure feedback delivered by an in-group versus an out-group experimenter on subsequent performance, reporting effect sizes of $d = 0.89$ and $d = 1.22$ (Rees et al. 2013). Using the lowest effect size estimate ($d = 0.89$) with an alpha of .05, power of .80, and a one-tailed effect, sample size estimates (G*Power; Faul et al. 2009) indicated that *N*=34 would be required. Recognising this small sample size, and given recent concerns about small sample size research (and related issues of reproducibility and replicability; e.g., see Asendorpf et al. 2013; Schweizer and Furley 2016), we aimed for a minimum sample of 64—that is, sixteen groups of four with an equal split across conditions of male and female groups. To protect against participant dropout, however, we tested in excess of this minimum sample amount at baseline (i.e., a total of *N*=88). As a result of the withdrawal of four participants between sessions, 12 of the original sample conducted Trial 2 in groups of three (i.e., four groups had one participant drop out prior to the Trial 2 sessions; thus, there were four groups containing just three participants each); by subsequently excluding those participants who conducted Trial 2 in groups of three (see preliminary analysis section below for the reasons behind this decision), we ended with an effective sample size of *N*=72, sufficient to detect effect sizes of $d = 0.60$.

### 5.3.3 Experimental Procedures

Participants visited the laboratory on two occasions separated by a period of one to two weeks. On both occasions, participants completed a five-minute self-paced warm up followed by a 5km time trial on a cycling ergometer (Wattbike Pro,

Nottingham, UK). Resistance levels were standardised for all time trials, with the air break set to 5 and the magnetic brake to 1 (mirroring flat cycling conditions). To overcome flywheel inertia, participants were asked to begin cycling at a self-selected comfortable cadence immediately prior to beginning both time trials. During the time trials, participants were blind to all information except distance remaining. No verbal encouragement was given but participants were permitted to drink water *ad libitum*. Participants were asked to refrain from (1) high intensity exercise in the two days prior to the testing sessions, and (2) consuming caffeine in the two hours prior to the testing sessions. Participants' testing sessions were conducted at the same time of day to minimise the influence of circadian variance (Teo et al. 2011), and at an ambient temperature of 21°C.

Prior to Trial 1, participants were given time to familiarise themselves with the cycling ergometer and adjust the saddle and handlebar positions to their liking. These positions were recorded and replicated for participants' second time trials. Participants attended the laboratory individually on their first visit and completed their time trial with only the first author or a research assistant present. The primary instruction given was to complete the test 'as fast as you can'.

Before the second round of testing, participants were allocated (via random number generation) to same-sex groups of four. For their second visit, participants were asked to attend the laboratory at the same time as their fellow group members. Once all group members had arrived, the experimenter (the first author) collectively informed participants that (1) a team competition had been organised, (2) one person had been chosen at random from each group to be the 'team leader', (3) this person had been contacted in advance to confirm they were happy to fulfil this role, and (4) this person had been provided some additional information about the competition.

The experimenter then asked the team leader to relay this information to the group while the experiment set up was finalised and left the room. In all instances, the individual identified as the leader was a confederate who, as far as participants were aware, was a fifth group member. At this stage the confederate informed the group that there was "a competition that involves 12 groups of students and the results for the total time taken by each group will be sent round afterwards by email as a leaderboard", before delivering the manipulation (see below). Following this, participants were called in turn into a separate room to complete their second time trials, with the confederate called last in all instances. When each participant had finished their time trial, they left the laboratory.

**5.3.4 Manipulation**

The sex of the confederate was matched to the sex of the group members to prevent this acting as a confounding variable. A single male confederate was used for all male groups, while two female confederates were used with each completing four of the eight female groups (two high identity entrepreneurship and two low identity entrepreneurship groups each) included in our final sample.

In developing manipulation scripts, we drew on previous identity entrepreneurship and social identity research. First, we drew on evidence linking leaders' effectiveness to their greater use of collective (rather than personal) pronouns; that is, evidence that we-referencing language—a strategy through which leaders can demonstrate their identity entrepreneurship (Haslam et al. 2011)—can help engender support from, and mobilise, followers (Steffens and Haslam 2013). Several references to 'we' were therefore included in the high identity entrepreneurship manipulation, while several references to 'I' were included in the low identity entrepreneurship manipulation. Second, we included a strategy that has

previously been used to build individuals' identification as a member of a newly formed team—the creation of a team name (Høigaard et al. 2013). By asking the confederate leaders to suggest this in the high (but not the low) identity entrepreneurship condition, we provided the leaders with a tool to demonstrate their desire to create a sense of 'us'. Finally, the content (i.e., underpinning message) of the high and low identity entrepreneurship manipulations aimed to emphasise (and reinforce throughout the session) the importance (or not in the low identity entrepreneurship condition) of the team.

Specifically, the manipulation delivered by confederates in the high identity entrepreneurship condition was: "So we're all in this together basically. Let's give this a really good go as a team. If we all do our best then we can do well here. We want to try and win don't we? Maybe we should come up with a team name. Any ideas?" Confederates were also provided with a list of phrases to use between one participant coming out of, and the next going into, the testing room: "Great stuff (person's name) you look exhausted, looks like you've really given your best for the team", "Well done (person's name) another big effort for team X", "Come on (person's name) do it for Team X". Confederates used one phrase in the transition between each of the other group members' time trials.

For the low identity entrepreneurship condition, the confederate followed their explanation of the competition by delivering the following manipulation: "I wouldn't worry too much about that though personally. It's not really a group thing, it's an individual task and what everyone does is up to them. I wouldn't worry about what anyone else is doing, just do your own thing." In this condition confederates were instructed to say nothing in the transition time between participants' time trials.

### 5.3.5 Debrief

Following the experiment, participants were informed of the study's aims and procedure and provided with a general summary of the results (all via email). Upon request, participants were also provided with their individual results. No leaderboard pertaining to group performance was circulated and no participants were given details of any other participant's individual results.

### 5.3.6 Measures

***Manipulation check.*** Following their second time trial (and while still in the testing room separate from their fellow participants and 'team leader'), participants completed the four entrepreneurship items of the Identity Leadership Inventory (Steffens et al. 2014c; e.g., "This leader made people feel as if they are part of the same group"). Items were scored on scales ranging from 1 (not at all) to 7 (completely). The four items were summed and divided by four to obtain a mean score for each participant. In line with previous research (Steffens et al. 2014a), this measure demonstrated good internal consistency (Cronbach's $\alpha = .89$), while confirmatory factor analyses (using AMOS 23.0; Arbuckle 2014) supported the psychometric properties of the scale: $\chi^2[2] = 6.03$, $p = .049$; CFI = .98; SRMR = .03; RMSEA = .17; PCLOSE = .08.

***Effort.*** Given the linear relation between intensity of work and heart rate (HR; Achten and Jeukendrup 2003), HR represents an appropriate physiological index of effort (e.g., see Sarrazin et al. 2002). As such, participants' average and maximum HR (measured in beats per min; Polar H7, Finland) were used as indicators of effort during the time trials. Although, as expected, these measures were highly correlated (Trial 1, $r = .91$, Trial 2, $r = .84$, both $ps < .01$), both were included in the final index of effort because they offer slightly different measures of

effort. That is, average HR provides an indication of effort exerted across the whole time trial, while maximum HR indicates participants' maximum effort exerted.

***Performance.*** Three objective indicators of performance were obtained during time trials: time taken (seconds), average power output, and average power output over the first 60 seconds (both measured in watts). We analysed the first 60 seconds in addition to whole time trials because of the primacy of this period to the manipulation (i.e., either the initial statement, or, in the high identity entrepreneurship condition, a phrase delivered by the confederate to reinforce it), and research indicating that identity-based manipulations elicit immediate performance effects (Høigaard et al. 2013; Rees et al. 2013). Nevertheless, to gain a broader understanding of the development of performance over the duration of the time trials, we also examined participants' average power output over each 250m interval, allowing a visual inspection of variations in participants' pacing across the two time trials.

## 5.4 Results

### 5.4.1 Preliminary Analysis

Data were screened for missing values, outliers, and indices of non-normality. For four participants' first time trials, raw data files revealed either partial or complete missing data for HR (due to equipment failing to detect HR throughout time trials). Values for average and maximum HR were treated as missing for these participants, and listwise deletion was used to handle these missing data in subsequent analyses. No other missing values were observed. For the purposes of detecting outliers (and subsequent analyses), we calculated gain scores by subtracting participants' Trial 1 results from their Trial 2 results for each variable (i.e., each indicator of effort and performance). Given evidence that outlier removal

has substantial benefits for error rates in *t*-tests and ANOVAs (Osborne and Overbay 2004), we then identified, and removed, gain score outliers within each condition (high and low identity entrepreneurship) for each variable using the Median Absolute Deviation (MAD) equation with a cut-off of 2.5 (i.e., the median ±2.5 times the MAD; Leys et al. 2013). This approach is a more robust measure of dispersion than mean ± 2 or 3 standard deviations (Leys et al. 2013). Following the removal of outliers, Shapiro-Wilk Tests indicated that gain scores for all indicators of effort and performance followed a normal distribution across both conditions.

Next, given the dropout of four participants, and the potential for different group sizes to influence group dynamics (and therefore our results; e.g., see Widmeyer et al. 1990), we tested for the effect of group size. To do this, we conducted one-way analyses of variance (ANOVAs) on the gain scores for each dependent variable (i.e., equivalent tests to the independent *t*-tests used throughout our main analyses, see below) and entered group size as an additional fixed factor. Results revealed a significant condition (i.e., manipulation) × group size interaction for average HR ($p = .017$). Given this significant interaction, previous evidence that group size can influence members' effort (and therefore their team's performance; e.g., Williams et al. 1981; Karau and Williams 1993), and to enhance reliability, we refrained from including participants who completed the second session in groups of three in subsequent analyses (but return to the results of analyses in which these participants were included in the Limitations and Future Research section). At this stage, gain score outliers were therefore recalculated, and removed, for each dependent variable (using the same MAD criteria) for the final sample of 72. Of these 72 participants, only three had missing data for HR and, following the removal of outliers, Shapiro-Wilk Tests once again indicated that gain scores for all

dependent variables followed a normal distribution in both conditions. Further analyses (using independent *t*-tests) revealed no significant differences in pre-test scores between participants in the high and low identity entrepreneurship conditions.

### 5.4.2 Main Analyses

#### Analytic Approach

Analyses based on gain scores were considered more appropriate than analyses of covariance (ANCOVAs) with pre- and post-test scores entered as covariates and dependent variables respectively. This is because our primary interest was in how the two conditions, on average, differed in gains, rather than how participants differed at post-test, given that they started with the same score—the question tested by ANCOVAs (Fitzmaurice et al. 2011). Indeed, with the exception of (some) randomised control trials, several researchers recommend against using ANCOVAs in pre- and post-test designs (Maxwell and Delaney 1990; Oakes and Feldman 2001; Fitzmaurice et al. 2011). We therefore conducted a series of independent *t*-tests to compare the gain scores of participants in the high and low identity entrepreneurship conditions. The assumption of equal variances (i.e., Levene's test) was met for all dependent variables, and the Student's *t*-test was used in all instances. The Bonferroni correction was applied separately to effort and performance outcomes (i.e., familywise). Alpha was therefore set at .025 for effort outcomes and .0167 for performance outcomes. In line with our directional hypotheses, one-tailed *p* values are reported for all indicators of effort and performance. Effect sizes are reported as Cohen's *d*, with 0.2, 0.5, and 0.8 representing small, medium, and large effect sizes respectively (Cohen 1988). Means and standard deviations for all dependent variables across the two conditions' first and second time trials (following the removal of outliers) are presented in Table 5.2.

Table 5.2. Means and standard deviations for all dependent variables across the two conditions' first and second time trials.

| | Time trial 1 | | Time trial 2 | |
|---|---|---|---|---|
| Variable | Mean | SD | Mean | SD |
| *High identity entrepreneurship condition* | | | | |
| Average HR (beats per min) | 167.57 | 10.42 | 165.67 | 11.14 |
| Maximum HR (beats per min) | 185.66 | 8.86 | 184.70 | 10.39 |
| Time taken (seconds) | 516.26 | 47.73 | 510.48 | 45.55 |
| Average power output (watts) | 178.24 | 38.97 | 181.18 | 39.15 |
| Average power output first 60 seconds (watts) | 167.23 | 57.95 | 181.70 | 51.13 |
| *Low identity entrepreneurship condition* | | | | |
| Average HR (beats per min) | 168.09 | 13.84 | 162.88 | 13.69 |
| Maximum HR (beats per min) | 186.33 | 11.03 | 182.40 | 10.76 |
| Time taken (seconds) | 517.33 | 43.76 | 516.84 | 41.40 |
| Average power output (watts) | 173.91 | 41.56 | 174.12 | 40.49 |
| Average power output first 60 seconds (watts) | 193.93 | 63.56 | 182.39 | 54.52 |

Note: SD=standard deviation

Prior to conducting our main analyses, we tested for potential interactions between our manipulation and (1) participants' gender, and (2) the confederate participants were exposed to in our manipulation. To do this, we conducted two additional sets of one-way ANOVAs on the gain scores for each of our dependent variables with gender and confederate separately entered as additional fixed factors. We observed no significant condition × gender or condition × confederate interactions, and therefore report the results of analyses in which we do not control for these factors.

**Manipulation Check**

Supporting the efficacy of our manipulation, an independent *t*-test showed that confederates were perceived to engage in significantly more identity entrepreneurship in the high identity entrepreneurship condition ($M$ = 5.05, $SD$ =

1.22) than in the low identity entrepreneurship condition ($M$ = 3.85, $SD$ = 1.45), $t(70) = 3.78$, $p < .001$, $d = 0.90$.

**Tests of H1: Impact of leaders' identity entrepreneurship on group members' effort.**

***Average HR.*** Results showed that mean scores for average HR were lower for Trial 2 than Trial 1 in both the high (gain score mean = -1.90, $SD$ = 7.29) and low (gain score mean = -5.55, $SD$ = 9.46) identity entrepreneurship conditions. Further analyses showed that 46.7% of participants' average HR scores were greater for Trial 2 than they were for Trial 1 in the high identity entrepreneurship condition, compared to 27.3% in the low identity entrepreneurship condition. With alpha set at .025 (as noted above), the two conditions' gain scores were not significantly different from each other: $t(61) = 1.701$, $p = .047$, $d = 0.43$.

***Maximum HR.*** Results showed that mean scores for maximum HR were lower for Trial 2 than Trial 1 in both the high (gain score mean = -.38, $SD$ = 6.99) and low (gain score mean = -3.91, $SD$ = 5.32) identity entrepreneurship conditions. Further analyses showed that 46.9% of participants' scores for maximum HR were greater for Trial 2 than they were for Trial 1 in the high identity entrepreneurship condition, compared to 15.2% of participants in the low identity entrepreneurship condition. The difference between the two conditions' gain scores was significant: $t(63) = 2.30$, $p = .013$, $d = 0.57$.

**Tests of H2: Impact of leaders' identity entrepreneurship on group members' performance**

***Time taken.*** Results showed that participants were faster in Trial 2 than in Trial 1 in both the high (gain score mean = -5.78, $SD$ = 24.74) and low (gain score mean = -.49, $SD$ = 16.94) identity entrepreneurship conditions. Further analyses

showed that 63.6% of participants' Trial 2 times were faster than their Trial 1 times in the high identity entrepreneurship condition, compared to 40.6% of participants' times in the low identity entrepreneurship condition. The difference between the two conditions' gain scores was not significant: $t(63) = -1.00$, $p = .160$, $d = .25$.

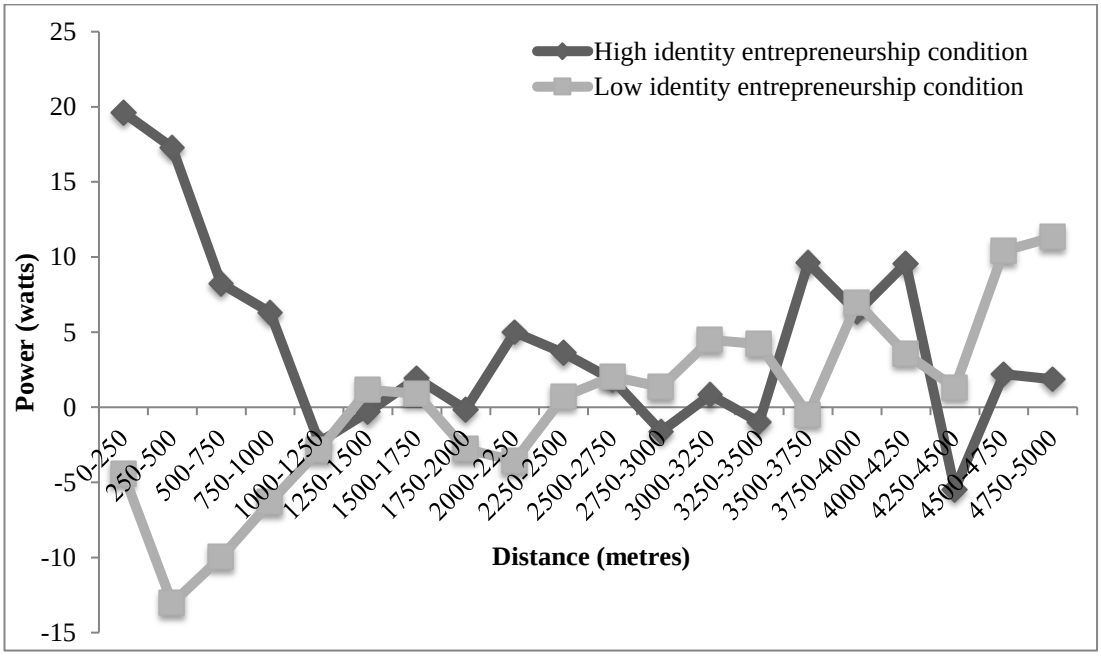
***Average power output.*** Results showed that participants produced greater average power output in Trial 2 than in Trial 1 in both the high (gain score mean = 2.94, *SD* = 22.97) and low (gain score mean = .21, *SD* = 17.25) identity entrepreneurship conditions. Further analyses showed that 61.8% of participants' average power output scores were greater for Trial 2 than they were for Trial 1 in the high identity entrepreneurship condition, compared to 47.1% of participants in the low identity entrepreneurship condition. The two conditions' gain scores were not significantly different from each other: $t(66) = .56$, $p = .291$, $d = .13$.

***Average power output first 60 seconds.*** Results showed that, in the high identity entrepreneurship condition, participants produced greater average power output in the first 60 seconds in Trial 2 than in Trial 1 (gain score mean = 14.46, *SD* = 42.70). In the low identity entrepreneurship condition, participants produced lower average power output in the first 60 seconds in Trial 2 than in Trial 1 (gain score mean = -11.54, *SD* = 39.91). Further analyses showed that 64.7% of participants' scores for average power output in the first 60 seconds were greater for Trial 2 than they were for Trial 1 in the high identity entrepreneurship condition, compared to 47.1% of participants in the low identity entrepreneurship condition. The difference between the two conditions' gain scores was significant: $t(66) = 2.59$, $p = .006$, $d = 0.63$.

**Further analyses of performance**

As noted above, to gain a greater understanding of performance effects, we conducted additional exploratory analyses examining participants' pacing by averaging their power output data over 250m intervals. Having obtained this information, we first calculated gain scores for each interval (by again subtracting participants' Trial 1 results from their Trial 2 results). Then, consistent with our previous analyses, we identified and removed gain score outliers in each condition (again using the MAD equation with a cut-off of 2.5; Leys et al. 2013). Based on this data, we plotted, and visually inspected, the mean difference in average power output for each 250m interval for the two conditions (see Figure 5.1).

Figure 5.1 Mean difference in average power output between Trial 1 and Trial 2 for each 250m interval for the high and low identity entrepreneurship groups.




Extending evidence of a significant difference between the two conditions' gain scores over the first 60 seconds (see above), Figure 5.1 shows clear differences in the early stages (i.e., over approximately the first 1km) of participants' time trials. While the low identity entrepreneurship condition's average power output was lower

in the early stages of Trial 2 than Trial 1, the high identity entrepreneurship condition's power output was higher. Indeed, in the high identity entrepreneurship condition, the largest positive within condition difference of any stage of time trials is apparent in the first 500m, while the largest negative within condition difference is apparent during this period in the low identity entrepreneurship condition. Although the two condition's difference scores then converge—such that changes for both conditions between Trial 1 and Trial 2 are similar between approximately the 1km and 4.5km points—visual inspection of Figure 5.1 also points to differences in the two condition's gain scores at the end of the trial (i.e., the final ~ 500m). Here, the low identity entrepreneurship condition's power output improved more from Trial 1 to Trial 2 than the high identity entrepreneurship condition's power output. These differences were, however, smaller than those observed in the early stages of the time trials.

**5.5 Discussion**

This study examined the impact of leaders' identity entrepreneurship on group members' effort during, and performance of, a physical exercise task. Hypotheses 1 and 2 were both partially supported, with results revealing significant differences—in favour of the high identity entrepreneurship condition—in gains from baseline to Trial 2 for maximum HR and average power output in the first 60 seconds. Further analyses of pacing across the two conditions showed large differences—again in favour of the high identity entrepreneurship condition—in gains in average power output from baseline in the early stages of Trial 2. This, to our knowledge, is the first demonstration of the positive effect that leaders' identity entrepreneurship can have on group members' effort and performance. As a result, our findings have several important theoretical and practical implications.

First, findings complement, and extend, previous research that points to the benefits of leaders' identity entrepreneurship. Previous research has shown that this is (1) positively related to leaders' capacity to engender both followers' support (Steffens and Haslam 2013) and group members' work engagement (Steffens et al. 2014a; Steffens et al. 2017), and (2) negatively associated with followers' burnout and turnover intentions (Steffens et al. 2014a; Steffens et al. 2017). Our findings indicated a positive effect of identity entrepreneurship on both effort (in terms of maximum heart rate) and performance (in terms of average power output in the first 60 seconds, while there was no effect on overall average power output or time taken). It is notable that, in the high identity entrepreneurship condition, the largest performance gains were observed at the start of Trial 2—immediately after the leader delivered the manipulation (either the initial statement or a reinforcement). It is plausible that, although in the high identity entrepreneurship condition participants' willingness to invest effort, and desire to perform well, may have been greater throughout Trial 2, exerting more effort, and therefore generating a high power output, at the beginning of Trial 2 caused early fatigue and prevented them from improving their overall performance to a greater extent. That is, participants in the high identity entrepreneurship condition may have exceeded their lactate threshold in the early stages of Trial 2, with the elevated concentration of lactate in their blood impairing their performance during the remainder of the trial (e.g., see Foster et al. 1994; Mattern et al. 2001; Stoter et al. 2016). In addition, it is also possible that the effect on group members' effort and performance 'wears off' in the absence of continued interaction and reinforcement. This suggests that further tests of relationships between leaders' identity entrepreneurship and group members' effort and performance—for example, using physical tasks of different durations

(and measuring blood lactate concentration as a further indicator of effort) or cognitive tasks where the effort required to perform well is mental rather than physical—are needed to establish the factors underpinning the effects observed here.

The present study also represents a methodological extension to previous identity entrepreneurship research. Steffens et al.'s (2017) two-time-point questionnaire study represented the first attempt to explore the direction of the relationship between leaders' perceived identity entrepreneurship and group member outcomes, with prior research adopting either a cross-sectional questionnaire design (Steffens et al. 2014a), or retrospectively analysing leaders' speeches (Steffens and Haslam 2013). Moving beyond this, ours is the first study to demonstrate the causal effects of manipulating leaders' identity entrepreneurship on group members' behaviour.

The present findings also extend growing evidence for the benefits of identity leadership in sporting settings (Slater et al. 2015; Fransen et al. 2016). In particular, by manipulating (one facet of) identity leadership, our findings build on Fransen et al.'s (2016) experimental study that identified a positive association between leaders' engagement in identity leadership and group members' performance. Rather than examining identity leadership as a mediator, however, here we examined this as an independent variable that can shed light on causality. Moreover, our findings provide evidence of a mechanism through which leaders' engagement in identity leadership impacts group members' performance—namely increased effort. Indeed, given (1) the stripped-down nature of our task—such that the impact of several additional factors (e.g., technique, concentration, co-ordination between team members) that may, in other contexts, influence performance were removed (or at least minimised), and (2) the standardised conditions in which participants undertook the task (i.e.,

controlling for the potential influence of environmental factors such as ambient temperature), our findings give some confidence that this is likely to be a key determinant of the differential performance effects we observed (particularly in the early stages of our trials) in the high and low identity entrepreneurship conditions.

On this basis, our findings have a number of implications for sporting leaders, exercise leaders, and leaders in various other domains (e.g., business and the military). Not least, this is because team members' effort and performance are key outcomes that leaders seek to increase. Indeed, even though improving group members' performance will not always be a key objective for these leaders (e.g., fitness class instructors), enhancing group members' effort is still likely to be. For example, fitness class members are likely to derive greater physiological benefits (e.g., greater weight loss) by exerting more effort during sessions and thereby enhancing the proportion of time they spend exercising within 'fat burning' HR zones (Carey 2009). Contradicting traditional approaches that promote the great 'I' in leadership (e.g., the great man approach; Weber 1946), our findings suggest that, in order to promote these key outcomes, leaders should attend to the 'we-ness' of leadership (Steffens and Haslam 2013). That is, they should focus on presenting themselves as part of (rather than above) the group, and behave in a ways that create a shared sense of identity among group members (Haslam et al. 2011). Speaking directly to the way in which leaders on the ground can accomplish this, our findings support Steffens and Haslam's (2013) assertion that we-referencing language is one simple and powerful tool that leaders can easily deploy. More generally, for those concerned with training leaders (e.g., in sport and exercise settings), our findings suggest that greater attention to developing leaders' capacity to create (and manage) group identities is needed. To this end, administrators of leadership training

programmes may look to incorporate aspects of the recently developed 5R programme, which, among other benefits, has been shown to improve organisational leaders' capacity to engage in identity leadership (Haslam et al. 2017), and group members' perceptions of their sporting leaders' engagement in identity leadership (Slater and Barker 2018).

### 5.5.1 Limitations and Future Research

Against the backdrop of this study's strengths, which included its novelty and research design (which allowed causality to be tested), some limitations and avenues for future research should be noted. First, although the controlled laboratory setting in which our experiment was conducted could be considered an additional strength, this setting—and the artificial situation we created within it—differs from real-world sport and exercise settings in several respects. Perhaps most notably, in sport and exercise settings, groups often have both formal leaders (who have commonly been elected by the group or appointed based on their expertise; e.g., captains, coaches, exercise class instructors) and informal leaders (who emerge over time and fulfil various leadership roles; Fransen et al. 2014b; Fransen et al. 2015b). In the present study, formal leaders were not appointed in this way, while informal leaders were given little time to emerge and their impact was not assessed. To confirm the ecological validity of our findings, future research might therefore explore the impact of real-world leaders (both formal and informal) engaging in identity entrepreneurship on group members' effort and performance. Nevertheless, the influence of our confederate leaders, who, as far as participants were aware, had been appointed arbitrarily and were no more qualified for the role than themselves or any other group member, has positive implications for the potential impact of real-world leaders whose status within the group may afford them greater influence.

Indeed, given that, in the present study, performance effects in the experimental group were strongest at the beginning of time trials—immediately after the manipulation—it is possible that real world leaders who are able to demonstrate their identity entrepreneurship throughout exercise bouts (e.g., in fitness classes) may exert an even greater impact on group members' behaviours.

Our final sample size (following the removal of four groups from our analyses) could be considered a further limitation. Although, as noted above, our sample was able to detect effects of smaller sizes than those observed by Rees et al. (2013) and Hoigaard et al. (2013), larger cell sizes would be advisable in future research. Researchers seeking to conduct further experimental research to build on the present study should also carefully consider group size. Similar findings to those reported in the Results section were observed when participants who conducted Trial 2 in groups of three were included in our analyses. That is, with the exception of average HR (which became significant), the significance (or otherwise) of the differences between the two conditions' gain scores were unchanged. Nevertheless, given that real-world exercise groups, sports teams, and groups and teams in other domains often consist of well over five people, it is particularly important that researchers test—both experimentally and through interventions—the impact of identity entrepreneurship (and identity leadership more broadly) on group members' effort and performance in larger groups.

**5.6 Conclusion**

The present findings support claims that leaders are likely to be more effective the more they are able to create a sense of shared social identity within the group they are attempting to lead (Haslam and Reicher 2007; Steffens and Haslam 2013; Steffens et al. 2017). More specifically, our findings provide the first causal

evidence that, by creating this sense of shared ingroup identity, leaders can foster improvements in (or at least help maintain) group members' effort and performance. In short, it appears that one key way in which leaders can motivate group members to try harder, and thereby help deliver better group outcomes, is by cultivating a strong sense of 'us' within the teams they lead. Indeed, if, as Fernando Torres (the former Spain international—World Cup, European Championships, and Champions League winner) observed, "we win as a team and every individual is better if we are part of the team", then one might consider the first task of leadership to be building social identity.

# Chapter 6: General discussion

## 6.1 Summary of findings

The overarching aim of this thesis was to examine the efficacy of a social identity approach to understanding physical activity. More specifically, the thesis first examined relationships between individuals forming strong social identities in a real-world exercise setting, their participation in this setting, their experience of participating in this setting, and the health-related outcomes associated with their participation in this setting (study 1, chapter 2). Second, it explored relationships between members' perceptions of their sport or exercise leader's engagement in social identity leadership, members' group identification, and members' group-relevant attendance (study 2, chapter 3). Third, it examined relationships between members' perceptions of their sport or exercise leader's engagement in social identity leadership, members' group identification, and members' group-relevant attendance over time (study 3, chapter 4). Finally, it examined the effect of manipulating one facet of identity leadership on individuals' effort during, and performance of, an exercise task (study 4, chapter 5).

Study 1 was conducted in parkrun using a cross-sectional questionnaire design. Supporting hypotheses 1-3, results revealed positive associations between the strength of participants' identification as a parkrunner and their parkrun participation, satisfaction with their parkrun experiences, and sense of group cohesion. Results also revealed a positive association between participants' identification as a parkrunner and their life satisfaction. This study therefore provided real-world evidence of the benefits of forming a strong social identity in an exercise setting.

Study 2 (chapter 3) also adopted a cross-sectional design and examined relationships between group members' perceptions of their sport or exercise leaders' engagement in social identity leadership and their own group identification and group-relevant attendance. Supporting hypotheses 1 and 2, results demonstrated positive associations between members' perceptions of their leader's engagement in identity leadership and members' group identification, and between members' group identification and their sport or exercise attendance. Moreover, in line with H3, results demonstrated a significant indirect effect for the relationship between members' perceptions of their leader's engagement in identity leadership and members' attendance through their group identification. This study therefore provided further evidence of the impact sport and exercise leaders can have on group members' participation (see Barnett et al. 1992; Ntoumanis et al. 2017 for previous indications of leaders' impact), and initial evidence for the potential value of sport and exercise leaders engaging in identity leadership for group members' participation.

Study 3 (chapter 4) extended understanding regarding relationships between members' perceptions of their leader's engagement in social identity leadership and their own group identification and attendance using a two-wave design. Supporting H1, results demonstrated that, for the prototypicality, advancement, and entrepreneurship (but not the impresarioship) facets of identity leadership, sports team members' perceptions of their leader's identity leadership at Time 1 predicted members' own subsequent greater group identification at Time 2, while controlling for their initial group identification at Time 1. In line with H2, results further showed that members' group identification at Time 2 was associated with their attendance at Time 2, while controlling for their attendance at Time 1. Additionally, supporting

H3, the indirect effect of members' perceptions of their leader's engagement in identity leadership at Time 1 on members' subsequent attendance at Time 2, through members' group identification at Time 2 (controlling for group identification and attendance at Time 1) was significant for three of the four identity leadership facets (prototypicality, advancement, and entrepreneurship). Finally, sensitivity analyses indicated that (1) relationships between identity leadership and group identification predominantly occurred and (with the exception of the impresarioship facet) were consistently stronger, in the hypothesised direction, and (2) the relationship between group identification and attendance was reciprocal but stronger in the hypothesised direction. This study therefore offered further support for the value of physical activity leaders engaging in identity leadership (in the context of a more robust research design than study 2), and more nuanced guidance for physical activity leaders seeking to promote group members' participation (i.e., by providing greater insight regarding the relative importance of the individual identity leadership facets).

Study 4 (chapter 5) adopted an experimental design to test the effect of manipulating confederate leaders' engagement in identity entrepreneurship on participants' effort during, and performance of, a 5km cycling time trial task. Supporting hypotheses 1 and 2, results demonstrated that, compared to participants in the low identity entrepreneurship condition, those in the high identity entrepreneurship condition maintained greater effort (maximum heart rate), and demonstrated improved (rather than poorer) performance (average power output in the first 60 seconds of time trials). Examination of pacing further indicated an effect of leaders' identity entrepreneurship on group members' performance. Perhaps most notably, the largest increases in participants' average power output occurred in the

early stages of their second time trials for those in the high identity entrepreneurship condition only.

Taken together, these four studies demonstrate the capacity of the social identity approach to aid understanding of physical activity. Indeed, the consistently positive findings observed in relation to (1) individuals possessing strong social identities as members of their physical activity groups, and (2) leaders engaging in—and members' perceiving leaders to engage in—social identity leadership provides clear evidence for the impact of these two factors on individuals' physical activity behaviours and experiences, particularly given the range of outcomes that have been examined (i.e., participation, group cohesion, satisfaction, life satisfaction, and effort). Further research, using a greater range of research designs, is required to determine the impact of social identities and social identity leadership on a broader range of outcomes, across a broader range of physical activity settings (for an elaboration and more specific suggestions see section 6.5 below). Nevertheless, the findings accumulated in this thesis' four studies have several important theoretical and practical implications. These are the focus of the following two sections.

## 6.2 Theoretical implications

### 6.2.1 The impact of social factors on physical activity and the potential of the social identity approach to help us understand these factors impact

In recent times, attempts to understand physical activity behaviours have begun to consider, and demonstrated the importance of, a wide range of environmental, policy, and social factors, including the built environment (Farley et al. 2007; Ferdinand et al. 2012), state policies regarding the minimum amount of physical education schools must provide (Slater et al. 2012), and the presence of social support (Resnick et al. 2002; Springer et al. 2006; Beets et al. 2010; Laird et

al. 2016). Building on this research, the present thesis provides further evidence for the need to consider the impact of social factors more closely. In particular, findings suggest that the groups to which people belong (chapters 2, 3, and 4) and the leaders of those groups (chapters 3, 4, and 5) are two factors that have been largely overlooked, yet may impact individuals' physical activity behaviours and experiences.

Following on from this, the evidence accumulated in this thesis also suggests that the social identity approach offers a valuable framework through which to understand the impact of social factors on individuals' physical activity behaviours and experiences. For example, research examining the relative benefits of different exercise environments has indicated that, with regard to promoting various positive outcomes (e.g., individuals' adherence, quality of life, and physiological effectiveness), group environments are typically more effective than individual environments (Burke et al. 2006). This thesis' findings suggest that the sense of identity people develop as a member of their exercise group(s), and the resulting (1) sense of connectedness they feel to that group, and (2) drive they feel to adopt normative group behaviours (see chapters 2, 3, and 4), may partially explain why these positive outcomes (particularly greater adherence) are more likely in group settings. Indeed, this thesis' findings may also help explain why 'true groups'—where group dynamics principles (such as promoting a sense of distinctiveness) are used to increase cohesiveness—have proved particularly effective (Burke et al. 2006). This may, at least in part, be due to the strong sense of identity such environments help to foster among members.

Along similar lines, the social identity approach also helps explain why leaders affect group members' behaviours (e.g., their participation in group-relevant

activities) and experiences (e.g., their satisfaction). This thesis' findings (particularly findings from studies 2 and 3) indicate that, to some extent at least, it is because leaders have a substantial impact on the strength of members' group identification, which, in turn, seemingly has implications for members' behaviours and experiences.

### 6.2.2 The full potential of the social identity approach and social identity approach to leadership have yet to be realised

Since its origins in the 1970s, the social identity approach has been applied to a diverse array of contexts including business and organisations (Ashforth and Mael 1989; Haslam 2004), politics (Reicher and Hopkins 2001), health (Jetten et al. 2012; Steffens et al. 2016b), and sport (Rees et al. 2015), and successfully used to explain a wide range of phenomena including stereotyping (Spears et al. 1996), crowd violence and rioting (Reicher 1984), motivation (van Knippenberg 2000; Ellemers et al. 2004), productivity (Worchel et al. 1998; Greenaway et al. 2016b), and stress (Haslam and Reicher 2006). Despite being almost 50 years old, and perhaps partially due to its "simple, elegant, testable, and usable principles" (Hornsey 2008, p.217), interest in the theory continues to grow (e.g., see Haslam et al. 2009; Haslam 2014). For example, in recent times, there has been a surge of interest from researchers in the sporting domain, leading to an increased understanding of, inter alia, factors affecting sporting performance (Høigaard et al. 2013; Slater et al. 2018), the feedback-performance relationship (Rees et al. 2013), and sports fans behaviour (Wann and Branscombe 1990; Wann and Pierce 2003). Findings from the present thesis suggest that physical activity—and in particular the analysis of how the nature of individuals' physical activity group memberships shape their participation and experiences in these settings—represents a further fresh area to which the insights

offered by the approach may be fruitfully applied. As such, this thesis provides an additional indication that, despite the considerable volume, and diverse array, of research that has been conducted drawing on the social identity approach, scope remains for further research in new contexts and dedicated to the analysis of new phenomena. Moreover, it provides further justification for the approach's emergence as a (possibly *the*) prevailing approach to the study of groups in social psychology (Haslam 2014; Rees et al. 2015).

Similarly, the present thesis' findings suggest that there is considerable scope for further research to uncover the full potential of the social identity approach to leadership. Indeed, this thesis makes several important contributions to on-going efforts to test the efficacy of the identity leadership approach. First, although the four principles of identity leadership have been outlined theoretically (Haslam et al. 2011; Slater et al. 2014; Steffens et al. 2014c), empirical identity leadership research has often focused specifically on the impact of leaders' prototypicality (e.g., see Cicero et al. 2007; Giessner and van Knippenberg 2008; Cicero et al. 2010; van Knippenberg 2011) or, less commonly, entrepreneurship (Steffens and Haslam 2013; Steffens et al. 2014a; Steffens et al. 2017) on either leaders' emergence or effectiveness, or key group member outcomes. While study 4 built on growing evidence for the various benefits of identity entrepreneurship, studies 2 and 3 are among the first to empirically examine the impact of leaders engaging in identity advancement and impresarioship. Indeed, study 3 provided an insight into the relative importance of the four identity leadership facets in physical activity settings, indicating that, with regard to promoting greater rates of attendance among group members, leaders' perceived engagement in identity prototypicality, advancement,

and entrepreneurship may be more important than their perceived engagement in identity impresarioship.

Second, this thesis represented the first attempt to test the efficacy of the identity leadership approach with regard to health-related outcomes in physical activity settings. As has been noted throughout the thesis, identity leadership research has predominantly been conducted in organisational settings (e.g., Cicero et al. 2010; Steffens et al. 2014a; Haslam et al. 2017), with recent applications to politics (Augoustinos and De Garis 2012; Steffens and Haslam 2013) and sporting performance (Slater et al. 2015; Fransen et al. 2016) representing preliminary attempts to understand the applicability of identity leadership to other domains. Despite this thesis' examination of the identity leadership approach in relation to a fresh set of outcomes in the physical activity domain, further research testing its efficacy in relation to these, and other, novel outcomes in physical activity contexts and other fresh contexts are clearly needed, with the volume and breadth of research testing the propositions of the identity leadership approach still someway behind many prevailing leadership theories. For example, across 10 top-tier journals between 2000 and 2012, 154 articles drew on transformational leadership theory, while only 31 drew on the identity leadership approach (Dinh et al. 2014).

Finally, this thesis included the first attempt to test the causal effects of identity entrepreneurship on group members' behaviours in the context of an experimental design (study 4). At the same time, this study also represented the first experimental test of the effect of any facet of identity leadership on group members' exercise behaviours, providing the strongest evidence to date that the extent to which physical activity leaders engage in identity leadership may exert a tangible impact on group members' behaviours. This study should, however, be viewed as foundation

for further research, and there remains considerable scope for further experimental research examining the effects of identity leadership on a range of outcomes within and outside physical activity settings (see section 6.5 for specific recommendations).

### 6.2.3 Individuals as individuals and individuals as group members

Since the early 1990s, attempts to understand physical activity behaviours have drawn heavily on self-determination theory (Deci and Ryan 1985) and the theory of planned behaviour (Ajzen 1991), with a vast number of studies underpinned by these theories (e.g., see Hagger et al. 2002; Downs and Hausenblas 2005; Teixeira et al. 2012 for reviews). A notable commonality of these theories (and others that have been applied to the analysis of physical activity behaviour; e.g., self-efficacy theory, the health action process approach, and the health belief model) is their predominant focus on the psychology of individuals *as individuals*. That is, as noted in the literature review, although these theories make some reference to social factors (e.g., via the notion of subjective norms in the theory of planned behaviour), they lack an analysis of the self as derived from social groups in a social context (Terry et al. 1999; Cruwys et al. 2015). This is important because, in line with the social identity approach—which argues that the self is dynamic, and can be defined at both an individual and a collective level (i.e., as 'we' and 'us' as well as 'I' and 'me'; Turner 1982)—this thesis provides evidence that defining oneself at a collective level (i.e., in terms of a particular group membership) can have a salient impact on individuals' physical activity-related behaviours. For example, findings from study 1 indicate that people who form a strong self-definition in terms of their group membership as a parkrunner are more likely to act in accordance with the norms and values of this social category by participating in more parkruns. Identical effects were observed in study 2 (in sports teams and exercise groups), and study 3

(again in sports teams). Indeed, evidence also suggests that greater consideration of individuals' capacity to define themselves as group members (and of the consequences of this) is needed to better understand peoples' health-related behaviours more generally (i.e., not just those related to physical activity). Specifically, research has shown that the salience of particular social identities and the strength of individuals' identification as members of particular social groups have important implications for peoples' behavioural intentions. Tarrant and Butler (2011) showed that making university students' identity as a 'British person' salient induced greater intentions to reduce alcohol consumption than making their identity as a 'university student' salient. Similarly, Falomir-Pichastor et al. (2009) demonstrated that nurses who possessed a stronger identity as a member of their professional group were more likely to have received a flu vaccination the previous year, and had stronger intentions to be vaccinated the following year.

Along similar lines, experimental research by Cruwys and colleagues (2012) demonstrates the salience of shared social identity in determining whether, and to what extent, normative influence (a key aspect of the theory of planned behaviour) impacts individuals' eating behaviours. In this study, participants (university students) were ostensibly recruited to evaluate university promotional videos. Prior to watching these videos participants' identity as students at their university was made salient, before they encountered a confederate who was presented as either an ingroup or outgroup member (i.e., a student at the same or a different university). Confederates (who were presented as fellow participants) revealed they had eaten all (high norm condition) or none (low norm condition) of a container of popcorn provided by the experimenters while watching the videos. Participants were then provided with their own containers of popcorn to eat if they wished while watching

the videos. Results showed that, across both the high and low norm conditions, participants only modelled the eating behaviours of ingroup members.

Findings from Cruwys et al.'s (2012) research point specifically to the need for a greater consideration of the role that shared identification plays in the relationship between norms, intentions, and behaviours (a key relationship within the theory of planned behaviour). More broadly, the findings summarised above (from the present thesis and elsewhere) demonstrate the importance of considering the psychology of individuals *as group members* in attempts to understand individuals' health-related behaviours, including their participation in physical activity. As such, they highlight a fundamental weakness of many of the theoretical frameworks that currently dominate the theoretical landscape in this domain, and point to the potential for the social identity approach to make a substantial contribution to this literature.

### 6.2.4 Situating the social identity approach within the physical activity literature

Although self-determination theory (Deci and Ryan 1985) and the theory of planned behaviour (Ajzen 1991) and preceding theory of reasoned action (Ajzen and Fishbein 1980) have been used most commonly, numerous additional theories, including the health action process approach (Schwarzer 1992), the health belief model (Rosenstock 1974), and self-efficacy theory (Bandura 1977) have been applied to the analysis of physical activity behaviours. Given (1) the preceding discussion of, and previous research highlighting, the limitations of these prevailing theoretical approaches (e.g., see Ogden 2003; Sheeran et al. 2013; Sniehotta et al. 2014), (2) fundamental differences between the social identity approach and prevailing approaches (see section 6.2.3 above), and (3) this thesis' assertions

regarding, and demonstrations of, the potential of the social identity approach to aid understanding of physical activity behaviours, a key issue to address is where the social identity approach 'sits' in relation to models that continue to dominate the theoretical landscape in this area. That is, key questions include (1) should the social identity approach replace existing approaches to understanding physical activity behaviours and experiences, and (2) where do the social identity approach, and prevailing theoretical approaches, fit within recent calls for the adoption of *ecological* approaches to understanding and promoting physical activity that emphasise the presence of numerous interacting individual, environmental, policy, and social determinants (e.g., Sallis et al. 2008; Bauman et al. 2012; Ding et al. 2012; Garcia et al. 2016; Thornton et al. 2017). This section seeks to address these questions.

Despite their limitations (see section 6.2.3 above and Ogden 2003; Sheeran et al. 2013; Sniehotta et al. 2014), the contention of this thesis is not that prevailing approaches to studying physical activity behaviours should be abandoned or their insights dismissed. As noted in the literature review, evidence suggests that interventions based on prevailing approaches (e.g., self-determination theory and the theory of planned behaviour) can have a positive impact on individuals' physical activity behaviours (Gourlan et al. 2016). Indeed, it is clear that these theories have advanced (and may continue to advance) our understanding of the factors (albeit predominantly the individual-level factors) that determine individuals' physical activity behaviours (e.g., see Ajzen 2015; Hagger 2015; Trafimow 2015). For example, the theory of planned behaviour has shed light on the role of intentions as a key construct in the processes that lead people to engage in particular behaviours (Hagger 2015). The contention of this thesis is, therefore, that the social identity

approach should sit alongside prevailing approaches as a framework to help understand physical activity behaviours, and to guide the development of interventions to promote physical activity.

More specifically, with regard to the social identity approach's capacity to guide the development of interventions, this thesis contends that the approach may be used not only in isolation, but also in conjunction with existing theoretical approaches to inform the development of more effective *multilevel* interventions to promote physical activity (and other health behaviours, such as healthy eating). The social identity approach has yet to be included in such efforts. In recent times, however, researchers have highlighted the potential, and begun to demonstrate the value, of adopting an approach in which the insights afforded by several theories are drawn on to inform the development of multilevel physical activity interventions tailored to particular individuals and populations in particular settings (Sallis et al. 2006; Elder et al. 2007; Webber et al. 2008; Rosenberg et al. 2009; Rosenberg et al. 2012). For example, Rosenberg et al. (2009) conducted a pilot study targeting increases in physical activity among a group of older adults in a continuing care retirement community. Prior to developing an intervention, the researchers conducted a literature review which suggested that (1) this population are mixed in terms of their preferences for exercising alone versus in a group, (2) this population find simple activity changes easier to maintain than complex ones, and (3) lifestyle activities are equally effective as structured activities for this population. Based on these observations, Rosenberg et al. (2009) chose to implement a walking intervention, then sought to determine the primary factors that prevent (or at least inhibit) walking in this population, and the strategies that have previously proved most successful in improving this population's walking behaviours. This analysis led

to the development of a multilevel intervention that involved (1) attempting to improve participants' knowledge of places they could walk (e.g., by providing route maps and encouraging participants to use these to identify safe places to walk), (2) distributing pedometers and encouraging participants to log their walking, and (3) brief counselling sessions that included goal setting, verbal persuasion, and encouragement. Facets 2 and 3 of the intervention therefore drew on social cognitive theorising, with the notion of verbal persuasion, for example, prominent within Bandura's (1977) self-efficacy theory. Results from Rosenberg et al.'s (2009) pilot study indicated that the intervention led to a significant increase in steps per day from baseline to post-test among participants. A subsequent replication of the intervention with more participants (87 rather than 12) and a longer baseline to post-test period (post-test completed three months after the conclusion of the intervention, rather than two weeks after the baseline) resulted in significant improvements in participants' step counts, cognitive function, satisfaction with walking opportunities, and perceptions of neighbourhood barriers to walking (Rosenberg et al. 2012).

Crucially for the potential of the social identity approach in physical activity settings, there also appears considerable scope to draw on the principles of the approach within multilevel ecological interventions, such as those implemented by Rosenberg and colleagues. Indeed, it is noteworthy that, in their original study, Rosenberg et al.'s (2009) intention was to facilitate the development of walking groups and encourage participants to try new routes together. Following a vote indicating participants preferred walking independently (due to concerns walks would be too fast or difficult for some, and too slow or easy for others), this idea was discarded. In other populations (e.g., people with similar fitness levels), however, these concerns may not arise and the principles of the social identity approach could,

therefore, be applied to foster the development of effective groups and sub-groups as part of a multilevel intervention. Indeed, this could involve appointing group leaders and educating these individuals' to the benefits of, and training them to engage in, social identity leadership. In the context of this thesis, the key point here then is that the social identity approach, and social identity approach to leadership, could inform particular facets of multilevel interventions, which, arguably, represent one of the most promising approaches for inducing behaviour change.

To summarise this section, this thesis contends that, despite their limitations, prevailing approaches to understanding physical activity behaviours, and the insights these approaches have yielded, should not be dismissed. Nevertheless, it is important that researchers test new approaches—such as the social identity approach—to build a broader understanding of the factors that influence behaviour and behaviour change. The insights offered by these various approaches may then be combined in multilevel interventions designed to promote positive behaviour change as part of an ecological approach.

### 6.3 Practical implications

In addition to the theoretical implications outlined above, the findings presented in this thesis also have practical implications for those seeking to promote physical activity. This includes researchers, policy makers, health professionals, applied practitioners, and sport and exercise leaders. Some practical implications have already been noted (e.g., within section 6.2.4 above, where the social identity approach's position in the physical activity literature, and potential to contribute to the development of multilevel interventions were discussed) and there are, of course, points of contact between the theoretical and practical implications of the thesis.

Building on previous sections, the following sections discuss some of the key practical implications of the thesis in greater detail.

### 6.3.1 Promote group activity and make groups meaningful

Given (1) the large volume of evidence indicating that group-based interventions are typically more effective than interventions that require individuals to conduct physical activity alone (e.g., see Burke et al. 2006; Harden et al. 2015 for reviews), and (2) the high levels of attrition at gyms and fitness clubs where individuals often go to exercise alone (DellaVigna and Malmendier 2006), the rationale for promoting physical activity in groups is stronger than ever. The present thesis' findings build on this evidence by highlighting an additional condition under which the effectiveness of groups may be further enhanced. Specifically, complementing previous research emphasising the benefits of (1) increasing groups' cohesion (Estabrooks et al. 2008; Estabrooks et al. 2011), and (2) attending to individuals' existing identities (e.g., Dunlop and Beauchamp 2011a; Beauchamp et al. 2018), the present findings suggest that groups are more effective—in terms of fostering participation and positive physical activity experiences—to the extent that members perceive their group membership to be important to their sense of self (i.e., to 'who they are'). Indeed, findings from study 1 indicate that the strength of individuals' group identification (i.e., how important the group is to individuals' sense of self) is positively associated with, and may be a precursor to (or is at least strongly associated with), group cohesion. Promoting individuals' sense of group identification is, therefore, one way applied practitioners may positively impact individuals' behaviours and experiences.

Given this, it is clear that identifying the best approach to promoting individuals' sense of group identification is an important agenda for researchers (for

an elaboration see section 6.5 below). Having said this, there are simple strategies that may be used to develop individuals' sense of group identification in existing group environments. In addition to attending to people's existing identities (i.e., in relation to their gender and age), a recent successful intervention also created opportunities for interaction between group members outside of exercise sessions (by providing coffee and refreshments and a place for members to connect socially following structured sessions; Beauchamp et al. 2018), while similar strategies have been used in other successful group-based interventions (e.g., see Estabrooks et al. 2008). Moving forward, this thesis' findings suggest that simple strategies such as this should be used more broadly in physical activity settings to foster participants' attachment to their groups. Indeed, there may even be value in using the group itself as the main 'draw' for attending sessions, such that the physical activity element becomes a beneficial bi-product. For example, attempts to encourage people to join walking or running groups could focus on the social (rather than physical) benefits (e.g., the opportunity to meet new people, make new friends, and get to know people in your local community).

More broadly, and speaking to the potential applicability of the present findings to less active populations, there is already evidence that identity-based campaigns can be effective. Specifically, the recent 'This Girl Can' campaign—an initiative designed to increase physical activity levels among girls and women of all ages and backgrounds (and thereby begin to address the physical activity gender gap)—has demonstrated substantial success (see Sport England, 2016). The campaign was designed to address the fear of judgement that acts as a barrier to females' participation in physical activity, and used girls and women of all ages and backgrounds to portray slogans such as 'I kick balls, deal with it', 'sweating like a

pig, feeling like a fox', and 'I'm slow but I'm lapping everyone on the couch' in advertising campaigns (see Campaign, 2016). Arguably, these messages acted to create an identity to which all girls and women could buy into (i.e., a sense that exercising, and not worrying what one looks like when doing it, is both acceptable and normative), while the campaign also provided resources that challenge girls and women to find the right way to get active for them (see This Girl Can, 2018). Based on this evidence, and growing evidence within this thesis (and elsewhere; e.g., Hunt et al., 2014; Beauchamp et al., 2018), for the participation-related benefits of targeting peoples' identities, similar campaigns could be used to encourage physical activity among other less active populations (e.g., older people). Indeed, within such campaigns it may also be prudent to direct target audiences to appropriate settings in which their identities can be lived out (see also section 6.3.3 below).

### 6.3.2 Work with leaders to promote group identification and positive physical activity behaviours and experiences

Following on from the preceding point, this thesis (particularly studies 2 and 3) highlights an additional way through which individuals' sense of group identification may be enhanced: through physical activity leaders. Findings therefore have important implications for these individuals. Specifically, they suggest that physical activity leaders must be aware that their effectiveness with regard to promoting positive behaviours and experiences among group members is, to some extent at least, contingent on their capacity to represent, advance, create, and embed a sense of identity that is shared by members of the particular group they lead. In other words, findings suggest that physical activity leaders should recognise the benefits of, and seek to engage in, identity leadership (Haslam et al. 2011).

To translate this into practice, leadership training programmes are perhaps the most appropriate setting in which to communicate this message. In this regard, and as suggested throughout the thesis, context-specific versions of the 5R leadership development programme (Haslam et al. 2017) may prove effective. Building from the position of leadership as a process of group identity development, the 5R programme takes leaders through a 5-stage process of (1) *Readying*: explaining the importance of social identities for leadership; (2) *Reflecting*: identifying group members' important social identities (e.g., as members of subgroups); (3) *Representing*: understanding the goals and aspirations associated with different subgroup identities, and identifying (a) obstacles to achieving these goals and aspirations, and (b) strategies to overcome these obstacles; (4) *Realising*: identifying superordinate and shared subgroup goals and developing strategies to achieve these; and (5) *Reporting*: gaining feedback and assessing progress toward goals. These stages are delivered in a series of workshops that include a structured programme of lecture material, exercises, and group activities, with the programme's primary goal to develop leaders by enhancing their motivation, and ability, to represent, advance, create, and embed a sense of shared identity among their own teams.

Results from a preliminary test of the programme (a longitudinal study with organisational leaders) provided an initial demonstration of its positive effects, with leaders' sense of team goal clarity, team identification, and, of particular note, self-reported ability to engage in identity leadership all increasing following participation (Haslam et al. 2017). Crucially too, recent evidence points to the transferability of the 5R programme to non-organisational domains—specifically, to elite sport (Slater and Barker 2018). Following the implementation of an adapted version of the

programme (that omitted the *Readying* and *Reporting* phases) with elite disabled soccer players, Slater and Barker (2018) documented increases in team members' perceptions of staff leaders' (i.e., the team manager and two team coaches) engagement in identity leadership, social identification, and hours of practice away from training camps. In the following section the 5R programme's applicability to, and potential in, the physical activity domain is considered more closely than it has been in the preceding chapters. Specifically, each stage of the programme is considered in turn.

First, the *readying* stage demonstrates clear transferability to physical activity settings. Raising physical activity leaders' awareness of the importance of identity processes for leadership would represent a vital first step toward enhancing their capacity, and willingness, to engage in identity leadership. Indeed, given the relatively recent emergence of the identity leadership approach, and its predominant application in organisational settings, physical activity leaders are unlikely to consider developing group identity crucial to their effective leadership, making this initial educational phase particularly important.

Second, identifying subgroups as part of a *reflecting* stage would also appear to have clear relevance in physical activity settings. Whether clearly defined (e.g., offensive and defensive squads on an American Football team) or informal (e.g., cliques or friendship groups within an exercise group or sports team), subgroups are likely to be present within most (if not all) physical activity groups.

Similar to organisational settings too, these subgroups are likely to have their own unique goals and aspirations, which could be identified in a *representing* stage. For example, a running club containing individuals with a wide spectrum of abilities may contain subgroups in which goals range from winning races, to losing weight, or

improving general fitness. Recognising this, and attending to these goals and aspirations, would improve the capacity of these groups' leaders to represent, advance, create, and embed a shared sense of identity (Haslam et al. 2011).

Fourth, emphasising the importance, and developing the capacity, of leaders to bring subgroups together and encourage those subgroups to (1) identify shared and superordinate goals, and (2) develop strategies to realise them (in a *realising* phase) would also be relevant (and beneficial) in various physical activity settings. For example, in the running club scenario outlined above, members, regardless of their ability, may identify protecting the longevity of the club as a superordinate goal, and therefore all need to undertake different club responsibilities (e.g., secretarial, administrative, coaching) to ensure it continues to run smoothly. Similarly, offensive and defensive squads on sports teams may have different goals (e.g., scoring versus preventing the opposition scoring) but identify winning games and/or their league as a shared superordinate goal, and need to work together to create a strategy to achieve this.

Finally, the *reporting* phase could be as valuable in the physical activity domain as it has proved in organisational settings. As with organisational leaders, this phase would provide an opportunity to ensure physical activity leaders are aware of the importance of obtaining feedback from group members throughout their pursuit of subgroup and superordinate goals, and for programme administrators to ensure that the programmes' lessons, activities, and objectives are becoming embedded in practice.

In sum, the data reported in this thesis suggest that physical activity leaders can have a substantial impact on group members' behaviours, and point to the importance of leaders promoting members' group identification to facilitate positive

group member behaviours. This thesis' findings further suggest that, to promote group identification, leaders should engage in identity leadership. Leadership development programmes represent an excellent vehicle through which to raise leaders' (1) awareness of the importance of engaging in identity leadership, and (2) motivation and capacity to engage in identity leadership. Given the success of the 5R programme in organisational settings (Haslam et al. 2017), evidence of its transferability to non-organisational settings (Slater and Barker 2018), and its clear relevance in physical activity contexts, context-specific versions of this programme could prove beneficial in this regard.

### 6.3.3 Small changes by leaders and health professionals could make a big difference

The section above provides a detailed outline of a potential approach to leadership development in line with the principles of identity leadership. Implementing and evaluating programmes of this nature is important as they may lead to substantial improvements in key group member outcomes. In addition to indicating the potential of such programmes, however, this thesis also indicates the potential benefits of some simple strategies that may be readily implemented by physical activity leaders and health professionals without the need for extensive training. These may similarly result in important benefits for group members.

First, this thesis extends previous research demonstrating the substantial impact that leaders' choice of language has on (1) their capacity to mobilise support from potential followers, and (2) their success in the role (Augoustinos and De Garis 2012; Steffens and Haslam 2013; Slater et al. 2015). In particular, study 4 demonstrated that leaders' language—in particular their engagement in 'we-referencing' language—can also effect the effort exerted by, and performance of,

group members. That is, this study's findings indicate that, by simply shifting the emphasis of their rhetoric from 'I' and 'me' to 'we' and 'us', physical activity leaders may exert a tangible positive effect on group members' behaviours. Leaders across various physical activity contexts (e.g., sports teams and exercise classes or groups) could implement this simple strategy to the benefit of both group members and themselves. For example, greater engagement in we-referencing language by exercise class instructors, or sports team captains or coaches may result in increased effort from group members and, therefore, greater physiological benefits for these individuals (e.g., greater weight loss and improvements in aerobic capacity; Swain and Franklin 2006; Carey 2009). In sports settings, increased effort from group members may also result in improved individual (and team) performance, which, in turn, may lead to improved results, which would reflect well on the leader.

Second, changes to the recommendations health professionals make to patients may have substantial benefits. In particular, for those involved in prescribing patient rehabilitation programmes (e.g., following injury, illness, or surgery) to patients for whom it is important to engage in regular exercise (e.g., following surgery necessitated fully, or in part, by the patient being overweight or not engaging in sufficient physical activity), replacing traditional approaches—such as advocating an individual exercise regimen or programme of exercises (e.g., see National Health Service 2018)—may promote more sustained adherence. That is, in line with previous research (Terry and Hogg 1996; Strachan et al. 2012), and further consistent evidence in this thesis for the positive identity-participation relationship, health professionals may be better served to advise patients to participate in activity groups they may develop a strong sense of identity as a member of. The high mean identification scores in study 1 suggest that parkrun is one example of a group that

demonstrates substantial potential in this regard. Indeed, there is already evidence of these ideas being translated into practice through a recent initiative called ‘parkrun practices’ (see Royal College of General Practitioners, 2018). In this initiative, general practitioner practices across the United Kingdom are being encouraged to develop close links with their local parkrun and encourage staff and patients to participate in parkrun events (e.g., by displaying posters and flyers, and mentioning parkrun in practice email and social media communications). A major benefit of this initiative is the inclusivity that parkrun promotes through its commitment to being available to everyone regardless of age, gender, ability, or background. Indeed, simply because it is free of charge it is more accessible to disadvantaged groups than, for example, initiatives where people must pay to attend individual sessions or purchase a membership (e.g., Crossfit or SoulCycle). Nevertheless, findings from the present thesis and elsewhere suggest that patients may also benefit (perhaps to an even greater extent) from health professionals (including general practitioners) making more specific recommendations on a case-by-case basis. That is, these individuals could advise patients based on their known identities (e.g., as a man or woman, a person of a particular age, or a fan of a particular football team; see Dunlop and Beauchamp 2011a; Hunt et al. 2014; Beauchamp et al. 2018). For example, an activity such as ‘walking football’—an initiative that has grown in popularity, leading to the birth of numerous clubs and leagues across the United Kingdom (Walking Football Association 2018)—could be prescribed to someone aged 50 or above with enthusiasm for the game. Health professionals therefore represent key stakeholders through which the findings of this thesis could be translated into practice to impact population physical activity levels.

### 6.4 Strengths and limitations

The strengths and limitations of the individual studies included in this thesis have been discussed in the relevant chapters and will not, therefore, be repeated here. Instead, the following section will consider some of the collective strengths and weaknesses of the thesis as a whole.

A primary strength of the thesis is its novelty. Sporadic attempts have been made to examine the capacity of the social identity approach to explain individuals' engagement, or intentions to engage, in health-related behaviours including healthy eating and alcohol consumption (Tarrant and Butler 2011), flu vaccinations (Falomir-Pichastor et al. 2009) and, most notably, physical activity (Terry and Hogg 1996; Strachan et al. 2012). Prior to this thesis, however, no effort had been made to examine the capacity of the social identity approach, and social identity approach to leadership, to explain multiple aspects of individuals' behaviours and experiences across a range of physical activity contexts in a programme of studies. The present thesis therefore provides (1) a more comprehensive insight into the potential of the approach in this domain, and (2) a strong foundation for further research in this area to complement and extend existing lines of research concerning the health-related benefits of social identities (e.g., see Jetten et al. 2012; Steffens et al. 2016b) and social identity leadership (Steffens et al. 2014a; Steffens et al. 2017) in other settings, and the performance-related benefits of social identities (Høigaard et al. 2013; Rees et al. 2013; Slater et al. 2018) and social identity leadership (Slater et al. 2015; Fransen et al. 2016) in sporting settings. Indeed, findings from study 4 speak to both the health and performance-related benefits of identity leadership in physical activity settings, and indicate that efforts to understand the effect of social identities

and social identity leadership on these outcomes need not be restricted to separate studies.

A second strength of the thesis relates to the samples used for the four studies. Recruiting participants from a wide array of physical activity contexts, including parkrun (study 1), sports teams (from various sports; studies 2 and 3) and exercise groups (of various types; study 2), yielded an analysis of the potential of the social identity approach in physical activity settings that can be more widely generalised than would have been possible following a programme of studies conducted in a single setting. Moreover, although a larger sample, and thus greater power to detect smaller effects, would have been preferable in study 4, sample sizes were also generally large across the four studies, ensuring high reliability.

A third strength of this thesis concerns the appropriateness and variety of methods employed across the four studies. Study 1 represented an initial attempt to test relationships between group identification and health-related outcomes in physical activity settings, while study 2 was the first to assess relationships between social identity leadership, group identification, and one particular (key) health-related outcome (attendance) in physical activity settings. The cross-sectional approach adopted in these studies was therefore warranted as a means of testing these relationships for the first time, and providing a foundation for further research (Mann 2003). This cross-sectional approach meant, however, that causal inferences could not be drawn based on these two studies' findings. Two-wave designs provide a more rigorous analysis of causal relationships between variables than cross-sectional designs (Ployhart and Ward 2011). The two-wave design used in study 3 therefore represented an appropriate way to further assess relationships between identity leadership, group identification, and attendance. It also afforded a greater

insight into the directionality of the positive relationships indicated in studies 1 and 2, indicating that although some effects were some reciprocal (e.g., between group identification and attendance), relationships primarily occurred, and were predominantly stronger, in the hypothesised direction. The experimental design adopted in study 4 afforded (1) the first examination of the causal effects of manipulating leaders' engagement in identity leadership (specifically identity entrepreneurship) on group members' exercise behaviours, and (2) the assessment of additional outcome variables (i.e., indicators of effort and performance), that were not included in studies 1-3, but that could be measured objectively in a laboratory environment.

One weakness of this thesis is the focus on formal leaders. This was initially identified as a limitation of study 2—where it was noted that recent research in sport suggests that, although formal leaders fulfill important leadership functions, leadership is often shared throughout teams (Fransen et al. 2014b; Fransen et al. 2015b)—and again noted in studies 3 and 4. Research has yet to establish the prevalence, or indeed presence, of informal leaders within exercise settings (e.g., exercise classes, running groups). However, given that studies 2 and 3 were either partially (study 2) or fully (study 3) conducted in sports settings, these studies could have been strengthened by first identifying the most influential leaders within teams with regard to the four established leadership roles (task, motivational, social, and external; Fransen et al. 2014b; Fransen et al. 2015b), then examining relationships between these individuals' engagement in identity leadership and the outcome variables, rather than focusing solely on formal leaders (e.g., captains in study 3). In study 4, a formal leader was 'created' to test the extent to which their engagement in identity entrepreneurship influenced group members' effort and performance. This

approach provided a clear causal test of this relationship. In real-world physical activity settings (e.g., sports teams), however, the extent to which informal leaders within teams engage in identity entrepreneurship (or identity leadership more broadly) may also influence the effort and performance of group members. Further research is therefore required in real-world settings (where informal leaders will naturally emerge over time) to examine (1) relationships between informal leaders engagement in identity leadership and key outcomes, and (2) the interacting effects of multiple formal and informal leaders engaging in identity leadership on key outcomes.

An additional limitation of the studies included in this thesis—and indeed social identity research more broadly at times—is the failure to consider the extent to which findings generalise to individuals who hold negative attitudes toward group activity (in this case group *physical* activity). The sampling strategies employed across studies 1-3 (i.e., recruiting individuals who were already participating in a group or team environment) meant that individuals who hold negative attitudes toward group activity were unlikely to have been included. This is not to say, however, that the present findings (i.e., regarding the benefits of individuals participating in a group environment where the group is important to their sense of self) would not apply to these individuals. Many peoples' dislike of group physical activity may, at least partially, emanate from negative experiences. In particular, people who have undertaken physical activity in groups lacking a clear identity and/or where no attempt has been made to attend to individuals' existing identities (e.g., as a woman, see Dunlop and Beauchamp 2011b) may possess less favourable attitudes toward group environments than those who have been part of groups structured in such a way to foster identity development and/or attend to existing

identities. Ensuring individuals with negative attitudes toward group activity participate in identity-affirming group environments may lead to the positive outcomes (e.g., improved participation, adherence, and perceived group cohesion) documented in this thesis and previous research (e.g., Dunlop and Beauchamp 2011a; Strachan et al. 2012; Beauchamp et al. 2018). Further research focussing specifically on these individuals is, however, required to ascertain whether this is the case.

### 6.5 Future research

In addition to the points raised in the preceding section, various avenues for future research have been highlighted throughout this thesis. These include further research (1) in a wider range of settings, (2) using a range of research designs—particularly those that allow causal relationships to be tested (e.g., longitudinal, experimental, and intervention), (3) considering the impact of social identities on individuals' overall physical activity participation levels (rather than just their participation in the context considered in the corresponding study), and (4) exploring the impact of social identities and social identity leadership on a wider range of variables. In some cases, these recommendations (e.g., for research using experimental designs) have, to some extent at least, been addressed in subsequent studies. Nevertheless, there remains considerable scope for further research both in line with, and distinct from, the suggestions made throughout the thesis. The following section will elaborate on some of the future research ideas proposed earlier in the thesis and highlight some additional avenues for further research.

Given that this thesis includes the first programme of studies devoted to examining the efficacy of the social identity approach in physical activity settings, the first (and perhaps most obvious) comment to make about future research is that,

despite the range of sport and exercise contexts from which participants in this thesis' studies were recruited, further efforts are needed to establish the generalisability of the present findings to other physical activity contexts (e.g., exercise initiatives such as Crossfit, SoulCycle, Orangetheory Fitness) and environments (e.g., clinical settings such as cardiac rehabilitation groups). This is important because, although consistent findings were observed across the range of contexts in which this thesis' studies were conducted, various factors may moderate (i.e., either facilitate or stifle) the impact of social identities and social identity leadership in settings not examined here. In clinical settings, for example, group members may favour medical expertise over leaders' prototypicality, advancement, entrepreneurship, and impresarioship. Further research to draw out such nuances is therefore required.

Second, building on the apparent capacity of the social identity approach to help understand the impact of group memberships and leaders on individuals' physical activity behaviours (see section 6.2.1), there is scope for further research to explore the extent to which the approach may also aid understanding of the impact of various additional social factors on individuals' physical activity behaviours. Most notably, research in other domains has demonstrated the important role of social identities in determining the effectiveness (or not) of *social support*. For example, across three studies Cruwys et al. (2016) asked participants to complete a social identity mapping task in which they were asked to write the name of each group they are a member of and provide a variety of information about those groups (e.g., relating to their importance, similarity, and compatibility). In the second of their studies, Cruwys and colleagues also asked participants to complete measures of their overall well-being, and of the social support they received from (1) members of the

groups they had identified in the social identity mapping task, and (2) individuals outside those groups. Results showed that the social support participants received from in-group members was significantly associated with participants' level of depression, whereas the support participants received from others (i.e., people outside their social groups) was not. These findings suggest that the value of social support is, with regard to some outcomes at least, dependent on the extent to which it is provided by an individual with whom a social identity is shared. Research to determine whether shared social identification is a necessary condition for effective social support (or at least increases its effectiveness) in physical activity settings would potentially lay the foundation for the provision of more effective social support to those seeking to maintain or improve their physical activity behaviours.

Third, as alluded to above, further research using designs that allow causal relationships to be examined are needed in a number of areas to further establish the potential of the social identity approach, and social identity approach to leadership, in physical activity settings. For example, building on the results of study 4, experimental research examining the causal effects of (1) the remaining three facets of identity leadership (prototypicality, advancement, and impresarioship) on individuals' effort and performance, and (2) all four facets of identity leadership on a range of additional variables (e.g., group members' persistence and mobilisation toward group goals) would provide a greater understanding of the impact this type of leadership has in these settings. Perhaps most saliently though, research examining the effect of interventions designed to foster identity within physical activity groups (e.g., by targeting group leaders as outlined in section 6.3.2) is needed to further assess the practical value of this thesis' findings. In particular, interventions that assess the impact of fostering group members' group identification on their physical

activity participation and adherence, and behaviour within group sessions (e.g., their effort, persistence, and engagement) is sorely needed.

Fourth, and related to the previous point, further work is needed to identify the most effective ways to develop identity, particularly in groups without leaders. Although the 5R programme has been outlined as a potentially fruitful way to develop leaders capacity to foster group identity, the best way to promote members' identification in leaderless settings (e.g., turn up and play initiatives such as 'FA Mars Just Play' and 'Netball Now') remains unclear. Several strategies, including involving group members in decision making (Haslam et al. 2014), encouraging groups to develop their own names, slogans, cheers, and drawings (Høigaard et al. 2013), and asking confederates to wear t-shirts that represent in and out groups (Levine et al. 2005; Rees et al. 2013) have been used to either foster or affirm social identification in experimental studies. However, these strategies have, at times, been implemented simultaneously (e.g., Høigaard et al. 2013), and their effectiveness never compared. Tests of the relative effectiveness of these techniques, and others, would lay the foundation for more effective interventions in the future, and help translate the ideas presented in this thesis into practice.

### 6.6. Conclusion

This thesis provides a detailed analysis of the potential for the social identity approach to advance understanding in the physical activity domain. First, it provides evidence that the identities people develop as a member of their physical activity groups have important (and positive) implications for their physical activity behaviours (i.e., their participation), experiences (i.e., their satisfaction), and perceptions of these groups (i.e., their cohesiveness). Second, it provides consistent evidence that, by engaging in social identity leadership, physical activity leaders

(coaches, captains, exercise group leaders) can foster members' group identification, and thus facilitate greater rates of group session attendance among members. Third, it provides evidence for a positive causal link between leaders engaging in identity leadership (identity entrepreneurship specifically) and group members' effort and performance (in the context of an exercise task; i.e., providing evidence for a relationship between identity leadership and two additional aspects of group members' behaviour).

Collectively, these findings indicate that a greater understanding of individuals' physical activity behaviours may be achieved by considering both the psychology of individuals as *individuals* (the predominant focus of prevailing approaches) and the psychology of individuals as *group members* (the focus of the social identity approach). That is, by considering the tangible effect that the groups to which people belong—and, in particular, the social identities that people form as members of those groups—seemingly exert on their behaviours. Moreover, the insights offered by this thesis regarding how people's physical activity behaviours are driven by their group memberships may be harnessed in future efforts to promote positive physical activity behaviours (e.g., greater or more sustained participation). Such efforts may involve focusing exclusively on creating effective new group physical activity environments or improving existing ones—for example by targeting physical activity leaders as the point of intervention, developing fresh ways to foster identity in groups, or drawing on aspects of previous interventions and experimental attempts to foster identity (e.g., see Høigaard et al. 2013; Rees et al. 2013; Beauchamp et al. 2018). Alternatively, this thesis' insights may be used to inform aspects of multilevel interventions to promote physical activity that subscribe to an ecological approach (e.g., along similar lines to Webber et al. 2008; Rosenberg et al.

2009; Rosenberg et al. 2012). Certainly, given the promise the social identity approach has demonstrated throughout this thesis, it is vital that the insights it offers are further examined, and applied in future attempts to tackle the current global physical inactivity pandemic.

## Chapter 7: References

Abraham, C. and Michie, S., 2008. A taxonomy of behavior change techniques used in interventions. *Health Psychology*, 27 (3), 379-387.

Achten, J. and Jeukendrup, A. E., 2003. Heart rate monitoring: Applications and limitations. *Sports Medicine*, 33 (7), 517-538.

Adams, J. and White, M., 2005. Why don't stage-based activity promotion interventions work? *Health Education Research*, 20 (2), 237-243.

Ajzen, I., 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50 (2), 179-211.

Ajzen, I., 2015. The theory of planned behaviour is alive and well, and not ready to retire: A commentary on Sniehotta, Presseau, and Araújo-Soares. *Health Psychology Review*, 9 (2), 131-137.

Ajzen, I. and Fishbein, M., 1980. *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Amiot, C. E., Sansfaçon, S. and Louis, W. R., 2014. How normative and social identification processes predict self-determination to engage in derogatory behaviours against outgroup hockey fans. *European Journal of Social Psychology*, 44 (3), 216-230.

Andersen, J. A., 2006. Leadership, personality and effectiveness. *Journal of Socio-Economics*, 35, 1078-1091.

Annesi, J. J., 2002. Goal-setting protocol in adherence to exercise by Italian adults. *Perceptual and Motor Skills*, 94 (2), 453-458.

Annesi, J. J., 2007. Effects of a computer feedback treatment and behavioral support protocol on drop out from a newly initiated exercise program. *Perceptual and Motor Skills*, 105 (1), 55-66.

Arbuckle, J. L., 2014. *Amos* (Version 23). Chicago: IBM SPSS.

Arikawa, A. Y., O'Dougherty, M., Kaufman, B. C., Schmitz, K. H. and Kurzer, M. S., 2012. Attrition and adherence of young women to aerobic exercise: Lessons from the WISER study. *Contemporary Clinical Trials*, 33 (2), 298-301.

Armitage, C. J., 2005. Can the theory of planned behavior predict the maintenance of physical activity? *Health Psychology*, 24 (3), 235-245.

Arthur, C. A., Bastardoz, N. and Eklund, R., 2017. Transformational leadership in sport: Current status and future directions. *Current Opinion in Psychology*, 16, 78-83.

Asendorpf, J. B., Conner, M., De Fruyt, F., De Houwer, J., Denissen, J. J. A., Fiedler, K., Fiedler, S., Funder, D. C., Kliegl, R., Nosek, B. A., Perugini, M., Roberts, B. W., Schmitt, M., Vanaken, M. A. G., Weber, H. and Wicherts, J. M., 2013. Recommendations for increasing replicability in psychology. *European Journal of Personality*, 27 (2), 108-119.

Ashforth, B. E. and Mael, F., 1989. Social identity theory and the organization. *Academy of Management Review*, 14 (1), 20-39.

Augoustinos, M. and De Garis, S., 2012. 'Too black or not black enough': Social identity complexity in the political rhetoric of Barack Obama. *European Journal of Social Psychology*, 42 (5), 564-577.

Avolio, B. J., 2007. Promoting more integrative strategies for leadership theory-building. *The American Psychologist*, 62 (1), 25-33.

Baillien, E., De Cuyper, N. and De Witte, H., 2011. Job autonomy and workload as antecedents of workplace bullying: A two-wave test of Karasek's Job Demand Control Model for targets and perpetrators. *Journal of Occupational and Organizational Psychology*, 84 (1), 191-208.

Bandura, A., 1977. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84 (2), 191-215.

Baray, G., Postmes, T. and Jetten, J., 2009. When I equals we: Exploring the relation between social and personal identity of extreme right-wing political party members. *The British Journal of Social Psychology*, 48 (4), 625-647.

Barnett, N. P., Smoll, F. L. and Smith, R. E., 1992. Effects of enhancing coach-athlete relationships on youth sport attrition. *Sport Psychologist*, 6 (2), 111-127.

Barreto, N. B. and Hogg, M. A., 2017. Evaluation of and support for group prototypical leaders: A meta-analysis of twenty years of empirical research. *Social Influence*, 12 (1), 41-55.

Bass, B. M., 1985. *Leadership and Performance Beyond Expectations.* New York: Free Press.

Bass, B. M. and Riggio, R. E., 2006. *Transformational Leadership (2nd edition)*. Mahwah, N.J: Lawrence Erlbaum Associates.

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J. F. and Martin, B. W., 2012. Correlates of physical activity: Why are some people physically active and others not? *Lancet*, 380 (9838), 258-271.

Beauchamp, M., Dunlop, W. L., Downey, S. M. and Estabrooks, P. A., 2012. First impressions count: Perceptions of surface-level and deep-level similarity within postnatal exercise classes and implications for program adherence. *Journal of Health Psychology*, 17 (1), 68-76.

Beauchamp, M. R., Carron, A. V., McCutcheon, S. and Harper, O., 2007a. Older adults' preferences for exercising alone versus in groups: Considering contextual congruence. *Annals of Behavioral Medicine*, 33 (2), 200-206.

Beauchamp, M. R., Harden, S. M., Wolf, S. A., Rhodes, R. E., Yan, L., Dunlop, W. L., Schmader, T., Sheel, A. W., Zumbo, B. D. and Estabrooks, P. A., 2015. GrOup based physical Activity for oLder adults (GOAL) randomized controlled trial: Study protocol. *BMC Public Health*, 15 (1), 1-11.

Beauchamp, M. R., Ruissen, G. R., Dunlop, W. L., Estabrooks, P. A., Harden, S. M., Wolf, S. A., Yan, L., Schmader, T., Puterman, E., Sheel, A. W. and Rhodes, R. E., 2018. Group-based physical activity for older adults (GOAL) randomized controlled trial: Exercise adherence outcomes. *Health Psychology*, 37 (5), 451-461.

Beauchamp, M. R., Welch, A. S. and Hulley, A. J., 2007b. Transformational and transactional leadership and exercise-related self-efficacy: An exploratory study. *Journal of Health Psychology*, 12 (1), 83-88.

Beets, M. W., Cardinal, B. J. and Alderman, B. L., 2010. Parental social support and the physical activity-related behaviors of youth: A review. *Health Education & Behavior*, 37 (5), 621-644.

Bentler, P. M., 2005. *EQS 6 Structural Equations Programme Manual*. Encino, CA: Multivariate Software.

Berlin, J. A. and Colditz, G. A., 1990. A meta-analysis of physical activity in the prevention of coronary heart disease. *American Journal of Epidemiology*, 132 (4), 612-628.

Berry, W. D. and Feldman, S., 1985. *Multiple Regression in Practice*. Thousand Oaks, CA: Sage Publications.

Biddle, S. J. H., Mutrie, N. and Gorely, T., 2015. *Psychology of Physical Activity: Determinants, Well-being and Interventions (3rd edition)*. London: Routledge.

Blanchard, C. M., Fortier, M., Sweet, S., O'Sullivan, T., Hogg, W., Reid, R. D. and Sigal, R. J., 2007. Explaining physical activity levels from a self-efficacy perspective: The physical activity counseling trial. *Annals of Behavioral Medicine*, 34 (3), 323-328.

Bollen, K. A. and Stine, R. A., 1992. Bootstrapping goodness-of-fit measures in structural equation models. *Sociological Methods & Research*, 21 (2), 205-229.

Bormann, K. C., Schulte-Coerne, P., Diebig, M. and Rowold, J., 2016. Athlete characteristics and team competitive performance as moderators for the relationship between coach transformational leadership and athlete performance. *Journal of Sport & Exercise Psychology*, 38 (3), 268-281.

Bowen, N. K. and Guo, S., 2011. *Structural Equation Modeling*. New York: Oxford University Press.

Brennan, L. K., Baker, E. A., Haire-Joshu, D. and Brownson, R. C., 2003. Linking perceptions of the community to behavior: Are protective social factors associated with physical activity? *Health Education and Behavior*, 30 (6), 740-755.

Bridle, C., Riemsma, R. P., Sowden, A. J., Mather, L., Pattenden, J., Watt, I. S. and Walker, A., 2005. Systematic review of the effectiveness of health behavior interventions based on the transtheoretical model. *Psychology and Health*, 20 (3), 283-301.

Broyles, S. T., Mowen, A. J., Theall, K. P., Gustat, J. and Rung, A. L., 2011. Integrating social capital into a park-use and active-living framework. *American Journal of Preventive Medicine*, 40 (5), 522-529.

Bruner, M. W., Dunlop, W. L. and Beauchamp, M. R., 2014. A social identity perspective on group processes in sport and exercise. *In:* Beauchamp, M. R. and Eys, M. A., eds. *Group Dynamics in Exercise and Sport Psychology (2nd edition).* Oxon: Routledge, 38-52.

Bruner, M. W. and Spink, K. S., 2010. Evaluating a team building intervention in a youth exercise setting. *Group Dynamics: Theory, Research, and Practice*, 14 (4), 304-317.

Bruner, M. W. and Spink, K. S., 2011. Effects of team building on exercise adherence and group task satisfaction in a youth activity setting. *Group Dynamics: Theory, Research and Practice*, 15 (2), 161-172.

Bull, F. C., Holt, C. L., Kreuter, M. W., Clark, E. M. and Scharff, D., 2001. Understanding the effects of printed health education materials: Which features lead to which outcomes? *Journal of Health Communication*, 6 (3), 265-279.

Burke, S. M., Carron, A. V., Eys, M. A., Ntoumanis, N. and Estabrooks, P. A., 2006. Group versus individual approach? A meta-analysis of the effectiveness of interventions to promote physical activity. *Sport and Exercise Psychology Review*, 2 (1), 19-35.

Burns, J., M. and Chandler, A., D., 1978. *Leadership*. New York: Harper and Row.
Byrne, B. M., 2016. *Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming (3rd edition)*. New York: Routledge.

Campaign, 2016. *Case study: How 'This girl can' got 1.6 million women exercising* [online]. Available from: https://www.campaignlive.co.uk/article/case-study-this-girl-can-16-million-women-exercising/1394836 [Accessed 1 December 2018].

Carey, D. G., 2009. Quantifying differences in the "fat burning" zone and the aerobic zone: Implications for training. *Journal of Strength and Conditioning Research*, 23 (7), 2090-2095.

Carron, A. V., Brawley, L. R. and Widmeyer, W. N., 1998. The measurement of cohesiveness in sport groups. *In:* Duda, J. L., ed. *Advances in Sport and Exercise Psychology Measurement.* Morgantown, WV: Fitness Information Technology, 213-226.

Carron, A. V. and Spink, K. S., 1993. Team building in an exercise setting. *The Sport Psychologist*, 7, 8-18.

Carron, A. V., Widmeyer, W. N. and Brawley, L. R., 1985. The development of an instrument to assess cohesion in sport teams: The group environment questionnaire. *Journal of Sport Psychology*, 7 (3), 244-266.

Caspersen, C. J., Powell, K. E. and Christenson, G. M., 1985. Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100 (2), 126-131.

Caudroit, J., Stephan, Y. and Le Scanff, C., 2011. Social cognitive determinants of physical activity among retired older individuals: An application of the health action process approach. *British Journal of Health Psychology*, 16 (2), 404-417.

Charbonneau, D., Barling, J. and Kelloway, E. K., 2001. Transformational leadership and sports performance: The mediating role of intrinsic motivation. *Journal of Applied Social Psychology*, 31 (7), 1521-1534.

Chemers, M. M., 2000. Leadership research and theory: A functional integration. *Group Dynamics: Theory, Research, and Practice*, 4 (1), 27-43.

Cicero, L., Bonaiuto, M., Pierro, A. and Van Knippenberg, D., 2008. Employees' work effort as a function of leader group prototypicality: The moderating role of team identification. *European Review of Applied Psychology*, 58 (2), 117-124.

Cicero, L., Pierro, A. and van Knippenberg, D., 2007. Leader group prototypicality and job satisfaction: The moderating role of job stress and team identification. *Group Dynamics: Theory, Research and Practice*, 11 (3), 165-175.

Cicero, L., Pierro, A. and van Knippenberg, D., 2010. Leadership and uncertainty: How role ambiguity affects the relationship between leader group prototypicality and leadership effectiveness. *British Journal of Management*, 21 (2), 411-421.

Cikara, M., Botvinick, M. M. and Fiske, S. T., 2011. Us versus them: Social identity shapes neural responses to intergroup competition and harm. *Psychological Science*, 22 (3), 306-313.

Coakley, J., 1992. Burnout among adolescent athletes: A personal failure or social problem? *Sociology of Sport Journal*, 9 (3), 271-285.

Cobb, L., Stone, W., Anonsen, L. and Klein, D., 2000. The influence of goal setting on exercise adherence. *Journal of Health Education*, 31 (5), 277-281.

Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences (2nd edition)*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, J., Cohen, P., West, S. G. and Aiken, L. S., 2003. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences (2nd edition)*. Hillsdale, NJ: Erlbaum.

Conn, V. S., Hafdahl, A. R., Cooper, P. S., Brown, L. M. and Lusk, S. L., 2009. Meta-analysis of workplace physical activity interventions. *American Journal of Preventive Medicine*, 37 (4), 330-339.

Conn, V. S., Valentine, J. C. and Cooper, H. M., 2002. Interventions to increase physical activity among aging adults: A meta-analysis. *Annals of Behavioral Medicine*, 24 (3), 190-200.

Cotterill, S. T. and Fransen, K., 2016. Athlete leadership in sport teams: Current understanding and future directions. *International Review of Sport & Exercise Psychology*, 9 (1), 116-133.

Cruwys, T., Haslam, S. A., Dingle, G. A., Haslam, C. and Jetten, J., 2014. Depression and social identity: An integrative review. *Personality & Social Psychology Review*, 18 (3), 215-238.

Cruwys, T., Haslam, S. A., Fox, N. E. and McMahon, H., 2015. "That's not what we do": Evidence that normative change is a mechanism of action in group interventions. *Behaviour Research and Therapy*, 65, 11-17.

Cruwys, T., Platow, M. J., Angullia, S. A., Chang, J. M., Diler, S. E., Kirchner, J. L., Lentfer, C.E., Lim, Y.J., Quarisa, A., Tor, V. W .L. and Wadley, A. L., 2012. Modelling food intake is moderated by salient psychological group membership. *Appetite*, 58 (2), 754-757.

Cruwys, T., Steffens, N. K., Haslam, S. A., Haslam, C., Jetten, J. and Dingle, G. A., 2016. Social identity mapping: A procedure for visual representation and assessment of subjective multiple group memberships. *The British Journal of Social Psychology*, 55 (4), 613-642.

Deci, E. L. and Ryan, R. M., 1985. *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum Press.

Deci, E. L. and Ryan, R. M., 2000. The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11 (4), 227-268.

DellaVigna, S. and Malmendier, U., 2006. Paying not to go to the gym. *The American Economic Review*, 96, 604-719.

Department of Health, 2011. *Physical activity guidelines for adults (19-64 years)* [online]. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213740/dh_128145.pdf [Accessed 31 May 2017].

Diener, E., Emmons, R. A., Larsen, R. J. and Griffin, S., 1985. The satisfaction with life scale. *Journal of Personality Assessment*, 49 (1), 71-75.

Ding, D., Lawson, K. D., Kolbe-Alexander, T. L., Finkelstein, E. A., Katzmarzyk, P. T., van Mechelen, W. and Pratt, M., 2016. The economic burden of physical inactivity: A global analysis of major non-communicable diseases. *Lancet*, 388 (10051), 1311-1324.

Ding, D., Sallis, J. F., Conway, T. L., Saelens, B. E., Frank, L. D., Cain, K. L. and Slymen, D. J., 2012. Interactive effects of built environment and psychosocial attributes on physical activity: A test of ecological models. *Annals of Behavioral Medicine*, 44 (3), 365-374.

Dingle, G. A., Brander, C., Ballantyne, J. and Baker, F. A., 2013. 'To be heard': The social and mental health benefits of choir singing for disadvantaged adults. *Psychology of Music*, 41 (4), 405-421.

Dinh, J. E., Lord, R. G., Gardner, W. L., Meuser, J. D., Liden, R. C. and Hu, J., 2014. Leadership theory and research in the new millennium: Current theoretical trends and changing perspectives. *The Leadership Quarterly*, 25, 36-62.

DiPietro, L., Dziura, J., Yeckel, C. W. and Neufer, P. D., 2006. Exercise and improved insulin sensitivity in older women: Evidence of the enduring benefits of higher intensity training. *Journal of Applied Physiology*, 100 (1), 142-149.

Do Lee, C., Folsom, A. R. and Blair, S. N., 2003. Physical activity and stroke risk: A meta-analysis. *Stroke*, 34 (10), 2475-2481.

Dolan, P., Kavetsos, G., and Vlaev, I., 2014. The happiness workout. *Social Indicators Research*, 119 (3), 1363-1377.

Downs, D. S. and Hausenblas, H. A., 2005. The theories of reasoned action and planned behavior applied to exercise: A meta-analytic update. *Journal of Physical Activity & Health*, 2 (1), 76-97.

Downward, P., and Rasciute, S., 2011. Does sport make you happy? An analysis of the well-being derived from sports participation. *International Review of Applied Economics*, 25 (3), 331-348.

Duck, J. M. and Fielding, K. S., 2003. Leaders and their treatment of subgroups: Implications for evaluations of the leader and the superordinate group. *European Journal of Social Psychology*, 33 (3), 387-401.

Duncan, K. A. and Pozehl, B., 2002. Staying on course: The effects of an adherence facilitation intervention on home exercise participation. *Progress in Cardiovascular Nursing*, 17 (2), 59-71.

Dunlop, W. L. and Beauchamp, M. R., 2011a. Does similarity make a difference? Predicting cohesion and attendance behaviors within exercise group settings. *Group Dynamics: Theory, Research, and Practice*, 15 (3), 258-266.

Dunlop, W. L. and Beauchamp, M. R., 2011b. En-gendering choice: Preferences for exercising in gender-segregated and gender-integrated groups and consideration of overweight status. *International Journal of Behavioral Medicine*, 18 (3), 216-220.

Dunn, A. L., Trivedi, M. H. and O'Neal, H. A., 2001. Physical activity dose-response effects on outcomes of depression and anxiety. *Medicine and Science in Sports and Exercise*, 33 (6), S587-S597.

Ehrhart, M. G. and Klein, K. J., 2001. Predicting followers' preferences for charismatic leadership: The influence of follower values and personality. *The Leadership Quarterly*, 12 (2), 153-179.

Eime, R. M., Harvey, J. T., Brown, W. J., and Payne, W. R., 2010. Does sports club participation contribute to health-related quality of life. *Medicine and Science in Sports and Exercise*, 42 (5), 1022-1028.

Ejere, E. I. and Abasilim, U. D., 2013. Impact of transactional and transformational leadership styles on organisational performance: Empirical evidence from Nigeria. *Journal of Commerce*, 5 (1), 30-41.

Ekeland, E., Heian, F. and Hagen, K. B., 2005. Can exercise improve self esteem in children and young people? A systematic review of randomised controlled trials. *British Journal of Sports Medicine*, 39 (11), 792-798.

Ekkekakis, P., Parfitt, G. and Petruzzello, S. I., 2011. The pleasure and displeasure people feel when they exercise at different intensities: Decennial update and progress towards a tripartite rationale for exercise intensity prescription. *Sports Medicine*, 41 (8), 641-671.

Elder, J. P., Lytle, L., Sallis, J. F., Young, D. R., Steckler, A., Simons-Morton, D., Stone, E., Jobe, J. B., Stevens, J., Lohman, T., Webber, L., Pate, R., Saksvig, B. I. and Ribisl, K., 2007. A description of the social-ecological framework used in the trial of activity for adolescent girls (TAAG). *Health Education Research*, 22 (2), 155-165.

Ellemers, N., 1993. The influence of socio-structural variables on identity management strategies. *European Review of Social Psychology*, 4 (1), 27-57.

Ellemers, N., 2012. The group self. *Science*, 336 (6083), 848-852.

Ellemers, N., De Gilder, D. and Haslam, S. A., 2004. Motivating individuals and groups at work: A social identity perspective on leadership and group performance. *Academy of Management Review*, 29 (3), 459-478.

Ellemers, N., Kortekaas, P. and Ouwerkerk, J. W., 1999. Self-categorisation, commitment to the group and group self-esteem as related but distinct aspects of social identity. *European Journal of Social Psychology*, 29 (2/3), 371-389.

Ellemers, N., Spears, R. and Doosje, B., 1997. Sticking together or falling apart: In-group identification as a psychological determinant of group commitment versus individual mobility. *Journal of Personality & Social Psychology*, 72 (3), 617-626.

Estabrooks, P. A., Almeida, F. A., Hill, J., Gonzales, M., Schreiner, P., Van Den Berg, R. and Smith-Ray, R. L., 2011. Move more: Translating an efficacious group dynamics physical activity intervention into effective clinical practice. *International Journal of Sport and Exercise Psychology*, 9 (1), 4-18.

Estabrooks, P. A., Bradshaw, M., Dzewaltowski, D. A. and Smith-Ray, R. L., 2008. Determining the impact of Walk Kansas: Applying a team-building approach to community physical activity promotion. *Annals of Behavioral Medicine*, 36 (1), 1-12.

Estabrooks, P. A. and Carron, A. V., 2000. The physical activity group environment questionnaire: An instrument for the assessment of cohesion in exercise classes. *Group Dynamics*, 4 (3), 230-243.

Estabrooks, P. A., Harden, S. M. and Burke, S. M., 2012. Group dynamics in physical activity promotion: What works? *Social and Personality Psychology Compass*, 6 (1), 18-40.

Falomir-Pichastor, J. M., Toscani, L. and Despointes, S. H., 2009. Determinants of flu vaccination among nurses: The effects of group identification and professional responsibility. *Applied Psychology: An International Review*, 58 (1), 42-58.

Farley, T. A., Meriwether, R. A., Baker, E. T., Watkins, L. T., Johnson, C. C. and Webber, L. S., 2007. Safe play spaces to promote physical activity in inner-city children: Results from a pilot study of an environmental intervention. *American Journal of Public Health*, 97 (9), 1625-1631.

Faul, F., Erdfelder, E., Buchner, A. and Lang, A.-G., 2009. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41 (4), 1149-1160.

Feltz, D. L. and Petlichkoff, L., 1983. Perceived competence among interscholastic sport participants and dropouts. *Canadian Journal of Applied Sport Sciences*, 8 (4), 231-235.

Ferdinand, A. O., Sen, B., Rahurkar, S., Engler, S. and Menachemi, N., 2012. The relationship between built environments and physical activity: A systematic review. *American Journal of Public Health*, 102 (10), e7-e13.

Field, A., 2017. *Discovering statistics using IBM SPSS Statistics (5th edition)*. London: SAGE Publications Ltd.

Fitzmaurice, G. M., Laird, N. M. and Ware, J. H., 2011. *Applied Longitudinal Analysis (2nd edition)*. Hoboken, NJ: Wiley.

Focht, B. C., 2009. Brief walks in outdoor and laboratory environments: Effects on affective responses, enjoyment, and intentions to walk for exercise. *Research Quarterly for Exercise & Sport*, 80 (3), 611-620.

Foster, C., Schrager, M., Snyder, A. C. and Thompson, N. N., 1994. Pacing strategy and athletic performance. *Sports Medicine*, 17 (2), 77-85.

Fox, L. D., Rejeski, W. J. and Gauvin, L., 2000. Effects of leadership style and group dynamics on enjoyment of physical activity. *American Journal of Health Promotion*, 14 (5), 277-283.

Fransen, K., Boen, F., Vansteenkiste, M., Mertens, N. and Vande Broek, G., 2018. The power of competence support: The impact of coaches and athlete leaders on intrinsic motivation and performance. *Scandinavian Journal of Medicine & Science in Sports*, 28 (2), 725-745.

Fransen, K., Haslam, S. A., Steffens, N. K., Vanbeselaere, N., De Cuyper, B. and Boen, F., 2015a. Believing in "us": exploring leaders' capacity to enhance team confidence and performance by building a sense of shared social identity. *Journal of Experimental Psychology: Applied*, 21 (1), 89-100.

Fransen, K., Van Puyenbroeck, S., Loughead, T. M., Vanbeselaere, N., De Cuyper, B., Vande Broek, G. and Boen, F., 2015b. Who takes the lead? Social network analysis as a pioneering tool to investigate shared leadership within sports teams. *Social Networks*, 43, 28-38.

Fransen, K., Vanbeselaere, N., De Cuyper, B., Slater, M. J., Boen, F. and Coffee, P., 2014a. The impact of athlete leaders on team members' team outcome confidence: A test of mediation by team identification and collective efficacy. *The Sport Psychologist*, 28 (4), 347-360.

Fransen, K., Vanbeselaere, N., De Cuyper, B., Vande Broek, G. and Boen, F., 2014b. The myth of the team captain as principal leader: Extending the athlete leadership classification within sport teams. *Journal of Sports Sciences*, 32 (14), 1389-1397.

Fransen, K., Vanbeselaere, N., De Cuyper, B., Vande Broek, G. and Boen, F., 2015c. Perceived sources of team confidence in soccer and basketball. *Medicine and Science in Sports and Exercise*, 47 (7), 1470-1484.

Fransen, K., Vande Broek, G., Boen, F., Steffens, N. K., Haslam, S. A. and Vanbeselaere, N., 2016. We will be champions: Leaders' confidence in 'us' inspires team members' team confidence and performance. *Scandinavian Journal of Medicine & Science in Sports*, 26 (12), 1455-1469.

Gabriel, S., Harris, B., Carvallo, M. and Troisi, J. D., 2012. The interconnected self: The social individual is more than just social + individual. *Social and Personality Psychology Compass*, 6 (11), 826-839.

Gaertner, L., Sedikides, C., Luke, M., O'Mara, E. M., Iuzzini, J., Jackson, L. E., Cai, H. and Wu, Q., 2012. A motivational hierarchy within: Primacy of the individual self, relational self, or collective self? *Journal of Experimental Social Psychology*, 48 (5), 997-1013.

Gaertner, S. L., Dovidio, J. F. and Bachman, B. A., 1996. Revisiting the contact hypothesis: The induction of a common ingroup identity. *International Journal of Intercultural Relations*, 20, 271-290.

Gaffney, A. M. and Hogg, M. A., 2017. Social identity and social influence. *In:* Harkins, S. G., Williams, K. D. and Burger, J. M., eds. *The Oxford Handbook of Social Influence.* New York: Oxford University Press, 259-278.

Ganster, D. C., Fox, M. L. and Dwyer, D. J., 2001. Explaining employees' health care costs: A prospective examination of stressful job demands, personal control, and physiological reactivity. *Journal of Applied Psychology*, 86 (5), 954-964.

Garcia, J. M., Healy, S. and Rice, D., 2016. The individual, social, and environmental correlates of physical activity and screen time in Irish children: Growing up in Ireland study. *Journal of Physical Activity & Health*, 13 (12), 1285-1293.

Gerend, M. A. and Maner, J. K., 2011. Fear, anger, fruits, and veggies: Interactive effects of emotion and message framing on health behavior. *Health Psychology*, 30 (4), 420-423.

Gerend, M. A. and Shepherd, M. A., 2016. When different message frames motivate different routes to the same health outcome. *Annals of Behavioral Medicine*, 50 (2), 319-329.

Ghosh, D. and Vogt, A., 2012. Outliers: An evaluation of methodologies. *Joint Statistical Mettings*, San Diego, CA. American Statistical Association.

Giessner, S. R. and van Knippenberg, D., 2008. "License to Fail": Goal definition, leader group prototypicality, and perceptions of leadership effectiveness after leader failure. *Organizational Behavior and Human Decision Processes*, 105, 14-35.

Gill, D. P., Blunt, W., De Cruz, A., Riggin, B., Hunt, K., Zou, G., Sibbald, S., Danylchuk, K., Zwarenstein, M., Gray, C. M., Wyke, S., Bunn, C. and Petrella, R. J., 2016. Hockey Fans in Training (Hockey FIT) pilot study protocol: A gender-sensitized weight loss and healthy lifestyle program for overweight and obese male hockey fans. *BMC Public Health*, 16 (1), 1096-1096.

Gollob, H. F. and Reichardt, C. S., 1987. Taking account of time lags in causal models. *Child Development*, 58 (1), 80-92.

Gourlan, M., Bernard, P., Bortolon, C., Romain, A. J., Lareyre, O., Carayol, M., Ninot, G. and Boiché, J., 2016. Efficacy of theory-based interventions to promote physical activity. A meta-analysis of randomised controlled trials. *Health Psychology Review*, 10 (1), 50-66.

Grant, N., Wardle, J. and Steptoe, A., 2009. The relationship between life satisfaction and health behavior: A cross-cultural analysis of young adults. *International Journal of Behavioral Medicine*, 16 (3), 259-268.

Greaves, C. J., Sheppard, K. E., Abraham, C., Hardeman, W., Roden, M., Evans, P. H. and Schwarz, P., 2011. Systematic review of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions. *BMC Public Health*, 11, 119.

Greenaway, K. H., Cruwys, T., Haslam, S. A. and Jetten, J., 2016a. Social identities promote well-being because they satisfy global psychological needs. *European Journal of Social Psychology*, 46 (3), 294-307.

Greenaway, K. H., Haslam, S. A., Cruwys, T., Branscombe, N. R., Ysseldyk, R. and Heldreth, C., 2015. From "we" to "me": Group identification enhances perceived personal control with consequences for health and well-being. *Journal of Personality and Social Psychology*, 109 (1), 53-74.

Greenaway, K. H., Thai, H. A., Haslam, S. A. and Murphy, S. C., 2016b. Spaces that signal identity improve workplace productivity. *Journal of Personnel Psychology*, 15 (1), 35-43.

Gustafsson, H. A., Kenttä, G. A. and Hassmén, P. A., 2011. Athlete burnout: An integrated model and future research directions. *International Review of Sport and Exercise Psychology*, 4 (1), 3-24.

Hagger, M. S., 2015. Retired or not, the theory of planned behaviour will always be with us. *Health Psychology Review*, 9 (2), 125-130.

Hagger, M. S., Chatzisarantis, N. L. and Biddle, S. J. H., 2002. A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology*, 24 (1), 3-32.

Hair, J. F., Anderson, R. E., Tatham, R. L. and Black, W. C., 1995. *Multivariate Data Analysis (3rd edition)*. New York: Macmillan.

Hannus, A. and Laev, M., 2011. Motives and motivating leaders in aerobics classes: Exercise motivation and instructors' leadership characteristics. *Acta Kinesiologiae Universitatis Tartuensis*, 17, 53-65.

Harden, S. M., McEwan, D., Sylvester, B. D., Kaulius, M., Ruissen, G., Beauchamp, M. R., Burke, S. M. and Estabrooks, P. A., 2015. Understanding for whom, under what conditions, and how group-based physical activity interventions are successful: A realist review. *BMC Public Health*, 15 (1), 1.

Hardy, L., Arthur, C. A., Jones, G., Shariff, A., Munnoch, K., Isaacs, I. and Allsopp, A. J., 2010. The relationship between transformational leadership behaviors, psychological, and training outcomes in elite military recruits. *The Leadership Quarterly*, 21, 20-32.

Harris, K. C., Kuramoto, L. K., Schulzer, M. and Retallack, J. E., 2009. Effect of school-based physical activity interventions on body mass index in children: A meta-analysis. *Canadian Medical Association Journal*, 180 (7), 719-726.

Haslam, C., Cruwys, T., Haslam, S. A., Dingle, G. and Chang, M. X.-L., 2016. Groups 4 Health: Evidence that a social-identity intervention that builds and strengthens social group membership improves mental health. *Journal of Affective Disorders*, 194, 188-195.

Haslam, C., Haslam, S. A., Knight, C., Gleibs, I., Ysseldyk, R. and McCloskey, L.-G., 2014. We can work it out: Group decision-making builds social identity and enhances the cognitive performance of care residents. *British Journal of Psychology*, 105 (1), 17-34.

Haslam, S. A., 2004. *Psychology in Organizations: The Social Identity Approach*. London: SAGE.

Haslam, S. A., 2014. Making good theory practical: Five lessons for an applied social identity approach to challenges of organizational, health, and clinical psychology. *The British Journal of Social Psychology*, 53 (1), 1-20.

Haslam, S. A., Jetten, J., Postmes, T. and Haslam, C., 2009. Social identity, health and well-being: An emerging agenda for applied psychology. *Applied Psychology: An International Review*, 58 (1), 1-23.

Haslam, S. A. and Reicher, S., 2006. Stressing the group: Social identity and the unfolding dynamics of responses to stress. *Journal of Applied Psychology*, 91 (5), 1037-1052.

Haslam, S. A. and Reicher, S., 2007. Identity entrepreneurship and the consequences of identity failure: The dynamics of leadership in the BBC prison study. *Social Psychology Quarterly*, 70 (2), 125-147.

Haslam, S. A., Reicher, S. D. and Platow, M. J., 2011. *The New Psychology of Leadership: Identity, Influence, and Power*. Hove: Psychology Press.

Haslam, S. A., Ryan, M. K., Postmes, T., Spears, R., Jetten, J. and Webley, P., 2006. Sticking to our guns: Social identity as a basis for the maintenance of commitment to faltering organizational projects. *Journal of Organizational Behaviour*, 27, 607-628.

Haslam, S. A., Steffens, N. K., Peters, K., Boyce, R. A., Mallett, C. J. and Fransen, K., 2017. A social identity approach to leadership development: The 5R program. *Journal of Personnel Psychology*, 16, 113-124.

Hayes, A. F., 2013. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-based Approach*. New York: The Guilford Press.

Hirst, G., Van Dick, R. and Van Knippenberg, D., 2009. A social identity perspective on leadership and employee creativity. *Journal of Organizational Behavior*, 30 (7), 963-982.

Ho, C. Y., 2016. Better health with more friends: The role of social capital in producing health. *Health Economics*, 25 (1), 91-100.

Hogg, M. A., 2001. A social identity theory of leadership. *Personality and Social Psychology Review*, 5 (3), 184-200.

Holt-Lunstad, J., Smith, T. B. and Layton, J. B., 2010. Social relationships and mortality risk: A meta-analytic review. *Plos Medicine*, 7 (7), e1000316.

Hooper, D., Coughlan, J. and Mullen, M. R., 2008. Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6 (1), 53-59.

Hornsey, M. J., 2008. Social identity theory and self-categorization theory: A historical review. *Social and Personality Psychology Compass*, 2 (1), 204-222.

Howarth, C., 2002. Identity in whose eyes? The role of representations in identity construction. *Journal for the Theory of Social Behaviour*, 32 (2), 145-162.

Hu, L. T. and Bentler, P. M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6 (1), 1-55.

Huang, H. and Humphreys, B. R., 2012. Sports participation and happiness: Evidence from US microdata. *Journal of Economic Psychology*, 33 (4), 776-793.

Hunt, K., Wyke, S., Gray, C. M., Anderson, A. S., Brady, A., Bunn, C., Donnan, P. T., Fenwick, E., Grieve, E., Leishman, J., Miller, E., Mutrie, N., Rauchhaus, P., White, A. and Treweek, S., 2014. A gender-sensitised weight loss and healthy living programme for overweight and obese men delivered by Scottish Premier League football clubs (FFIT): A pragmatic randomised controlled trial. *Lancet*, 383 (9924), 1211-1221.

Hunter, R. F., Christian, H., Veitch, J., Astell-Burt, T., Hipp, J. A. and Schipperijn, J., 2015. The impact of interventions to promote physical activity in urban green space: A systematic review and recommendations for future research. *Social Science & Medicine*, 124, 246-256.

Høigaard, R., Boen, F., De Cuyper, B. and Peters, D. M., 2013. Team identification reduces social loafing and promotes social laboring in cycling. *International Journal of Applied Sports Sciences*, 25 (1), 33-40.

Jetten, J., Branscombe, N. R., Haslam, S. A., Haslam, C., Cruwys, T., Jones, J. M., Cui, L., Dingle, G., Liu, J., Murphy, S. C., Thai, A., Walter, Z. and Zhang, A., 2015. Having a lot of a good thing: Multiple important group memberships as a source of self-esteem. *Plos One*, 10 (6), e0131035.

Jetten, J., Duck, J., Terry, D. J. and O'Brien, A., 2002. Being attuned to intergroup differences in mergers: The role of aligned leaders for low-status groups. *Personality and Social Psychology Bulletin*, 28 (9), 1194-1201.

Jetten, J., Haslam, C. and Haslam, S. A., 2012. *The Social Cure: Identity, Health and Well-being*. New York: Psychology Press.

Jiryaee, N., Siadat, Z. D., Zamani, A. and Taleban, R., 2015. Comparing of goal setting strategy with group education method to increase physical activity level: A randomized trial. *Journal of Research in Medical Sciences*, 20 (10), 987-993.

Jones, J. M. and Jetten, J., 2011. Recovering from strain and enduring pain: Multiple group memberships promote resilience in the face of physical challenges. *Social Psychological and Personality Science*, 2 (3), 239-244.

Kaczynski, A. T. and Glover, T. D., 2012. Talking the talk, walking the walk: Examining the effect of neighbourhood walkability and social connectedness on physical activity. *Journal of Public Health*, 34 (3), 382-389.

Karau, S. J. and Williams, K. D., 1993. Social Loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, 65 (4), 681-706.

Kendzierski, D. and DeCarlo, K. J., 1991. Physical activity enjoyment scale: Two validation studies. *Journal of Sport & Exercise Psychology*, 13 (1), 50-64.

King, A. C., Ahn, D. K., Oliveira, B. M., Castro, C. M., Gardner, C. D. and Atienza, A. A., 2008. Promoting physical activity through hand-held computer technology. *American Journal of Preventive Medicine*, 34 (2), 138-142.

King, A. C., Hekler, E. B., Grieco, L. A., Winter, S. J., Sheats, J. L., Buman, M. P., Banerjee, B., Robinson, T. N. and Cirimele, J., 2013. Harnessing different motivational frames via mobile phones to promote daily physical activity and reduce sedentary behavior in aging adults. *Plos One*, 8 (4), e62613.

Klandermans, B., 2002. How group identification helps to overcome the dilemma of collective action. *American Behavioral Scientist*, 45 (5), 887-900.

Kline, R. B., 2005. *Principles and Practice of Structural Equation Modeling (2nd edition)*. New York: Guilford Press.

Kohl, H. W., Craig, C. L., Lambert, E. V., Inoue, S., Alkandari, J. R., Leetongin, G. and Kahlmeier, S., 2012. The pandemic of physical inactivity: Global action for public health. *Lancet*, 380 (9838), 294-305.

Laird, Y., Fawkner, S., Kelly, P., McNamee, L. and Niven, A., 2016. The role of social support on physical activity behaviour in adolescent girls: A systematic review and meta-analysis. *International Journal of Behavioral Nutrition & Physical Activity*, 13, 1-14.

Lee, I. M., 2003. Physical activity and cancer prevention - data from epidemiologic studies. *Medicine and Science in Sports and Exercise*, 35 (11), 1823-1827.

Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N. and Katzmarzyk, P. T., 2012. Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *Lancet*, 380 (9838), 219-229.

Lei, M. and Lomax, R. G., 2005. The effect of varying degrees of nonnormality in structural equation modeling. *Structural Equation Modeling*, 12 (1), 1-27.

Leithwood, K. and Jantzi, D., 2000. The effects of transformational leadership on organizational conditions and student engagement with school. *Journal of Educational Administration*, 38 (2), 112-129.

Levine, M., Prosser, A., Evans, D. and Reicher, S., 2005. Identity and emergency intervention: How social group membership and inclusiveness of group boundaries shape helping behavior. *Personality and Social Psychology Bulletin*, 31 (4), 443-453.

Leys, C., Ley, C., Klein, O., Bernard, P. and Licata, L., 2013. Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology*, 49 (4), 764-766.

León, J. A. M., Cantisano, G. T. and Mangin, J.-P. L., 2009. Leadership in nonprofit organizations of Nicaragua and El Salvador: A study from the social identity theory. *The Spanish Journal of Psychology*, 12 (2), 667-676.

Li, L., 2014. The financial burden of physical inactivity. *Journal of Sport and Health Science*, 3 (1), 58-59.
Lindell, M. K. and Whitney, D. J., 2001. Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, 86 (1), 114-121.

Little, R. J., 1988. A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83 (404), 1198-1202.

Loughead, T. M., Fransen, K., Van Puyenbroeck, S., Hoffmann, M. D., De Cuyper, B., Vanbeselaere, N. and Boen, F., 2016. An examination of the relationship between athlete leadership and cohesion using social network analysis. *Journal of Sports Sciences*, 34 (21), 2063-2073.

Loughead, T. M., Patterson, M. M. and Carron, A. V., 2008. The impact of fitness leader behavior and cohesion on an exerciser's affective state. *International Journal of Sport & Exercise Psychology*, 6 (1), 53-68.

MacCallum, R. C. and Austin, J. T., 2000. Applications of structural equation modeling in psychological research. *Annual Review of Psychology*, 51, 201-226.

Mann, C. J., 2003. Observational research methods. Research design II: Cohort, cross sectional, and case-control studies. *Emergency Medicine Journal*, 20 (1), 54-60.

Marshall, S. J. and Biddle, S. J., 2001. The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine*, 23 (4), 229-246.

Mattern, C. O., Kenefick, R. W., Kertzer, R. and Quinn, T. J., 2001. Impact of starting strategy on cycling performance. *International Journal of Sports Medicine*, 22 (5), 350-355.

Maxwell, S. E. and Cole, D. A., 2007. Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, 12 (1), 23-44.

Maxwell, S. E., Cole, D. A. and Mitchell, M. A., 2011. Bias in cross-sectional analyses of longitudinal mediation: Partial and complete mediation under an autoregressive model. *Multivariate Behavioral Research*, 46 (5), 816-841.

Maxwell, S. E. and Delaney, H. D., 1990. *Designing Experiments and Analyzing Data: A Model Comparison Perspective*. Pacific Grove, CA: Brooks/Cole.

McAuley, E. and Jacobson, L., 1991. Self-efficacy and exercise participation in sedentary adult females. *American Journal of Health Promotion*, 5 (3), 185-191.

McKay, H. G., King, D., Eakin, E. G., Seeley, J. R. and Glasgow, R. E., 2001. The diabetes network internet-based physical activity intervention: A randomized pilot study. *Diabetes Care*, 24 (8), 1328-1334.

Menard, S., 1995. *Applied Logistic Regression Analysis: Sage University Series on Quantitative Applications in the Social Sciences*. Thousand Oaks, CA: Sage.

Michie, S., Ashford, S., Sniehotta, F. F., Dombrowski, S. U., Bishop, A. and French, D. P., 2011a. 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 (11), 1479-1498.

Michie, S., Hyder, N., Walia, A. and West, R., 2011b. Development of a taxonomy of behaviour change techniques used in individual behavioural support for smoking cessation. *Addictive Behaviors*, 36 (4), 315-319.

Michie, S., Whittington, C., Hamoudi, Z., Zarnani, F., Tober, G. and West, R., 2012. Identification of behaviour change techniques to reduce excessive alcohol consumption. *Addiction*, 107 (8), 1431-1440.

Middelkamp, J., Van Rooijen, M. and Steenbergen, B., 2016. Attendance behavior of ex-members in fitness clubs: A retrospective study applying the stages of change. *Perceptual and Motor Skills*, 122 (1), 350-359.

Mo, P. K. H., Chong, E. S. K., Mak, W. W. S., Wong, S. Y. S., Lau, J. T. F., Mo P, K. H., Chong, E. S., Mak, W. W., Wong, S. Y. and Lau, J. T., 2016. Physical activity in people with mental illness in Hong Kong: Application of the health belief model. *Journal of Sport & Exercise Psychology*, 38 (2), 203-208.

Moen, F., Hoigaard, R. and Peters, D. M., 2014. Performance progress and leadership behavior. *International Journal of Coaching Science*, 8 (1), 69-81.

Munneke, M., de Jong, Z., Zwinderman, A. H., Jansen, A., Ronday, H. K., Peter, W. F. H., Boonman, D. C. G., van den Ende, C. H. M., Vliet Vlieland, T. P. M. and Hazes, J. M. W., 2003. Adherence and satisfaction of rheumatoid arthritis patients with a long-term intensive dynamic exercise program (RAPIT program). *Arthritis and Rheumatism*, 49 (5), 665-672.

National Health Service, 2018. *Rehabilitation guidelines* [online]. Available from: https://www.rnoh.nhs.uk/our-services/rehabilitation-guidelines [Accessed 20 June 2018].

National Institute for Health and Care Excellence, 2014. *Behaviour change: Individual approaches* [online]. Available from: https://www.nice.org.uk/guidance/ph49/resources/behaviour-change-individual-approaches-1996366337989 [Accessed 01 Sep 2016].

Nevitt, J. and Hancock, G. R., 2001. Performance of bootstrapping approaches to model test statistics and parameter standard error estimation in structural equation modeling. *Structural Equation Modeling*, 8 (3), 353-377.

Ng, J. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., and Williams, G. C., 2012. Self-determination theory applied to health contexts: A meta-analysis. *Perspectives on Psychological Science*, 7 (4), 325-340.

Ng, M. and Lin, J., 2016. Testing for mediation effects under non-normality and heteroscedasticity: A comparison of classic and modern methods. *International Journal of Quantitative Research in Education*, 3 (1-2), 24-40.

Northouse, P. G., 2016. *Leadership: Theory and Practice (7th edition)*. Los Angeles: SAGE.

Ntoumanis, N., Thøgersen-Ntoumani, C., Quested, E. and Hancox, J., 2017. The effects of training group exercise class instructors to adopt a motivationally adaptive communication style. *Scandinavian Journal of Medicine & Science in Sports*, 27 (9), 1026-1034.

Nyrop, K. A., Cleveland, R. and Callahan, L. F., 2014. Achievement of exercise objectives and satisfaction with the walk with ease program-group and self-directed participants. *American Journal of Health Promotion*, 28 (4), 228-230.

Oakes, J. M. and Feldman, H. A., 2001. Statistical power for nonequivalent pretest-posttest designs: The impact of change-score versus ANCOVA models. *Evaluation Review*, 25 (1), 3-28.

Ogden, J., 2003. Some problems with social cognition models: A pragmatic and conceptual analysis. *Health Psychology*, 22 (4), 424-428.

Osborne, J. W. and Overbay, A., 2004. The power of outliers (and why researchers should always check for them). *Practical Assessment, Research & Evaluation*, 9 (6), 1-12.

Oyserman, D., Fryberg, S. A. and Yoder, N., 2007. Identity-based motivation and health. *Journal of Personality and Social Psychology*, 93 (6), 1011-1027.

Petrella, R. J., Gill, D. P., Zou, G., De Cruz, A., Riggin, B., Bartol, C., Danylchuk, K., Hunt, K., Wyke, S., Gray, C. M., Bunn, C. and Zwarenstein, M., 2017. Hockey fans in training: A pilot pragmatic randomized controlled trial. *Medicine and Science in Sports and Exercise*, 49 (12), 2506-2516.

Petruzzello, S. J., Landers, D. M., Hatfield, B. D., Kubitz, K. A. and Salazar, W., 1991. A meta-analysis on the anxiety-reducing effects of acute and chronic exercise. Outcomes and mechanisms. *Sports Medicine*, 11 (3), 143-182.

Physical Activity Research Council, 2016. *The Physical Activity Council's annual study tracking sports, fitness and recreation participation in the US* [online]. Available from: http://www.physicalactivitycouncil.com/pdfs/current.pdf [Accessed 19 Sep 2016].

Pierro, A., Cicero, L., Bonaiuto, M., van Knippenberg, D. and Kruglanski, A. W., 2005. Leader group prototypicality and leadership effectiveness: The moderating role of need for cognitive closure. *The Leadership Quarterly*, 16 (4), 503-516.

Platow, M. J., Hoar, S., Reid, S., Harley, K. and Morrison, D., 1997. Endorsement of distributively fair and unfair leaders in interpersonal and intergroup situations. *European Journal of Social Psychology*, 27 (4), 465-494.

Platow, M. J., Nolan, M. A. and Anderson, D., 2003. Intergroup identity management in a context of strong norms of fairness: Responding to in-group favouritism during the Sydney 2000 Olympics. Unpublished.

Platow, M. J., van Knippenberg, D., Haslam, S. A., van Knippenberg, B. and Spears, R., 2006. A special gift we bestow on you for being representative of us: Considering leader charisma from a self-categorization perspective. *The British Journal of Social Psychology*, 45 (2), 303-320.

Ployhart, R. E. and Ward, A. K., 2011. The "quick start guide" for conducting and publishing longitudinal research. *Journal of Business and Psychology*, 26 (4), 413-422.

Postmes, T., Haslam, S. A. and Jans, L., 2013. A single-item measure of social identification: Reliability, validity, and utility. *British Journal of Social Psychology*, 52 (4), 597-617.

Preacher, K. J. and Hayes, A. F., 2008. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40 (3), 879-891.

Prochaska, J. O. and DiClemente, C. C., 1983. Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51 (3), 390-395.

Prochaska, J. O. and Velicer, W. F., 1997. The transtheoretical model of health behavior change. *American Journal of Health Promotion*, 12 (1), 38-48.

Raedeke, T. D., 2007. The relationship between enjoyment and affective responses to exercise. *Journal of Applied Sport Psychology*, 19 (1), 105-115.

Raedeke, T. D., Lunney, K. and Venables, K., 2002. Understanding athlete burnout: Coach perspectives. *Journal of Sport Behavior*, 25 (2), 181-206.

Rees, T., Haslam, S. A., Coffee, P. and Lavallee, D., 2015. A social identity approach to sport psychology: Principles, practice, and prospects. *Sports Medicine*, 45 (8), 1083-1096.

Rees, T., Salvatore, J., Coffee, P., Haslam, S. A., Sargent, A. and Dobson, T., 2013. Reversing downward performance spirals. *Journal of Experimental Social Psychology*, 49 (3), 400-403.

Reicher, S. and Haslam, S. A., 2006. Rethinking the psychology of tyranny: The BBC prison study. *The British Journal of Social Psychology*, 45 (1), 1-40.

Reicher, S., Haslam, S. A. and Hopkins, N., 2005. Social identity and the dynamics of leadership: Leaders and followers as collaborative agents in the transformation of social reality. *The Leadership Quarterly*, 16 (4), 547-568.

Reicher, S. and Hopkins, N., 1996. Self-category constructions in political rhetoric; an analysis of Thatcher's and Kinnock's speeches concerning the British miners' strike (1984-5). *European Journal of Social Psychology*, 26 (3), 353-371.

Reicher, S. and Hopkins, N., 2001. *Self and Nation*. London: SAGE.
Reicher, S. D., 1984. The St. Pauls' riot: An explanation of the limits of crowd action in terms of a social identity model. *European Journal of Social Psychology*, 14 (1), 1-21.

Rejeski, W. J., Brawley, L. R., Ambrosius, W. T., Brubaker, P. H., Focht, B. C., Foy, C. G. and Fox, L. D., 2003. Older adults with chronic disease: Benefits of group-mediated counseling in the promotion of physically active lifestyles. *Health Psychology*, 22 (4), 414-423.

Renner, B., Spivak, Y., Kwon, S. and Schwarzer, R., 2007. Does age make a difference? Predicting physical activity of South Koreans. *Psychology and Aging*, 22 (3), 482-493.

Resnick, B., Orwig, D., Magaziner, J. and Wynne, C., 2002. The effect of social support on exercise behavior in older adults. *Clinical Nursing Research*, 11 (1), 52-70.

Rhodes, R. E. and de Bruijn, G. J., 2013. How big is the physical activity intention-behaviour gap? A meta-analysis using the action control framework. *British Journal of Health Psychology*, 18 (2), 296-309.

Rhodes, R. E. and Kates, A., 2015. Can the affective response to exercise predict future motives and physical activity behavior? A systematic review of published evidence. *Annals of Behavioral Medicine*, 49 (5), 715-731.

Rhodes, R. E., McEwan, D., and Rebar, A. L., 2018. Theories of physical activity behaviour change: A history and synthesis of approaches. *Psychology of Sport and Exercise* [Advance online publication]. doi: 10.1016/j.psychsport.2018.11.010

Rhodes, R. E. and Nigg, C. R., 2011. Advancing physical activity theory: A review and future directions. *Exercise and Sport Sciences Reviews*, 39 (3), 113-119.

Roberts, G. C., Kleiber, D. A. and Duda, J. L., 1981. An analysis of motivation in children's sport: The role of perceived competence in participation. *Journal of Sport Psychology*, 3 (3), 206-216.

Rosenberg, D. E., Kerr, J., Sallis, J. F., Norman, G. J., Calfas, K. and Patrick, K., 2012. Promoting walking among older adults living in retirement communities. *Journal of Aging and Physical Activity*, 20 (3), 379-394.

Rosenberg, D. E., Kerr, J., Sallis, J. F., Patrick, K., Moore, D. J. and King, A., 2009. Feasibility and outcomes of a multilevel place-based walking intervention for seniors: A pilot study. *Health & Place*, 15 (1), 173-179.

Rosenstock, I. M., 1974. The health belief model and preventive health behavior. *Health Education & Behavior*, 2 (4), 354-386.

Rottensteiner, C., Tolvanen, A., Laakso, L. and Konttinen, N., 2015. Youth athletes' motivation, perceived competence, and persistence in organized team sports. *Journal of Sport Behavior*, 38 (4), 432-449.

Royal College of General Practitioners, 2018. *parkrun practices* [online]. Available from: http://www.rcgp.org.uk/clinical-and-research/our-programmes/clinical-priorities/parkrun-practice.aspx [Accessed 30 November 2018].

Sallis, J. F., Bull, F., Guthold, R., Heath, G. W., Inoue, S., Kelly, P., Oyeyemi, A. L., Perez, L. G., Richards, J. and Hallal, P. C., 2016. Progress in physical activity over the Olympic quadrennium. *Lancet*, 388 (10051), 1325-1336.

Sallis, J. F., Cervero, R. B., Ascher, W., Henderson, K. A., Kraft, M. K. and Kerr, J., 2006. An ecological approach to creating active living communities. *Annual Review of Public Health*, 27, 297-322.

Sallis, J. F., Owen, N. and Fisher, E. B., 2008. Ecological models of health behavior. *In:* Glanz, K., Rimer, B. K. and Viswanath, K., eds. *Health Behavior and Health Education: Theory, Research, and Practice.* 4th edition. San Francisco, CA: Jossey-Bass, 465–486.

Sarrazin, P., Roberts, G., Cury, F., Biddle, S. and Famose, J. P., 2002. Exerted effort and performance in climbing among boys: The influence of achievement goals, perceived ability, and task difficulty. *Research Quarterly for Exercise and Sport*, 73 (4), 425-436.

Sato, M., Jordan, J. S. and Funk, D. C., 2015. Distance running events and life satisfaction: A longitudinal study. *Journal of Sport Management*, 29 (4), 347-361.

Sato, M., Jordan, J. S. and Funk, D. C., 2016. A distance-running event and life satisfaction: The mediating roles of involvement. *Sport Management Review*, 19, 536-549.

Sattelmair, J., Pertman, J., Ding, E. L., Kohl, H. W., Haskell, W. and Lee, I. M., 2011. Dose response between physical activity and risk of coronary heart disease: A meta-analysis. *Circulation*, 124 (7), 789-795.

Schafer, J. L., 1999. Multiple imputation: A primer. *Statistical Methods in Medical Research*, 8 (1), 3-15.

Schafer, J. L. and Graham, J. W., 2002. Missing data: Our view of the state of the art. *Psychological Methods*, 7 (2), 147-177.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A. and King, J., 2006. Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, 99 (6), 323-338.

Schultz, S. J., 1993. Educational and behavioral strategies related to knowledge and participation in an exercise program after cardiac positron emission tomography. *Patient Education and Counseling*, 22 (1), 47-57.

Schwarzer, R., 1992. Self-efficacy in the adoption and maintenance of health behaviors: Theoretical approaches and a new model. *In:* Schwarzer, R., ed. *Self-efficacy: Thought control of action.* Washington, DC, US: Hemisphere Publishing Corp, 217-243.

Schweizer, G. and Furley, P., 2016. Reproducible research in sport and exercise psychology: The role of sample sizes. *Psychology of Sport and Exercise*, 23, 114-122.

Selig, J. P. and Little, T. D., 2012. Autoregressive and cross-lagged panel analysis for longitudinal data. *In:* Laursen, B., Little, T. D. and Card, N. A., eds. *Handbook of Developmental Research Methods.* New York: Guilford Press, 265-278.

Sheeran, P., Gollwitzer, P. M. and Bargh, J. A., 2013. Nonconscious processes and health. *Health Psychology*, 32 (5), 460-473.

Sherif, M., 1956. Experiments in group conflict. *Scientific American*, 195 (5), 54-58.

Sherif, M., Harvey, O. J., White, B. J., Flood, W. R. and Sherif, C. W., 1961. *Intergroup Conflict & Cooperation: The Robbers Cave Experiment*. Norman: University Book Exchange.

Silva, M. N., Markland, D., Minderico, C. S., Vieira, P. N., Castro, M. M., Coutinho, S. R., Santos, T. C., Matos, M. G., Sardinha, L. B. and Teixeira, P. J., 2008. A randomized controlled trial to evaluate self-determination theory for exercise adherence and weight control: rationale and intervention description. *BMC Public Health*, 8 (1), 234.

Silva, M. N., Vieira, P. N., Coutinho, S. R., Minderico, C. S., Matos, M. G., Sardinha, L. B. and Teixeira, P. J., 2010. Using self-determination theory to promote physical activity and weight control: A randomized controlled trial in women. *Journal of Behavioral Medicine*, 33 (2), 110-122.

Slater, M. J. and Barker, J. B., 2018. Doing social identity leadership: Exploring the efficacy of an identity leadership intervention on perceived leadership and mobilization in elite disability soccer. *Journal of Applied Sport Psychology* [Advance online publication]. doi: 10.1080/10413200.2017.1410255.

Slater, M. J., Barker, J. B., Coffee, P. and Jones, M. V., 2015. Leading for gold: Social identity leadership processes at the London 2012 Olympic Games. *Qualitative Research in Sport, Exercise and Health*, 7 (2), 192-209.

Slater, M. J., Coffee, P., Barker, J. B. and Evans, A. L., 2014. Promoting shared meanings in group memberships: A social identity approach to leadership in sport. *Reflective Practice*, 15 (5), 672-685.

Slater, M. J., Haslam, S. A. and Steffens, N. K., 2018. Singing it for "us": Team passion displayed during national anthems is associated with subsequent success. *European Journal of Sport Science*, 18 (4), 541-549.

Slater, S. J., Nicholson, L., Chriqui, J., Turner, L. and Chaloupka, F., 2012. The impact of state laws and district policies on physical education and recess practices in a nationally representative sample of US public elementary schools. *Archives of Pediatrics & Adolescent Medicine*, 166 (4), 311-316.

Smith, R. E., 1986. Toward a cognitive-affective model of athletic burnout. *Journal of Sport Psychology*, 8 (1), 36-50.

Sniehotta, F., 2009. An experimental test of the theory of planned behavior. *Applied Psychology: Health and Well-Being*, 1 (2), 257-270.

Sniehotta, F. F., Presseau, J. and Araújo-Soares, V., 2014. Time to retire the theory of planned behaviour. *Health Psychology Review*, 8 (1), 1-7.

Sniehotta, F. F., Scholz, U. and Schwarzer, R., 2005. Bridging the intention–behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health*, 20 (2), 143-160.

Speake, H., Copeland, R. J., Till, S. H., Haake, S., Hart, O. and Breckon, J. D., 2016. Embedding physical activity in the heart of the NHS: The need for a whole-system approach. *Sports Medicine*, 46 (7), 939-946.

Spears, R., Oakes, P. J., Ellemers, N. and Haslam, S. A., 1996. *The Social Psychology of Stereotyping and Group Life*. Oxford: Blackwell.

Spernak, S. M., Moore, P. J. and Hamm, L. F., 2007. Depression, constructive thinking and patient satisfaction in cardiac treatment adherence. *Psychology, Health & Medicine*, 12 (2), 172-189.

Sport England, 2016. *Record number of women get active* [online]. Available from: https://www.sportengland.org/news-and-features/news/2016/december/8/record-numbers-of-women-getting-active/ [Accessed 1 December 2018].

Sport England, 2018. *Active lives adult survey: November 16/17 report* [online]. Available from: https://www.sportengland.org/media/13038/active-lives-adult-survey-nov-16-17-report.pdf [Accessed 18 April 2018].

Springer, A. E., Kelder, S. H. and Hoelscher, D. M., 2006. Social support, physical activity and sedentary behavior among 6th-grade girls: A cross-sectional study. *International Journal of Behavioral Nutrition & Physical Activity*, 3, 1-10.

Steffens, N. K., Cruwys, T., Haslam, C., Jetten, J. and Haslam, S. A., 2016a. Social group memberships in retirement are associated with reduced risk of premature death: Evidence from a longitudinal cohort study. *BMJ Open*, 6 (2), e010164.

Steffens, N. K. and Haslam, S. A., 2013. Power through 'us': leaders' use of we-referencing language predicts election victory. *Plos One*, 8 (10), e77952.

Steffens, N. K., Haslam, S. A., Kerschreiter, R., Schuh, S. C. and van Dick, R., 2014a. Leaders enhance group members' work engagement and reduce their burnout by crafting social identity. *German Journal of Human Resource Management*, 28 (1-2), 173-194.

Steffens, N. K., Haslam, S. A. and Reicher, S. D., 2014b. Up close and personal: Evidence that shared social identity is a basis for the 'special' relationship that binds followers to leaders. *The Leadership Quarterly*, 25 (2), 296-313.

Steffens, N. K., Haslam, S. A., Reicher, S. D., Platow, M. J., Fransen, K., Yang, J., Ryan, M. K., Jetten, J., Peters, K. and Boen, F., 2014c. Leadership as social identity management: Introducing the Identity Leadership Inventory (ILI) to assess and validate a four-dimensional model. *The Leadership Quarterly*, 25, 1001-1024.

Steffens, N. K., Haslam, S. A., Schuh, S. C., Jetten, J. and van Dick, R., 2016b. A meta-analytic review of social identification and health in organizational contexts. *Personality And Social Psychology Review*, 6 (2), e010164.

Steffens, N. K., Yang, J., Jetten, J., Haslam, S. A. and Lipponen, J., 2017. The unfolding impact of leader identity entrepreneurship on burnout, work engagement, and turnover intentions. *Journal of Occupational Health Psychology*, 23 (3), 373-387.

Stenling, A. and Tafvelin, S., 2014. Transformational leadership and well-being in sports: The mediating role of need satisfaction. *Journal of Applied Sport Psychology*, (2), 182-196.

Stevens, M., Rees, T., Coffee, P., Haslam, S. A., Steffens, N. K. and Polman, R., 2018a. Leaders promote attendance in sport and exercise sessions by fostering social identity. *Scandinavian Journal of Medicine & Science in Sports*, 28 (9), 2100-2108.

Stevens, M., Rees, T., Coffee, P., Steffens, N. K., Haslam, S. A. and Polman, R., 2017. A social identity approach to understanding and promoting physical activity. *Sports Medicine*, 47 (10), 1911-1918.

Stevens, M., Rees, T. and Polman, R., 2018b. Social identification, exercise participation, and positive exercise experiences: Evidence from parkrun. *Journal of Sports Sciences* [Advance online publication]. doi: 10.1080/02640414.2018.1489360.

Stogdill, R. M., 1948. Personal factors associated with leadership: A survey of the literature. *The Journal of Psychology*, 25, 35-71.

Stoter, I. K., MacIntosh, B. R., Fletcher, J. R., Pootz, S., Zijdewind, I. and Hettinga, F. J., 2016. Pacing strategy, muscle fatigue, and technique in 1500-m speed-skating and cycling time trials. *International Journal of Sports Physiology and Performance*, 11 (3), 337-343.

Strachan, S. M., Shields, C. A., Glassford, A. and Beatty, J., 2012. Role and group identity and adjustment to the possibility of running group disbandment. *Psychology of Sport and Exercise*, 13 (4), 436-443.

Swain, D. P. and Franklin, B. A., 2006. Comparison of cardioprotective benefits of vigorous versus moderate intensity aerobic exercise. *The American Journal of Cardiology*, 97 (1), 141-147.

Tajfel, H., 1972. Social categorization. *In:* Moscovici, S., ed. *Introduction a la psychologie sociale.* Paris: Larousse, 272-302.

Tajfel, H., 1974. Social identity and intergroup behaviour. *Social Science Information*, 13 (2), 65-93.

Tajfel, H., Billig, M. G., Bundy, R. P. and Flament, C., 1971. Social categorization and intergroup behaviour. *European Journal of Social Psychology*, 1 (2), 149-178.

Tajfel, H. and Turner, J. C., 1979. An integrative theory of intergroup conflict. *In:* Austin, W. G. and Worchel, S., eds. *The Social Psychology of Intergroup Relations.* Monterey, CA: Brooks/Cole, 33-47.

Tak, E. C. P. M., van Uffelen, J. G. Z., Paw, M. J. M. C. A., van Mechelen, W. and Hopman-Rock, M., 2012. Adherence to exercise programs and determinants of maintenance in older adults with mild cognitive impairment. *Journal of Aging and Physical Activity*, 20 (1), 32-46.

Tarrant, M. and Butler, K., 2011. Effects of self-categorization on orientation towards health. *British Journal of Social Psychology*, 50 (1), 121-139.

Taylor, A. H., 2003. Physical activity, anxiety, and stress. *In:* Biddle, S. J. H., Fox, K. R. and Boutcher, S. H., eds. *Physical Activity and Psychological Well-being.* London: Routledge, 10-45.

Taylor, J., Hughes, A. and Koufaki, P., 2013. The impact of community-based physical activity projects on girls' and young women's engagement in physical activity: Findings from an evaluation of the 'Girls on the Move' programme. *Managing Leisure*, 18 (1), 46-60.

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N. and Ryan, R. M., 2012. Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 9 (1), 78.

Teo, W., Newton, M. J. and McGuigan, M. R., 2011. Circadian rhythms in exercise performance: Implications for hormonal and muscular adaptation. *Journal of Sports Science & Medicine*, 10 (4), 600-606.

Terry, D. J. and Callan, V. J., 1998. In-group bias in response to an organizational merger. *Group Dynamics: Theory, Research, and Practice*, 2 (2), 67-81.

Terry, D. J., Carey, C. J. and Callan, V. J., 2001. Employee adjustment to an organizational merger: An intergroup perspective. *Personality and Social Psychology Bulletin*, 27 (3), 267-280.

Terry, D. J. and Hogg, M. A., 1996. Group norms and the attitude-behavior relationship: A role for group identification. *Personality and Social Psychology Bulletin*, 22 (8), 776-793.

Terry, D. J., Hogg, M. A. and White, K. M., 1999. The theory of planned behaviour: Self-identity, social identity and group norms. *The British Journal of Social Psychology*, 38 (3), 225-244.

Teychenne, M., Ball, K. and Salmon, J., 2008. Physical activity and likelihood of depression in adults: A review. *Preventive Medicine*, 46 (5), 397-411.

This Girl Can, 2018. *Fit Got Real*. Available from: http://www.thisgirlcan.co.uk [Accessed 1 December 2018].

Thornton, C. M., Kerr, J., Conway, T. L., Saelens, B. E., Sallis, J. F., Ahn, D. K., Frank, L. D., Cain, K. L. and King, A. C., 2017. Physical activity in older adults: An ecological approach. *Annals of Behavioral Medicine*, 51 (2), 159-169.

Trafimow, D., 2015. On retiring the TRA/TPB without retiring the lessons learned: A commentary on Sniehotta, Presseau and Araújo-Soares. *Health Psychology Review*, 9 (2), 168-171.

Tucker, J. M., Welk, G. J. and Beyler, N. K., 2011. Physical activity in U.S. adults: Compliance with physical activity guidelines for Americans. *American Journal of Preventive Medicine*, 40 (4), 454-461.

Tully, M. A. and Hunter, R. F., 2015. Promoting physical activity: Time for a major re-think. *Aspetar Sports Medicine Journal*, 4, 258-263.

Turner, E. E., Rejeski, W. J. and Brawley, R. L., 1997. Psychological benefits of physical activity are influenced by the social environment. *Journal of Sport & Exercise Psychology*, 19 (2), 119-130.

Turner, J. C., 1982. Towards a cognitive redefinition of the social group. *In:* Tajfel, H., ed. *Social Identity and Intergroup Relations.* Cambridge: Cambridge University Press, 15-40.

Turner, J. C., 1985. Social categorization and the self-concept: A social cognitive theory of group behaviour. *In:* Lawler, E. J., ed. *Advances in Group Processes (Vol. 2).* Greenwich, CT: JAI Press, 77-122.

Turner, J. C., 1991. *Social Influence*. Milton Keynes: Open University Press.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D. and Wetherell, M. S., 1987. *Rediscovering the Social Group: A Self-Categorization Theory*. Oxford: Blackwell.

Turner, J. C. and Oakes, P. J., 1989. Self-categorization theory and social influence. *In:* Paulus, P. B., ed. *Psychology of Group Influence.* Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc, 233-275.

Turner, J. C. and Oakes, P. J., 2015. Self-categorization theory and social influence. *In:* Paulas, P. B., ed. *The Psychology of Group Influence (2nd edition).* Hove: Psychology Press, 233-278.

Turner, J. C., Oakes, P. J., Haslam, S. A. and McGarty, C., 1994. Self and collective: Cognition and social context. *Personality and Social Psychology Bulletin*, 20 (5), 454-463.

Ullrich, J., Christ, O. and van Dick, R., 2009. Substitutes for procedural fairness: Prototypical leaders are endorsed whether they are fair or not. *Journal of Applied Psychology*, 94 (1), 235-244.

van Dijke, M. and De Cremer, D., 2010. Procedural fairness and endorsement of prototypical leaders: Leader benevolence or follower control? *Journal of Experimental Social Psychology*, 46 (1), 85-96.

van Knippenberg, D., 2000. Work motivation and performance: A social identity perspective. *Applied Psychology: An International Review*, 49 (3), 357-371.

van Knippenberg, D., 2011. Embodying who we are: Leader group prototypicality and leadership effectiveness. *The Leadership Quarterly*, 22 (6), 1078-1091.

van Knippenberg, D. and Sitkin, S. B., 2013. A critical assessment of charismatic—transformational leadership research: Back to the drawing board? *Academy of Management Annals*, 7 (1), 1-60.

Walking Football Association, 2018. *What is walking football?* [online]. Available from: https://thewfa.co.uk [Accessed 14 May 2018].

Wann, D. L. and Branscombe, N. R., 1990. Die-hard and fair-weather fans: Effects of identification on BIRGing and CORFing tendencies. *Journal of Sport & Social Issues*, 14 (2), 103-117.

Wang, F., Orpana, H. M., Morrison, H., De Groh, M., Dai, S., and Luo, W., 2012. Long-term association between leisure-time physical activity and changes in happiness: Analysis of the Prospective National Population Health Survey. *American Journal of Epidemiology*, 176 (12), 1095-1100.

Wann, D. L. and Pierce, S., 2003. Measuring sport team identification and commitment: An empirical comparison of the sport spectator identification scale and the psychological commitment to team scale. *North American Journal of Psychology*, 5 (3), 365-372.

Warburton, D. E. R., Nicol, C. W. and Bredin, S. S. D., 2006. Health benefits of physical activity: The evidence. *Canadian Medical Association Journal*, 174 (6), 801-809.

Webber, L. S., Catellier, D. J., Lytle, L. A., Murray, D. M., Pratt, C. A., Young, D. R., Elder, J. P., Lohman, T. G., Stevens, J., Jobe, J. B. and Pate, R. R., 2008. Promoting physical activity in middle school girls: Trial of Activity for Adolescent Girls. *American Journal of Preventive Medicine*, 34 (3), 173-184.

Weber, M., 1946. The Sociology of Charismatic Authority. *In:* Gerth, H. H. and Mills, C. W., eds. *Max Weber: Essays in Sociology*. New York: Oxford University Press, 245-252.

Webster, M. and Sell, J., 2014. Why do experiments? *In:* Webster, M. and Sell, J., eds. *Laboratory Experiments in the Social Sciences (2nd Edition).* London: Elsevier, 5-21.

West, S. G., Finch, J. F. and Curran, P. J., 1995. Structural equation models with nonnormal variables: problems and remedies. *In:* Hoyle, R. H., ed. *Structural Equation Modeling: Concepts, Issues, and Applications.* Thousand Oaks, CA, US: Sage Publications Inc, 56-75.

Whittaker, T. A. and Stapleton, L. M., 2006. The performance of cross-validation indices used to select among competing covariance structure models under multivariate nonnormality conditions. *Multivariate Behavioral Research*, 41 (3), 295-335.

Whitton, S. M. and Fletcher, R. B., 2014. The Group Environment Questionnaire: A multilevel confirmatory factor analysis. *Small Group Research*, 45 (1), 68-88.

Wicker, P. and Frick, B., 2015. The relationship between intensity and duration of physical activity and subjective well-being. *The European Journal of Public Health*, 25 (5), 868-872.

Wicker, P. and Frick, B., 2016. Intensity of physical activity and subjective well-being: an empirical analysis of the WHO recommendations. *Journal of Public Health*, 39 (2), e19-e26.

Widmeyer, W. N., Brawley, L. R. and Carron, A. V., 1990. The effects of group size in sport. *Journal of Sport & Exercise Psychology*, 12 (2), 177-190.

Williams, K., Harkins, S. G. and Latané, B., 1981. Identifiability as a deterrant to social loafing: Two cheering experiments. *Journal of Personality and Social Psychology*, 40 (2), 303-311.

Wilson, J. J., Kirk, A., Hayes, K., Bradbury, I., McDonough, S., Tully, M. A., O'Neill, B. and Bradley, J. M., 2016. Applying the transtheoretical model to physical activity behavior in individuals with non-cystic fibrosis bronchiectasis. *Respiratory Care*, 61 (1), 68-77.

Wininger, S. R. and Pargman, D., 2003. Assessment of factors associated with exercise enjoyment. *Journal of Music Therapy*, 40 (1), 57-73.

Wong, L., Bliese, P. and McGurk, D., 2003. Military leadership: A context specific review. *The Leadership Quarterly*, 14, 657-692.

Wong, S. T., Wu, A., Gregorich, S. and Pérez-Stable, E. J., 2014. What type of social support influences self-reported physical and mental health among older women? *Journal of Aging and Health*, 26 (4), 663-678.

Worchel, S., Rothgerber, H., Day, E. A., Hart, D. and Butemeyer, J., 1998. Social identity and individual productivity within groups. *British Journal of Social Psychology*, 37 (4), 389-413.

World Health Organization, 2010. *Global recommendations on physical activity for health*. Geneva, Switzerland.

World Health Organization, 2013. *Physical inactivity: meeting the 2025 global targets* [online]. Geneva: Available from: http://www.searo.who.int/entity/noncommunicable_diseases/events/ncd_workshop_2014_physical_inactivity.pdf [Accessed 31 May 2017].

World Health Organization, 2017. *Prevalence of insufficient physical activity* [online]. Available from: http://www.who.int/gho/ncd/risk_factors/physical_activity_text/en/ [Accessed 14 June 2017].

World Health Organization, 2018. *Global action plan on physical activity 2018-2030: More active people for a healthier world*. Geneva, Switzerland.

Wright, S. C., Taylor, D. M. and Moghaddam, F. M., 1990. Responding to membership in a disadvantaged group: From acceptance to collective protest. *Journal of Personality & Social Psychology*, 58 (6), 994-1003.

Yammarino, F. J., Salas, E., Serban, A., Shirreffs, K. and Shuffler, M. L., 2012. Collectivistic leadership approaches: Putting the 'we' in leadership science and practice. *Industrial & Organizational Psychology*, 5 (4), 382-402.

Yukl, G. A., 2013. *Leadership in Organisations (8th edition)*. London: Pearson.

Zhao, X., Lynch, J. G. and Chen, Q., 2010. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37 (2), 197-206.

# Appendices

Appendix 1: Sample version of the study 2 questionnaire (this particular version was used for participants recruited from exercise classes).

Appendix 2: Separate means, standard deviations and correlations for participants who completed the questionnaire online and in person in study 2.

Appendix 3: Separate mediation analyses for participants who completed the questionnaire online and in person in study 2.

Appendix 4: The study 3 questionnaire (Time 1).

Appendix 5: The study 3 questionnaire (Time 2).

Appendix 6: Details of relationships in the study 3 mediation models.

Appendix 7: Health questionnaire completed by all study 4 participants prior to their participation.

Appendix 8: Consent form completed by all study 4 participants prior to their participation.

**Appendix 1: Sample version of the study 2 questionnaire**

## Section 1: All about you

Q1. Are you male or female?

Male ☐ Female ☐

Q2. Please indicate your age in the space provided below

_____

Q3. Ethnicity (Please Tick) Ethnic Origin is not about Nationality, Place of Birth or Citizenship. It is about Colour and *Broad* Ethnic Group.

| | | | |
|---|---|---|---|
| Asian/Asian British – Bangladeshi | ☐ | White - British | ☐ |
| Asian/Asian British – Pakistani | ☐ | White - Irish | ☐ |
| Asian/Asian British – Indian | ☐ | Other White Background | ☐ |
| Chinese | ☐ | Black/Black British - African | ☐ |
| Other Asian Background | ☐ | Black/Black British - Caribbean | ☐ |
| Mixed – White & Black Caribbean | ☐ | Other Black Background | ☐ |
| Mixed – White & Black African | ☐ | Other Mixed Background | ☐ |
| Mixed – White & Asian | ☐ | Other Ethnic Background | ☐ |

Q4. Please specify the name of the exercise class in which you participate most frequently in the space provided.

_____

**For the remainder of the questionnaire please answer the questions with the specific exercise class that you have identified above in mind.**

## Section 2: All about your exercise

Q5. In a typical week how many times does the exercise class meet?

_____

Q6. In a typical week how many of these exercise classes do you attend?

_____

Q7. Thinking about your chosen exercise class, please indicate the extent to which you agree with the following statements. (please circle one number on each line)

| | Fully disagree | | | | | | Fully agree |
|---|---|---|---|---|---|---|---|
| I feel committed to my exercise group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I am glad to be part of my exercise group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Being part of this exercise group is an important part of how I see myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I identify with my exercise group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

## Section 3: Your opinions regarding your exercise leader

Q8. Is the leader of your exercise class male or female? (please tick one box only)

Male ☐ Female ☐

Q9. Thinking about the leader of your exercise class, please indicate the extent to which you agree with each of the following statements.
(please circle one number on each line)

| | Not at all | | | | | | Completely |
|---|---|---|---|---|---|---|---|
| This leader embodies what the group stands for | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader is representative of members of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader is a model member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader exemplifies what it means to be a member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader promotes the interests of members of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader acts a champion for the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader stands up for the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| When this leader acts, he or she has the groups interests at heart | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader makes people feel as if they are part of the same group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader creates a sense of cohesion within the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader develops an understanding of what it means to be a member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader shapes members' perceptions of the group's values and ideals | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader devises activities that bring the group together | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader arranges events that help the group function effectively | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This leader creates structures that are useful for group members | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Appendix 2: Separate means, standard deviations and correlations for participants who completed the questionnaire online and in person in study 2.**

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| *Online* | | | | | | | | | |
| 1. Identity leadership | 5.62 | 1.35 | - | .94** | .95** | .96** | .87** | .26** | -.04 |
| 2. Prototypicality | 5.62 | 1.42 | | - | .88** | .88** | .73** | .21** | -.05 |
| 3. Advancement | 5.82 | 1.36 | | | - | .88** | .74** | .28** | -.07 |
| 4. Entrepreneurship | 5.67 | 1.45 | | | | - | .79** | .26** | <.01 |
| 5. Impresarioship | 5.28 | 1.59 | | | | | - | .23** | <-.01 |
| 6. Identification | 6.01 | 1.17 | | | | | | - | .16** |
| 7. Attendance | .76 | .31 | | | | | | | - |
| | | | | | | | | | |
| *In person* | | | | | | | | | |
| 1. Identity leadership | 5.61 | 1.16 | - | .92** | .94** | .95** | .88** | .47** | .06 |
| 2. Prototypicality | 5.62 | 1.22 | | - | .83** | .82** | .72** | .45** | .03 |
| 3. Advancement | 5.73 | 1.16 | | | - | .88** | .74** | .45** | .10 |
| 4. Entrepreneurship | 5.66 | 1.22 | | | | - | .79** | .45** | .06 |
| 5. Impresarioship | 5.37 | 1.48 | | | | | - | .40** | .03 |
| 6. Identification | 5.92 | 1.13 | | | | | | - | .23** |
| 7. Attendance | .89 | .20 | | | | | | | - |

Note: * $p < 0.05$, ** $p < 0.01$.

**Appendix 3: Separate mediation analyses for participants who completed the questionnaire online and in person in study 2.**

| | Indirect effects | | | | | | Direct effects | |
|---|---|---|---|---|---|---|---|---|
| | | *β* [CI's] | | | Model | | *β* [CI's] | SE |
| | IL facet → GI | GI → Att | Indirect effect | Bootstrap SE | $R^2$ | F | IL facet → Att | |
| *Online* | | | | | | | | |
| Identity leadership | .229** [.128, .329] | .051** [.019, .082] | .012 [.004, .024] | .005 | .071 | 6.773 | -.017 [-.045, .010] | .014 |
| Prototypicality | .172** [.076, .269] | .050** [.019, .081] | .009 [.003, .019] | .004 | .072 | 6.946 | -.019 [-.044, .007] | .013 |
| Advancement | .242** [.143, .341] | .054** [.023, .086] | .013 [.005, .025] | .005 | .079 | 7.640 | -.028* [-.055, -<.001] | .014 |
| Entrepreneurship | .206** [.112, .299] | .048** [.016, .079] | .009 [.003, .020] | .004 | .067 | 6.358 | -.008 [-.034, .018] | .013 |
| Impresarioship | .173** [.087, .259] | .047** [.016, .079] | .008 [.002, .017] | .004 | .066 | 6.321 | -.006 [-.030, .017] | .012 |
| *In person* | | | | | | | | |
| Identity leadership | .461** [.365, .557] | .055** [.033, .077] | .025 [.014, .041] | .007 | .097 | 11.007 | -.017 [-.038, .004] | .011 |
| Prototypicality | .410** [.318, .503] | .056** [.035, .078] | .023 [.013, .038] | .006 | .101 | 11.468 | -.020 [-.039, <.001] | .010 |
| Advancement | .433** [.336, .530] | .049** [.027, .071] | .021 [.010, .038] | .007 | .090 | 10.183 | -.006 [-.027, .015] | .011 |
| Entrepreneurship | .415** [.322, .508] | .055** [.033, .076] | .023 [.012, .039] | .007 | .097 | 11.004 | -.016 [-.036, .004] | .010 |
| Impresarioship | .306** [.228, .384] | .054** [.032, .075] | .016 [.009, .027] | .005 | .097 | 11.062 | -.013 [-.029, .003] | .008 |

Notes: * $p < 0.05$, ** $p < 0.01$; IL= Identity leadership; GI= Group identification; Att= Attendance

**Appendix 4: The study 3 questionnaire (Time 1).**

**For the purposes of this research we would like to compare your responses at 2 separate times. To allow us to do this please could you provide your full name, the name of your university, and your email address in the spaces provided below. With your consent, we will only email you if you are not present the second time the questionnaire is distributed.**

Name _____

University _____

Email _____

I agree to be contacted for the purposes outlined above Yes ☐ No ☐

## Section 1: All about you

Q1. I identify as:

Male ☐ Female ☐ Other ☐ Prefer not to say ☐

Q2. Please indicate your age in the space provided _____

Q3. Ethnicity (Please Tick) Ethnic Origin is not about Nationality, Place of Birth or Citizenship. It is about Colour and *Broad* Ethnic Group.

| | | | |
|---|---|---|---|
| Asian/Asian British – Bangladeshi | ☐ | White - British | ☐ |
| Asian/Asian British – Pakistani | ☐ | White - Irish | ☐ |
| Asian/Asian British – Indian | ☐ | Other White Background | ☐ |
| Chinese | ☐ | Black/Black British - African | ☐ |
| Other Asian Background | ☐ | Black/Black British - Caribbean | ☐ |
| Mixed – White & Black Caribbean | ☐ | Other Black Background | ☐ |
| Mixed – White & Black African | ☐ | Other Mixed Background | ☐ |
| Mixed – White & Asian | ☐ | Other Ethnic Background | ☐ |

## Section 2: All about your sport

Q4. Please specify the name of one university sports team that you have joined since starting university in the space provided.

_____

**For the remainder of the questionnaire please answer the questions with this team in mind.**

Q5. In a typical week how many times (including matches) does your sports team meet?

_____

Q6. In a typical week how many of these sessions do you attend?

_____

Q7. Please indicate the extent to which you agree with the following statements. (please circle one number on each line)

| | Fully disagree | | | | | | Fully agree |
|---|---|---|---|---|---|---|---|
| I feel committed to my sports team | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I am glad to be part of my sports team | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Being part of this sports team is an important part of how I see myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I identify with my sports team | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Q8. Thinking about the captain of your sports team, please indicate the extent to which you agree with each of the following statements.
(please circle one number on each line)

| | Not at all | | | | | | Completely |
|---|---|---|---|---|---|---|---|
| This captain embodies what the group stands for | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain is representative of members of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain is a model member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain exemplifies what it means to be a member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain promotes the interests of members of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain acts a champion for the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain stands up for the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| When this captain acts, he or she has the groups interests at heart | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain makes people feel as if they are part of the same group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain creates a sense of cohesion within the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain develops an understanding of what it means to be a member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain shapes members' perceptions of the group's values and ideals | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain devises activities that bring the group together | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain arranges events that help the group function effectively | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Appendix 5: The study 3 questionnaire (Time 2).**

To allow us to compare your responses to those you gave when you answered the first questionnaire please provide your name and the name of your university in the spaces provided below

Name _____

University _____

Please indicate the name of the university team you answered the first questionnaire in relation to in the space provided below. This would have been a team you joined in the first few weeks of the semester. If you are unsure which team you wrote down for any reason then please ask.

_____

Are you still a member of this team?

Yes ☐ No ☐

If you answered 'No' then we thank you for your time. Your data will still be important for the research but there is no need for you to complete the remainder of the questionnaire.

If you answered 'Yes' then please answer the remaining questions with this team in mind.

Q1. In a typical week how many times (including matches) does your sports team meet?

_____

Q2. In a typical week how many of these sessions do you attend?

_____

Q3. Please indicate the extent to which you agree with the following statements.
(please circle one number on each line)

| | Fully disagree | | | | | | Fully agree |
|---|---|---|---|---|---|---|---|
| I feel committed to my sports team | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I am glad to be part of my sports team | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Being part of this sports team is an important part of how I see myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I identify with my sports team | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Q4. Thinking about the captain of your sports team, please indicate the extent to which you agree with each of the following statements.
(please circle one number on each line)

| | Not at all | | | | | | Completely |
|---|---|---|---|---|---|---|---|
| This captain embodies what the group stands for | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain is representative of members of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain is a model member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain exemplifies what it means to be a member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain promotes the interests of members of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain acts as a champion for the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain stands up for the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| When this captain acts, he or she has the groups interests at heart | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain makes people feel as if they are part of the same group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain creates a sense of cohesion within the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain develops an understanding of what it means to be a member of the group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain shapes members' perceptions of the group's values and ideals | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain devises activities that bring the group together | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain arranges events that help the group function effectively | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| This captain creates structures that are useful for group members | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Appendix 6: Details of relationships in the study 3 mediation models.**

| | *b* [CI's] | | |
|---|---|---|---|
| | **T1 IL facet → T2 GI** | **T2 GI → T2 Att** | **T1 GI → T2 GI** |
| Prototypicality | .244** [.075, .412] | .087*** [.062, .113] | .428*** [.266, .591] |
| Advancement | .209* [.026, .393] | .087*** [.062, .112] | .459*** [.299, .619] |
| Entrepreneurship | .216* [.041, .391] | .085*** [.060, .110] | .456*** [.297, .616] |
| Impresarioship | .049 [-.096, .194] | .086*** [.061, .111] | .509*** [.351, .666] |

| | *b* [CI's] | | |
|---|---|---|---|
| | **T1 Att → T2 Att** | **T1 Att → T2 GI** | **T1 GI → T2 Att** |
| Prototypicality | .352*** [.197, .506] | .367 [-.533, 1.267] | -.017 [-.047, .013] |
| Advancement | .351*** [.196, .507] | .326 [-.587, 1.240] | -.018 [-.047, .012] |
| Entrepreneurship | .350*** [.195, .504] | .366 [-.541, 1.272] | -.020 [-.050, .010] |
| Impresarioship | .346*** [.191, .502] | .453 [-.469, 1.375] | -.018 [-.048, .011] |

Notes: $N$ = 182–183; * $p < 0.05$, ** $p < 0.01$; *** $p < 0.001$; $b$ = unstandardized beta; IL= Identity leadership; GI = Group identification; Att = Attendance; T1 = Time 1; T2 = Time 2; details of the relationships are divided into two tables because space limitations prevent the data being presented in a single table.

**Appendix 7: Health questionnaire completed by all study 4 participants prior to their participation.**

# MEDICAL, CARDIOVASCULAR, AND OTHER RISK FACTORS QUESTIONNAIRE

In order to be eligible to participate in the experiment investigating:

**Cycling time trial performance**

You are required to complete the following questionnaire which is designed to assess the risk of you having a cardiovascular event occurring during an exhaustive exercise bout.

**NAME:** _____ **DATE** _____

**AGE:** _____ **YRS**

**SEX:** **M / F**

**TELEPHONE: Mobile:** _____

**WEIGHT** _____ **KG**

**EMAIL:** _____ **HEIGHT** _____ **CM**

**EMERGENCY CONTACT:** _____ **MOBILE:**

**RELATIONSHIP:** _____ _____

**MEDICAL HISTORY:**

**In the past have you ever had/is there a possibility you may have (tick No or Yes)**

| **Medical Condition** | **NO** | **YES** | **Medical Condition** | **NO** | **YES** |
|---|---|---|---|---|---|
| Heart Attack | ☐ | ☐ | Congenital Heart Disease | ☐ | ☐ |
| Chest Pain (angina) | ☐ | ☐ | Disease of Arteries/Veins | ☐ | ☐ |
| Heart Murmur | ☐ | ☐ | Asthma | ☐ | ☐ |
| Heart Rhythm Disturbance | ☐ | ☐ | Lung Disease (e.g. emphysema) | ☐ | ☐ |
| Heart Valve Disease | ☐ | ☐ | Epilepsy | ☐ | ☐ |
| Stroke | ☐ | ☐ | Pituitary disorders | ☐ | ☐ |
| Thyroid disorders | ☐ | ☐ | Injuries to back, knees, ankles | ☐ | ☐ |
| Do you have a cardiac pacemaker? | ☐ | ☐ | Is there a possibility you may be pregnant? | ☐ | ☐ |

**If you answered YES to any of the previous questions. Please elaborate.**

_____

_____

**List any prescribed medications being taken** (Including vitamin supplements, antioxidants, oral contraceptives, diuretics etc)

_____

_____

**List any surgical procedures that you have had (write the year in brackets):**

**example: appendix (1990)**

_____

_____

_____

**List any injuries in your past medical history**

_____

_____

_____

_____

**Do you think you have any medical complaint or any other reason which you know of which you think may prevent you from participating in strenuous exercise?**

**NO** □ **YES** □

If yes, give details: _____

_____

_____

**Have you had any neuromuscular problems that have required medical treatment (e.g., muscle soreness, muscle spasms, loss of muscular control, muscle rigidness etc)?**

**NO** ☐ **YES** ☐

If yes, give details: _____

_____

_____

**ALLERGIES:** Do you have any allergies **NO** ☐ **YES** ☐

If yes, give details: _____

_____

_____

**SYMPTOMS DURING OR AFTER EXERCISE**

**As a result of exercise, have you ever experienced any of the following:**

| **Symptom during exercise** | **NO** | **YES** | **Symptom during exercise** | **NO** | **YES** |
|---|---|---|---|---|---|
| Pain or discomfort in the chest, back, arm, or jaw | ☐ | ☐ | Palpitations (heart rhythm disturbance) | ☐ | ☐ |
| Severe shortness of breath or problems with breathing during mild exertion | ☐ | ☐ | Pain in the legs during mild exertion | ☐ | ☐ |
| Dizziness, nausea or fainting | ☐ | ☐ | Severe heat exhaustion | ☐ | ☐ |

**CARDIOVASCULAR RISK FACTORS:**

Do you have (tick NO, YES or circle ? for DON'T KNOW)

| **Cardiovascular Risk Factors** | **NO** | **YES** | **DON'T KNOW** | |
|---|---|---|---|---|
| High Blood Pressure | ☐ | ☐ | **?** | |
| High Blood Cholesterol/Triglycerides | ☐ | ☐ | **?** | |
| Diabetes | ☐ | ☐ | **?** | |
| Current Smoker | ☐ | ☐ | Average/day = | |
| Ex-smoker | ☐ | ☐ | Average/day = | |
| Do you drink alcohol regularly? | ☐ | ☐ | Average/day = | drinks |

**FAMILY MEDICAL HISTORY:**
Have members of your immediate family ever had any of the following conditions: (tick NO, YES or circle ? for DON'T KNOW). If you answer Yes or ?, write beside this the member of the family affected (F=father, M=mother, B=brother, S=sister, GM=grandmother, GF=grandfather).

| FAMILY MEDICAL HISTORY | NO | YES | ? | FAMILY MEMBER | AGE (Years) | ALIVE NOW?) |
|---|---|---|---|---|---|---|
| Heart Attack | ☐ | ☐ | ? | ____ | _____ | |
| Chest Pain (Angina) | ☐ | ☐ | ? | ____ | _____ | |
| Stroke | ☐ | ☐ | ? | ____ | _____ | |
| High Blood Pressure | ☐ | ☐ | ? | ____ | _____ | |
| High Blood Cholesterol/Triglycerides | ☐ | ☐ | ? | ____ | | |
| Diabetes | ☐ | ☐ | ? | ____ | | |
| Thyroid disorders | ☐ | ☐ | ? | ____ | | |
| Pituitary disorders | ☐ | ☐ | ? | ____ | | |

**Client Declaration**

I declare that the above information is to my knowledge true and correct, and that I have not omitted any information that is requested on this form.

***Signed:***

_____

***Date:*** _____/_____/ _____

**OFFICE USE ONLY CLEARANCE TO UNDERGO AN EXERCISE TEST**

This person has been cleared to undergo a fitness test:

□ Without medical supervision
□ With medical supervision
□ A fitness test is not advisable at this time

**Signed: Dr/Mr/Mrs/Ms**

**(Circle appropriate title: Physician/exercise physiologist)**

## Appendix 8: Study 4 participant consent form.

Bournemouth University

### Participant Agreement Form

**Full title of project:**

Examining Time Trial Performance

**Name, position and contact details of researcher:**

Mark Stevens, PhD Researcher, email: mstevens@bournemouth.ac.uk

**Name, position and contact details of supervisor (if the researcher is a student):**

Tim Rees, Professor in Sport, email: trees@bournemouth.ac.uk

| | **Please Initial or Tick Here** |
|---|---|
| I have read and understood the participant information sheet for the above research project | |
| I confirm that I have had the opportunity to ask questions. | |
| I understand that my participation is voluntary. | |
| I understand that I am free to withdraw up to the point where I have completed the second laboratory session | |
| During the task or experiment, I am free to withdraw without giving reason and without there being any negative consequences. | |
| Should I not wish to complete a test or answer any particular question(s) on the subsequent questionnaire I am free to decline. | |
| I give permission for members of the research team to use my identifiable information for the purposes of this research project to compare my results in sessions 1 and 2 and understand that I will not be identified or identifiable in the outputs that result from the research. | |
| I agree to take part in the above research project. | |

_____ _____ _____

Name of Participant Date Signature

_____ _____ _____

Name of Researcher Date Signature

This form should be signed and dated by all parties after the participant receives a copy of the participant information sheet and any other written information provided to the participants. A copy of the signed and dated participant agreement form should be kept with the project's main documents which must be kept in a secure location.