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

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Abstract

Growing evidence suggests that social identities may have profound implications for physical activity participation. Real-world examinations of this relationship have, however, been lacking, with research predominantly examining intentions and hypothetical scenarios. To address this shortcoming and further advance understanding in this area, the present study tested relationships between group identification, participation, two exercise-specific outcomes (exercise-specific satisfaction and group cohesion), and a broad health indicator (life satisfaction) among individuals recruited from parkrun. Participants (N=289) completed questionnaires measuring all variables except participants' parkrun participation, which was objectively assessed. Structural equation modeling demonstrated that group identification was significantly associated with greater participation, exercise-specific satisfaction, group cohesion, and life satisfaction. Findings provide real-world evidence of the health-related benefits associated with forming strong social identities in exercise settings.

Key words: social identity; exercise; structural equation modeling; parkrun

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, Mutrie, & Gorely, 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., Ding et al., 2012; Garcia, Healy, & Rice, 2016; Sallis et al., 2006). 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 (Strachan, Shields, Glassford, & Beatty, 2012; Terry & Hogg, 1996; 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; Strachan et al., 2012; Terry & Hogg, 1996).

Social Identity and Exercise

According to the *social identity approach* (Tajfel & Turner, 1979; Turner, Hogg, Oakes, Reicher, & Wetherell, 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 Rhodes & de Bruijn, 2013; Sniehotta, Scholz, & Schwarzer, 2005), however, exploring the relationship between group identification and individuals' actual (rather than intended) exercise participation is a vital next step for research.

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 1. First, building on previous research (Strachan et al., 2012; Terry & Hogg, 1996), 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

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., 2011; Estabrooks, Bradshaw, Dzewaltowski, & Smith-Ray, 2008). 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, Boen, De Cuyper, & Peters, 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). Despite research demonstrating the relationship between overall exercise participation and life satisfaction (e.g., see Grant, Wardle, & Steptoe, 2009) and growing evidence of the potential for one-off distance running events to improve participants' life satisfaction (Sato, Jordan, & Funk, 2015, 2016), the relationship between participation and life satisfaction has 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.

Methods

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.

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.

Measures

Group identification. Participants' identification as a parkrunner was measured using a four-item scale (Postmes, Haslam, & Jans, 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, Widmeyer, & Brawley, 1985) to keep the burden of measurement to a minimum, but also because some GEQ (and Physical Activity Group Environment Questionnaire; Estabrooks & 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 & 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, Emmons, Larsen, & Griffin, 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 $\alpha = .92$).[1]

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

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[1] We also measured enjoyment, via Raedeke's (2007) 8-item version of Kendeirski 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 & Guo, 2011), we removed enjoyment from all subsequent analyses.

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 & 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 Ghosh & Vogt, 2012; Osborne & Overbay, 2004), 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, Finch, & Curran, 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 (Lei & Lomax, 2005; Nevitt & Hancock, 2001). Second, because the chi-square (χ^2) statistic is influenced by multivariate non-normality (Lei & Lomax, 2005), the Bollen-Stine (B-S) bootstrapping procedure was employed. This adaptation of χ^2 provides an adjusted *p*-value correcting for non-normality (Bollen & 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 & Hancock, 2001). As with χ^2, non-significant B-S *p*-values indicate better model fit.

Consistent with recommendations (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999; Kline, 2005), 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 & 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 & 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 & 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 & Stapleton, 2006).

Results

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.

Structural Equation Modeling

Means, standard deviations, and correlations are presented in Table 1. The hypothesised model (Model 1, see Figure 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) 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 ($\beta = .21$, $p < 0.001$; H1), exercise-specific satisfaction ($\beta = .29$, $p < 0.001$; H2), and group cohesion ($\beta = .55$, $p < 0.001$; H3). Group identification was 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 ($\beta = .005$ $p = .936$).[2] 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.[3]

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 χ^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 χ^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

[2] 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.

[3] 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.

those found in Model 2 (β's: .20, .17, .49, and .10 respectively). These findings therefore provide support for our hypothesised theoretical sequence.[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 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 (Strachan et al., 2012; Terry & Hogg, 1996) 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, Spears, & Doosje, 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, Kortekaas, & Ouwerkerk, 1999) may partially explain the transferability

[4] 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.

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 (Falomir-Pichastor et al., 2009; Strachan et al., 2012; Tarrant & Butler, 2011; Terry & Hogg, 1996), 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 (Gaffney & Hogg, 2017; Turner et al., 1987). 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 (Focht,

2009; Wininger & Pargman, 2003). 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., 2011; Estabrooks et al., 2008). 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 & Spink, 1993; Høigaard et al., 2013).

Findings also extend previous research—collectively referred to as the 'social cure' (Jetten, Haslam, & Haslam, 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, Brander, Ballantyne, & Baker, 2013), and with regard to various health indicators, including self-esteem (Jetten et al., 2015) and quality of life (Steffens, Cruwys, Haslam, Jetten, & Haslam, 2016), 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 (Grant et al., 2009), 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. In line with these suggestions, a lack of additional running (or other exercise) besides parkrun may underlie the non-significant relationship observed among our participants. Further research tracking the full range of individuals' exercise behaviours would, however, be required to test this.

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 & 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 (Strachan et al., 2012; Terry & Hogg, 1996), 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).

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.

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Table 1. Means, standard deviations, and correlations.

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 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.

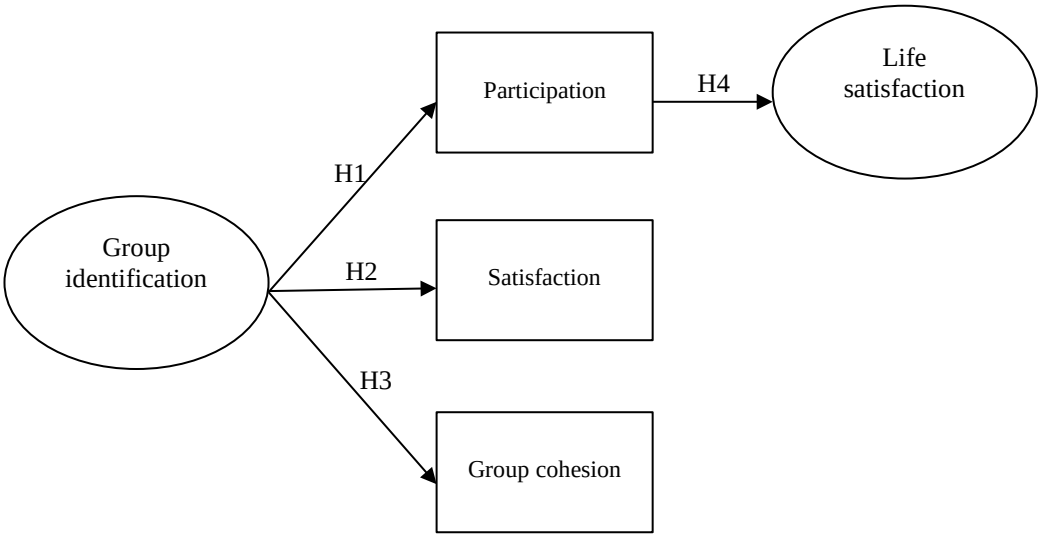

Figure 2. The final model including the standardised regression path coefficients. Ellipses denote latent variables and rectangles observed variables.