Group structure and entitativity in group fitness: considering groupness at within- and between-group levels

M. Blair Evans, Scott Graupensperger, Alex J. Benson, Mark Eys, Bryce Hastings & Jinger S. Gottschall

To cite this article: M. Blair Evans, Scott Graupensperger, Alex J. Benson, Mark Eys, Bryce Hastings & Jinger S. Gottschall (2019): Group structure and entitativity in group fitness: considering groupness at within- and between-group levels, Psychology & Health

To link to this article: https://doi.org/10.1080/08870446.2019.1566548

Published online: 29 Jan 2019.

Submit your article to this journal

View Crossmark data
Group structure and entitativity in group fitness: considering groupness at within- and between-group levels

M. Blair Evans\textsuperscript{a,}\textsuperscript{1}, Scott Graupensperger\textsuperscript{a,}\textsuperscript{1}, Alex J. Benson\textsuperscript{b}, Mark Eys\textsuperscript{c,d}, Bryce Hastings\textsuperscript{e} and Jinger S. Gottschall\textsuperscript{a}

\textsuperscript{a}Department of Kinesiology, Penn State University, University Park, PA, USA; \textsuperscript{b}Department of Psychology, University of Western Ontario, London, Ontario, Canada; \textsuperscript{c}Department of Kinesiology and Physical Education, Wilfrid Laurier University, Waterloo, Ontario, Canada; \textsuperscript{d}Department of Psychology, Wilfrid Laurier University, Waterloo, Ontario, Canada; \textsuperscript{e}Les Mills International, Auckland, New Zealand

ABSTRACT

Objective: How can we distinguish between a collection of individuals exercising alongside one another from group that is exercising ‘together’? This question is central to research on the extent that individuals perceive their fitness settings to entail core features of groups. To advance understanding of the nature of groupness and its implications in exercise, the current study (a) evaluated a brief measure of groupness and (b) examined the extent that groupness predicted perceptions of exertion and affect.

Design: Participants included 633 exercisers ($M_{\text{age}} = 33.92$, $SD = 11.05$, 74% female) who completed surveys after group fitness classes ($k = 34$).

Main outcome measures: Groupness, affect, exertion, and group cohesion.

Results: Exploratory structural equation modelling provided support for a two-factor solution reflecting entitativity and group structure as subdimensions of groupness. The groupness factors were differentially associated with theoretically relevant aspects of classes (e.g. synchronised movement), the individual (e.g. number of members interacted with), as well as group cohesion. Groupness also predicted perceived exertion and affect.

Conclusion: Our research provides support for a brief measure of groupness, advances theory related to how individuals perceive exercise groups, and provides evidence regarding how broader experiences during exercise may relate to exercisers’ perceptions of groupness.

ARTICLE HISTORY
Received 6 April 2018
Accepted 23 December 2018

KEYWORDS
Social influence; exercise psychology; group dynamics; multilevel; scale validation

CONTACT M. Blair Evans mbe13@psu.edu Department of Kinesiology, 276 Recreation Building, Penn State University, University Park, PA 16802, USA

Supplemental data for this article is available online at here

© 2019 Informa UK Limited, trading as Taylor & Francis Group
Introduction

Among the patchwork of influences on physical activity behaviour, our actions are powerfully shaped by the individuals we interact with as well as the organisations and institutions to which we belong (Trost, Owen, Bauman, Sallis, & Brown, 2002). Although proximal connections like family members represent some of the strongest social influences on physical activity, small groups also influence our behaviour (Carron, Hausenblas, & Mack, 1996). Small groups may be most evident in the sport teams we see in our communities, though they are also core features of physical activity contexts ranging from physical rehabilitation and outdoor recreation to private fitness settings (Eys & Evans, 2018). Small groups are also key components of many interventions to promote physical activity that extend across communities and across the lifespan (e.g. Izumi et al., 2015; Watson, Martin-Ginis, & Spink, 2004). What is more, individuals often prefer social exercise settings and are more likely to adhere to group interventions when compared against individual interventions (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006). When explaining reasons for why groups influence physical activity, theorists expect that physical activity groups become a source of affiliation, belonging, and identity – increasing investment in being a member to meet basic needs (e.g. belongingness; Baumeister & Leary, 1995).

Group-based social influence is especially evident in fitness settings, which include community and clinical settings where members exercise together, often led by peer leaders or formal fitness instructors. Considering the popularity of fitness settings alongside high rates of member turnover, Ntoumanis, Thøgersen-Ntoumani, Quested, and Hancox (2017) emphasised the need to study social influences in fitness. For instance, optimal fitness group environments and instructor behaviours foster motivation and adherence (e.g. Ntoumanis et al., 2017; Spink & Carron, 1993). Alongside motivation and adherence, positive group environments and instructor behaviours can enhance exercisers’ affective experiences (Fox, Rejeski, & Gauvin, 2000; Raedeke, Focht, & Scales, 2007). These affective perceptions are vital targets for supporting exercise behaviour because they condition individuals’ anticipated experiences in exercise (Williams, 2008). With these benefits, the study of fitness groups is essential to uncover ways that group settings can enhance the experiences of exercisers. Although not directly generalisable to other contexts, studying fitness groups provides a valuable first step in building theory that can be subsequently tested in clinical and at-risk populations and through interventions that use fitness groups for behaviour change (e.g. Beauchamp et al., 2015).

One way of understanding how groups influence motivation and exercise experiences entails considering their most fundamental characteristic: The degree to which members truly represent a group. For instance, physical activity intervention effects are amplified when physical activity group membership is consistent over time, when members share an identity, and when the physical activity task entails interacting with other members (Burke et al., 2006; Estabrooks, Harden, & Burke, 2012). Furthermore, satisfaction with sport and physical activity groups is promoted when members are bound by common interdependencies (Evans & Eys, 2015). As group influence seems to be contingent upon the degree to which members represent a group, it is important to identify characteristics that signal to individuals that they belong to a ‘group’.
**Groupness**

Theorists use numerous approaches to characterise a ‘true group’. For instance, most efforts to distinguish small groups from social collectives focus on specific characteristics, including how members: (a) are bound by interdependencies such as shared outcomes and task demands, (b) readily recognise themselves as a ‘group’, and (c) develop social structures such as roles that guide their communication (e.g. Brown, 1988; Kozlowski & Ilgen, 2006). Although these characteristics may be observed, the psychosocial construct of *groupness* refers to the extent that exercisers believe they belong to a group. In an initial study involving groupness, a small sample of exercisers ($n = 86$) recalled an exercise group they belonged to within the past six months (Spink, Wilson, & Priebe, 2010). Participants reported their perceptions of group interactions using a 5-item scale that aggregated characteristics of groups (e.g. common fate, social structure, mutual benefit, group processes, self-categorisation). Those perceiving stronger groupness reported more frequent physical activity. This research has, in turn, generated sport-based research that manipulated or measured groupness and revealed positive associations with constructs like social identity and intentions to return to sport (Martin, Balderson, Hawkins, Wilson, & Bruner, 2017; Spink, McLaren, & Ulvick, 2017). Overall, these studies reveal that exercisers may perceive groupness in settings that meet few objective criteria required of a group, while individuals may attribute varying levels of groupness even in ‘true groups’ like sport teams. Despite evidence regarding the role of groupness, researchers have yet to establish a clear theoretical and measurement-based foundation for studying this construct.

When considering the nature of groupness in exercise it is prudent to consider the construct of *entitativity*. Defined as having ‘the nature of an entity, of having real existence’ (Campbell, 1958, p. 17), entitativity is a fundamental evaluation that we make about groups where members share similarity and boundedness. For example, similarity in traits (e.g. skin colour) as well as collective behaviours (e.g. synchronised movements) each contribute to perceptions of a group as an entity (Ip, Chiu, & Wan, 2006). Researchers often directly measure the extent that members share a category and represent a ‘group’ (i.e. ‘to what extent do these individuals represent a group?’). However, researchers also measure shared goals, similarities, interactions, and social structures to represent entitativity, or as features of groups that individuals look towards when evaluating entitativity (Blanchard, Caudill, & Walker, 2018; Lickel et al., 2000; Rydell & McConnell, 2005). Across these operationalisations, perceptions of entitativity impact the value that individuals ascribe to their groups (Crawford & Salaman, 2012). Although entitativity is predominately used to study intergroup processes (i.e. studying how members of outgroups and ingroups interact), it may be a central element for understanding the extent that exercisers see a collective as an authentic group.

Applying this foundation to exercise groups, we define groupness as the extent that members of a collective (i.e. two or more individuals) perceive that they belong to a group and rely on others, as well as the degree that members feel they interact and form a social structure. This distinguishes abstract perceptions of entitativity (i.e. we seem like a group) from more concrete social structures and member interactions (i.e. we act like a group). Although both of these aspects have occasionally been
combined when measuring the construct of entitativity (e.g. Rydell & McConnell, 2005), more recent literature considers interactions and social structures as distinct from entitativity (Blanchard et al., 2018). This contrast is also practically evident in conceptualisations that distinguish group distinctiveness from group structure and processes (Spink & Carron, 1993).

Beyond delineating what groupness is, it is also essential to emphasise that groupness is expected to be associated with, but distinct from, group cohesion. Group cohesion entails perceptions that one’s exercise group is united when pursuing goals (i.e. group integration) and satisfies the affective needs that individuals hold related to the group (i.e. attractions to the group) both during the task and through social interactions (Estabrooks & Carron, 2000). Considering that cohesion enhances outcomes of exercise groups and provides a motive to continue being a member, it is seen as the ‘active ingredient’ in interventions and initiatives (Estabrooks et al., 2012; Harden, Burke, Haile, & Estabrooks, 2015). Indeed, Estabrooks et al. (2012) emphasised the importance of cohesion in their definition of group dynamics-based exercise interventions, as approaches that: ‘…provide opportunities for group members to interact, include activities that enhance attractiveness of the group across members, and increase perceptions of group cohesion’ (p. 20).

Group cohesion and groupness are each valuable characteristics of groups, but are distinct evaluations. Groupness refers to the extent that members represent a group, regardless of how appealing the group is or how efficiently members interact. Meanwhile, cohesion focuses specifically on how members perceive these qualities of a group, by evaluating feelings of unity during member interaction and attraction to groups in both social and task domains. Crucially, researchers in other domains (e.g. social psychology; organisational psychology) have distinguished entitativity from group cohesion by showing that cohesion perceptions are actually contingent upon entitativity (Blanchard et al., 2018; Ip et al., 2006). Therefore, distinguishing these constructs places practitioners and researchers in a better position to leverage cohesion-enhancing strategies. For instance, team building models commonly endorse strategies that are direct reflections of entitativity and group structure (e.g. forming individual roles and norms; Spink & Carron, 1993). Measuring groupness could be a way to assess the process of building groups, with cohesion as a longer-term outcome. Second, certain group fitness contexts may limit the potential for group cohesion to develop (e.g. drop-in style classes). Members may nevertheless vary regarding the amount of groupness they attribute to these settings, which may influence their adherence (e.g. Spink et al., 2010).

**The current study**

Studying groupness offers an avenue to better understand the nature of groups and identify characteristics that are responsible for social influences on physical activity. The current study was thus conducted to advance our understanding of the nature of groupness and entailed two research objectives related to developing and validating a measure of groupness, followed by one research objective related to how groupness is associated with exercise experiences.
First, we sought to assess the validity of a brief groupness measure by examining construct validity (i.e. factor structure) along with criterion validity (i.e. associations with characteristics of members and the class as a whole). Exploratory structural equation modelling (ESEM) was used to evaluate the psychometric properties of the measure, which was optimal for testing the proposed two-factor structure: entitativity and group structure. ESEM was valuable considering the early stage of measure development (e.g. identifying misspecified items), as well as its capacity to account for structures where factors correlate with one another, as anticipated between group structure and entitativity. Second, we sought to evaluate the nomological validity of the groupness measure by examining associations with class characteristics and group cohesion. Regarding objective class characteristics, we expected that groupness would be highest when members interacted with a greater number of other members and within certain types of classes (e.g. larger classes, and those with synchronised movement; Lewis & Sullivan, 2018). The construct of cohesion is ideally situated to test criterion validity given that it theorised to be correlated with, yet distinct from, the current operationalisation of groupness. We anticipated that those perceiving greater groupness would report greater group cohesion, and specifically that they would be more attracted to the group (Blanchard et al., 2018; Ip et al., 2006).

Finally, we designed this study to examine how groupness predicted perceived exertion and affective valence that individuals recalled from their recent fitness class. Exertion and affect are influenced by one’s social environment, and are critical evaluations that are expected to influence motivation and adherence over time (Williams, 2008). Fitness groups were selected as a context where groups are widespread and shape exercisers’ experiences. By examining perceptions directly following specific group exercise bouts, and by integrating numerous responses within groups, we aimed to provide insight into the extent that groupness shapes exercise experiences.

Methods

Participants and context

Regarding the research context, we sampled exercisers from 34 different classes across four fitness club locations, though most participants were located at a single club (52%). All fitness clubs were located in New Zealand and were facilities of Les Mills International. This organisation designs and distributes group fitness class programs to health clubs worldwide, and owns private fitness facilities where those programs are provided. Class sizes ranged from 10 to 122 participants (M = 51.50, SD = 28.69), and the average number of respondents per class was 18.61 (SD = 8.13). Classes spanned numerous fitness types including various cardiovascular formats (i.e. indoor cycling, mixed martial arts, plyometrics, dance), strength training, yoga fusion, and high intensity interval training. Classes were conducted in the morning before 10:00 am (14%), midday (34%; from 10:00 am to 3:00 pm), and late afternoon (52%; after 3:00 pm). Recruitment at each club was conducted at varying times and days to limit the overlap of class members (i.e. limited repeated participation) and was focused on classes with varying instructors (i.e. reduce systematic influences on group perceptions attributed to instructors). Classes spanned 33 different instructors (one instructor taught
two classes), with instructors ranging from 20 to 57 years of age ($M = 35.93$, $SD = 10.50$; 36% male).

The final sample of participants included 633 exercisers ($M_{age} = 33.92$, $SD = 11.05$, range $= 17–76$, 74% female) who were recruited after completing a group fitness-based exercise class. Most participants reported being in the ‘maintenance’ phase of physical activity involvement, having been consistently active for more than 6 months (67%). Participants reported attending 4.07 classes per week ($SD = 1.78$), although it is important to note that participants often participate in back-to-back classes during the same day. The average body mass index across the sample was 23.97 ($SD = 3.75$). Refer to Table 1 for further descriptive statistics.

**Procedure**

After gaining approval from four club managers, fitness instructors and staff were informed of the study, which was conducted over a period of two weeks. The sampling protocol was arranged in concert with all clubs, to promote involvement from a diversity of classes (i.e. class types, times, and instructors) and to seek unique participants. Instructors directed attendees from their class towards club meeting spaces at the conclusion of their exercise session to complete the voluntary pen and paper surveys. A study investigator was present to aid participants through their survey. Additional details regarding classes (i.e. class time, number of attendees, class type, instructor demographics) were collected from each club upon completion of the study using electronic records. The lead investigator gained approval from his institutional human ethics research board before initiating this study and all participants provided informed consent.

**Measures**

**Demographics and class characteristics**

Participants completed open-ended items to indicate age, gender, weight, and height. Participants reported their average weekly group fitness bouts across class types using the item: ‘On average, I participate in [blank] group fitness bouts per week at this facility.’ Participants also confirmed the class they had completed and reported the number of other individuals from the class who they spoke to using an open-ended response question: ‘How many other class members did you personally interact with today (e.g. instructors or participants you talked to before, during, or after class).’ This item was developed for specific use within the current study.

**Groupness**

A measure of groupness was designed for this study. An initial item pool was drawn from past research involving groupness in exercise, which used a single 5-item scale with a small sample of undergraduate students (Spink et al., 2010). Although some items were directly applied, other items were altered to improve readability or to reduce the potential for an item to be ‘double-barreled’. For example, the item ‘Does this structured exercise setting have norms or roles concerning group behavior?’ was
Table 1. Descriptive statistics and bivariate correlations at the individual level and class level.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.19</td>
<td>-.25</td>
<td>.37†</td>
<td>.41*</td>
<td>-.02</td>
<td>.04</td>
<td>-.33</td>
<td>-.12</td>
<td>-.13</td>
<td>.29</td>
<td>.20</td>
<td>.34*</td>
<td></td>
</tr>
<tr>
<td>Affect</td>
<td>.01</td>
<td>-.34†</td>
<td>.27</td>
<td>.38†</td>
<td>.07</td>
<td>.43*</td>
<td>-.29</td>
<td>-.35†</td>
<td>.26</td>
<td>.52**</td>
<td>.31</td>
<td>.41*</td>
<td></td>
</tr>
<tr>
<td>Exertion</td>
<td>.02</td>
<td>.07</td>
<td>-.09</td>
<td>-.06</td>
<td>.63**</td>
<td>-.05</td>
<td>.70**</td>
<td>.36†</td>
<td>.04</td>
<td>-.38†</td>
<td>.14</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td>.17**</td>
<td>.09†</td>
<td>.07</td>
<td>.45**</td>
<td>.12</td>
<td>.24</td>
<td>.09</td>
<td>.14</td>
<td>.13</td>
<td>.46**</td>
<td>.39†</td>
<td>.46**</td>
<td></td>
</tr>
<tr>
<td>Attraction to group-social</td>
<td>.08</td>
<td>.23**</td>
<td>.13*</td>
<td>.37**</td>
<td>.33</td>
<td>.29</td>
<td>-.08</td>
<td>-.30</td>
<td>.11</td>
<td>.38†</td>
<td>.69**</td>
<td>.71**</td>
<td></td>
</tr>
<tr>
<td>Attraction to group-task</td>
<td>-.03</td>
<td>.21**</td>
<td>.39**</td>
<td>.08</td>
<td>.34**</td>
<td>.20</td>
<td>.44*</td>
<td>.18</td>
<td>.16</td>
<td>-.05</td>
<td>.41*</td>
<td>.41*</td>
<td></td>
</tr>
<tr>
<td>Attendees</td>
<td>-.03</td>
<td>.14**</td>
<td>.03</td>
<td>.07</td>
<td>.10*</td>
<td>.08</td>
<td>.01</td>
<td>-.17</td>
<td>.07</td>
<td>.35†</td>
<td>.48**</td>
<td>.47**</td>
<td></td>
</tr>
<tr>
<td>Intensitya</td>
<td>-.18**</td>
<td>-.09†</td>
<td>.35**</td>
<td>.04</td>
<td>-.01</td>
<td>.17**</td>
<td>.08</td>
<td>.25</td>
<td>.17</td>
<td>.04</td>
<td>.04</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>Equipmenta</td>
<td>-.09†</td>
<td>-.13*</td>
<td>.15**</td>
<td>-.04</td>
<td>-.07</td>
<td>.06</td>
<td>-.12*</td>
<td>.18**</td>
<td>-.68*</td>
<td>-.56*</td>
<td>-.40*</td>
<td>-.43*</td>
<td></td>
</tr>
<tr>
<td>Syncheda</td>
<td>-.05</td>
<td>.10†</td>
<td>.05</td>
<td>.03</td>
<td>.01</td>
<td>.04</td>
<td>.06</td>
<td>.22**</td>
<td>-.74**</td>
<td>.53**</td>
<td>.32</td>
<td>.38†</td>
<td></td>
</tr>
<tr>
<td>Durationa</td>
<td>.11*</td>
<td>.18**</td>
<td>-.18**</td>
<td>.14**</td>
<td>.12*</td>
<td>-.01</td>
<td>.40**</td>
<td>.12*</td>
<td>-.54**</td>
<td>.44**</td>
<td>.27</td>
<td>.37†</td>
<td></td>
</tr>
<tr>
<td>Entitativity</td>
<td>.01</td>
<td>.22**</td>
<td>.20**</td>
<td>.24**</td>
<td>.50**</td>
<td>.34**</td>
<td>.19**</td>
<td>.06</td>
<td>-.14**</td>
<td>.12*</td>
<td>.11*</td>
<td>.87**</td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>.06</td>
<td>.22**</td>
<td>.19**</td>
<td>.33**</td>
<td>.52**</td>
<td>.30**</td>
<td>.20**</td>
<td>.02</td>
<td>-.18**</td>
<td>.16**</td>
<td>.14**</td>
<td>.77**</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>–</td>
<td>-5 to +5</td>
<td>6-20</td>
<td>–</td>
<td>1-7</td>
<td>–</td>
<td>0.1</td>
<td>1-7</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4.70 (1.47)</td>
</tr>
<tr>
<td>Individual-level mean</td>
<td>33.92 (11.05)</td>
<td>4.47 (11.15)</td>
<td>16.32 (2.34)</td>
<td>2.04 (2.85)</td>
<td>5.44 (1.46)</td>
<td>6.38 (8.5)</td>
<td>59.82 (32.89)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4.70 (1.47)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: The sample for analyses included 613 individuals and 34 classes. Values presented below the diagonal are correlations at the individual level, those above the diagonal are at the class level.
†p < .05.
*p < .01.
**p < .001.
*aBinary (0,1) variables.
split into two items that referred to roles and norms separately. Additional items were drawn from sport and organisational psychology scales describing group interdependence (Evans & Eys, 2015) and entitativity (Hogg, Sherman, Dierselhuis, Maitner, & Moffitt, 2007; Lickel et al., 2000). We initially developed nine items, which were rated on a 1 (not at all) to 7 (very much so) scale and expected to load onto entitativity and group structure subscales. All nine items are provided within Table 2.

### Attraction to the group (group cohesion)
As an indicator of cohesion, pertinent as a measure of criterion validity, we used two items from the Physical Activity Group Environment Questionnaire (PAGEQ; Estabrooks & Carron, 2000). These items were drawn from scales for attraction to the group task (‘I liked the amount of physical activity that I got in this class’) and attraction to the group social (‘I enjoyed my social interactions in this class’), rated on a 1 (not at all) to 7 (very much so) scale. Although the PAGEQ is a measure of group cohesion that includes four subscales across numerous items, attraction to the group dimensions were selected to indicate individuals’ affective perceptions of the group in which they participated and because these two items were reported on by Maher, Gottschall, and Conroy (2015) when exploring post-class evaluations of similar groups.

### Affect
Perceived affect was assessed using the item ‘How did you feel throughout the class you just participated in’ from -5 [unpleasant (miserable)] to +5 [pleasant (happy)]. Although this single item measure of affect is commonly used within exercise psychology research (see Ekkekakis, Hall, & Petruzzello, 2008), it is important to note that only the affective dimension was measured (not arousal) and that the measure was completed after class.

### Table 2. Standardised factor loadings and list of retained and removed groupness items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Standardised factor loading (k)</th>
<th>Entitativity</th>
<th>Group structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Members of this class shared a collective goal</td>
<td>.68</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td>2. This exercise session felt like a team effort</td>
<td>.58</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>3. The people in this class felt like a group (i.e. ‘we’) as opposed to simply a collection of individuals</td>
<td>.73</td>
<td>-.02</td>
<td></td>
</tr>
<tr>
<td>4. Members of this class took-on roles that impacted others</td>
<td>.01</td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>5. This class has norms for behavior (e.g. who will be here and where we all stand)</td>
<td>.07</td>
<td>.56</td>
<td></td>
</tr>
<tr>
<td>6. Members of this class encouraged one another</td>
<td>-.03</td>
<td>.87</td>
<td></td>
</tr>
</tbody>
</table>

**Removed items**
7. There is something unique about this exercise class, compared to other classes
8. I relied on other members of this class to perform my best
9. Members of this class communicated with one another

Note: Bold values indicate significant factor loadings at $p \leq .01$. 

---

M. B. EVANS ET AL.
Perceived exertion

Perceived exertion was measured using the Rating of Perceived Exertion Scale (Borg, 1998). Participants were instructed to ‘Rate how hard you had to exert yourself during the exercise class you just completed. Focus on your total feeling of exertion.’ Participants rated perceived exertion on a scale from 6 (no exertion at all) to 20 (maximal exertion).

Data analysis

Initial data analysis included reviewing data to consider missing values and to examine whether data met the assumptions related to the current analyses. When nesting participants within groups, 12 participants were identified as having provided complete responses at two time-points. In these cases, only participants’ initial responses were retained and their second set of responses were discarded. During analysis, a further step was to categorise class type. Beginning with 12 class types, the research team sought experts within the fitness facilities to classify classes based on intensity, synchronisation, equipment use, and class duration. The experts then iteratively worked together to create four binary class type variables based on: (a) intensity (0 = low intensity, 1 = high intensity), (b) equipment use (0 = no equipment used, 1 = classes using equipment such as cycles or weight bars), (c) synchronisation (0 = members do not move in synchrony; 1 = members do move in synchrony), and (d) duration (0 = 30 minutes, 1 = 45 or 60 minutes). For example, core exercise classes were classified as low intensity, no equipment, non-synchrony, and brief. A full classification table and details of classes are provided in the online supplemental materials.

Subsequent analyses included exploratory structural equation modelling (ESEM) to assess the factor structure of responses to the groupness items using Mplus 8 software (Asparouhov & Muthén, 2009). We applied maximum likelihood estimation, which is robust to some issues that are common to subjective survey-based data (e.g. non-normality). ESEM was initiated with the expectation that evaluations of groupness would represent personal evaluations across two subscales of entitativity and group structure. We used ESEM instead of confirmatory analysis because of the novelty of the items and the proposed factor structure (e.g. Gucciardi, Hanton, & Mallett, 2012). The model specification allowed factors to correlate with one another, while error variances were constrained to one and factor loadings were scaled to one. Using the COMPLEX function, analyses produced fit indices and values (e.g. chi-square, standard errors) that account for the nested nature of the data even though analyses only produced factors at the individual level. Using this function is in contrast to using a two-level analysis, which would demand a larger number of exercise groups than in the current study. We applied the CENSOR function to adjust estimates based on ceiling effects. We assessed factor solutions across absolute indices of model fit [i.e. chi-square value ($\chi^2$), root mean square error of approximation (RMSEA)] along with incremental indices of model fit [i.e. comparative fit index (CFI) and Tucker–Lewis index (TLI)]. When using the COMPLEX and CENSORED functions, MPlus reports a weighted root mean square residual (WRMR), for which a typical accepted value is below 1.0 (DiStefano, Liu, Jiang, & Shi, 2017).
Multilevel regressions were conducted to examine key associations at the individual-level (i.e. 633 individuals) and class-level (i.e. 34 classes). Although classes were further housed within clubs, the fact that only four facilities were included meant that higher-order analyses at a club level could not be conducted. Prior to conducting regression analyses, intraclass correlations (ICCs) of key variables were computed by specifying null models. ICCs hold value from a descriptive standpoint while also justifying the decomposition of data into within- and between-group effects (Preacher, Zyphur, & Zhang, 2010). Initial analyses applying random intercepts and random slopes did not provide evidence that slopes for key associations varied by group. As such, resulting analyses involved random intercept models. Regressions were first conducted to examine how individual features (i.e. age, number of class members interacted with) and class level features (i.e. class type; class size) predicted entitativity and group structure perceptions (Regressions 1 and 2). Subsequent analyses considered how entitativity and group structure predicted attraction to group-task and attraction to group-social items (Regressions 3 and 4), along with regressions examining how both groupness subscales predicted perceived exertion and affect (Regressions 5 and 6). Several regressions also included key constructs theorised to potentially influence the relationships of interest. Regressions 3 and 4 controlled for perceptions of other members interacted with, which is a social construct that may be important in relation to the association between groupness and attraction to the group (i.e. cohesion). Meanwhile, regressions 5 and 6 controlled for class intensity, as the intensity of classes is predictive of affect and perceived exertion (Ekkekakis et al., 2008). In all cases, we computed group-mean centred values and interpreted standardised coefficients to account for variability in the scaling of predictors (Enders & Tofighi, 2007). As such, coefficients represent the amount of change in the dependent variable for each standard deviation unit change in the predictor.

Results

Less than 5% of the data were missing, and analyses demonstrated that missing values for scale-scored items were missing completely at random using Little’s (1988) MCAR test, \( \chi^2 (82) = 101.27, p = .07 \). As a result of missing values on specific items or scales, analyses examined the final sample of 613 individuals across 34 groups/classes.

Evaluating the factor structure of a brief groupness measure

Modelling was conducted across two steps. In the initial ESEM model, adequate model fit was achieved, \( \chi^2 = 124.39, p < .001; \) RMSEA = 0.08 (.07–.09); CFI = 0.95; TLI = 0.91; WRMR = 0.61. However, one item loaded onto both factors significantly: The item ‘I relied on other members of this class to perform my best’ demonstrated standardised loadings greater than .58. In subsequent model attempts, one item was not loading on either factor (i.e. all loadings below .30, ps > .05; ‘There is something unique about this exercise class, compared to other classes’) while another item caused model misspecification (‘Members of this class communicated with one another’). The subsequent ESEM model removing these items and featuring six items demonstrated good
model fit, $\chi^2 = 7.70, p = .10$; RMSEA = .04, 90% CI (0.00–0.08); CFI = 0.99; TLI = 0.98; WRMR 0.22. The interfactor correlation between subscales was high ($r = .83$), but the model fit indices and theoretical foundation led us to retain a two-factor model. See Table 2 for all items and loadings.

**Multilevel regressions with groupness**

**Descriptive results**

Table 1 includes descriptive statistics and correlations for all study variables at the individual and class level, while the online supplemental table includes descriptive statistics stratified by class type. In addition, the ICCs computed within null models (see Tables 3 and 4) ranged from .06 (affect) to .22 (perceived exertion). Because ICC's represent variability in a construct that is attributable to shared group patterns, a small-to-moderate amount of variability in key variables could be attributed to the specific class context. In addition, assumptions of typical multivariate analyses were supported. Although responses to scale scored items like affect were negatively skewed, the MLR function in Mplus is robust to non-normality. As noted above, there was a high interfactor correlation between groupness subscales. Although this can increase potential for model misspecification, both variables were included as simultaneous predictors in each model because of the (a) theoretical value of estimating the unique variance explained by each groupness factor and (b) large sample size. Furthermore, although multicollinearity among predictors in multilevel models makes estimates more conservative (e.g. inflates standard errors), the variance predicted in outcome variables typically remains consistent (Shieh & Fouladi, 2003).

**Predicting group structure and entitativity (Regressions 1 and 2)**

Recall that we expected features of individuals and their classes would predict groupness. Regression results are presented in Table 3. At the individual level, more interactions with others predicted higher perceptions of entitativity ($b = 0.23, p < .001$) and group structure ($b = 0.31, p < .001$). At the class level, larger class sizes ($bs = 0.49$ and $0.50, ps < .001$) and more interactions among members ($bs = 0.45$ and $0.46, ps = .02$) were associated with heightened perceptions of entitativity and group structure. Regarding class type, longer class duration ($b = -0.47, p < .001$) and equipment use ($b = -0.48, p = .01$) corresponded to lower perceptions of entitativity. Shorter class duration ($b = -0.42, p < .001$) and having members engage in synchronous movement ($b = 0.39, p < .01$) corresponded to stronger group structure perceptions. Although relatively limited variance was predicted at the individual level (Entitativity = 5%; Group structure = 10%), much higher variability was predicted at the class level (Entitativity = 65%; Group structure = 75%).

**Predicting attraction to group (Regressions 3 and 4)**

Regression results are presented in Table 4 and included entitativity, group structure, as well as the number of social interactions as predictors at both levels. At the individual level, entitativity was the sole predictor of attraction-to-group-task ($b = 0.25, p < .001$), whereas all three individual-level variables predicted perceptions of
attraction-to-group-social ($b = 0.22–0.24$, $p < .001$). At the group level, classes that held stronger perceptions of group structure reported higher attraction to group social ($b = 0.41$, $p = .04$), whereas there were no significant predictors of class-level attraction to group task. Variance in attraction to group perceptions that was predicted ranged across both models at the individual level (social = 30%; task = 10%) and at the class level (social = 75%; task = 32%).

**Predicting exertion and affect (Regressions 5 and 6)**

Regression results are presented in Table 4 and integrated group structure and entitativity at both levels, along with class intensity as a Level 2 predictor. Models predicted small amounts of variance at the individual level (Affect = 4%; Exertion = 5%) and moderate levels of class-level variance (Affect = 55%; Exertion = 58%). At the individual level, greater entitativity predicted more positive affect ($b = .13$, $p = .02$), whereas higher group structure predicted increased exertion ($b = .14$, $p = .02$).

**Discussion**

When does a collection of individuals exercising together represent a ‘group’ in the eyes of its members? Although evidence regarding groupness is nascent, understanding the factors that shape perceptions of such fundamental group characteristics may hold value when enhancing group environments and promoting physical activity. The current research advances a brief measure of groupness, identifies individual-level and group-level antecedents of groupness, and demonstrates linkages between groupness and key perceptions of fitness groups. Findings support a novel two-factor structure representing how individuals perceive groupness in fitness settings, revealing associations with class size, those interacted with, and class type. Although groupness strongly predicted group cohesion perceptions, small but significant associations with
additional evaluations of the fitness setting (i.e. affect, exertion) indicate the potential for groupness to explain unique variance in how individuals experience exercise sessions.

The most notable implications of this work involve theoretical and measurement developments. Research in sport and exercise contexts evaluated groupness using a latent structure spanning five items (Spink et al., 2010), whereas research from other domains tended to exclusively evaluate entitativity as a more specific and abstract concept (Hogg et al., 2007; Lickel et al., 2000). Our findings reveal the potential for groupness to be evaluated by underlying features of the group that represent boundedness, interdependence, and the feeling of being a group (i.e. entitativity), along with perceptions of group structure that involve the degree that members form roles and interact with one another. At the heart of these distinctions is a contrast between the abstract evaluations of entitativity with more concrete evaluations of how group members interact. Given that researchers from other domains advocate for numerous components of groupness (Crawford & Salaman, 2012), developing a groupness tool with a broader bandwidth may demonstrate additional underlying features of entitativity (e.g. similarity, interdependence) along with group structure (e.g. roles, norms, communication).

Validity of this measure was also supported by linking theoretically relevant constructs to groupness (i.e. criterion validity). Perhaps most notably, individuals (and groups) who reported interacting with a higher number of members before, during, and after class perceived higher groupness. Furthermore, it is interesting that larger class sizes predicted higher groupness. We expect that a large collection of individuals could provide a symbolic experience, as research on crowd behaviour reveals that large collective gatherings generate strong affective reactions and feelings of significance for people who participate (e.g. Páez, Rimé, Basabe, Wlodarczyk, & Larraitz,

---

**Table 4. Multilevel regression results when predicting cohesion, affect, and exertion.**

<table>
<thead>
<tr>
<th>Fixed effects</th>
<th>Regression 3: Attraction to group-social</th>
<th>Regression 4: Attraction to group-task</th>
<th>Regression 5: Affect</th>
<th>Regression 6: Exertion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td>.22 (.05)**</td>
<td>- .02 (.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group structure</td>
<td>.23 (.06)**</td>
<td>.09 (.06)</td>
<td>.08 (.05)</td>
<td>.14 (.07)*</td>
</tr>
<tr>
<td>Entitativity</td>
<td>.24 (.05)**</td>
<td>.25 (.05)**</td>
<td>.14 (.05)†</td>
<td>.10 (.07)</td>
</tr>
<tr>
<td><strong>Class level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactions mean</td>
<td>.27 (.17)</td>
<td>-.06 (.18)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class intensity</td>
<td></td>
<td></td>
<td>-.36 (.13)*</td>
<td>.75 (.10)**</td>
</tr>
<tr>
<td>Group structure mean</td>
<td>.41 (.23)†</td>
<td>.27 (.33)</td>
<td>.73 (.41)</td>
<td>.01 (.21)</td>
</tr>
<tr>
<td>Entitativity mean</td>
<td>.33 (.22)</td>
<td>.34 (.35)</td>
<td>-.12 (.42)</td>
<td>.10 (.20)</td>
</tr>
<tr>
<td>Intercept</td>
<td>11.54 (1.83)**</td>
<td>26.87 (9.38)**</td>
<td>26.63 (5.55)**</td>
<td>13.05 (2.79)**</td>
</tr>
<tr>
<td>Level 1 $R^2$ (SE)</td>
<td>.30 (.04) **</td>
<td>.10 (.03) **</td>
<td>.04 (.02)†</td>
<td>.05 (.02) *</td>
</tr>
<tr>
<td>Level 2 $R^2$ (SE)</td>
<td>.75 (.09) **</td>
<td>.32 (.17)†</td>
<td>.55 (.21) *</td>
<td>.58 (.14) **</td>
</tr>
<tr>
<td>Intraclass correlation [null(final)]</td>
<td>.08 (.10)</td>
<td>.07 (.08)</td>
<td>.06 (.07)</td>
<td>.22 (.23)</td>
</tr>
<tr>
<td>Loglikelihood</td>
<td>-972.914</td>
<td>-727.09</td>
<td>-1106.012</td>
<td>-1319.457</td>
</tr>
<tr>
<td>Akaike</td>
<td>1963.828</td>
<td>1472.186</td>
<td>2228.025</td>
<td>2654.913</td>
</tr>
</tbody>
</table>

Note: Coefficients are presented as standardised values, using the STDYX option.
†p < .05.
*p < .01.
**p < .001.
and larger groups engaged in physical tasks reduce perceptions of pain and effort (Lewis & Sullivan, 2018). Providing a parallel example, a small mob or protest of five or six individuals on a sidewalk may feel little of the degree of groupness felt by a massive group standing across a fence from them. These findings are interesting when held in contrast to findings about group cohesion, which is often stronger in smaller fitness classes (Carron & Spink, 1995). Number of members in a class may be one facet of groups where the association with cohesion would differ or compete with the association with groupness: Large classes may provide a less united group, but may result in unique chances to interact with others. Additionally, groupness varied across class types. Perhaps most strongly tied to theory (e.g. Lewis & Sullivan, 2018), classes demanding synchronous movement (e.g. aerobics classes) generated stronger perceptions that members had group structure.

Regarding perceptions of classes that were predicted, groupness was most closely associated with perceptions of social cohesion (attraction to the group – social) at the group- and individual-levels (i.e. *I enjoyed my social interactions in this class*). This supports expectations regarding the association between cohesion and groupness, although longitudinal or experimental research is necessary to support theorising about how these two constructs diverge. The current findings also provide insight into how groupness influences the evaluations we derive from our group experience, even though associations with perceived affect and perceived exertion were modest at the individual level. For example, regarding the association with perceived exertion, it is possible that increased group structure generates either: (a) incentive to invest more effort into exercise sessions or (b) interaction and communication that conveys a sense that one is working harder. Beyond these direct associations, however, future researchers could examine more complex predictions by examining how groupness may moderate the associations between other variables that hold theoretical relevance. Using the modelling of affect during activity as an example (e.g. Ekkekakis et al., 2003), perhaps momentary associations between exercise activities and affect will take-on different patterns when individuals feel that the groups they perform them in have high groupness.

**Limitations and future directions**

Despite these theoretical implications, limitations of the current research are important to convey. First, conducting the survey in a post-class environment and on a voluntary basis meant that it was important to employ brief or single-item versions of larger scales – often relying on single items. This constrained the possible range of items included in the pool for measuring groupness so that, when some items underperformed, aspects of groupness were not incorporated in the scale (e.g. relying on other exercisers). Furthermore, although multilevel analyses were valuable to assess effects across 34 classes, participants were also members of four fitness facilities within a larger commercial fitness organisation. This small number and uneven distribution across clubs limited the opportunity for higher-order analyses. Because class-level analyses in such models conflate elements of class-level and club-level variance, along
with variability in instructors, the variability attributed to groups should be interpreted cautiously.

This study was also limited in its potential to assess characteristics of groups that may impact groupness. In drop-in fitness groups like the context of the current study, fitness instructors have a substantial role in impacting motivational states. For instance, Ntoumanis et al. (2017) demonstrated how instructor training in autonomy-supportive strategies impacted exerciser motivation across varying class types. Instructor behaviours are thus important to take into account, especially behaviours that promote entitativity (e.g. use of pronouns like ‘we’) and group structure (e.g. developing norms). Similarly, analyses did not account for objective indicators of group interaction, including the extent that a group’s members are consistent and the frequency that a given member attends a given group. As such, instructor behaviours and class characteristics are important targets for furthering understanding of groupness.

The nature of the sample is also important to consider when deriving implications, as participants included a relatively homogeneous sample who were frequently active. We expect that evaluations of groupness could be generalisable, but research is necessary to examine whether response patterns and associations with other constructs are still evident in inactive and more diverse samples. Particularly, although this tool is unlikely to generalise to all forms of group-based exercise intervention, it has the potential effectively assess experiences within interventions that make use of community-based group fitness. As one example, Beauchamp et al. (2015) conducted a fitness group-based intervention housed in a community facility, wherein older adults were randomly assigned to group compositions varying according to age and gender. Indeed, the theoretical foundation for this intervention was developed through research in broader community fitness contexts, including samples that were occasionally younger or more active (e.g. Dunlop & Beauchamp, 2012). Groupness aligns with many strategies used to enrich exercise groups (e.g. assigning roles; creating names to make groups more distinct; using tasks involving cooperation; establishing group goals; Spink & Carron, 1993), so measuring it throughout the duration of interventions may provide a ‘process measure’ to evaluate components of interventions that have the strongest impact (see Steckler, Linnan, & Israel, 2002). It is essential that further research is conducted to support such an extension.

Further practical application of groupness measurement relates to the potential to examine group environments spanning a broader spectrum of contexts. Considering that cohesion perceptions may be unlikely to develop in some community settings like the current context (i.e. limited social interactions; shifting membership), measurement of groupness may reveal the value in engendering a feeling among members that they belong to a group. There is even the potential to follow the approach of Crawford and Salaman (2012), who asked members to list all of the groups they belonged to and report perceived entitativity and basic needs satisfied by each. Related to physical activity, measures of groupness may be well-suited for examining the variety of group environments in which people engage in physical activity alongside others.
Conclusions

The current research is the first effort to use intact groups to consider the role of groupness within fitness classes. The brief measure that emerged from our efforts to develop a measurement tool included subscales of entitativity and group structure, and associations were identified with aspects of fitness class environments as well as individuals’ perceptions of affect and exertion. Notable characteristics of the current study were that participants’ responses were tethered to a specific group context (i.e. recently completed class) and were evaluated at both group- and individual-levels. Research building from these findings may be especially valuable if it entails longitudinal and intensive designs with a goal of uncovering when a collection of individuals exercising alongside one another become a group that is exercising together. In other words, we hope that the current findings encourage researchers to consider how exercisers come to believe they are a collection of individuals, are bound within a group, and interact as such.

Disclosure statement

No potential conflict of interests was reported by the author(s).

Funding

Partial funding to complete this proved was funded through a research contract funded by Les Mills International [0402327 UP46NF0].

ORCID

M. Blair Evans http://orcid.org/0000-0003-0668-4928
Scott Graupensperger http://orcid.org/0000-0002-8655-1190

References


