Transformational Teaching, Self-Presentation Motives, and Identity in Adolescent Female Physical Education

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Abstract

This study examined whether teachers’ use of transformational teaching behaviours within physical education (PE), as perceived by adolescent girls, would predict girls’ moderate-vigorous physical activity (MVPA) via mediated effects of physical activity self-presentation motives, physical activity identity and PE class engagement. Self-report data were acquired at two time points, one week apart, from 273 Scottish high school girls in grades S1-S3 ($n_{s1} = 91; n_{s2} = 108; n_{s3} = 74$). Significant predictive pathways were found from transformational teaching to girls’ MVPA via mediated effects of acquisitive self-presentation motives and physical activity identity. Results are discussed in relation to existing literature and future research directions.

Keywords: leadership, exercise identity, impression motivation, impression construction, physical activity
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Globally, the prevalence estimate of physical inactivity among adolescent females exceeds 80% (Hallal, Andersen, Bull, Guthold, Haskell & Ekelund, 2012). Scotland, in which the present study was conducted, recently ranked as least successful in tackling sedentary behaviour and encouraging participation in physical activity among 38 countries in an international study of physical activity levels among youth (Active Healthy Kids, 2016). A significant decrease in female physical activity after age 11 has been identified (Active Healthy Kids Scotland, 2016), with government figures further showing that almost half (47%) of females aged 13-15 years are insufficiently active when assessed against the recommended physical activity guidelines (The Scottish Government, 2015). The Scottish Government has invested £3 million domestically per annum in recent years to increase physical activity in those furthest from meeting national guidelines, including adolescent girls (The Scottish Government, 2014). Inactivity levels among Scottish children and adolescents, however, has been found to be stable over a five-year period of funding (The Scottish Government, 2015).

Systematic reviews indicate a paucity of effective strategies to increase child and adolescent physical activity across a variety of environments (Metcalf, Henley, & Wilkin, 2012; Morton, Atkin, Corder, Suhrcke, & Van Sluijs, 2016). Metcalf et al. (2012), for example, have asserted that there is “strong evidence that physical activity interventions have had only a small effect (approximately 4 minutes more walking or running per day) on children’s overall activity levels” (p. 1). Specific to adolescent girls, a recent review has highlighted the potential effectiveness of school-based interventions underpinned by theory to positively change adolescent girls’ physical activity (Owen, Curry, Kerner, Newson & Fairclough, 2017). While extant interventions are primarily concerned with behavioural
interventions (Metcalf, et al., 2012; Owen, et al., 2017), and given the limited effect exhibited by these, the present work aims to examine the basis for a novel, theory-based psychosocial intervention. The work draws together constructs previously identified as predictors of physical activity, including physical activity identity (Rhodes, Kaushal, & Quinlan, 2016) and physical activity self-presentational motives (Howle, Dimmock, Whipp, & Jackson, 2015a; Howle, Jackson, Conroy, & Dimmock., 2015) which we propose may be shaped by transformational teaching behaviour (Beauchamp et al., 2010).

The notion of transformational teaching is underpinned by Transformational Leadership Theory (Bass, 1985); an unstudied theory within school-based physical education (PE) until relatively recently (Morton, Keith & Beauchamp, 2010; Beauchamp & Morton, 2011). Transformational leaders aim to “empower and inspire others, transcend one’s own self-interests and give others the confidence to achieve higher levels of functioning” (Beauchamp et al. 2010, p. 1124). The construct is conceptualised as incorporating four dimensions (Beauchamp & Morton, 2011). 

- **Inspirational motivation** involves leader communication aimed at inspiring and energising followers towards achieving higher standards and goals.
- **Idealised influence** takes place when a leader is able to gain trust, respect and admiration amongst followers via expression of personal beliefs and ethical behaviour.
- **Intellectual stimulation** takes place when a leader promotes consideration of issues from different perspectives, while also challenging commonly held assumptions and promoting alternative ways of thinking.
- **Individualised consideration** involves catering to individual needs, recognising individual achievements and showing care and concern for the individual.

The study of transformational behaviours within an adolescent PE context has provided findings which mirror those found in an organisational context (Morton et al. 2010; Beauchamp et al. 2014): namely, students who perceive their teachers to be using such behaviours tend to score higher on adaptive response measures relating to their PE class.
engagement. These adaptive responses occur across domains of functioning, including those that are cognitive (e.g., motivation and positive attitudes towards being physically active), affective (e.g., reporting pleasure while being physically active) and behavioural (e.g., engaging in sufficient physical activity both within PE class and outside of school during leisure-time). Given the amount of time adolescents spend within a school-based context, and specifically the influence that PE teachers have on childrens’ self-efficacy, feelings of support and motivation (Beauchamp et al., 2011; Beauchamp, et al. 2014; Morton et al., 2016), evidence suggests that PE teachers’ transformational teaching behaviour is a viable area to target in seeking to address the issue of adolescent female insufficient activity. If adolescent girls’ physical activity thoughts and patterns can be positively changed, these changes may persist into adulthood and promote significant long-term health benefits (Due et al., 2011; Loprinzi, Cardinal, Loprinzi & Lee, 2012).

As suggested in a narrative study with adolescent girls (Knowles, Niven & Fawkner, 2013), unfavourable thoughts, emotions and self-presentational concerns have negative implications for girls’ interest in physical activity involvement. Self-presentation is characterised by motivation to control how one’s self is regarded by others (impression motivation) and the avenues used to create one’s desired image (impression construction; Leary & Kowalski, 1990). Recent advancements in the literature have proposed a 2x2 framework of self-presentation to conceptualise different impression management strategies individuals may be motivated to employ within a PE setting (Howle, Dimmock et al., 2015a; Howle, Jackson et al., 2015). The framework draws from existing theoretical perspectives focused on interpersonal motivation and behaviour, including the approach-avoidance paradigm (Elliot, 2008) and agency-communion principles (Bakan, 1966). Conceptualisation of self-presentation motives based on approach notions have been termed *acquisitive motives* (a desire to present oneself in a way to gain social approval) and avoidance notions have been
termed protective motives (a desire to present oneself in a way to avoid social disapproval; Arkin, 1981). Agentic and communal motives refer, respectively, to individuals’ preference to orient their self-presentational focus on skill and task mastery or on social relationships and interconnectedness.

The 2x2 framework of self-presentation in physical activity settings (Howle, Dimmock et al., 2015a; Howle, Jackson et al., 2015) proposes four impression management motives (see Howle, Jackson et al., 2015 for a full overview). Acquisitive-agentic motives focus on a desire to gain social approval via others’ perceptions of their physical skill and task mastery (e.g. drawing attention to one’s competence on a drill in front of classmates). Acquisitive-communal motives focus on a desire to gain social approval via others’ perceptions of their social relationships and interconnectedness (e.g. being friendly and encouraging to fellow classmates). Protective-agentic motives focus on a desire to avoid social disapproval via others’ perceptions of their physical skill and task mastery (e.g. withdrawal from physical activity participation). Finally, protective-communal motives focus on a desire to avoid social disapproval via others’ perceptions of their social relationships and interconnectedness e.g. hesitation to interact with classmates). Motives are conceptualised as situation and context specific, accounting for individuals who endorse multiple motives at any one time, which could differ momentarily in type and/or strength dependent on context (Howle, et al. 2016).

Empirically the 2x2 self-presentation framework has been used with students in PE settings, and has found a positive association between stronger endorsement of acquisitive self-presentation motives (both agentic and communal) and PE class engagement (both emotional; e.g. enjoyment, and behavioural; e.g. increased participation; Howle, Dimmock, et al. 2015a). Around half of the 301 students in their sample were characterised by strong motive endorsement, suggesting that self-presentation emerged as a prominent drive for students. Additionally, having higher confidence in creating a desired image relating to
physical appearance and competency (self-presentational efficacy) or in initiating and maintaining relationships (social efficacy) within a PE class was later found to be associated with stronger endorsement of acquisitive-agentic or acquisitive-communal self-presentation motives, respectively (Howle, Dimmock, et al. 2015b). Collectively, research seems to suggest that facilitation of strong acquisitive-agentic and acquisitive-communal self-presentation motives could be achieved by targeting students’ confidence beliefs. Given that previous research has indicated that transformational teaching positively and significantly impacts upon adolescents’ self-efficacy and PE class engagement (Beauchamp et al., 2011), teachers’ use of transformational teaching behaviour may also positively influence the adoption of acquisitive self-presentation motives for physical activity.

Endorsement of protective motives (both agentic and communal) has previously been shown to be unrelated to PE class engagement (Howle, Dimmock, et al. 2015a). However, in line with theoretical expectations, protective motives are said to align with avoidance behaviours (e.g. withdrawal from physical activity Elliot, 2008) which would suggest an impending negative association with PE class engagement in the current study. Howle and colleagues (2016) provided mixed evidence for this, finding a negative and non-significant association, and a negative and significant association respectively between protective-agentic motives and performance on a physical activity task via personal task goals in two separate studies. Consequently, there is a need to further understand the role and impact of self-presentation motives on physical activity engagement, and the possible mediators that may influence this relationship (Howle, et al. 2015a).

One such concept is the notion of identity (i.e., who one is), which is of importance in understanding self-presentational processes. According to Leary and Kowalski’s (1990) two-component model, individuals are biased in modifying behavioural strategies to act consistently with a desired image and identity; however, the reverse is also true. That is,
individuals also seek to avoid acting consistently with an undesired image and identity (e.g. protective self-presentational motives). It has been theorised that individuals have multiple identities as part of a multi-dimensional self-concept that can be activated depending on one’s view of belonging in a given group, societal role, or context (Burke, 2006). With respect to adolescent girls specifically, work from Scotland has shown that girls are less likely than boys to see physical activity as integral to their identities (Sport Scotland, 2006) and tend to place little value in physical activity and often see it as a “boys’ thing” (Knowles, Niven & Fawkner, 2013).

Identity theory has been used to explore the basis of commitment and future physically active behaviour as a consequence of acting consistently with a salient identity (Stryker & Burke, 2000). A strong physical activity identity has been found to predict adherence to regimens of physical activity (Anderson & Cychosz, 1995; Anderson, Cychosz & Franke, 1998), moderate the intention-behaviour relationship (Rhodes et al., 2016) and predict overall behavioural consistency and frequency of being physically active (Strachan, Brawley, Spink & Jung, 2009). Therefore, there appears to be merit in influencing behaviour associated with facilitating an identity associated with a desired image (i.e. acquisitive-agentic and acquisitive-communal self-presentation motives) as opposed to an undesired image (i.e. protective-agentic and protective-communal self-presentation motives).

The purpose of the current study was to evaluate a novel conceptual framework by exploring the strength and nature of associations between adolescent girls’ physical activity behaviour and teachers’ transformational teaching behaviours, as perceived by girls, via mediated effects of physical activity self-presentational thoughts, their physical activity identity and PE class engagement. The testing of a model that conceptually integrates these variables as a predictive network has not yet been undertaken. In light of research evidence, we hypothesised that: 1) positive direct effects would be observed from transformational
teaching behaviours to both acquisitive self-presentational motives, physical activity identity and PE class engagement; 2) teachers’ transformational teaching behaviours would have a positive effect on girls’ moderate-vigorous physical activity (MVPA) via mediated effects of self-presentation motives (i.e. both acquisitive motives only), physical activity identity and PE class engagement; 3) positive direct effects would be observed from both acquisitive self-presentational motives to physical activity identity and PE class engagement; 4) negative direct effects would be observed from both protective self-presentational motives to PE class engagement; 5) positive direct effects would be observed from physical activity identity to PE class engagement and MVPA and from PE class engagement to MVPA.

Method

Participants

A total of 352 adolescent girls in the first three years of study (S1-S3) at a Scottish Secondary School responded to a questionnaire given out during Time 1 data collection. Due to drop-out between Time 1 and Time 2 data collection (n = 37), unreliable data (n = 28, e.g. answering questions in a pattern, getting a friend to complete the questionnaire) and excessive missing data (n = 16, e.g. at least one or more complete scales unanswered), data from a total of 273 participants (representing approximately 57% of the overall female S1-S3 population within the school) were used for analysis: S1 (n = 91; \( M_{age} = 11.75 \) years; \( SD_{age} = .46 \)), S2 (n = 108; \( M_{age} = 12.71 \) years; \( SD_{age} = .45 \)), and S3 (n = 74; \( M_{age} = 13.64 \) years; \( SD_{age} = .51 \)). Comparison of baseline measurements from time 1 data collection between participant drop-outs versus non-drop outs suggests there was no significant difference (A-A: \( F[1,307] = 1.824, p=.178 \); A-C: \( F[1, 307] = 1.316, p = .252 \); P-A: \( F[1,307] = .154, p = .695 \); P-C: \( F[1,306] = .117, p = .732 \); TTQ: \( F[1,307] = 1.090, p = .297 \); EIS: \( F[1,307] = .387, p = .534 \)).

The majority of participants self-identified as Scottish, English, or British (n = 264; 96.7%), while the remaining participants self-identified as Pakistani (n = 5; 1.8%), Irish (n =
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2; 0.7%), Canadian (n = 1; 0.4%) or Indian (n = 1; 0.4%). This school involved in the investigation resulted from a recent merger of two secondary schools into a single new facility. Of the participants, 182 came from the earlier secondary schools (n_{school1} = 151 girls, 55% of complete responses; n_{school2} = 31 girls, 11% of complete responses), while 91 (33% of complete responses) were in their first year of secondary school. According to the Scottish Index of Multiple Deprivation, the area in which the current school resides is among the most deprived areas in Scotland (top 20%) across all measured domains including income, health, access to services, crime and housing, employment, and most importantly education (Fife Health and Social Care Partnership, 2016).

Measures

Transformational Teaching. The 16-item Transformational Teaching Questionnaire (TTQ) is the first adolescent-focused measure to be developed for assessing teacher behaviour within a PE context (Beauchamp et al., 2010). Participants responded on a 5-point Likert scale from 0 (Not at all) to 4 (Frequently) across four dimensions: idealised influence (e.g. “Acts as a person that I look up to”), inspirational motivation (e.g. Demonstrates that s/he believes in me”), intellectual stimulation (“Creates lessons that really encourage me to think”) and individualised consideration (“Shows that s/he cares about me”). Evidence from Beauchamp and colleagues (2010) supports content validity of the measure and adolescents, PE teachers and physical activity experts were included in the development of scale items. Subsequent consequential validity was demonstrated by generating a Flesch (1948) readability score of 78.6 which is regarded as ‘fairly easy’ and appropriate for use with students possessing a reading age of grade 4 level (age 9-10) and above.

Transformational leadership has been conceptualised through its distinct behavioural dimensions or as a global construct (e.g., Beauchamp, et al. 2010). Employing a differentiated approach is typically optimal (Arthur, Bastardoz, & Eklund, 2017), however
global conceptualisations are appropriate for use during early examination phases of research questions and/or when relatively complex models are being tested (Arthur & Tomsett, 2014).

Given the novelty of the current research and the complex multiple serial mediational model being testing, it was decided that a global conceptualisation of transformational leadership was appropriate. Beauchamp and colleagues (2010) found comparable support in factorial validity analyses when TTQ data were modelled as a global, $\chi^2 (208) = 2994.077, p < .001$, CFI = .920, TLI = .907, RMSEA = .069, SRMRwithin = .041, or second-order multidimensional construct, $\chi^2 (201) = 2258.410, p < .001$, CFI = .940, TLI = .928, RMSEA = .061, SRMR = .037. Adequate fit indices were obtained when TTQ data was modelled as a global construct in the present study, $\chi^2 (100) = 230.538, p < .001$, CFI = .940, TLI = .928, RMSEA = .069, SRMR = .044. The composite reliability of the global Transformational Teaching latent variable in this study was .93.

**Self-Presentation Motives for Physical Activity.** The 16-item Self-Presentation Motives for Physical Activity Questionnaire (SMPAQ; Howle, Dimmock, et al., 2015a) measures self-presentation motives across four dimensions relative to desired presentation during PE. Each question was preceded by the stem “Right at this moment in time, thinking about my PE class, I am focusing my attention on…”: Acquisitive-Agentic (A-A; e.g. “Having others admire me for my physical ability during PE activities”), Acquisitive-Communal (A-C; e.g. “Having others view me as friendly”), Protective-Agentic (P-A; e.g. “Avoiding others viewing me as incompetent during PE activities”) and Protective-Communal (P-C; e.g. “Avoiding others viewing me as someone who works poorly with others”). Participants responded on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Confirmatory factor analysis (CFA) of SMPAQ data from the present study indicated an adequate fit for four-factor model, $\chi^2 (98) = 238.084, p < .001$, CFI = .932, TLI =
.917, RMSEA = .072, SRMR = .061. Composite reliability of the four latent variables were:

A-A = .84, A-C = .88, P-A = .83 and P-C = .77.

The SMPAQ was deemed adequate for use in the present study because valid and reliable data had been obtained previously from similar-aged high school students during initial validation of the scale (Howle, Dimmock, et al., 2015a). During this initial testing, acceptable composite reliability coefficients (i.e., ranging from .82 to .88) were observed, suggesting that distinctive features of self-presentation motives are assessed by the scale dimensions. Convergent validity was also demonstrated, with acquisitive-motives positively predicting PE class engagement.

**Physical Activity Identity.** The 9-item Exercise Identity Scale (EIS; Anderson & Cychosz, 1994) was used in this investigation as an operationalization of the Physical Activity Identity. This measure assesses how strongly girls view themselves as physically active exercisers (e.g., “I consider myself an exerciser”). Reliable and valid data have been collected using the scale from college students (Anderson & Cychosz, 1994) and adult populations (Anderson, Cychosz & Franke, 1998). This measure was deemed to be an appropriate measure of identity for use with adolescent girls after consideration of the Flesch-Kincaid reading difficulty index, which indicated a readability age of 8.5 using the Grade Level. Participants responded on a 7-point Likert scale, from 1 (Strongly disagree) to 7 (Strongly agree). Test–retest reliability has been observed for items in this scale (α = .94 and .93, respectively; Anderson & Cychosz, 1995). Similarly, the composite reliability in this study was .92. Adequate fit indices were observed in confirmatory modelling of EIS data in the present study, χ² (27) = 79.958, p < .001, CFI = .958, TLI = .944, RMSEA = .085, SRMR = .035.

**Engagement.** A 10-item, PE specific engagement questionnaire (Shen, McCaughtry, Martin, Fahlam & Garn, 2012) was used in the present study to gauge the behavioural (focus,
participation, attention, e.g., “I tried hard to do well in my PE class”) and emotional
( enjoyment, interest, e.g., “When I was in my PE class, I felt good”) engagement of girls
within PE. Participants responded on a 7-point Likert scale, from 1 (not at all) to 7 (very
much). The behavioural and emotional subscales of engagement were highly correlated ($r = .84$), and were modelled as a single latent factor with correlated errors among items with
overlapping content. While normally engagement has been conceptualised as a two-factor
model, CFA results from the present study showed comparable results for a global, $\chi^2(28) = 57.090, p < .001$, CFI = .986, TLI = .977, RMSEA = .062, SRMR = .024, and a two-factor
model $\chi^2 (29) = 56.843, p < .001$, CFI = .986, TLI = .979, RMSEA = .059, SRMR = .024.
The composite reliability of the global engagement latent variable was .94.

Data have previously been obtained using this instrument from school children
(Skinner, Furrer, Marchand, & Kindermann, 2008), and later high school girls (Shen et al,
2012). Test-retest reliability has been observed for items in this scale (behavioural: $\alpha = .71$
and .72 respectively, emotional: $\alpha = .83$ and .84 respectively; Skinner et al., 2008). A CFA
conducted by Shen and colleagues (2012) yielded adequate model fit indices of instrument
items (CFI > .96, SRMR < .04, RMSEA < .04), and high Cronbach’s alphas (.84 and .87 for
behavioural and emotional engagement respectively), demonstrating validation support for
the internal consistency of the scale.

**Moderate-Vigorous Physical Activity.** A modified version of the Godin Leisure-Time
Questionnaire (GLTEQ; Godin & Shephard, 1985) was used to assess girls’ self-reported
number of mild, moderate, and vigorous bouts of physical activity within a week. This
questionnaire was modified by the addition of a statement which asked participants to include
within-class physical activity during PE in their responses, as well as leisure-time physical
activity. The score was assessed using metabolic equivalents (METs), calculated via the
formula: (strenuous x 9) + (moderate x 5). In line with literature which suggests that mild
activity does not have a tangible effect on health (Godin, 2011;), only MVPA was calculated for analysis: >24 units indicating an active individual, 14-23 units indicating a moderately active individual, and <14 units indicating an insufficiently active individual.

**Procedure**

The current study was granted ethical approval by the School of Sport Research Committee at the lead author’s institution. The Secondary School head teacher expressed his willingness for the school to be involved via a letter of intent. All participants were under the age of 16, therefore the parents/guardians of all girls were given a letter providing full disclosure of study procedures one week prior to data collection, and an option to withdraw their child from the study was provided via an opt-out form. A total of 20 withdrawal slips were returned from parents, and subsequently 20 girls were excluded from the study. For the remaining participants, data were acquired at two time points, one week apart.

**Time 1.** Research was conducted during PE classes over the course of one week. A total of 15 girls declined participation in the study during the informed consent process. Remaining participants were given a pre-packed envelope containing the questionnaire (demographics, TTQ, SMPAQ and EIS). Participants were asked to provide their names for the purpose of matching Time 1 and Time 2 responses, therefore completed questionnaires were sealed in the envelope provided and dropped in a box to ensure confidentiality.

**Time 2.** One week subsequent to Time 1, researchers returned to the school for Time 2 collection of GLTEQ and PE class engagement data. Given that the study purpose involved prediction of physical activity, the 1-week duration between data collection time points allowed for the minimum 7-day recall of leisure-time physical activity required to complete the GLTEQ (Godin, 2011; Godin & Shephard, 1985) while also minimising recall bias and ensuring forward prediction (i.e. appropriate time-sequencing) occurred on the prediction of GLTEQ scores using Time 1 data. PE class engagement and GLTEQ data were obtained via
questionnaire during three dedicated assemblies (one per year group). Participants were asked to drop their completed questionnaires in a designated box.

**Analysis**

SPSS was used to generate descriptive statistics and Pearson inter-correlations for all variables. Structural equation modelling (SEM) in Mplus version 7.4 (Muthén & Muthén, 1998-2015) was used to analyse model direct and indirect effects on the basis of the robust maximum likelihood (MLR) estimator. Maximum likelihood estimation was used to manage the small amount of data missing at the item level (0.4% - 5.9% missing across variables; $M = .88\%, SD = 1.08\%$). Model fit was assessed using the robust chi-square test, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). Values $>.90$ for CFI and TLI, $<.80$ for SRMR, and $<.60$ for RMSEA were generally deemed supportive of acceptable model fit (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004). Year (e.g. S1-S3) was specified as a covariate in relation to all study variables to control for the effect of year on predictive pathways from transformational teaching behaviours to girls’ MVPA. The effects of nesting of students within classes were not controlled in the current analyses due to an overlap of PE teachers across classes (i.e., girls rated only their current PE teacher, but some reported concurrent exposure to more than one PE teacher in their classes), and a large class number to low participant number ratio. We acknowledge the issue of potential nesting effects and lack of multi-level modelling as a limitation of our analyses. In line with previous literature (Howle, Dimmock, et al., 2015a), self-presentational subscales had reasonably high inter-correlations. Our initial modelling of data occurred without self-presentational subscale disturbances being freed to covary. Post-hoc exploration of modification indices revealed these covariance constraints were a major source of model misfit. Therefore, due to the expected conceptual inter-relatedness, and because there was no
expectation that transformational teaching scores would completely account for the shared variance in the prediction of each of those subscales, residual errors from the regression of transformation teaching on the four self-presentation subscales was allowed to covary.

Results

Descriptive statistics for study variables (by year and total sample) are provided in Table 1. Table 2 provides the inter-correlations among study variables across the entire sample. Significant, positive associations were observed between transformational teaching and acquisitive self-presentation motives (A-A: \( r = .42 \); A-C: \( r = .38 \)), physical activity identity (\( r = .41 \)), PE class engagement (\( r = .50 \)) and MVPA (\( r = .17 \)). MVPA was significantly and positively associated with physical activity identity (\( r = .32 \)) and class engagement (\( r = .28 \)). Non-significant, low correlations with MVPA were observed for all self-presentation motives, with the exception of a low but significant and positive association with A-A (\( r = .13 \)). PE class engagement was significantly and positively associated with acquisitive self-presentation motives (A-A: \( r = .35 \); A-C: \( r = .37 \)), however small non-significant correlations were observed with both protective self-presentation motives.

Figure 1 provides an overview of the model tested, including standardised coefficients for the observed effects. Adequate fit of the model to the data was observed: \( \chi^2 (1293) = 2135.035, p < .001, \text{CFI} = .90, \text{TLI} = .89, \text{SRMR} = .05, \text{RMSEA} = .05 \). Controlling for year, all significant pathways were consistent with expectations: pathways from transformational teaching through both acquisitive self-presentation motives and physical activity identity to MVPA were all significant. Pathways from physical activity identity to MVPA were significant; however, the pathway from PE class engagement to MVPA only trended toward being significant (\( p = .054 \)). Non-significant pathways between all acquisitive and protective self-presentation motives and PE class engagement was observed. With regards to protective motives, this may not be surprising in light of comparable findings from Howle and
Colleagues (2015a). However, as with the non-significant pathway between PE class engagement and MVPA, the prediction of PE class engagement on acquisitive motives may follow a similar explanation given the significant and moderate correlation between acquisitive motives and physical activity identity (A-A: $r = .60$; A-C: $r = .50$). Therefore, this is an important relationship to consider when interpreting the current results and the non-emergence of acquisitive motives as a predictor of PE class engagement.

All indirect pathways were tested, and considerable support for our mediation hypotheses was observed, in particular, in the significant indirect effects of transformational teaching behaviour on girls’ MVPA through both acquisitive motives and physical activity identity (A-A and EIS: .06 [.02], $p < .05$; A-C and EIS: .02 [.01], $p < .05$), and physical activity identity alone (.04 [.02], $p < .05$). The indirect effect from transformational teaching to girls’ MVPA via engagement (.05 [.03], $p = .06$) was not significant, but indicated a trend that provided interesting potential support as well.

**Discussion**

The purpose of the current study was to evaluate a novel conceptual framework by exploring the strength and nature of the associations between teachers’ use of transformational teaching behaviours (Beauchamp et al., 2014) as perceived by adolescent girls and their subsequent engagement in MVPA, as mediated by variables previously implicated as significant predictors of MVPA. These specific mediators included physical activity identity (Rhodes et al., 2016), physical activity self-presentational thoughts (Howle, Dimmock et al., 2015a; Howle, Jackson et al., 2015) and PE class engagement. The modelling of these variables (as depicted in Figure 1) accounted for 14% of the variance in self-reported MVPA, comparable to another study evaluating youth physical activity (14.7%; Heitzler, Lytle, Erickson, Barr-Anderson, Sirard & Story, 2010) and Beauchamp and colleagues (2014) who accounted for 16% of variance in leisure-time physical activity and
almost 19% of variance in within-class physical activity. Positive direct effects were observed from teachers’ transformational teaching behaviours to both self-presentational acquisitive motives (A-A: .44[.06], p < .005; A-C: .38[.06], p < .005), physical activity identity (.14[.06], p < .05) and PE class engagement (.36[.06], p < .005), providing novel insights and full support for hypothesis 1. Significant predictive pathways were shown in directions consistent with our second hypothesis that transformational teaching behaviours in PE would have an effect on girls’ subsequent MVPA via mediated effects from acquisitive self-presentation motives and physical activity identity, and directly via physical activity identity (see Figure 1). However, study results did not find any effect of teachers’ transformational teaching behaviours on MVPA via PE class engagement, directly or indirectly (i.e. via acquisitive self-presentation motives). Therefore, there was only partial support for hypothesis 2.

Positive direct effects were observed from both acquisitive self-presentation motives to physical activity identity, but not to PE class engagement, contrary to previous findings (e.g. Howle, Dimmock et al., 2015a). Significant simple correlations among the acquisitive self-presentation motives and physical activity identity (i.e., rs from .50 to .60) were observed, and provide useful context around these findings. Identity, but not the acquisitive self-presentation variables, provided a unique contribution to the multivariate prediction of engagement (beyond common shared variance) in the model. Acquisitive-motives have previously been observed to have indirect effects on behaviour through constructs such as task goals (Howle, et al. 2016), a finding in line with the approach/ avoidance paradigm wherein motives shape goals, which in turn shape behaviour. Identity is implicated in behavioural consistency enactments with specific roles (Stryker & Burke, 2000) and these results extend our understanding of how acquisitive self-presentation motives may impact upon girls’ engagement in MVPA. That is, if girls adopt acquisitive self-presentation
motives, this may positively impact upon their subsequent strength of physical activity
identity, which in turn has positive consequences for their overall consistency of physical
activity engagement. This is reinforced by the significant indirect effect in which teachers’
transformational teaching behaviours and MVPA are mediated by acquisitive self-
presentation motives and physical activity identity (A-A and EIS: .06 [.02], p < .05; A-C and
EIS: .02 [.01], p < .05). Thus, partial support of hypothesis 3 was found in the current study.

With regards to the relationship between protective self-presentation motives and PE class
engagement, previous literature has been mixed (Howle, et al. 2015a; Howle, et al. 2016). In
the present study, no significant pathway was observed between these variables, falsifying
hypothesis 4 and adding to findings from Howle and Colleagues (2015a).

Finally, partial support for hypothesis 5 was observed via a positive direct effect from
physical activity identity to girls’ PE class engagement, however there was no direct effect
between PE class engagement to MVPA. The unique contribution by identity to the
prediction of MVPA (i.e. over and above the contribution of engagement) appears to be large
enough beyond the level of shared variance between the predictors to be significant. As
expected, and in line with previous literature (Rhodes et al., 2016), physical activity identity
was found to positively predict adolescent girls’ physical activity. Furthermore, physical
activity identity positively predicted girls’ behavioural and emotional engagement within PE
class which, although a novel finding, may not be surprising in light of previous research
which show similar predictions of physical activity adherence (Anderson & Cychosz, 1995;
Anderson et al., 1998), the intention-behaviour relationship (Rhodes et al., 2016) and
behavioural consistency and frequency (Strachan et al., 2009).

Limitations and Future Directions

The current research has several strengths that include expanded knowledge in the areas
of transformational leadership, self-presentation motives, physical activity identity and
physical activity in adolescent girls, and the modest and fairly typical amount of variance
accounted for with regards to MVPA (14%). However, there are also limitations that warrant
future investigation. Within the current study, girls were asked to self-report on class-time PE
engagement, while measurements of physical activity identity and MVPA were more broadly
focused, encompassing both within-class and leisure-time physical activity. Consequently,
the activity and engagement measures are not cleanly aligned. This could present another
account of why engagement was a non-significant predictor in the present study and could be
improved upon in the future by the use of measures that align more precisely.

Secondly, we operationalized transformational leadership as a global construct; an
approach that has been described as somewhat crude (c.f., Arthur et al., 2017; Arthur &
Tomsett, 2014). Although this approach was justified in the current research given the
complex nature and novelty, future research is required to test whether some of the different
transformational leader behaviours have different relationships with the outcomes variables
examined. Whilst we took steps to limit the impact of common method variance by using a
prospective design where the outcome variables were collected one week after the
independent variables, some of the pathways in our model may be more susceptible to
common method effects. Thus, future research could examine the relationship between the
self-report variables included in the current research longitudinally by employing a longer
time period between the collection of each of the serial mechanisms, and/or by employing
additional data collection intervals to accrue more accurate time-specific data.

Another limitation was that multi-level analysis was not used. The level 2 sample size
obtained was such that it precluded this, thus necessitating the involvement of more schools
to ascertain a sufficient sample. However, it was considered that the inclusion of additional
schools would introduce another confound to the data. Therefore, future research should seek
to involve larger level 2 samples in order to properly account for the complex data structure.
Additionally, steps should be taken to control for the issue of complex nesting effects within analyses and potential confounds to study results. Kavussanu, Boardley, Jutkiewicz, Vincent and Ring (2008) found that more experienced athletes who were exposed to more than one coach had higher standards and expectations of coaches (similar to our participants who were exposed to multiple PE teachers), thus this could also be a consideration for future research.

A highlighted but untapped potential area of interest in the current study was related to physical activity and the effect of the low socioeconomic status of the area in which the current research was conducted. To date, inconsistent evidence on the effect of socioeconomic status on physical activity has precluded any comprehensive evaluation of the current state of literature for adolescents in particular (Stalsberg & Pedersen, 2010). Nonetheless, Stalsberg and Pedersen (2010) did find evidence to suggest that a number of studies indicated that physical activity engagement was significantly lower in areas with a low socioeconomic status. In the current study, however, extracurricular PE activities after school were suggested by PE teachers to be a popular and vital aspect of girls’ lives to combat issues of deprivation such as lack of access to amenities. While this information was provided anecdotally, current results in the form of similar physical activity scores across S1 to S3 (Table 1) may provide some initial support for this idea. Nonetheless, while the school used in the current study was within a low socioeconomic area, not all students were from a low socioeconomic background. It is possible that this heterogeneity could have implications for physical activity engagement, thus further research may consider the complex and potentially confounding relationship of such deprivation statistics by controlling for these in future research.

In terms of future intervention delivery, our expectation is that it may well take the form of a workshop, as guided by existing successful transformational leadership
interventions (e.g., Beauchamp, et al. 2011; Hardy et al., 2010) and consistent with rigorous intervention development guidelines (e.g., focus groups, interviews and multi-stakeholder workshops; MRC, 2006). This approach would determine the length, number, format and content of workshops to best suit PE teachers.

Conclusions

The present study shows evidence of significant pathways between transformational teaching, physical activity identity and self-presentation motives, which in turn significantly predicted MVPA. As a preliminary study that provides the first investigation of how these constructs interact in a PE context, these are encouraging results. We hope that the novel insight provided by these findings may be used to inform subsequent longitudinal efforts to increase levels of physical activity within adolescent girls. In addition, the effects observed provide indication of real-world application, and subsequently this knowledge can be carried forward in the development, modelling, and feasibility testing of a new intervention to address insufficient adolescent female physical activity.

Acknowledgements
References


Sportscotland.


Figure 1. Latent model with year covariate used for structural equation analysis. Note. TT: transformational teaching; A-A: acquisitive agentic; A-C: acquisitive communal; P-A: protective agentic; P-C: protective communal; PAI: physical activity identity; Eng: engagement; MVPA: moderate-vigorous physical activity. Parameter results are shown in the format estimate (standard error), with variance explained ($r^2$) underneath construct headings. Dotted lines indicate non-significance; thick lines indicate significance; dashed lines ≤.05, solid lines ≤.005. Inter-correlations among SMPAQ constructs, and ‘year’ which was specified as a covariate on all variables are not shown to avoid cluttering of the diagram.
Table 1. Descriptive statistics of demographics and measured variables across school year (grade)

<table>
<thead>
<tr>
<th>Data</th>
<th>School Year (Grade)</th>
<th>Total (n = 273)</th>
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<tbody>
<tr>
<td></td>
<td>S1 (n = 91)</td>
<td>S2 (n = 108)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Age</td>
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<tr>
<td>Weight (kg)</td>
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</tr>
<tr>
<td>Height (cm)</td>
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<td>TT</td>
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<tr>
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<td>A-A</td>
<td>4.46</td>
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<td>A-C</td>
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<tr>
<td>P-A</td>
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<td>1.42</td>
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<tr>
<td>P-C</td>
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<tr>
<td>Eng</td>
<td>5.94</td>
<td>1.07</td>
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<td>MVPA (METs)</td>
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### Table 2. Pearson correlations of all measured variables

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<tr>
<td>3. A-A</td>
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<td>.60**</td>
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<td>4. A-C</td>
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<td>.50**</td>
<td>.58**</td>
<td>1.00</td>
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<td></td>
<td></td>
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<tr>
<td>5. P-A</td>
<td>.15*</td>
<td>.21**</td>
<td>.41**</td>
<td>.38**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. P-C</td>
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<td>.15*</td>
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<td>.32**</td>
<td>.63**</td>
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<tr>
<td>7. Eng</td>
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<td>.53**</td>
<td>.35**</td>
<td>.37**</td>
<td>.08</td>
<td>.09</td>
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<td>.13*</td>
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<td>.06</td>
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<td>.28**</td>
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*Note.* TT: transformational teaching; PAI: physical activity identity; A-A: acquisitive agentic; A-C: acquisitive communal; P-A: protective agentic; P-C: protective communal; Eng: PE Class Engagement; MVPA: MVPA recorded in METs using GLTEQ. 

$p* \leq .05, p** \leq .005$. 
