BODY SHAME, BODY COMPASSION AND PHYSICAL ACTIVITY

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Abstract

Participation in physical activity in the population and especially in young people has been frequently highlighted as a concern, given the increased risk of serious health issues in people who are insufficiently active. Body image concerns and body shame have been suggested as reasons not to engage in physical activity for young people (especially girls). Self-compassion has been shown to be a useful tool in reducing body shame and dissatisfaction, similarly body compassion or body self-compassion have been suggested to be associated with exercise behaviour and body image. The present research aimed to explore the roles of body image and shame on physical activity and the potential for self-compassion and in particular compassion directed to one's own body (*body compassion*) on explaining the association.

First the associations between body image and physical activity in previous research findings are summarised in a scoping review. Previous research suggests an association between body image and physical activity, which appears to vary by gender, age, disability and ethnicity or race. The roles of body-related self-conscious emotions (e.g. body shame and pride) and of self-determined motives for physical activity are also suggested.

The roles of body shame and pride and self-determination are described in a narrative review that suggests a role of self-compassion in predicting self-determined motives for physical activity and in reducing shame. The importance of body specific self-compassion in reducing body shame and increasing body pride is also discussed.

Studies 1-3 describe the development and validation of a new measure of body compassion; the Body Compassion and Criticism Scale (BoCCS). In a sample of 728 participants aged 16-76, the factor structure of the BoCCS was examined through exploratory and confirmatory factor analysis. The BoCCS was shown to have 4 subscales: (1) *Body Kindness* (2) *Common Humanity* (3) *Motivated Action* and (4) *Body Criticism*. These were shown to incorporate key elements of compassion and self-compassion. The factor structure was confirmed to be a bifactor model, whereby total score or subscales can be used. The BoCCS was also shown to have good internal consistency, construct validity and test-retest reliability (with 198 of the original participants). Differences in body compassion and its subscales were shown to differ by sex and BMI. Validation with behaviour was also

demonstrated through comparison with spontaneous expressions of body compassion in a sample of 27 female undergraduates (study 2) and word use in body image writing in a sample of 45 female undergraduates (study 3).

Study 4 evaluated models to predict the six self-determined motivation for physical activity regulation styles: *amotivation, external, introjected, identified, integrated* and *intrinsic* regulation. A sample of 310 participants, aged 16-76 were used to test these models. Body compassion was shown to predict these, mediated by pride shame in relation to one's current body size as well as that anticipated if one were to gain weight.

Study 5 prospectively tested three models to predict elements of physical activity behaviour: aerobic/moderate-vigorous physical activity, strength activities and adherence to overall physical activity guidelines (as recommended by the NHS). A sample of 80 participants from study 4 completed an additional measure of physical activity four-weeks after initial participation. This showed that body pride/shame in relation to one's current body and pride/shame anticipated if one were to gain weight predicted physical activity behaviour mediated by self-determined motives for physical activity.

Finally study 6 tested a brief body compassionate writing intervention to improve physical activity behaviour in young people (aged 16-25; baseline N = 103; follow-up N = 76). Four groups were examined: body image writing; body image writing plus forming of implementation intentions (II); body compassionate writing; and body compassionate writing plus II. The body compassionate writing group was shown to significantly increase their physical activity, while the other groups did not. Additionally, those who wrote about body image and formed IIs increased in body criticism and showed reduced body compassion.

In conclusion body compassion has been demonstrated to be a useful tool in predicting health behaviours such as physical activity and can be implemented into an intervention to improve physical activity. Recommendations for how to build on the research shown in this thesis is discussed as well as further applications for body compassion and policy changes that would help to reduce the need for individual body compassion. A model describing the roles of body compassion, body pride/shame and motives for physical activity in predicting physical activity is developed.

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Table of Contents

List of Tables

List of Figures

List of Abbreviations

AC	Active Control
BC	Body Criticism
BCS	Body Compassion Scale
BCS-CH	Body Compassion Scale – Common Humanity
BCW	Body Compassionate Writing
BHF	British Heart Foundation
BI	Body Image
BIAQ	Body Image Avoidance Questionnaire
BISS	Body Image States Scale
BK	Body Kindness
BMI	Body Mass Index (kg/m^2)
BoCCS	Body Compassion and Criticism Scale
BPS(S)	Body Pride and Shame (Scale)
BREQ	Behavioural Regulation in Exercise Questionnaire
CASE	Culture and Sport Evidence
CBT	Cognitive Behavioural Therapy
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index/Indices
CFT	Compassion Focused Therapy
CFT-E	Compassion Focused Therapy – Eating Disorders
CH	Common Humanity
CI	Confidence Interval
CMIN	Chi-square minimum discrepancy
CMT	Compassionate Mind Training
DF	Degrees of Freedom
DR	Dietary Restraint
EC	Eating Concern
ED(s)	Eating Disorder(s)
EDE-Q	Eating Disorder Examination – Questionnaire

EFA	Exploratory Factor Analysis
GFI	Goodness of Fit Index/Indices
ICC	Intraclass Correlation
IFI	Incremental Fit Index/Indices
II	Implementation Intention(s)
KMO	Kaiser-Meyer-Olkin
LIWC	Linguistic Inquiry Word Count
MA	Motivated Action
MAB	Mindfulness Acceptance Based
MeSH	Medical Subject Headings
MET(s)	Metabolic Equivalent
MVPA	Moderate-Vigorous Physical Activity
NFI	Normed Fit Index/Indices
NHS	National Health Service
OEQ	Obligatory Exercise Questionnaire
OSWEQ	Online Self-report Walking and Exercise Questionnaire
PA	Physical Activity
PE	Physical Education
PTSD	Post-Traumatic Stress Disorder
RMSEA	Root Mean Square Error of the Approximation
SC	Shape Concern
SCI	Spinal Cord Injury
SCS	Self-Compassion Scale
SCS-CH	Self-Compassion Scale – Common Humanity
SCS-I	Self-Compassion Scale – Isolation
SCS-M	Self-Compassion Scale – Mindfulness
SCS-OI	Self-Compassion Scale – Over-Identification
SCS-SJ	Self-Compassion Scale – Self-Judgement
SCS-SK	Self-Compassion Scale – Self-Kindness
SCSSF	Self-Compassion Scale Short Form
SDHS	Short depression-Happiness Scale

SDT	Self-Determination Theory
SEM	Structural Equation Modelling
SPA(S)	Social Physique Anxiety (Scale)
WC	Weight Concern
WHO	World Health Organization

CHAPTER 1 INTRODUCTION

1.1 ENGAGEMENT IN SPORT AND REASONS FOR NON-ENGAGEMENT

Increased participation in sport and physical activity has social and cultural impacts, health impacts for the individual and economic impacts. The economic value of sport in terms of health is thought to be £11.2 billon per annum (Sport England, 2015) with a total of £20.3 billion generated through sport and sport-related activities in 2010 (Sport England, 2015). In the UK more than £900 million was spent in 2009/10 in treating individuals with heart disease, type 2 diabetes and obesity and overweight-related ill health, all of which could have been prevented by being more physically active (Townsend, Wickramasinghe, Williams, Bhatnagar, & Rayner, 2015). Physical activity can reduce the risk of major illnesses like diabetes, cancer and heart disease as well as improving well-being (NHS, 2018a) and there is evidence for improvements to numeracy skills in young people, reducing crime and reoffending, increased progression into higher education and improved school attendance (S. Cox, 2012; Sport England, n.d.-a, n.d.-b).

The NHS recommends that adults (aged 19+) engage in 150 minutes of moderate physical activity or 75 minutes of vigorous activity a week as well as strength-based exercises two or more times a week in order to maintain a healthy lifestyle and reduce the risk of a number of health complaints, diseases and illnesses (NHS, 2018b). Meeting these targets can help to lower the risks of heart disease and stroke by up to 35%, diabetes and some cancers by up to 50%, early death by 30% and depression and dementia by up to 30% (NHS, 2018a). This makes a lack of physical activity one of the biggest risk factors for early death worldwide (World Health Organization, 2017). Despite these obvious health benefits and the social and economic benefits of physical activity (Sport England, n.d.-a) participation levels of physical activity are still worryingly low. The World Health Organisation (WHO) reports that globally 1 in 4 adults is insufficiently active (World Health Organization, 2017), though there is great variation between certain groups. For example, 62.7% of males compared to 51.7% of females are “sufficiently active” (Sport England, 2013). There are also age differences. Children under 19 are expected to engage in at least 60 minutes of physical activity a day and strength-based activity 3 days a week. However, children are less likely to achieve adequate levels of physical

activity than adults (Townsend et al., 2015) and, globally, more than 80% of the adolescent population is “insufficiently active” (World Health Organization, 2017). Physical activity also varies by ethnicity with Asians having the highest levels of inactivity (33.3%), while those from mixed race backgrounds have the lowest inactivity (19.7%) (Sport England, 2013).

Insecurity about appearance and poor body image have been highlighted (L. Cox, Coleman, & Roker, 2006) as key factors that reduce the desire to engage in physical activity. The same factors associated with physical activity described above (gender, age and ethnicity) also share a common association with body image. For example, women generally have poorer (and place more emphasis on) body image than men (Brennan, Lalonde, & Bain, 2010). Body image also differs according to ethnicity with differences in self-esteem (Viner et al., 2006) and body appreciation in British female undergraduates (Swami, Airs, Chouhan, Amparo Padilla Leon, & Towell, 2009). Hispanic and African Caribbean women were shown to have the highest body appreciation, while South Asian women were shown to have the lower body appreciation (Swami et al., 2009). This is also consistent with research in American samples (Altabe, 1998; Cachelin, Rebeck, Chung, & Pelayo, 2002; Miller et al., 2000). Other factors influencing physical inactivity include disabilities (Sport England, 2013) and, while there may be physical or practical constraints on physical activity (depending on the nature of the disability), body image problems may be contributory factor here too. Therefore, an understanding of how body image is related to physical activity participation and how this relationship is affected by other variables, such as motivation, social physique anxiety and self-objectification, as well as how it varies with demographic factors, is necessary to help in the promotion of healthy body image and physical activity behaviours.

A number of reviews have been carried out, but these have generally been limited and focused on only one subgroup. For example, reviews have focused on qualitative research (Allender, Cowburn, & Foster, 2006), disability (T. L. L. Williams, Smith, & Papathomas, 2014), women (Mosur-Kałaźa & Guszkowska, 2015) and specific ethnic groups (Seronda A. Robinson, Webb, & Butler-Ajibade, 2012). Yet other reviews have focused on the effect of physical activity on body image (Hausenblas & Fallon, 2006; Mosur-Kałaźa & Guszkowska, 2015).

It is clear that there is a growing to need to improve physical activity engagement across these groups in order to improve the health and well-being of the individuals resulting in a reduction in the strain on the healthcare systems and on the economy. There is a large body of literature examining what affects physical activity motivation and participation. In particular body image factors have been identified as a major factor in young people's (especially women's) engagement in sport and exercise (L. Cox et al., 2006), especially for those who engage in no sport at all, who stated that this was their main reason for not participating.

Originally the intention was to conduct a systematic search to see if there was previous evidence of body image-based interventions improving physical activity motivation or physical activity. The interventions had to have a body image element to them, and physical activity or physical activity motivation had to be the primary outcome of the intervention.

The search terms used and the number of hits for each search at both PubMed and Scopus are shown in Appendix A. Search terms were found from previous reviews of body image (Alleva, Sheeran, Webb, Martijn, & Miles, 2015; Lewis-Smith, Diedrichs, Rumsey, & Harcourt, 2016; Yager & O'Dea, 2009) and physical activity (Olander et al., 2013) reviews, as well as derivations of these keywords and similar words.

Using these inclusion criteria the results of these searches were examined and revealed only one intervention; M. N. Silva et al. (2010). This study used the self-determination theory as a basis for the intervention and therefore had a body image tenet but also included eating behaviour, information on increasing physical activity, addressing barriers and weight maintenance strategies. Physical activity did improve for the intervention group but as there were other elements to the intervention there is no way of knowing if body image was a big contributing factor in the intervention or not, especially as pre- and post-test measurements for body image were not taken.

Although there was very little research focused on body image interventions to improve physical activity, also revealed in the search were studies that, while not interventions (and therefore excluded from the systematic search), did highlight the importance of body image and appearance in physical activity. For example, O'Hara, Cox and Amorose (2014) showed that appearance focused fitness class instruction leads to higher self-objectification of one's

body and that women with more appearance related reasons for engaging in exercise had a higher social physique anxiety (SPA). They also discovered that higher SPA and self-objectification are associated with less enjoyment in the class and with less likelihood to return in the future, a result supported by previous research (Crawford & Eklund, 1994; Eklund & Crawford, 1994; Melbye, Tenenbaum, & Eklund, 2007).

The lack of research into this area but the wealth of research highlighting the importance of body image to adolescent and adult motivation for and engagement in physical activity shows the importance of studying this area and of creating an intervention to target these effects.

1.2 THESIS OVERVIEW

Given the literature discussed above, this thesis aims to explore the associations between body image and physical activity, the mediating and moderating factors that act on this relationship and develop an intervention to improve physical activity in young people.

Chapter 2 explores the relationship between body image and physical activity in the form of a scoping review. The review explores this relationship with respect to individual differences such as age, gender, disability, ethnicity and race. It also considers the roles of other factors in this relationship such as motivation for physical activity, shame and self-compassion.

Chapter 3 narratively reviews the roles of physical activity motivation as well as shame and pride in the relationship between body image and physical activity. It also explores ways of intervening in shame and motivation such as self-compassion and how this interacts with body image and physical activity in the literature.

Chapter 4 develops and tests the validity and reliability of a measure of body compassion and criticism. It also explores body compassion's associations with eating disorders, physical activity outcomes and with disability and mood.

Chapters 5 and 6 test structural equation models to predict self-determined motives for physical activity and physical activity behaviour. Chapter 5 tests models of physical activity motivation using body compassion, body pride and shame and individual differences as

predictors of each style of behavioural regulation in exercise. These examine body pride and shame (current and anticipated) as mediators between body compassion and motivation. Chapter 6 extends this through a prospective study, to include physical activity behaviour, examining the effects of body pride and shame and physical activity motivation on behaviour. Physical activity motivation is examined as a mediator of the relationship between body pride and shame and physical activity behaviour.

Chapter 7 describes the development and testing of a body compassionate writing intervention to improve body compassion, physical activity motivation and behaviour. It uses implementation intentions (II), both alone and in combination in order to test whether body compassion works as an element of an intervention or is effective on its own. The content of participants body compassionate writing is also examined using linguistic analysis.

Finally, Chapter 8 acts as a general discussion of the findings throughout the thesis. This summarises the findings and evaluates the implications and future applications of these findings. It also describes a model that summarises how the variables investigated throughout the thesis interact.

CHAPTER 2 SCOPING REVIEW OF EVIDENCE OF THE EFFECT OF BODY IMAGE ON PHYSICAL ACTIVITY PARTICIPATION

This review considers the relationship between body image and physical activity; specifically, the effect that body image has on physical activity participation. It considers as wide a range of samples as possible from the demographic features highlighted above to explore how these variables influence the relationship. To the extent that body image may influence participation in physical activity, this review highlights the need to address body image in physical activity interventions.

This review is a scoping review, in that it adopts systematic search techniques to examine research using a broader research question than a systematic search would allow, taking account of the broad and disparate nature of the literature on this topic. Scoping reviews have been defined in many ways for example Mays, Roberts and Popay (2001) define them as a way to "map rapidly the key concepts underpinning a research area and the main sources and types of evidence available and [which] can be undertaken as stand-alone projects in their own right" (p.194). However, Arksey and O'Malley (2005) emphasised that unlike systematic reviews scoping reviews seek to address broader topics where many study designs are applicable (unlike systematic where they can identify designs in advance) and unlikely to assess the quality. They also emphasise that due to the scoping review taking account of a wider range of literature than a systematic review they are not necessarily "rapid" as stated by Mays et al (2001).

The aims of this scoping review are therefore:

1. To conduct a systematic search for studies considering the link between body image and physical activity
2. To identify the nature of the link between body image and physical activity and the limitations of this evidence
3. To identify possible moderators of the link between body image and physical activity
4. To propose recommendations for future research in order to more fully test the putative causal link between body image and physical activity.

2.1 METHOD

Studies were identified through conducting searches of the PubMed and Scopus databases, Cochrane review database, Google Scholar (search terms are included in Table 2.1), previous searches and through recommendations from academics in the field (Flintoff & Scraton, 2001; Garrett, 2004; Prichard & Tiggemann, 2008), as well as from terms collected from the previous review detailed in chapter 1. *Self-determination* was added as a search term based on the prevalence of this term emerging in the search. Published literature and grey literature such as theses and self-published work (i.e. not commercially published) were included in these searches. The research found through these techniques was expanded upon through bibliography searches and the 'cited by' functions available at Google Scholar and Scopus. Searches were also performed on reoccurring authors (e.g. D. Markland) and journals (e.g. Body Image) as well as on subject-specific journals, author websites and topic websites, as well as using studies referenced in older or more specific review papers (Seronda A. Robinson et al., 2012).

All searches were limited by year (post 1990) and by subject (Psychology & social sciences) as there were a large number of irrelevant medical studies appearing in the initial searches. All ages, healthy & non-healthy, disability, all countries and ethnicities were included. There was no language filter put in to eliminate language bias and both qualitative and quantitative research was included.

Table 2.1 Search terms used in scoping review database searches

Body image terms	Physical activity terms
Body image	Physical activit*
Body dissatisfaction	Exercis*
Body anxiet*	Physical inactivit*
Body esteem	Sport*
Body satisfaction	Sport* motivation*
Body attitude*	Exercise motivation*
Body concern*	Self-determination
Body appreciation	
Weight concern	
Shape concern	
Body dysmorphia	
Body image disturbance	
Body preoccupation	
Body image acceptance	
Self-objectification	
Body shame	
Body pride	
Body guilt	
Social physique anxiety	
Appearance	

Note: column one was entered into one search using the term "OR" in between. The same was then done for column 2. The searches were then combined, and the results filtered as detailed above.

The final search was conducted on the 05.06.2017. Figure 2.1 shows the process of going from the results of these searches to the final list of 155 studies using the inclusion and exclusion criteria listed below. An update was completed in 05.2019 which led to a final total number of 185. During this update another similar review was also discovered (Sabiston, Pila, Vani, & Thøgersen-Ntoumani, 2018), however the results of this study were limited to features of the design, methodology, sample and a brief overview of the findings, which it is hoped the

present review will elaborate on in more detail. In addition, the present review included a number of additional studies due to the Sabiston et al. (2018) review being limited to English only, no theses and from 2008-2018 only. The Sabiston et al. (2018) review also only considered from children-middle aged adults with no older populations considered and only healthy participants with no special groups such as weight loss groups considered. In order to get a full picture of the nature of the literature as a whole the present review will consider these.

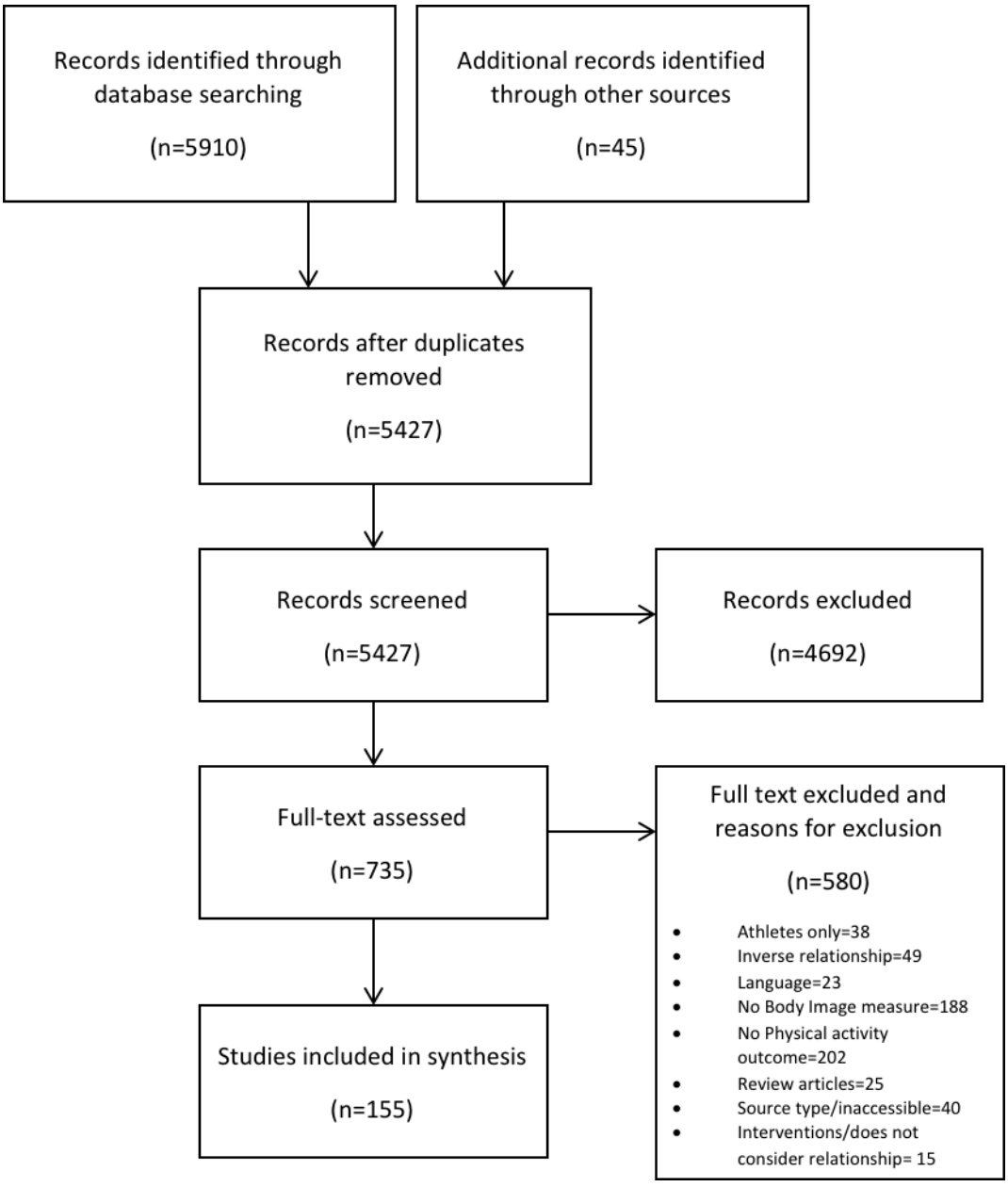

Figure 2.1 PRISMA flow diagram of scoping review literature

INCLUSION CRITERIA

a. Should have a body image (BI) component (see Table 1.2); measuring BI as a correlate, covariate, barrier, facilitator, goal, motivator, mediator, moderator, or interview component/question/topic.
b. Should have a physical activity (PA) component (see Table 1.2) as an outcome.
c. Should examine/consider the effect of body image on physical activity.
d. All articles, articles in press, book chapters/sections, and books will be considered, as will MSc and PhD theses where these are unpublished in one of the aforementioned source types.
e. Must be from 1990 onwards for practicality and due to the likelihood of changed attitudes towards BI and PA in the recent decades.
f. Must be written entirely/mostly in English, French or Spanish.

EXCLUSION CRITERIA

a. No body image component (See Table 1.2) or body image as an outcome only.
b. No Physical activity component (see Table 1.2) or not an outcome (e.g. physical activity intervention to improve body image).
c. Considers the inverse relationship only (i.e. the effect of PA on BI).
d. Considers athletes only with no comparison of activity levels.
e. Conference papers not considered due to lack of detail available and high likelihood of being presented in a journal article.
f. Full-text inaccessible due to language (only English, Spanish & French were included) or another barrier (e.g. copyright/access).
g. Reviews will be included in searches and selected based on the above. However, they will be used only as a source of further material and papers cited within reviews will be extracted and the reviews themselves not included in the results. The same criteria will apply to papers found in this way as those from search results and other sources.

Data were extracted based on:

a. Country where the study was conducted.
b. Sample ethnicities, ages, genders, BMI, disability.
c. Body image and physical activity measures.
d. Additional variables investigated.
e. Relationship presence and nature between body image and physical activity (i.e. correlation, predictor, barrier etc.).

Articles were screened for relevance in a number of stages. First titles were considered alone for extraction of abstracts. Next abstracts were considered to consider which were appropriate for full-text extraction. At this initial screening (titles – abstracts) 10% and at full-text assessment (abstracts – full-text) 10% of these documents were independently assessed by the principle supervisor. Inter-rater reliability was calculated by percentage agreement. Finally, from the full-texts the final synthesis of studies (see table 2.2) was extracted.

2.2 RESULTS

INTER-RATER RELIABILITY

The agreements of paper titles that were deemed suitable for further consideration was 87.2 %, while the agreement from abstracts that were deemed suitable for full-text extraction was 89.0%. Disagreements were dealt with through discussion.

SAMPLE AND ARTICLE CHARACTERISTICS

The 185 studies cited in this review used a variety of different samples, methods and even definitions of the key concepts (body image and physical activity). A summary of the studies can be found in Appendix B and a list of the studies reviewed here is shown in Table 2.2. All papers were published between 1990 and 2019 and mostly conducted within North America and Europe, however there were studies available from across the world (see Table 2.3). A qualitative measurement was used in 39 studies, with 37 being entirely qualitative, 7 studies included those with disabilities (although 2 did not examine the effect this had on the relationship), 60 had female only samples and 17 had male only.

Table 2.2 List of studies in final synthesis with location of study and design

	Citation	Location	Design
1	Garrett (2004)	Australia/NZ	Qualitative
2	Atalay and Gençöz (2008)	West Asia	Cross-sectional
3	Duncan, Al-Nakeeb, Nevill and Jones (2004)	North Europe	Cross-sectional
4	Bassett and Martin Ginis (2009)	North America	Cross-sectional
5	Kołoło, Guszkowska, Mazur and Dzielska (2012)	East Europe	Cross-sectional
6	Chen, Fox and Haase (2010)	East Asia	Qualitative
7	Abbott and Barber (2011)	Australia/NZ	Cross-sectional
8	Sands, Tricker, Sherman, Armatas and Maschette (1997)	Australia/NZ	Cross-sectional
9	Laus, Costa, and Almeida (2011)	South America	Cross-sectional
10	Mama, Quill, Fernandez-Esquer, Reese-Smith, Banda and Lee (2011)	North America	Cross-sectional
11	Kopcakova, Veselska, Geckova, van Dijk and Reijneveld (2014)	East Europe	Cross-sectional
12	Deforche, Bourdeaudhuij and Tanghe (2006)	West Europe	Cross-sectional
13	Cox, Coleman and Roker (2006)	North Europe	Qualitative
14	Markland and Ingledew (2007)	North Europe	Cross-sectional
15	Anton, Perri and Riley (2000)	North America	Cross-sectional
16	Markland (2009)	North Europe	Cross-sectional
17	Sabiston, Brunet, Kowalski, Wilson, Mack and Crocker (2010)	North America	Cross-sectional
18	Pila, Barlow, Wrosch and Sabiston (2016)	North America	Retrospective
19	Kantanista, Osiński, Borowiec, Tomczak and Krol-Zielińska (2015)	East Europe	Cross-sectional
20	Coelho, Giatti, Molina, Nunes and Barreto (2015)	South America	Cross-sectional
21	Coakley and White (1992)	North Europe	Qualitative

22	Flintoff and Scraton (2001)	North Europe	Qualitative
23	Cockburn and Clarke (2002)	North Europe	Qualitative
24	Zabinski, Saelens, Stein, Hayden-Wade and Wilfley (2003)	North America	Cross-sectional
25	Kruger, Lee, Ainsworth and Macera (2008)	North Europe	Cross-sectional
26	Symons, Polman, Moore, Boekoles, Eime, Harvey, Craike, Banting and Payne (2013)	Australia/NZ	Cross-sectional
27	Withall, Jago and Fox (2011)	North Europe	Qualitative
28	Wetterhahn, Hanson and Levy (2002)	North America	Cross-sectional
29	Neumark-Sztainer, Paxton, Hannah, Haines, and Story (2006)	North America	Longitudinal
30	Jensen and Steele (2009)	North America	Cross-sectional
31	Finne, Bucksch, Lambert and Kolip (2011)	West Europe	Cross-sectional
32	Felts, Parrillo, Chenier and Dunn (1996)	North America	Cross-sectional
33	Taylor, Yancey, Leslie, Murray, Cummings, Sharkey, Wert, James, Miles and McCarthy (1999)	North America	Qualitative
34	Yancey, Simon, McCartney, Lightstone and Fielding (2006)	North America	Cross-sectional
35	Frisén and Holmqvist (2010)	North Europe	Qualitative
36	James (2000)	Australia/NZ	Qualitative
37	Smith (2013)	North Europe	Qualitative
38	Slater and Tiggemann (2011)	Australia/NZ	Cross-sectional
39	Slater & Tiggemann (2010)	Australia/NZ	Qualitative
40	Mabry, Young, Cooper, Meyers, Jaffe and Duggan (2003)	North America	Qualitative
41	Ashton, Hutchesson, Rollo, Morgan & Collins (2017)	Australia/NZ	Cross-sectional
42	Aguirre-Loaiza, Reyes, Ramos-Bermúdez, Bedoya, Franco (2017)	South America	Cross-sectional
43	Patte, Laxer, Qian & Leatherdale (2016)	North America	Longitudinal

44	Lodewyk and Sullivan (2016)	North America	Cross-sectional
45	Porto, Cardoso, Luiz & Sacomori (2016)	South America	Cross-sectional
46	Arigo, Butryn, Raggio, Stice & Lowe (2016)	North America	Longitudinal
47	Dikareva, Harvey, Chicchillitti, Bartlett & Anderson (2016)	North America	Qualitative
48	Nikniaz, Mahdavi, Amiri, Ostradrahimi & Nikniaz (2016)	South Asia	Cross-sectional
49	Blanchette-Sylvestre & Meilleur (2016)	North America	Cross-sectional
50	Goodwin, Haycroft & Meyer (2016)	North Europe	Cross-sectional
51	Biolcati, Ghigi, Mameli & Passini (2016)	South Europe	Cross-sectional
52	Tennant (2016)	North America	Longitudinal
53	Stapleton, McIntyre & Bannatyne (2016)	Australia/NZ	Cross-sectional
54	Yachyra & Gibson (2016)	North America	Qualitative
55	Coelho, Fonseca, Pinto & Mourão-Carvalhal (2016)	South Europe	Cross-sectional
56	Ornelas, Rodríguez, Mayorga-Vega & Contreras (2016)	Central America	Cross-sectional
57	De Mesa, Tuero, Zagalaz & Sanchez (2016)	South Europe	Cross-sectional
58	Fraguela-Vale, Varela-Garrote & Sanz-Arazuri (2016)	South Europe	Cross-sectional
59	Sampasa-Kanyinga, Hamilton, Willmore & Chaput (2017)	North America	Cross-sectional
60	Del Mar Bibiloni, Coll, Pich, Pons & Tur (2017)	South Europe	Cross-sectional
61	Chae, Kang & Ra (2017)	East Asia	Cross-sectional
62	Michels & Amenyah (2017)	Africa	Cross-sectional
63	Wilkinson, Miller, Koehly, Daniel & Forman (2017)	Central & North America	Cross-sectional
64	Sani, Eskandarnejad & Fathirezaie (2016)	South Asia	Cross-sectional
65	Edman, Lynch, Yates, Patron & Aruguete (2015)	East & South East Asia*	Cross-sectional

66	Alipour Abbasalizad Farhangi, Dehghan, & Alipour (2015)	South Asia	Cross-sectional
67	Aşçi, Gökmen, Tiryaki & Aşçi (1997)	West Asia	Cross-sectional
68	Bastug (2011)	West Asia	Cross-sectional
69	Beltrán-Carrillo, Devís-Devís & Peiró-Velert (2016)	South Europe	Qualitative
70	Bevans, Fitzpatrick, Sanchez & Forrest (2010)	North America	Observational
71	Boujut & Déchamps (2012)	West Europe	Cross-sectional
72	Bowker, Gadbois & Cornock (2003)	North America	Cross-sectional
73	Bratland-Sanda & Sundgot-Borgen (2012)	North Europe	Cross-sectional
74	Butt, Weinberg, Breckon & Claytor (2011)	North America	Cross-sectional
75	Carmona, Tornero-Quiñones & Sierra-Robles (2015)	South Europe	Cross-sectional
76	Chen & Wang (2012)	North America	Cross-sectional
77	Cok (1990)	West Asia	Cross-sectional
78	Davison, Werder, Trost, Baker & Birch (2007)	North America	Longitudinal
79	De Bruin, Woertman, Bakker, Oudejans (2009)	West Europe	Cross-sectional
80	Duin, Ennis Keippel, Ciemins, Hanson, Neary, Fink (2015)	North America	Qualitative
81	Dwyer, Allison, Goldenberg, Dein, Yosgida, Boutilier (2006)	North America	Qualitative
82	Evans (2006)	North Europe	Qualitative
83	Francisco, Narciso & Alarcão (2013)	South Europe	Cross-sectional
84	Fulkerson, Keel, Leon & Dorr (1999)	North America	Cross-sectional
85	Gillison, Standage & Skevington (2011)	North Europe	Longitudinal
86	Greguol, Gobbi & Carraro (2014)	South America & South Europe	Cross-sectional
87	Guinn, Semper, Jorgensen, Skaggs (1997)	North America	Cross-sectional
88	Hausenblas, & McNally (2004)	North America	Cross-sectional
89	Hulens, Vansant, Claessens, Lysens, Muls, & Rzewnicki (2002)	West Europe	Cross-sectional

90	Hurley, Lyle & Hyner (2013)	North America	Cross-sectional
91	Hurst, Dittmar, Banerjee, & Bond (2017)	North Europe	Cross-sectional & Longitudinal
92	Im, Ko, Hwang, Chee, Stuifberger, Walker & Brown (2013)	North America	Qualitative
93	Ingledew & Sullivan (2002)	West Europe	Cross-sectional
94	Jachyra (2016)	North America	Qualitative
95	Johnson (2000)	North Europe	Qualitative
96	Johnson, Fallon, Harris & Burton (2013)	North America	Cross-sectional
97	Kelly, Mazzeo, Evans, Stern, Thacker, Thornton & Laver (2011)	North America	Longitudinal
98	Koyuncu, Tok, Canpolat & Catikkas (2010)	West Asia	Cross-sectional
99	Kubayi & Surujlal (2014)	Africa	Cross-sectional
100	Lascar, Kennedy, Hancock, Jenkins, Andrews, Greenfield, & Narendran (2014)	North Europe	Qualitative
101	Lodewyk & Pybus (2013)	North America	Cross-sectional
102	Loman (2008)	North America	Qualitative
103	Lowery, Robinson Kurpius, Befort, Blanks, Sollenberger, Nicpon & Huser (2005)	North America	Cross-sectional
104	Luszczynska & Abraham (2012)	East Europe	Longitudinal
105	Kelly, Wall, Eisenberg, Story & Neumark-Sztainer (2005)	North America	Cross-sectional
106	Meyer, Blissett, Alberry & Sykes (2013)	North Europe	Cross-sectional
107	Myers & Roth (1997)	North America	Cross-sectional
108	Nair, Collins, & Napolitano (2013)	North America	Cross-sectional
109	Nerini (2015)	South Europe	Cross-sectional
110	Neumark-Sztainer, Goeden, Story, & Wall (2004)	North America	Cross-sectional
111	Rakfalska & Schier (2008)	East Europe	Cross-sectional
112	Ravaldi et al (2003)	South Europe	Cross-sectional
113	Ricciardelli, McCabe & Banfield (2000)	Australia/NZ	Qualitative

114	K. Robinson & Ferraro (2004)	North America	Cross-sectional
115	Runfola, Von Holle, Peat, Gagne, Brownlet, Hofmeier & Bulik (2013)	North America	Cross-sectional
116	Schwerin Corcoran, Fisher, Patterson, Askew, Olrich, Sjanks (1996)	North America	Cross-sectional
117	Seidel (2015)	East Europe	Cross-sectional
118	Shriver, Harrist, Page, Hubbs-Tait, Moulton, & Topham (2013)	North America	Cross-sectional
119	Sigrist, Anderson & Auld (2005)	North America	Qualitative
120	Silva, Nahas, de Sousa, Del Duca, & Peres (2011)	South America	Cross-sectional
121	Sit, Kerr & Wong (2008)	East Asia	Cross-sectional
122	Steinfeld, Zakrajsek, Carter & Steinfeldy (2011)	North America	Cross-sectional
123	Swami, Steadman, & Tovée (2009)	North Europe	Cross-sectional
124	Thompson, Humbert & Mirwald (2003)	North America	Qualitative
125	Tiggemann & Williamson (2000)	Australia/NZ	Cross-sectional
126	Vinkers, Evers, Adriannse, & de Ridder (2012)	West Europe	Cross-sectional
127	Walseth, Aartun, & Engelsrud (2017)	North Europe	Qualitative
128	Wasilenko, Kulik, & Wanic (2007)	North America	Observational
129	Zamboni, Crawford & Carrico (2008)	North America	Cross-sectional
130	Bramham (2003)	North Europe	Qualitative
131	Orme (1991)	North Europe	Qualitative
132	Robertson (2003)	North Europe	Qualitative
133	Donnelly, Al Suwaldi, Al Enazi, Idris, Albulushi, Yassin, Rehman & Hassan (2012)	West Asia	Qualitative
134	Berger & Peerson (2009)	West Asia	Qualitative
135	Al-Kaabi, Al-Maskari, Saadi, Afandi, Parkar, & Nagelkerke (2009)	West Asia	Qualitative
136	Denison, Weir, Carver, Norman & Reynolds (2015)	North Europe	Qualitative

137	Petrov Fieril, Fagevik Olsén, Glantz & Larsson (2014)	North Europe	Qualitative
138	Weir, Bush, Robson, McParlin, Rankin & Bell (2010)	North Europe	Qualitative
139	Marquez, Bustamante, Bock, Markenson, Tovar & Chasan-Taber (2009)	North America	Qualitative
140	D'Arcy (2007)	North America	Cross-sectional
141	DiBartolo & Shaffer (2002)	North America	Cross-sectional
142	Hoag (2012)	North America	Cross-sectional
143	Wiggins & Moode (2000)	North America	Cross-sectional
144	Vancampfort et al (2014)	West Europe	Cross-sectional
145	Gonzalez-Carrascosa et al (2013)	South Europe	Cross-sectional
146	Hernandez & Jimenez (2013)	Central America	Cross-sectional
147	Davis & Cowles (1991)	North America	Cross-sectional
148	Davidson et al (2010)	North America	Longitudinal
149	Finkenberg et al (1993)	North America	Cross-sectional
150	Kim (2013)	East Asia	Cross-sectional
151	Loland (1998)	North Europe	Cross-sectional
152	Rauff & Downs (2011)	North America	Longitudinal
153	Richman & Shaffer (2000)	North America	Cross-sectional
154	Trout & Graber (2009)	North America	Qualitative
155	Varnes et al (2015)	North America	Cross-sectional
156	Lopez (2019)	North America	Qualitative
157	Piateck, Zawadzka & Ostrowska (2018)	East Europe	Cross-sectional
158	Hartson, Gance-Cleveland, Amura & Schmiege (2018)	North America	Cross-sectional
159	Zarychta, Chan, Kruk & Luszczynska (2019)	East Europe	Cross-sectional
160	Aguirre-Loaiza, Reyes, Ramos-Bermúdez, Bedoya & Franco (2017)	South America	Cross-sectional
161	Jones, Arcelus, Bouman & Haycraft (2017)	North Europe	Qualitative

162	Lopez-Castedo, Domínguez-Alonso & Portela-Pino (2018)	South Europe	Cross-sectional
163	Ahmadi, Heyrani & Yoosefy (2018)	South Asia	Cross-sectional
164	Saller & Khaled (2018)	West Asia	Cross-sectional
165	Joseph, Ramaswamy & Wang (2018)	North America	Review
166	Austin, Serier, Sarafin & Smith (2017)	North America	Longitudinal
167	Soulliard, Kauffman, Fitterman-Harris, Perry & Ross (2019)	North America	Cross-sectional
168	Mendo-Lázaro, Polo-del-Río, Amado-Alonso, Ingelsia-Galbyo & Léon-del-barco (2017)	South Europe	Cross-sectional
169	Añez, Fornieles-Deu, Fauquet-Ars, López-Guimerá, Puntî-Vidal & Sánchez-Carracedo (2016)	South Europe	Cross-sectional
170	Lunde & Gattario (2017)	North Europe	Qualitative
171	More, Phillips & Colman (2019)	North America	Longitudinal
172	Gilchrist, Pila, Castonguay, Sabiston & Mack (2018)	North America	Cross-sectional
173	Peráčová, Chovancová, Kukurová & Plevková (2018)	East Europe	Cross-sectional
174	McCabe, Connaughton, Tatangelo, Mellor & Busija (2017)	Australia/NZ	Longitudinal
175	Fuller-Tyszkiewicz, Dias, Krug, Richardson & Fassnacht (2018)	Australia/NZ	Longitudinal
176	Min, Yan, Wang & Wang (2018)	East Asia	Longitudinal
177	Cerar, Kondrič, Ochiana & Sindik (2017)	South Europe	Cross-sectional
178	Jones, Haycraft, Bouman & Arcelus (2018)	North Europe	Cross-sectional
179	Ribeiro et al. (2018)	South America	Cross-sectional
180	Sun, Chen, Wang, Lui & Zheng (2018)		Meta-Analysis
181	Sündermann, Rydberg, Linder & Linton (2018)	North Europe	Qualitative
182	Plevinsky, Wojtowicz, Poulopoulos, Schneider & Greenley (2018)	North America	Cross-sectional

183	Robbins, Ling & Resnicow (2017)	North America	Cross-sectional
184	Monge-Rojas, Fuster-Baraona, Garita-Arce, Sánchez-López, Colon-Ramos & Smith-Castro (2017)	Central America	Qualitative
185	Miranda et al (2018)	South America	Cross-sectional

*Note: these numbers are used to help summarise latter tables. *Hawai'i with Japanese and Filipino participants.*

g The measurements of body image and physical activity were affected by the differing definitions of these terms used in the studies and by nationality. Table 2.3 highlights the different methods used to measure body image and can be split into 4 main sections of measure: National/international surveys, eating pathology, figure rating/drawing and other. The eating behaviour measures often contained a body dissatisfaction subscale, which was used in these studies, while figure ratings were used to measure perceived body image and desired body image, with the differences between these representing level of dissatisfaction or body image discrepancy (Bibiloni, Coll, Pich, Pons, & Tur, 2017).

Table 2.3 Measures of body image used in the scoping review studies

BI measure	Study numbers	Total
National/International survey		
HBSC (Health Behaviours in School-age Children)	5, 11	2
Other National/Int. survey[1]	26, 32, 70	3
Eating pathology		
EDI (all versions)	49, 50, 73, 84, 88, 106, 114, 140, 144, 169	9
EDE or EDE-Q	53, 112	2
Figure Rating/Drawing		
Stunkard Figure Rating Scale	14, 16, 48, 55, 60, 62, 64, 65, 66, 76, 120, 160, 163, 168	11
Collins' Figure Rating Scale	30, 42, 93	3

Contour Drawing Rating Scale	9, 56, 79, 83, 103, 183	5
Silhouette Rating Scale	20, 101, 145, 176, 179, 185	3
Other questionnaires		
Body Esteem Scale (BES-all versions)	3, 61, 72, 78, 111, 118, 122, 126, 129, 143, 149, 153, 155, 158, 164, 174	14
Body Discrepancy Scale	15, 44*	2
Multidimensional Body-Self Relations Questionnaire	18, 28, 46, 52, 68, 96, 97, 104, 146, 151, 159, 173	10
Body Investment Scale	19, 51	2
Body Shape Satisfaction Scale	29, 105, 108, 109, 110, 156, 171	6
Weight Perception	34, 43, 59, 76, 114	5
Body Shape Questionnaire	49, 57, 145, 166, 185	3
Body Image Avoidance Questionnaire	53, 75	2
Body Image Satisfaction Scale	77, 98	2
Body Cathexis Scale	87, 125	2
Body Attitude Scale/Test	89, 144	2
Body Appreciation Scale	91, 142, 167	2
Objectified Body Consciousness	103, 155	2
Body Parts/Areas Satisfaction Scale	128, 152	2
Athletic Image Scale	140, 142	2
Qualitative	1, 6, 13, 21, 22, 23, 27, 33, 35, 36, 37, 39, 40, 47, 54, 69, 80, 81, 82, 92, 94, 95, 100, 102, 113, 119,	39

	124, 127, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 154, 156, 161, 170, 181, 184	
Custom	2, 20, 25, 31, 32, 58, 92, 96, 175	8
Barriers and Benefits (Scale/custom)	12, 24, 74, 90, 99, 107, 121, 162	7
Other[1]	4, 7, 10, 17, 38, 45, 63, 67, 71, 75, 85, 86, 91, 108, 112, 114, 115, 116, 117, 123, 140, 141, 142, 147, 148, 150, 157, 175, 177, 178, 182	31

*Notes: *modified. [1]Other scales include: Adult Body Satisfaction Questionnaire (4), Embodied Image Scale (7), Body Image Scale (8), Pulver's Body Image Scale (10), Self-conscious emotions (Body Shame, Pride & Guilt-17, 172), WHO (26), Youth Risk Behaviour Surveillance (32), Body Dissatisfaction Index (116), Body Size Dissatisfaction & Weight/Shape concerns (115), Appearance Anxiety (38), Body & Sexual Esteem (45), Berscheid Body Image Questionnaire (67), Health Pathways Child-report (70), Kolech Body Image Questionnaire (71), Body Change inventory (85), Offer Self-Image Questionnaire (86), Self-Discrepancy Index (91), Physical Appearance State and Trait Anxiety Scale & Body Image States Scale (108), Body Image Drawing Test (114), Body Uneasiness Test (112), Bodybuilder Image Grid (117), Photographic Figure Rating Scale (123), Body Image survey (141), Body Dissatisfaction Scale (142), Body Image Inventory (147), Disinclination for Physical Activity (148), Decisional Balance Scale (150), Trunk Appreciation Scale (157), Body Image and Body Change Inventory, state appearance awareness from Objectified Body Consciousness Scale Self-Surveillance subscale (175), motives for physical activity (177), IMPACT-35 (182)*

DEFINITIONS OF BODY IMAGE

There were many terms used to represent "body image" throughout this research however much of it is used interchangeably (e.g. body image and body esteem). Body image (BI) is often defined using Slade's definition that it is "the picture we have in our minds of the size, shape and form of our bodies; our feelings concerning these characteristics and our constituent body parts" (Slade, 1988). Other definitions also mention the "perception, thoughts and feelings" about one's body (e.g. Alipour, Abbasalizad Farhangi, Dehghan, & Alipour, 2015) and of encompassing cognitive, affective and behavioural aspects. Body dissatisfaction is also commonly described as the "attitudinal component of body image" (E. M. Coelho, Fonseca, Pinto, & Mourão-Carvalhal, 2016) or the "distortion of perception, behaviour or

cognition in relation to weight or the body" (D. A. S. Silva, Nahas, de Sousa, Del Duca, & Peres, 2011). There is also body shame and pride represented with reference to appearance and fitness (Gilchrist, Pila, Castonguay, Sabiston, & Mack, 2018). Finally, body image disturbance has been described in two key ways, either the combination of body dissatisfaction and body image avoidance behaviours (Stapleton, McIntyre, & Bannatyne, 2016) or negative body image (Cash, Phillips, Santos, & Hrabosky, 2004).

DEFINITIONS OF PHYSICAL ACTIVITY

The definitions of physical activity (PA) and of sufficient levels of physical activity were fairly consistent, mostly following national (e.g. NHS) or international guidelines, with definitions including any activity of 15-30 minutes or more, usually split into light, moderate and vigorous intensities. However, the methods used to measure physical activity levels differed ranging from simple yes/no responses, a comparison between sports people and sedentary people to simple questionnaires asking participants to recall the number of mild, moderate and vigorous activities within a week (e.g. using the Godin Leisure-Time Exercise Questionnaire) to direct measuring devices such as accelerometers or pedometers. The most frequent measures can be seen in Table 2.4.

Table 2.4 Frequently used physical activity measures in the scoping review studies

PA measure	Studies	Total
Comparison between sport/athletes/PA and sedentary	2, 28, 45, 53, 56, 57, 67, 68, 69, 79, 83, 84, 98, 109, 111, 112, 114, 116, 117, 120, 122, 140, 141, 142, 143, 149, 151, 155, 157, 163, 167, 168, 173, 175	34
Godin Leisure Time Exercise Questionnaire	14, 16, 17, 29, 50, 52, 85, 88, 91, 96, 104, 108, 110, 150, 152, 159, 172	17
International Physical Activity Questionnaire	9, 10, 20, 34, 47, 48, 60, 62, 148, 171	10

Baecke Physical Activity Questionnaire	12, 15, 89, 140, 144, 179	6*
Accelerometer/Pedometer	46, 78, 148, 166, 183	5
Recall (e.g. 7 day PA recall)	3, 4, 97, 185	4
Youth Risk Behaviour Survey	32, 40, 63	3

*Notes: *12 used modified Baecke PAQ*

OVERALL STATE OF THE ASSOCIATION

Overall more positive body image is associated with greater physical activity participation (e.g. W. Sun, Chen, Wang, Liu, & Zhang, 2018), with poorer body image or insecurity about appearance being a significant predictor of lower physical activity (Deforche, De Bourdeaudhuij, & Tanghe, 2006). However, the results also appear to vary by age, ethnicity and culture (Seronda A. Robinson et al., 2012), disability (T. L. L. Williams et al., 2014) and gender (Kopcakova, Veselska, Geckova, van Dijk, & Reijneveld, 2014).

There are also a number of other concepts that appear to moderate this relationship. In order to assess the second aim of this review, the sections below will consider each of these factors in turn, however the interactions between certain variables are also considered, for example the interaction between gender and age or between gender and disability. These interactions, as well as the factors independently appear to affect the relationship between body image and physical activity.

EFFECT OF GENDER

There were interesting and somewhat contradictory results between genders. Men are generally more physically active than women (Bratland-Sanda & Sundgot-Borgen, 2012; Butt, Weinberg, Breckon, & Claytor, 2011; Carmona, Tornero-Quiñones, Sierra-Robles, & Sierra-Robles, 2015) while women generally report a more negative body image than men (Bowker, Gadbois, & Cornock, 2003; Bratland-Sanda & Sundgot-Borgen, 2012; Carmona et al., 2015), although body image issues are becoming increasingly common among men (Stapleton et al., 2016).

In research comparing genders directly, the results are thoroughly inconsistent. Some have suggested that there were no differences between males and females and that in both genders there was a relationship between body image and physical activity (Añez et al., 2018; Cok, 1990; Goodwin, Haycraft, & Meyer, 2011; Kruger, Lee, Ainsworth, & Macera, 2008; Kubayi & Surujlal, 2014; Zarychta, Chan, Kruk, & Luszczynska, 2019), or no relationship present in either gender (Aguirre-Loaiza, Reyes, Ramos-Bermúdez, Bedoya, & Franco, 2017; Ahmadi, Heyrani, & Yoosefy, 2018; Castillo Hernández & Moncada-Jiménez, 2013; M. J. Duncan, Al-Nakeeb, Nevill, & Jones, 2004; Fulkerson, Keel, Leon, & Dorr, 1999; Ingledew & Sullivan, 2002; Laus, Costa, & Almeida, 2011; Lowery et al., 2005). Yet others have found that there was an association between body image and physical activity in males but not females (Bratland-Sanda & Sundgot-Borgen, 2012; C. G. Coelho, Giatti, Molina, Nunes, & Barreto, 2015; E. M. Coelho et al., 2016; T. R. Da Silva, Saenger, & Pereira, 2011; Gillison, Standage, & Skevington, 2011; Hartson, Gance-Cleveland, Amura, & Schmiege, 2018; Kopcakova et al., 2014; Neumark-Sztainer, Goeden, Story, & Wall, 2004; Saller & Khaled, 2019), or in females but not males (Biolcati, Ghigi, Mameli, & Passini, 2017; X. Chen & Wang, 2012; Finkenberg, DiNucci, McCune, & McCune, 1993; Francisco, Narciso, & Alarcão, 2013; Jensen & Steele, 2009; M Tiggemann & Williamson, 2000; Wilkinson, Miller, Koehly, Daniel, & Forman, 2017) or finally that there is an association for both but they manifest themselves in different ways (Chae, Kang, & Ra, 2017; Finne, Bucksch, Lampert, & Kolip, 2011; Hurley, Lyle, & Hyner, 2014; Lodewyk & Sullivan, 2016; Loland, 1998; Markland & Ingledew, 2007; McCabe, Connaughton, Tatangelo, & Mellor, 2017; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006; Zabinski, Saelens, Stein, Hayden-Wade, & Wilfley, 2003). Research has also shown however that when controlling for gender, despite gender differences in body image, significantly higher body appreciation and functionality appreciation is present in athletes than non-athletes (Soulliard, Kauffman, Fitterman-Harris, Perry, & Ross, 2019), while although no direct association was shown (in either gender) between body dissatisfaction and physical activity, it was mediated by exercise avoidance in both sexes (More, Phillips, & Eisenberg Colman, 2019).

Inconsistencies in results may be partly accounted for by differences in country of origin/ethnicity, age differences across samples and differences in measures and definitions of physical activity and body image. However, this does not explain the inconsistencies fully. For

example, while negative body image can be related to lower levels of physical activity in female-only samples (Anton, Perri, & Riley, 2000; Miranda et al., 2018; Runfola et al., 2013; Sands, Tricker, Sherman, Armatas, & Maschette, 1997; Symons et al., 2013), other research suggests that BI can act as both a barrier and a facilitator of physical activity. In girls, body image concern was a facilitator of physical activity (specifically physical education at school) since it was perceived to help in the development and maintenance of the desired feminine physique (W. C. Taylor et al., 2000). However, it was also a barrier depending on the "audience" (e.g. self-consciousness in the presence of boys) where PA was perceived to affect the appearance of attractiveness that was expected of them (W. C. Taylor et al., 2000) or where PE uniforms were 'unflattering', 'unfeminine' and/or 'embarrassing' (Coakley & White, 1992; Cockburn & Clarke, 2002; L. Cox et al., 2006; Flintoff & Scraton, 2001; Orme, 1991) or tightly fitted or too revealing (James, 2000; Walseth, Aartun, & Engelsrud, 2017). Women were also shown to have a significant association between exercise and appearance awareness, but not trait body dissatisfaction, however appearance and health motives for physical activity were associated with exercise (Fuller-Tyszkiewicz, Dias, Krug, Richardson, & Fassnacht, 2018). In males, Jachyra (2016) also showed that body dissatisfaction dissuaded participation in PE and instead could contribute to unhealthy weight control practices. Conversely, Bramham (2003) demonstrated how body dissatisfaction could also motivate PE and physical activity participation.

L. Cox et al., (2006) showed that those girls who 'always' participated in physical activity still showed the insecurities about their bodies that are present in girls who 'sometimes' or never participate in physical activity but reported very low feelings of self-consciousness and rarely felt embarrassed. This is in stark contrast to those who sometimes engage in physical activity reporting that body related issues are their main reason for engaging and describe more negative feelings and memories associated with engaging in PE and exercise. Finally, those who do not engage state that embarrassment and self-consciousness are the main reasons they do not take part and that this self-consciousness is what they dislike most about sport and physical activity (also stated by James, 2000; Loman, 2008).

Body image concerns, embarrassment about appearance and sweating were also barriers to physical activity in pregnant women (Denison, Weir, Carver, Norman, & Reynolds,

2015; Marquez et al., 2009; Weir et al., 2010), while also a key motivator for PA in pregnant women was to recover or maintain the desired weight and body shape during pregnancy and after birth (Denison et al., 2015; Petrov Fieril, Fagevik Olsen, Glantz, & Larsson, 2014). Similarly, women who had recently undergone bariatric surgery felt uncomfortable and embarrassed wearing sports and exercise clothing which was a barrier to participation in PA but it has also been highlighted how both a positive and a negative body image could help them to become motivated, with weight loss improving body image and appearance-based motivation for physical activity (Cockburn & Clarke, 2002; Dikareva, Harvey, Cicchillitti, Bartlett, & Andersen, 2016). However in breast cancer survivors, there were no differences in physical activity between satisfied and non-satisfied individuals (Ribeiro et al., 2018). In young men, too, the prospect of improving one's body image was a key motivator for physical activity while intimidation and embarrassment was a barrier (Ashton, Hutchesson, Rollo, Morgan, & Collins, 2017). Furthermore, boys who perceived themselves to be "too fat" or "too thin" were less physically active, feeling that their bodies did not "fit" with the athletic ideal of sports and physically active groups (Jachyra & Gibson, 2016).

In distinguishing between physical activity and sports participation, Abbott and Barber (2011) discovered that girls who participated in sports had a higher body satisfaction than physically active and sedentary girls. The same difference is generally found in males (Bastug, 2011; Blanco Ornelas, Tristán Rodríguez, Mayorga-Vega, & Ornelas Contreras, 2016; Stapleton et al., 2016). Female athletes describing the sport culture compared to the culture external to sport, describe the differences between the performing body and the objectified body and the appreciation of body type diversity compared to body size prejudice (Lunde & Gattario, 2017). Women in sport have also shown significant differences to those outside of sport in terms of fitness evaluation, but not other elements of body image (Peráčková, Chovancová, Kukurová, & Plevková, 2018). Exposure to fit peers has also been shown to impact negatively upon the body satisfaction and physical activity duration of women attempting to engage in activity (Wasilenko, Kulik, & Wanic, 2007).

Some research has also considered transgender adults, showing that insufficient activity can be put down to body dissatisfaction as well as availability of changing facilities and acceptance by others (Jones, Arcelus, Bouman, & Haycraft, 2017). However body satisfaction

improvement was also a motive for engaging in physical activity (Jones et al., 2017) and a significant predictor of physical activity in transgender people on cross-sex hormones (Jones, Haycraft, Bouman, & Arcelus, 2018).

Although women seem to report poorer body image than men, a consideration of gender does not clarify the link between body image and physical activity. Research on men has a shorted history, this may become clearer with more research. While a few of the issues surrounding body image and physical activity appear to be emotional, there are also (especially in females and transgender individuals) a number of practical concerns (e.g. changing facilities). In males and females there was an effect of peer relationships, expectations and bullying on physical activity.

Next the association will be examined with reference to ethnicity, culture and country to see if these factors might influence how the body image – physical activity relationship manifests itself.

EFFECT OF ETHNICITY, CULTURE AND COUNTRY

There is also an effect of nationality, ethnicity and/or culture on the association between body image and physical activity. The distribution of the countries studied can be seen in Table 1.4 although the literature is dominated by research in the US (43%) and Northern Europe (18%).

In most countries studied there is a significant association between poor body image and lower physical activity participation including the UK (e.g. Coakley & White, 1992; Goodwin et al., 2011; Knowles, Niven, Fawkner, & Henretty, 2009), the USA (Anton et al., 2000; Zabinski et al., 2003), Western & Northern Europe, (Deforche et al., 2006; Finne et al., 2011; Frisén & Holmqvist, 2010), Eastern Europe (Kantanista, Osiński, Borowiec, Tomczak, & Król-Zielińska, 2015; Kołoło, Guszkowska, Mazur, & Dzielska, 2012), Australia (Ashton et al., 2017; Garrett, 2004; Symons et al., 2013) and South America (Aguirre-Loaiza et al., 2017; Blanco Ornelas et al., 2016; Guinn, Semper, Jorgensen, & Skaggs, 1997). This was also true in Canada (e.g. Jachyra & Gibson, 2016; Patte, Laxer, Qian, & Leatherdale, 2016; Sampasa-Kanyinga, Hamilton, Willmore, & Chaput, 2017) although one study of French-Canadians (Blanchette-Sylvestre & Meilleur, 2016) found a significant relationship between body image

dissatisfaction and physical activity level in those who engaged in physical activity to lose weight but not in those with other types of motivation (e.g. social or health). Furthermore, many of the same inconsistencies in results in the relationship between BI and PA in men and women are found across nationalities and ethnicities. It is therefore not particularly informative to give a detailed account of all the results. Nevertheless, there are some differences that are worth noting and this section focuses on these.

Black and Hispanic participants are generally less likely than Whites to perceive themselves as overweight even when they are (Felts, Parrillo, Chenier, & Dunn, 1996; Yancey et al., 2006), more likely to have higher body esteem (Mabry et al., 2003) and for curves to be both more acceptable and appealing than the western "ideal" (Im et al., 2013; Mathew Joseph, Ramaswamy, & Wang, 2018). More importantly, even when body image is negative, this is generally associated with lower levels of physical activity and more sedentary behaviour in Black and Hispanic individuals (Im et al., 2013; Tennant, 2016; Yancey et al., 2006); although non-replications were also shown (e.g. Mama et al., 2011; W. C. Taylor et al., 2000). Conversely, while White participants are more likely to report higher perceived body weight than Hispanic and Black participants, Whites are also more likely to exercise to lose weight (Felts et al., 1996; Im et al., 2013). In adolescents, too, this acceptance of larger body size is associated with less physical activity in black adolescents while in white adolescents a desire to be thin can serve as a motivator for more physical activity (Mabry et al., 2003). However research has also shown that body shape satisfaction is a significant predictor of reaching step goals in Mexican and Mexican American women and attendance in weight loss programmes (Austin, Serier, Sarafin, & Smith, 2017).

In British Asian samples, barriers to physical activity of clothing and being "too fat" were highlighted, mostly by women from Pakistani and Bangladeshi backgrounds (more so than Indian backgrounds). Additionally, the importance of not wanting to go somewhere where parts of people's bodies are shown off also featured heavily, again mostly by women from Pakistani and Bangladeshi backgrounds. Given religious differences between Pakistan/Bangladesh and India, these differences in barriers may be due to religious factors rather than nationality (M. R. D. Johnson, 2000).

Interviews with Taiwanese adolescents showed that appearance insecurity was a major barrier to physical activity along with considerations that it is unfeminine, disliking it and physical complaints (e.g. pain, sweating) (L. J. Chen, Fox, & Haase, 2010). This idea of physical activity not being 'feminine' or reducing femininity is not unique to this group, however. UK adolescents and young women also report that they were drawn only to activities that were traditionally feminine (Coakley & White, 1992), with the need to 'remove adornments of femininity' (e.g. jewellery, make-up) in order to engage in physical activity (Cockburn & Clarke, 2002). However, while the Taiwanese adolescents focus more on the physical complaints and feeling insecure in taking part, UK adolescents focused much more on the idea of PE lessons enforcing their insecurities through the PE kits, enforced showering and mixed sex classes (Coakley & White, 1992; Flintoff & Scraton, 2001; James, 2000). L. J. Chen et al., (2010) did not just report negative effects however; they also reported that some found appearance to be a key motive to physical activity, suggesting that while it can dissuade some, it motivates others. Similar to this, Sit, Kerr and Wong (2008) discovered that for middle aged Chinese women, the 'inconvenience' of sweating and hair grooming was a slight (but not major) barrier to physical activity, but also that appearance was a key motive to physical activity in this group. For Chinese children discrepancy between oneself and one's ideal body image motivated physical activity and dietary behaviour (Min, Yan, Wang, & Wang, 2018). In the USA in Latina teens, self-consciousness, insecurity, concerns over how boys would view them and that physical activity would ruin make-up were identified as key barriers to joining in sports and sport teams (Lopez, 2019). Costa Rican adolescents described how girls were expected to maintain their aesthetic appearance even during sport and were anxious around being shamed and sexually objectified in exercise and that this contributed to their decrease in physical activity participation (Monge-Rojas et al., 2017). In the United Arab Emirates, female college students also acknowledged the importance of exercise in 'getting slim'. Also similar to the UK and Taiwan these adolescents expressed concerns that make-up and perfume (which was not allowed in school and so was applied at home) would be ruined by exercise (Berger & Peerson, 2009). This appears to reduce in importance overtime however, as only 0.5% of older adults expressed lack of self-belief or embarrassment as a barrier to physical activity (Al-Kaabi, Al-Maskari, Afandi, Parkar, & Nagelkerke, 2009).

For this research, it is clear that there are some societal, cultural and geographical differences in how body image impacts upon physical activity. For some it appears to be more of a motivator, either through societal norms or expectations or personal drives. For others it can be a barrier due to insecurity and self-consciousness or a barrier due to the body shape when not exercising being more desirable than an athletic or slim figure.

Next the associations between body image and physical activity will be considered with reference to age, to see if there is a particular moment or moments where this relationship starts to form and affect behaviour in the short or long term.

EFFECT OF AGE

It has been suggested that the turning point for body image to affect physical activity is around 15 years. Research on 11-14 year olds generally finds no association between BI and PA (M. J. Duncan et al., 2004; Sands et al., 1997; Shriver et al., 2013), while research into 15 year olds does (Biolcati et al., 2017; Flintoff & Scraton, 2001; Kantanista et al., 2015; N. R. Kelly et al., 2011; Kołoło et al., 2012; Lodewyk & Sullivan, 2016; Patte et al., 2016). However, even here results are mixed. For example, Bevans, Fitzpatrick, Sanchez, and Forrest (2010) found no association between physical activity and body image in early adolescence but there was an association between body image and PE engagement. There was also a difference in body dissatisfaction between early adolescent dancers and non-physically active controls (Nerini, 2015). However, this is likely due to the dancing nature of their physical activity; an active control group was not studied so this cannot be known for sure. Some inconsistency is also shown by Davison, Werder, Trost, Baker, and Birch (2007) where higher levels of body esteem at ages 11 and 13 was significantly positively correlated with self-reported physical activity, moderate-vigorous physical activity and enjoyment of physical activity at age 13. However, Garn et al., (2016) investigated younger children's body fat self-concept and physical activity (8-11 years) and discovered (in contrast to other research in this age group) that body fat self-concept predicted future, but not concurrent, moderate-vigorous physical activity (measured 8 months later). More children who engage in sport were satisfied with their bodies than those who did not engage in sport, while more of those who did not engage were dissatisfied (Mendo-Lázaro, Polo-del-Río, Amado-Alonso, Iglesias-Gallego, & León-del-Barco, 2017). Research has also shown that current body image and body image discrepancy

are negatively associated with physical activity in younger teens but ideal body image is not (Robbins, Ling, & Resnicow, 2017). Jensen and Steele (2009) also discovered a significant association between body dissatisfaction and the number of vigorous physical activities engaged in by young adolescent girls. Knowles et al. (2009) investigated the effects of maturation on adolescent girls' physical self-perceptions and physical activity. The adolescents were in their early teens (around 13 years) at the start of the study and were measured a year later. There was a decrease in physical activity, which was not influenced by physical characteristics or maturation status, but physical self-perceptions did partially account for this change in physical activity. This suggests a critical role of body image perception around early-mid adolescence, especially in girls, on participation in physical activity which is consistent with reports from Sport England (L. Cox et al., 2006; Sport England, 2013). Finne et al., (2011) also demonstrated that in both boys and girls physical activity decreased with age and that age was the best predictor of inactivity in adolescents. While the effects of age have also been highlighted by Seronda A. Robinson et al., (2012), Symons et al., (2013) found no differences in body image or physical activity between 12 and 16 year olds. Zabinski et al., (2003) also found no significant differences in body-related barriers to physical activity between older and younger adolescents. Nevertheless, in mid-older teens body image was shown to be a barrier for physical activity (López-Castedo, Domínguez-Alonso, & Portela-Pino, 2018) and lower body satisfaction at 15 predicted lower levels of moderate-vigorous physical activity at age 20 in both males and females (Neumark-Sztainer et al., 2006).

Some clear conclusions can be drawn from the literature considering age in this association. It is consistently concluded that mid-teen years, specifically around the age of 15 appears to be when the effect of body image on physical activity takes effect, with the result continuing to impact on future behaviour into adulthood. Intervention at 15, as well as at later key time-points in a young person's life (e.g. starting A-levels, college, university, work) may help to ensure that the effects of this are mitigated and that enjoyment and motivation for activity is maintained.

EFFECT OF DISABILITY, ILLNESS AND INJURY

A number of studies have focused on those with disabilities. It was shown that in those with Spinal Cord Injuries (SCI), perceived impact on quality of life is crucial to whether there

was an effect. In those who perceived that their body image negatively impacted on their quality of life, those who were physically active significantly differed from those who were not in terms of their functional body satisfaction (Bassett & Martin Ginis, 2009). In SCI patients it was also shown that physical body factors and body-self relationships are associated with physical activity. For example, B. Smith (2013) reported that men were motivated to engage in PA by body appearance, specifically in the development of muscularity. These individuals also showed "body-self compassion" in taking ownership of their bodies and appreciating their uniqueness rather than criticising. Further research looking at paraplegic men determined that athletes had significantly higher body and sexual esteem than non-athletes (Dos Passos Porto, Cardoso, and Sacomori 2016), further highlighting the importance of sport (certainly in men) for those with spinal cord injuries and paraplegia. In individuals with amputations, Wetterhahn, Hanson, and Levy (2002) found that active participants had more positive (generic and amputee-specific) body image than minimally active participants. In scoliosis patients there was no association between trunk appearance perception and physical activity (Piątek, Zawadzka, & Ostrowska, 2018). Those with musculoskeletal pain report appearance concerns, with exercise as a coping mechanism for this (Sündermann, Rydberg, Linder, & Linton, 2018). In those with inflammatory bowel diseases body image concerns alongside disease related symptoms and older age were the strongest predictors of impaired physical activity behaviour (Plevinsky, Wojtowicz, Poulopoulos, Schneider, & Greenley, 2018). Finally, Greguol, Gobbi, and Carraro (2014) compared Italian and Brazilian visually impaired adolescents and found that a more positive body image is associated with greater physical activity.

It is clear that there is an association between body image and physical activity in those with a number of physical disabilities. This can be related to appearance, while in others it is more of a practical, pain or function related issue. It is not just shown to be a negative factor, however, as participation in physical activity for these individuals seems to have the effect of improving body image compared to those who do not participate. This may indicate a cyclical nature, where an individual may not participate for body image related reasons, but if they do, then the body image related concerns may be reduced, reducing the barriers to their continued participation. However, it is clear that the initial barrier needs to be removed or reduced in order for this cycle to start.

EFFECT OF OTHER VARIABLES

A number of studies included other variables although many of these were included too infrequently to be particularly informative in the relationship between BI and PA (see Table 2.5). However, in the case of eating/dietary factors and motives for physical activity, there is some consistency that they may help to explain some of the inconsistency in the relationship between BI and PA.

Table 2.5 Other variables considered in the scoping review studies

Variable	Study numbers	Total
Eating/dietary	2, 8, 15, 29, 38, 43, 46, 50, 51, 53, 55, 59, 60, 62, 66, 73, 76, 79, 83, 84, 88, 89, 105, 106, 112, 113, 114, 115, 119, 126, 140, 141, 144, 145, 147, 156, 158, 159, 166, 174, 176	41
Relative autonomy/motivation/self-regulation/reasons for exercise	14, 16, 17, 26, 52, 85, 91, 93, 101, 121, 125, 126, 129, 141, 175	15
Mental disorders/health	20, 120, 140, 144, 182	5
Drive for muscularity/thinness	73, 114	2
Social Physique Anxiety	2, 85, 98, 116, 142	5
Self-Objectification/objectified body consciousness	38, 103, 155	3
Mood/Depression/Well-being	52, 61, 62, 65, 71, 78, 89, 97, 108, 112, 114, 129, 141, 152, 166, 172, 174	17

Socioeconomic status	3, 31, 43, 48, 55, 59, 60, 61, 63, 77, 78, 105, 120, 156, 163, 176, 179,	17
Alcohol/tobacco consumption	55, 68, 104, 105, 108, 120, 135	7
Quality of Life/Life satisfaction	4, 115, 129	3
Anxiety	2, 44, 63, 108, 112	5
Self-efficacy	5, 44, 52, 71, 76, 148, 153, 164	8
Self-esteem	5, 8, 62, 79, 83, 87, 98, 103, 125, 129, 158, 178	12
Self-perception/Self-concept/Self-description	67, 72, 78, 122, 141, 153, 168	7
Pubertal timing	7, 31, 77, 78, 148	5
Social comparison	18, 113	2
Social support	24, 89, 105, 113, 135	5
PA weight criticism/teasing	30, 38	2
Media influence	51, 62, 109, 113, 123, 140, 142	7
Perceived/actual physical fitness	64, 144	2
Gender/sex roles	68, 72, 129, 153	4

PA/PE competence	70, 104, 153	3
Neuroticism/personality	71, 84	2
TV/screen time/sedentary behaviour	76, 110, 158, 169, 179, 183, 185,	7
PA enjoyment	78, 148	2
Weight control	79, 115, 156, 163, 176	5
Medical/health status	89, 92, 97, 104, 135, 156, 182, 183	8
Stage of exercise change	96, 120	2
Internalization of thin/athletic ideal	109, 155	2
Maturity fears	78, 114	2

Note: Others that were only included in one study: Compulsive exercise (50), Resilience (45), self-surveillance (38), other leisure activities (58), Goals in exercise (91), barriers efficacy & temptation not to exercise (96), cosmetic surgery & body art (51), thrill/adventure seeking (63), self-loathing/exercise performance dissatisfaction (65), anti-fat attitudes & teaching style (74), information on body development (77), Eating disorder risk (85), Global assessment of functioning (144), decisional balance & process of change (96), exercise beliefs & young schema (106), smoking urge (108), interoceptive awareness, ineffectiveness, perfectionism, interpersonal distrust & intelligence (114), fear of negative evaluation (116), conformity to feminine/masculine norms (122), social desirability (129), Sexual satisfaction (146), disinclination for physical activity (148), weight/height discrepancy (151), social acceptance (153), desired shape of parents' view, desired shape of opposite sex view, body weight/size importance (163), dispositional flow, trait sport confidence, subjective performance questionnaire (167), sociocultural attitude towards appearance (169), perceived behavioural control, exercise avoidance (171), muscle esteem, male physical attributes investment scale (174), parental BMI (176), hospital anxiety and depression, experience of transphobia (178).

The most commonly measured variable in addition to BI and PA was eating/dieting (23% of studies). Although BI and PA were associated with eating behaviour in a number of studies (Anton et al., 2000; Arigo, Butryn, Raggio, Stice, & Lowe, 2016; Biolcati et al., 2017; A. M. Kelly, Wall, Eisenberg, Story, & Neumark-Sztainer, 2005; Sands et al., 1997; Slater & Tiggemann, 2011; Stapleton et al., 2016; Vinkers, Evers, Adriaanse, & de Ridder, 2012), this is not consistently shown (Goodwin, Haycraft, & Meyer, 2016) and occasionally only in females (e.g. Biolcati et al., 2017). The association between body dissatisfaction and eating pathology/disorders is clear as body dissatisfaction is frequently measured as a symptom of eating pathology (e.g. Goodwin et al, 2016). However, eating behaviour has also been associated with physical activity in various contradictory ways; for example, physical activity being both negatively (e.g. Anton et al, 2000) and positively (Arigo et al., 2016; Biolcati et al., 2017; Francisco et al., 2013; Ravaldi et al., 2003; Vinkers et al., 2012) correlated with eating pathology. However, studies have not considered how eating actually interacts with the relationship between BI and PA beyond suggesting such an interrelationship exists (e.g. Arigo et al., 2016; Biolcati et al., 2017).

Although also included in only a relatively small number of studies (9% of studies), motivation/regulation may be useful in shedding light on the inconsistency in findings. For example, self-determination theory describes how internal and external motivation relates to various behaviours. One element of this theory that physical activity research has focused on is the Organismic Integration Theory (OIT) (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000), which is concerned with the internalisation of behavioural regulation. Regulation lies on a continuum from completely non-self-determined (e.g. *External* Regulation) to completely self-determined (e.g. autonomous or Internal Regulation),

Differences in types of motivation may account for the differences in results described above in relation to gender (Markland & Ingledew, 2007), age (Withall, Jago, & Fox, 2011) and ethnicity (Markland, 2009; Tennant, 2016). Extrinsic goals are those which focus on improving appearance or losing weight and were found to be negatively predictive of self-determined motivation, while intrinsic goals are those which focus on health and fitness and social and enjoyment factors, which were found to be positively predictive of self-determined motivations (Gillison, Standage, & Skevington, 2006). Weight-related motives have also been

shown to be related to poorer body image and greater weight control behaviours than those with non-weight related motives (De Bruin, Woertman, Bakker, & Oudejans, 2009). *Identified* (a form of self-determined motivation) and *intrinsic* regulation have also been found to mediate between body size discrepancies and physical activity (Frisén & Holmqvist, 2010; Gillison et al., 2011; Ingledew & Sullivan, 2002; Markland, 2009; Sabiston et al., 2010; Sit et al., 2008; Symons et al., 2013). DiBartolo and Schaffer (2002) showed that health and enjoyment motives for physical activity differ between athletes and non-athletes, where athletes are more motivated for these reasons. They also demonstrated that athletes had significantly lower body dissatisfaction and greater self-perception. Results in relation to exercise motives are not always consistent (e.g. Cerar, Kondrič, Ochiana, & Sindik, 2017; Hurst, Dittmar, Banerjee, & Bond, 2017; Vinkers et al., 2012) although it is still only a small number of studies that have included a measure of this construct (Lodewyk & Pybus, 2013).

There are a number of other factors that may influence the association between body image and physical activity. However, the consideration of motivation, appears to be the one most associated with the relationship overall. While factors such as eating are associated with body image and therefore also with activity, they may not be a factor that influences the relationship, rather occurs alongside it.

2.3 DISCUSSION

This scoping review examined the literature on the association between body image and physical activity in order to fulfil four aims: (1) to conduct a systematic search for studies considering the link between body image and physical activity, (2) to identify the nature of the link between body image and physical activity and the limitations of this evidence, (3) to identify possible moderators of the link between body image and physical activity and (4) to propose recommendations for future research in order to more fully test the putative causal link between body image and physical activity. Aims 1 to 3 have been met while aim 4 will be further addressed here.

FINDINGS

In general, a more positive body image was associated with more physical activity engagement, with insecurity or negative body image associated with less physical activity. However, these results vary depending on age, gender, ethnicity and disability and the association can be direct or indirect (i.e. via other variables such as self-determined motivation).

There is a wide range of designs, samples and relationships presented here. Several studies used a very diverse sample, making the comparisons between ethnicities, ages and genders much clearer (Felts et al., 1996; Kruger et al., 2008). However, many studies used specific samples such as only females (Anton et al., 2000), only one ethnicity (L. J. Chen et al., 2010; Laus et al., 2011) or only those with a disability (B. Smith, 2013). Although not allowing a comparison of the association between subgroups, it does mean the association for these samples can be understood in greater detail.

To make sense of the disparate findings, it is important to consider goals and motivation. This is often not considered in the research described. However, where it is, findings suggest that those who hold extrinsic goals to physical activity (e.g. that are appearance based) are less likely to be motivated to engage long term (Gillison et al., 2006). It is also likely that if an exercise class is largely focused on appearance and weight goals, participants are less likely to enjoy or continue to participate in this activity (Crawford & Eklund, 1994; Eklund & Crawford, 1994; Krentz & Warschburger, 2011; Melbye et al., 2007; O'Hara et al., 2014).

STRENGTHS AND LIMITATIONS

This review highlights the gaps in the literature and the lack of consistency in definitions and measurement of the key elements of this research. This is also the first comprehensive summary to highlight and summarise the methodology and samples as well as the results of this research, considering qualitative and quantitative research as well as samples from across ages, ethnicities, countries, cultures and disability. As with any review this is largely limited to the research that has been published and there are growing concerns over publication bias.

The research reported here is also not without fault or limitations. One key issue is the lack of reporting (or measuring) of ethnicity or race in much of the research. In some cases (L. J. Chen et al., 2010; Kopcakova et al., 2014), this might not be necessary as it is based on a specific sample in which there is very little ethnic diversity; however, in the case of the research from the UK and Australia the lack of measurement is an issue which should be addressed in future research. Ethnicity has been shown to have an effect on physical activity and on body image and is therefore an important factor to measure. Further, many authors report general findings, not specifying ethnicity as a potential confounder of the results.

Many of the studies used a quantitative design; however, there were a few that used qualitative methods. By reviewing both qualitative and quantitative methods it is possible to see how the two methodologies support one another's results, for example how body image concerns are a barrier to physical activity and sport in some instances but can be a motivator in others; but also how what someone says they would like to do does not always translate into actual behaviour, i.e. they know that physical activity is good for them and can help improve their body image, but do not participate in physical activity precisely because of their body image concerns.

An important consideration is the direction of association between body image and physical activity. This review is concerned with research addressing (or proposing) that body image impacts on physical activity. There is already a large amount of research addressing the effects that physical activity and sport can have on body image (Seronda A. Robinson et al., 2012; Wetterhahn et al., 2002) showing both positive (S. A. Smith & Michels, 2006) and negative associations (Bhuiyan, Gustat, Srinivasan, & Berenson, 2003). However, as much of this research uses a cross-sectional design, the direction of effect is not always easily pinpointed (Abbott & Barber, 2011). Nevertheless, as research has previously favoured exploring the effect of physical activity on body image there have been interventions targeting improving physical activity. In contrast, only one study could be found targeting body image and testing its effect on subsequent physical activity (M. N. Silva et al., 2010). However, one consequence of this review is explicitly to call for this research to be done. It seems likely that there is a circular effect of physical activity and body image, in that a positive body image is

needed to initially engage in physical activity and that this physical activity will further help to improve body image.

IMPLICATIONS

THEORY

In considering theoretical implications it is of utmost importance that the body image definitions are combined, used consistently or clearly distinguished such that they are used appropriately. The studies here show inconsistency in their definitions of 'body image' and measurements. Some use 'body image' measurements such as the MBSRQ (e.g. Pila, Barlow, Wrosch, & Sabiston, 2016); while others focus on self or weight perception (e.g. Gillison et al., 2006), 'body satisfaction' measures (e.g. Neumark-Sztainer et al., 2006) or body size discrepancies (e.g. D. Markland, 2009). As highlighted in the ethnicity and country differences, it is highly likely that language and translation issues might impact upon the use of different measurements (e.g. Figure rating used instead of more questionnaire based). With this in mind it is recommended that more language free or more easily translated measures are used to explore across different populations such that these differences can be more easily explored.

Taken together research exploring the roles of other factors in this relationship has highlighted how different definitions and associated concepts of body image can affect physical activity involvement either directly or via self-determined motivations and goal setting. It also shows that identified and intrinsic motivation styles were the most consistently predictive of physical activity. With identified motivation individuals accept that physical activity is important to achieve outcomes such as weight loss and fitness and this helps to overcome possible barriers such as body image concerns, creating a cyclical effect of improving body image and it being less of a barrier to physical activity. With internal motivation, by contrast, the outcomes and benefits of physical activity will be recognised but are unimportant (or relatively unimportant) with enjoyment providing more of a motivator here, such that body image concerns would not prevent participation. Additionally, much of the research that has considered these motivation styles' effect on this relationship has used "body image discrepancy" including the use of figure rating scales discussed above (e.g. Ingledew & Sullivan, 2002; Markland, 2009; Markland & Ingledew, 2007). There has been an increase in

critique of body image discrepancy measures, with a call to move away from these measures alone to measure body image (Sabiston et al., 2018).

RESEARCH

Most studies here utilise a self-report method for both body image and physical activity. In addition to the usual criticisms of self-report (e.g. memory reliance, truthful reporting), the measurement of physical activity is diverse and differs in levels of detail, with some focusing on step-count (which would include all intensities and is often inaccurate) and others focusing on only moderate-vigorous activity (which would not consider walking and other gentler pursuits no matter how long the duration of these activities). A diary measurement or more detailed measurement of physical activity would allow the researcher to more accurately chart the level of activity of their individual participants by calculating an average Metabolic Equivalent of Task (METs) for each participant. Thus, regardless of the actual measure used, comparison across studies would still be possible. For body image measurement there is also reliance on self-report but as this is more of a subjective concept this may be less of an issue. More of a problem here is the lack of consistency in the definitions of 'body image', which is quite unclear, with terms used interchangeably.

Another issue is the lack of ethnic diversity of the published research; for example, few studies examine the relationship between body image and physical activity in Eastern Europe, Asian and the Caribbean. Research in the Pacific Islands and Australasia are also largely limited to Hawaii and Australia. Research in Africa is also limited but considering the differing attitudes towards body image ideals that are shown between Africa, Northern Europe and the US, it is likely the relationship would not be the same. Finally, there are also gaps in the research in Asia. While research has explored barriers to physical activity and issues with low participation rates have been highlighted (Cheah, Azahadi, Phang, & Hazilah, 2017; Khan, Burton, & Trost, 2017), body image is not often mentioned in this research. It is unclear from the research available whether body image has just not been studied in these populations, is of little concern to people in these countries or whether this research has simply not been published in English, Spanish or French as reviewed here. However, in some research body shape was seen as an important motivator and benefit to physical activity but it was not identified as a barrier (Rajaraman et al., 2015). Further to this, focus group discussions with

Indian women produced identification of barriers of lack of motivation, time, interest and safety; and of facilitators such as social factors were discussed (Mathews, Lakshmi, Ravindran, Pratt, & Thankappan, 2016). None of these women mentioned body related issues. This tentatively suggests that this may not be an issue in this group, but more research is needed to investigate cross-cultural and cross-country effects of this relationship.

In the limited number of studies on body image and physical activity in disability, body image can be either a motivator or a barrier to physical activity (e.g. B. Smith, 2013). However, other research into barriers and facilitators to physical activity has not raised body related issues at all (Jaarsma, Dijkstra, Geertzen, & Dekker, 2014). Clearly more research needs to consider the role of body image in physical activity in disabled populations to determine whether there are any effects over and above any functional limitations of certain types of physical activity.

Furthermore, to test this association better, future research should aim to manipulate body image (e.g. improve it) to see the impact that this has on physical activity. Intervention designs are likely to be the only ones that can fully determine the direction of cause. The present comprehensive scoping review did not find any studies that have done this - to date only one study could be identified that includes a body image component that was embedded in a physical activity intervention (among many other components; M. N. Silva et al., 2010).

PRACTICE

The impact of school sport and PE must be considered. The effect of clothing, time for showering, hair maintenance and change of clothing and mixed sex versus segregated class types were all highlighted as concerns for both boys and girls in school sport and PE classes. Throughout this research much is still unclear. However, one area that is clear is that the age from 14-16 appears critical in body image concerns affecting physical activity participation. It is clear that changes need to be made in order to improve school sports to encourage future engagement.

However, it is also clear that body image does not stop being an issue once people are over this difficult period of time, as mid-older teens (López-Castedo et al., 2018) demonstrate that this is still a barrier as do adult men and women. It has also been shown that the number of people being physically active from 18 to 24 shows a sharp decline (Grim, Hortz, & Petosa,

2011). It is notable that this is the period of time where (if they had not already) many children finish school and either go into college or university education or go into work. It is therefore possible that an intervention in this age group may also be beneficial for reducing this decline.

Interventions for physical activity currently in use tend to involve elements of informational, behavioural and social or environmental and policy approaches (Kahn et al., 2002), as well as elements of cognitive and behavioural techniques such as planning and prompts and cues (Howlett, Trivedi, Troop, & Chater, 2015). Additionally interventions involving young people have also shown a focus on social and cognitive approaches (Stone, McKenzie, Welk, & Booth, 1998). The present review suggests a potential role of emotional elements to impact on the effectiveness of these interventions.

CONCLUSION

The age of around 15 appears to be the point where body image starts to become an issue in physical activity adherence in both boys and girls. It appears that race, ethnicity, country/culture and disability also influence this relationship, but the research is less clear due to inconsistencies in measurement and a difficulty in comparing these. The individual effects and combined effects of these variables on this relationship should be assessed further in future research.

Factors such as self-determined motivation may explain some of the inconsistencies in findings and should therefore be routinely included in research designs. Given research highlighting a role of body shame and pride in physical activity, it is also possible that this may play a role in motivation and behaviour.

It is also recommended that future research test the impact of interventions based on body image and the effect on physical activity in order to fully determine the causal association.

CHAPTER 3 MOTIVES FOR PHYSICAL ACTIVITY, BODY SHAME AND SELF-COMPASSION

The previous chapters have highlighted the potential role of motives for physical activity in accounting for differences in the association between body image and physical activity. This will be reviewed in greater detail here. In addition, the previous chapter highlighted the potential of body shame and pride in motives and physical activity behaviour, which will also be explored in more detail here. This chapter will also explore the potential of an emotion regulation strategy for managing shame; self-compassion.

3.1 SELF-DETERMINATION THEORY

Self-Determination Theory (SDT) is a theory of human motivation for behaviour, that has frequently been applied to physical activity (e.g. Ryan, Williams, Patrick, & Deci, 2009); See Teixeira, Carraça, Markland, Silva, & Ryan, 2012, for a review). The basic division of motivation in SDT is between intrinsic and extrinsic motivations; whereby intrinsic involves engaging in physical activity because it is pleasurable and provides satisfaction, while extrinsic motivation involves engagement for another outcome, such as reward, avoiding punishment or approval of others. A sub-theory of SDT is the Organismic Integration Theory (OIT; Deci & Ryan, 1985; Ryan & Deci, 2000). This theory describes the different forms of extrinsic motivation through a continuum from non-self-determined, non-autonomous, externally regulated behaviour, through to more internalised, self-determined and autonomous forms of regulation.

- **External regulation:** At the controlled and non-autonomous end is *external* regulation, in which one's behaviour is entirely externally driven, controlled by reward or punishment, such that behaviour is not maintained when the contingencies of reward and punishment are no longer present.
- **Introjected regulation:** Next on the scale is *introjected* regulation, where individuals engage in behaviour to improve their feelings of self-worth or pride and/or avoid self-disapproval, shame and guilt. This is still controlled but it is controlled through internal reward and punishment.

- **Identified regulation:** *Identified* regulation is a more autonomous form of regulation, which identifies with or values the behaviour or direct outcomes of the behaviour. As the behaviour is associated with value it is independent of environmental reward or punishment and is more likely to persist.
- **Integrated regulation:** When how one identifies with or values the behaviour is in line with one's own personal values and beliefs, it is described as *integrated* regulation. Here there is a very high level of autonomy, internalisation and self-determination.
- **Amotivation:** At the non-self-determined end there is also *amotivation*, which describes a complete lack of intention to engage in the behaviour. This could be due to lacking a sense of competence, feeling they lack skills or knowledge needed to engage, that they see no connection between the behaviour and desired outcomes (e.g. physical activity and losing weight) or that they do not want to (e.g. they find no value or interest in the activity) (Ryan et al., 2009).

As such the continuum of behavioural regulation (see Figure 3.1) as they relate to physical activity is: *amotivation, external* regulation*, introjected* regulation*, identified* regulation*, integrated* regulation and *internal* regulation (Deci & Ryan, 2004; Markland & Tobin, 2004; Ryan et al., 2009).

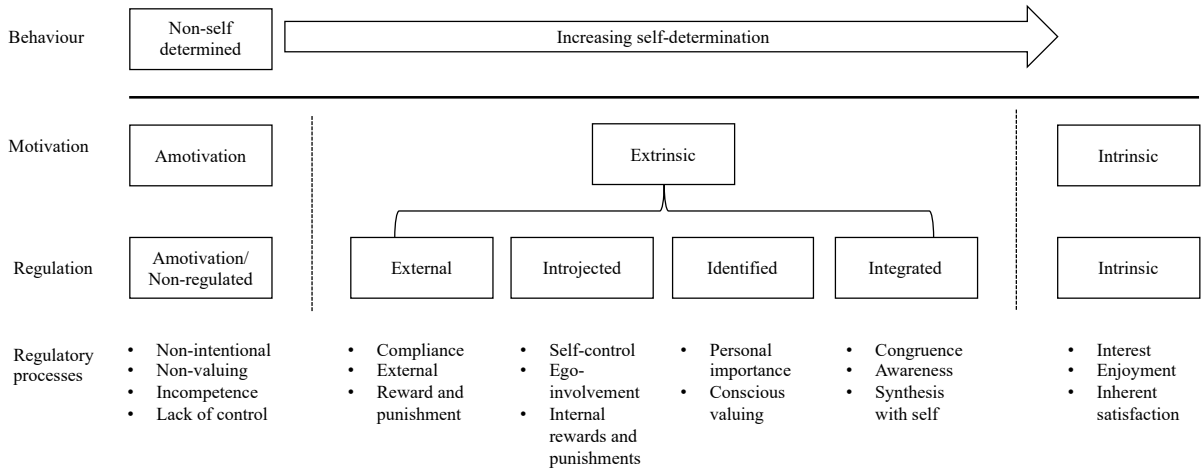

Figure 3.1 Diagram of behavioural regulation, motivation and regulatory processes (Deci & Ryan, 2000).

These can also be split up in terms of autonomous (*intrinsic, integrated* and *identified*) and controlled regulations (*external* and *introjected*). In general the more autonomous and

internally regulated (*intrinsic*, *integrated* and *identified*) are related positively with physical activity behaviour including frequency, duration and intensity (Biddle & Wang, 2003; L. R. Duncan, Hall, Wilson, & Jenny, 2010; Gillison et al., 2006; Markland & Tobin, 2010; Sebire, Standage, & Vansteenkiste, 2011; M. N. Silva et al., 2010; Standage, Sebire, & Loney, 2008; Vierling, Standage, & Treasure, 2007; Weman-Josefsson, Lindwall, & Ivarsson, 2015; Wilson & Rodgers, 2002) and intentions to engage in physical activity (Lim & Wang, 2009). More autonomous motivations such as *identified regulation* have also been shown to be associated with more health and fitness reasons for exercise (Ingledew & Markland, 2008; Ingledew, Markland, & Ferguson, 2009; Ingledew, Markland, & Strömmer, 2014).

Appearance and weight management motives have been shown to predict more controlled motivations such as *external* and *introjected regulation*, while social affiliation, challenge related, and stress management motives have also been shown to be related to autonomous regulation styles such as *identified* and *intrinsic* regulation (Ingledew & Markland, 2008; Ingledew et al., 2009, 2014) as these relate more to the sheer enjoyment of the activity, rather than a specific goal or outcome to. *Introjected* has also shown to be positively associated with physical activity (L. R. Duncan et al., 2010; Gillison et al., 2006; Hurst et al., 2017), whereas *external* regulation and *amotivation* are more likely to be negatively associated (Biddle & Wang, 2003; L. R. Duncan et al., 2010; Lim & Wang, 2009; Weman-Josefsson et al., 2015; Wilson & Rodgers, 2002).

The fulfilment of the basic psychological needs of autonomy, competence and relatedness (Deci & Ryan, 2002b) have been suggested to be associated with psychological well-being. Satisfying these needs of autonomy (Lim & Wang, 2009), competence and relatedness (Brunet & Sabiston, 2009; Vierling et al., 2007) have also been shown to be associated with one's motives for physical activity. Autonomy is a feeling of volition over one's behaviour and the desire to be the source of their behaviour. Competence refers to one's (perceived) competence in how one effectively interacts with their environment and experiences the opportunity to exercise as well as showing their capability. Relatedness is one's feelings of connection to significant others, feeling cared for and that one belongs (Deci & Ryan, 1985; Ryan & La Guardia, 2000; Wilson, Rogers, Rodgers, & Wild, 2006).

Satisfaction of these needs has been shown to positively predict more self-determined regulations e.g. *intrinsic, identified* and *introjected* regulations (e.g. Sebire, Jago, Fox, Edwards, & Thompson, 2013), while being negatively associated with *amotivation* and *external regulations* (Weman-Josefsson et al., 2015). However other studies have shown that autonomous motivations (e.g. *identified, integrated* and *intrinsic*) positively predict autonomy, competence and relatedness (Gunnell, Crocker, Mack, Wilson, & Zumbo, 2014). In predicting exercise behaviour, competence has been shown to be an independent predictor of strenuous exercise along with gender, age and *external*, *introjected* and *identified* regulations.

In terms of autonomous regulations, autonomy and relatedness positively predicted *identified, integrated* and *intrinsic* regulations (Markland & Tobin, 2004; Schneider & Kwan, 2013); while competency positively predicted identified and intrinsic regulation (Markland & Tobin, 2004; Schneider & Kwan, 2013). *Identified* regulation has been also shown to mediate the association between competence and strenuous exercise (Edmunds, Ntoumanis, & Duda, 2006). *Intrinsic* regulation has also been predicted by perceived autonomy support and competence (Fenton, Duda, & Barrett, 2016), where competence was a partial mediator of the effect of perceived autonomy support on *intrinsic* regulation (Edmunds et al., 2006).

In terms of controlled/non-self-determined regulation autonomy has been shown to be negatively predictive of *amotivation* (Schneider & Kwan, 2013) and *external regulation* (Gourlan, Sarrazin, & Trouilloud, 2013; Markland & Tobin, 2010), while relatedness has been shown to positively predict *external regulation* (Gourlan et al., 2013). Autonomy (Gourlan et al., 2013) and relatedness (Markland & Tobin, 2004) have been shown to be positive predictors of *introjected regulation*.

3.2 SELF-DETERMINATION THEORY AND INDIVIDUAL DIFFERENCES

Sample demographics such as age, gender, disability and BMI have been shown to affect self-determination, motives for physical activity as well as behaviour itself (see Chapter 1). For example, *introjected regulation* has been shown to differ by gender. While females were shown to be more *introjected* than males overall (Guérin, Bales, Sweet, & Fortier, 2012), in males it was related to social factors such as avoiding social disapproval and in females it was related to the internalisation of health and fitness rationales (Gillison, Osborn, Standage, &

Skevington, 2009). In addition, females have been shown to generally be lower in self-determined and higher in more *externally regulated* motivation than males (Egli, Bland, Melton, & Czech, 2011; Gillison et al., 2006; Lauderdale, Yli-Piipari, Irwin, & Layne, 2015). Gender differences have also been shown where *external regulation* is positively predictive of physical activity in men but not women, *introjected* has been shown to be negatively predictive in women only and *identified* regulation has been shown to be positively predictive in women only (Weman-Josefsson et al., 2015). Here the effect of need satisfaction on self-determined motivation has also been shown to be affected by gender.

Different motives and goals for physical activity were also shown to differ by gender, for example where competition, appearance, physical condition and mastery motives contributed most towards gender differences in physical activity participation (Molanorouzi, Khoo, & Morris, 2015). Males were shown to have more enjoyment, challenge, social recognition, affiliation, competition, health pressure, nimbleness and strength and endurance motives. Females favoured more ill health avoidance, positive health and weight management motives (Egli et al., 2011). Gender differences have also been shown for need satisfaction, specifically in perceived competence (Schneider & Kwan, 2013).

Age also shows an influence whereby *identified* is negatively predictive of physical activity in younger people but not in older people, while *intrinsic* is positively predictive of physical activity for older people only and not in younger people (Weman-Josefsson et al., 2015). Younger people (16-24 years) were shown to be lower in *intrinsic* and *identified regulation* than older, while *introjected* is significantly higher in older people (35-75 years) compared to this younger group (Moreno Murcia, Cervelló Gimeno, & Martínez Camacho, 2007). Older adolescents are shown to be less intrinsically motivated than younger, while also being less motivated by task orientation, perceived athletic abilities and perceived physical appearance (Digelidis & Papaioannou, 1999). Labbrozzi, Robazza, Bertollo, Bucci, and Bortoli (2013) showed that older girls show lower physical activity enjoyment and intrinsic motivation than younger girls as well as poorer sporting competence and physical self-concept. Age differences have also been shown for affiliation (lower in younger), health pressures and ill-health avoidance motives (higher in younger) (Egli et al., 2011). However, in another study younger people were shown to be less motivated for stress, revitalisation and ill health

avoidance than older (S. Roberts, Reeves, & Ryrie, 2015). Older adults who were high in *intrinsic, identified* and *introjected* regulations have been shown to be significantly more active than those high in *introjected* but low in *intrinsic* and *identified* regulation (Ferrand, Nasarre, Hautier, & Bonnefoy, 2012).

BMI has also been shown to influence self-determination in exercise, where those with a 'normal' BMI are more internally motivated (Power, Ullrich-French, Steele, Daratha, & Bindler, 2011) and less *amotivated* (Ersöz, Altiparmak, & Aşçı, 2016). Overweight and obese adolescents have also been shown to be more *amotivated* and *externally* motivated than normal weight adolescents however no differences in physical activity behaviour are observed here (Hwang & Kim, 2011). For obese adolescents it has also been shown that physical activity behaviour is positively associated with *introjected, identified* and *intrinsic* regulation (Verloigne et al., 2011). Sport participation is also negatively associated with *amotivation* while active transportation behaviour is associated positively with *identified* and *intrinsic* regulation (Verloigne et al., 2011).

Finally, physical and learning disabilities have been shown to affect self-determination and motives for physical activity. Autistic spectrum children were shown to be less physically active than non-autistic children. They were significantly lower in competence and relatedness as basic psychological needs in exercise, as well as lower in *intrinsic, identified* and *introjected* regulations, while being higher in *amotivation* (Pan, Tsai, Chu, & Hsieh, 2011). They have also shown to be lower in their enjoyment of physical activity and in their intentions to be physically active (Pan et al., 2011). Those with visual impairments have been shown to score low in self-determined motivation (B. L. Robinson & Lieberman, 2004), however wheelchair basketball players with disabilities have been shown to not significantly differ from their unimpaired teammates in sports motivation (Perreault & Vallerand, 2007). Finally, in young adults with physical disabilities autonomy support has been shown as the only significant predictor of long-term physical activity (Saebu, Sørensen, & Halvari, 2013).

3.3 SELF-DETERMINATION THEORY AND BODY IMAGE

Styles of behavioural regulation have also been associated with body dissatisfaction (Thøgersen-Ntoumani & Ntoumanis, 2007), physical self-worth (Thøgersen-Ntoumani &

Ntoumanis, 2006, 2007), drive for thinness (Thøgersen-Ntoumani & Ntoumanis, 2007) and social physique anxiety (Crawford & Eklund, 1994; Frederick & Morrison, 1996; Magnus, Kowalski, & McHugh, 2010; Thøgersen-Ntoumani & Ntoumanis, 2006, 2007). It has also shown associations with BMI and body size discrepancies in males, and with body size discrepancies in females (Markland & Ingledew, 2007). Associations have been shown with body-related self-conscious emotions such as pride, shame and guilt (Castonguay, Pila, Wrosch, & Sabiston, 2014; Sabiston et al., 2010). In general autonomy and more internalised regulations (e.g. *intrinsic*) have been shown to be associated with fewer negative body size discrepancies (Markland & Ingledew, 2007), more self-worth, less social physique anxiety (Thøgerson-Ntoumanis & Ntoumanis, 2007, 2006; Brunet & Sabiston, 2009) and more pride and less shame associated with one's body (Sabiston et al., 2010; Castonguay et al., 2014). Those with increased anxiety about their physiques (social physique anxiety; SPA) who are also low in autonomous forms of regulation and *introjection*, but high in *external* regulation have been shown to report less enjoyment of and participation in physical activity (A. E. Cox, Ullrich-French, Madonia, & Witty, 2011). Agreement between ideal and actual self-perception has been shown to be related to physical activity directly and indirectly through behavioural regulation (Brunet, Sabiston, Castonguay, Ferguson, & Bessette, 2012).

Appearance and health related reasons for physical activity have also been associated with perceived body size in older female adolescents, but only with BMI in males, while nimbleness as a motive for exercise is associated with ideal body size in older and younger adolescent females (Ingledew & Sullivan, 2002). As discussed above appearance related reasons/motives have been shown to be associated with more controlled forms of motivation, while health or social reasons have been associated with more autonomous regulation. Research has also shown that behavioural regulation style acts as a mediator between motives and reasons for physical activity and exercise behaviour. For example, Ingledew et al., (2014) show that appearance motives positively predict controlled regulation, which negatively predicted exercise satisfaction. Health motives and goals (as well as the interaction between these) positively predict autonomous regulation which positively predicted exercise satisfaction, exercise amount and exercise intentions. More autonomous and self-determined forms of behavioural regulation have been shown to mediate between body size discrepancy and physical activity (Markland, 2009). *Introjected regulation* (frequently associated with self-

worth and pride and shame), has been shown to be related to social factors such as disapproval in males, but more with health and fitness in females (Gillison et al., 2009). Non-body related reasons for physical activity have been shown to be more highly associated with walking behaviour and exercise class use/membership (Segar, Spruijt-Metz, & Nolen-Hoeksema, 2006). Sporting differences have also been shown here, with aerobics participants more likely to cite body-related motives than Tae Kwon Do participants, who are more likely to cite competence and enjoyment motives (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997).

3.4 SELF-DETERMINATION THEORY AND COMPASSION

CONCEPTUALISATION OF COMPASSION, SELF-COMPASSION AND BODY COMPASSION

Compassion has been defined as "a sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it" (Gilbert, 2014b; p.19). It has also been suggested that compassion is composed of four components (Jazaieri et al., 2013):

Cognitive – an awareness of suffering

Affective – sympathy with or being moved by suffering

Intention – desire to see relief of suffering

Motivation – responsiveness to relieve suffering

Both of these definitions incorporate two mind-sets that have been termed the psychologies of compassion (Gilbert, 2009, 2017a). These are the motivated sensitivity to suffering and motivated action to alleviate and prevent suffering. Gilbert (2009, 2017a) proposed six competencies to engage with suffering: sympathy, distress tolerance, empathy, non-judgement, care for wellbeing and sensitivity. Gilbert has also proposed six skills to alleviate and prevent suffering: helpful attention, imagery, reasoning, behaviour, sensory and feelings.

Gilbert, (2017b) details the "flow of compassion (p. 44) from compassion we feel *for* others, openness and responsiveness, to compassion *from* others and finally to the capacity for *self-compassion.*

Building on this, Neff (2003a, 2003b) defined self-compassion as being open to and touched by one's own suffering and a desire to alleviate this to heal with kindness. Neff (2003 a, 2003b) suggests there are three bipolar components to self-compassion: self-kindness as opposed to self-judgement, common humanity over isolation and mindful awareness or mindfulness rather than over-identification of painful thoughts and feelings. The self-compassion scale (SCS: Neff, 2003b), has these 6 components (Self-kindness, common humanity, mindfulness, self-judgement, isolation and over-identification) as subscales which combine to form a single overall score or can be used as separate subscale scores to indicate these separate elements of self-compassion. However, following the development of the SCS (Neff, 2003b), there has been dispute over its structure. Some authors have suggested a two-factor solution where there is no single component of self-compassion but instead a self-compassion component and self-criticism component (Costa, Marôco, Pinto-Gouveia, Ferreira, & Castilho, 2016; López et al., 2015). Others have suggested a six-factor solution where only the six separate components are considered with no overall global score (X. Sun, Chan, & Chan, 2016; M. J. Williams, Dalgleish, Karl, & Kuyken, 2014). Even in studies identifying six factors, there is debate. For example, in addition to the traditional higher-order model (Neff, 2003a, 2003b) where items load onto six factors which then load on a single higher order factor of self-compassion, other studies have identified a bi-factor model where all items load onto a single global measure of self-compassion directly as well as the six individual subscales (Neff, Whittaker, & Karl, 2017; Tóth-Király, Bőthe, & Orosz, 2017).

Compassion has also been recently defined by C. Strauss et al., (2016) as a cognitive, affective and behavioural process with 5 components that relate compassion for *others* and for *oneself*:

1. Recognition of suffering
2. Understanding of the universality of suffering in the human experience
3. Feelings of empathy for the person suffering (self or other) and connecting with their/your distress

4. Tolerance for the uncomfortable feelings in response to this suffering. Being open to and accepting of this suffering
5. Motivation to act to alleviate suffering

Many of these components can be seen to be associated with Gilbert's definitions of the psychologies of compassion as well as with Neff's (2003a, 2003b) definitions of self-compassion. For example, the understanding of the universality of suffering is clearly describing common humanity.

The theory behind compassion is from evolutionary psychology and involves an affect regulation system and the three systems that are proposed to operate within it (Depue & Morrone-Strupinsky, 2005): the threat prevention system, the drive system and the contentment system.

The threat prevention system is designed to notice threats to the self and trigger emotions (e.g. anger). This elicits an appropriate behavioural response (e.g. fight, flight or submission) (Gilbert, 2001). However, because this threat prevention is over cautious, taking a better safe than sorry approach (Gilbert, 1998a) it can be a source of psychopathology (Gilbert, 1998b, 2009), creating anxiety when recognising something as a threat when it is not. It has been theorised that early life events might sensitise this system to develop strategies to operate in certain situations to combat threats to the self. However, these can be maladaptive and lead to an increased vulnerability to anxiety or depression (Gilbert, 2009).

The drive system involves motivation for resources and or to reach goals. It is a source of anticipation and pleasure, however not necessarily happiness due to the dependence on reward and achievement (Gilbert, 2009). Status seeking, competitiveness and rejection avoidance have all been associated with this drive system (Depue & Morrone-Strupinsky, 2005).

The contentment system or social safeness system is associated with soothing, calm and positive affect and wellbeing, not simply the absence of threat. It is associated with attachment, the evolution of which led to signals of caring and kindness to be soothing and activate these positive effects (Depue & Morrone-Strupinsky, 2005; Gilbert, 2009). The

contentment system is said to be a regulator of the other systems and as such is a key element in compassion-based therapies and the ability to self-soothe.

The balance of these systems is the foundation of compassion-based interventions for shame and self-criticism like compassion focused therapy (CFT e.g. Boersma, Håkanson, Salomonsson, & Johansson, 2014; Gilbert, 2009). The strategies for threat prevention and for attaining goals are associated not only with the basic emotions such as anxiety, anger, fear and disgust but also associated with self-conscious emotions, like shame (Tracy & Robins, 2004). Specifically, self-conscious emotions are associated with social situations and the achievement of social goals like status or to prevent rejection. It has been suggested that for women high in shame and criticism, disordered eating and weight management are a consequence of shame and self-criticism (Goss & Gilbert, 2002) and the association between body image, eating pathology and shame in community and patient groups has been demonstrated on a number of occasions (e.g. Gee & Troop, 2003; Goss & Allan, 2010; Troop et al., 2008). However, self-compassion has been suggested as an alternative to regulating threat and negative affect (Gilbert, 2009, 2017b, 2017a), such that it would replace these maladaptive strategies.

In this thesis compassion will refer to compassion in the general sense considering Gilbert (2017b) as well as C. Strauss et al., (2016), in that it includes the flow of compassion to, from and towards oneself. Self-compassion on the other hand refers specifically to compassion directed towards oneself as detailed by Neff (2003a).

SHAME AND COMPASSION

It has been shown that self-conscious emotions, despite not being universal with recognisable facial expressions like basic emotions, are important in health and well-being (Sabiston et al., 2010) and can play a role in motivating and regulating individuals' thoughts, feelings and behaviours (Campos, 1995; Fischer & Tangney, 1995; Sabiston et al., 2010; Tracy & Robins, 2004). However, they can also become pathological and have been associated with depression (Gilbert, 1998b, 2016a) and eating disorders (e.g. Ferreira, Matos, Duarte, & Pinto-Gouveia, 2014; Gee & Troop, 2003; Troop, Allan, Serpell, & Treasure, 2008). The self-conscious emotions typically include guilt, pride and shame (Fischer & Tangney, 1995; Tangney, Miller, Flicker, & Barlow, 1996), though of most interest here are pride and shame.

Shame has been shown to be a more strongly associated with drive for thinness, bulimia and body dissatisfaction than guilt (Sanftner, Barlow, Marschall, & Tangney, 1995) and that women with disordered eating are more likely to feel bad about themselves (shame) than about their behaviour (strongly characteristic of guilt) (Sanftner et al., 1995). Eating shame and body shame have been shown to be strong predictors of eating disturbance, with eating shame a stronger predictor than eating guilt (Burney & Irwin, 2000). It has also been suggested that guilt is more readily resolved than shame, as guilt allows reparation of the cause of the guilt, while shame stays with the individual (Tangney, 1995). Guilt can also help compassion acting as compassionate repair and is socially cohesive (Gilbert, 2017b). Being in touch with one's sadness and remorse can help to keep a compassionate intention, while shame can block this (Gilbert, 2009). Guilt is not a threat to oneself or to others as it evolved as a strategy to prevent hurt (Gilbert, 1998b; Tangney & Dearing, 2002).

Shame is associated with exposure of negative aspects of oneself (M. Lewis, 1992, 2003) and/or a negative evaluation of oneself (H. Lewis, 1971; Tangney, 1998). Shame has been described as multifaceted, with five components: a social or external cognitive component (e.g. feeling that others see oneself as inferior, bad or inadequate), an internal self-evaluative component, an emotional component (e.g. feeling anger, disgust or anxiety to do with oneself), a behavioural component (e.g. avoiding being seen, avoiding eye gaze) and a physiological component (e.g. physiological stress response) (Gilbert, 2014). In addition, it has been suggested that there are two types of shame: external shame (attention and cognitive processing focused on what others are thinking of oneself) and internal (inward focus on one's own emotions, personal characteristics and behaviour) (Gilbert, 1997, 1998b, 2003, 2007). It has been suggested that shame may motivate someone to deny or avoid a situation that triggers it, for example avoiding going to the gym because of shame over one's physique (Sabiston et al., 2010).

By contrast pride results from an individual's experience with a valued behaviour (e.g. exercise) or characteristic (e.g. being fit and attractive) (Fischer & Tangney, 1995; Sabiston et al., 2010; Tracy & Robins, 2007b, 2007a). Two components of pride have been suggested. Authentic pride ("I am proud of what I did") often occurs as a result of attributions to internal, stable and controllable causes ("I won because I practiced") and is an adaptive and positive

emotion (Tracy & Robins, 2007b). Conversely, hubristic pride (also associated with overconfidence – "I won because I am always great") results from attributions to internal, unstable and uncontrollable causes and may elicit adaptive (e.g. continued persistence) or maladaptive behaviours, feelings or emotions (e.g. feel exercise is unnecessary) (Sabiston et al., 2010; Tracy & Robins, 2007b).

Body shame has been defined as a perception that one has unattractive bodily attributes or features which cause rejection or attack. It involves self-consciousness and embarrassment when one views one's shape or appearance as failing to meet the (often unattainable) societal ideal (McKinley, 1998, 1999). This can be related to appearance or other bodily aspects such as function and fitness (Skårderud, 2007). Body or bodily shame has been shown to mediate the link between childhood abuse and adult bulimia (Andrews, 1997) as well as predicting eating pathology better than general shame (Burney & Irwin, 2000) and predicting an increase in anorexia symptoms (Troop & Redshaw, 2012). Chronic body shame has been associated with depression (e.g. Tiggemann & Kuring, 2004), eating disorders (e.g. Swan & Andrews, 2003), reduced physical activity participation (Sabiston et al., 2010) as well as reduced self-esteem (e.g. Bessenoff & Snow, 2006). Body shame has been shown to be associated with eating behaviour (e.g. Andrews, 1997; Slater & Tiggemann, 2010) a stronger predictor of eating pathology than general shame or independently predictive of eating pathology (Burney & Irwin, 2000; Doran & Lewis, 2011). Health related behaviours (e.g. physical activity and eating) have been negatively associated with body shame in both men and women as well as other body related measures like body dissatisfaction, body surveillance and body control (Lowery et al., 2005). Body shame has also been shown to predict disordered eating in athletes, exercisers and sedentary females alike, with body shame also being associated with more appearance related exercise motives (Jankauskiene & Pajaujiene, 2012).

Body pride is far less researched at this point; however, it has been suggested to originate from engaging in a socially valued behaviour or presenting one's physical self socially in a positive manner (Castonguay, Brunet, Ferguson, & Sabiston, 2012; Tracy & Robins, 2007a).

A temporal element of body pride and shame has also been suggested, in terms of anticipated shame and pride associated with significant weight loss or gain (e.g. Troop, 2016).

It has been suggested that while one might act upon current feelings of shame to lose weight, one might also diet to lose weight (or prevent weight gain) if one feels that to gain weight would also be shameful, leading to preventative action such as dieting (Russell, 1995; Troop, 2016). Current and anticipated shame have been shown to predict restrictive efforts to reduce weight in both clinical and non-clinical females (Troop, Sotrilli, Serpell, & Treasure, 2006), while anticipated body shame also predicted an increase in fear of weight gain over 2.5 years in women with a history of eating disorders (Troop & Redshaw, 2012). Anticipating shame with weight gain has also been shown to predict eating fewer calories over the following 7 days in a healthy population, while current body shame predicted eating more (Troop, 2016). Research has also suggested anticipated authentic and hubristic pride can indirectly predict physical activity behaviour through intentions (Gilchrist & Sabiston, 2018).

A potential strategy to reduce shame is self-compassion (Gilbert, 2009, 2017a; Neff, 2003a). Internal and external shame can be combined to form an 'exposed self' (M. Lewis, 1992, 2003). This threat to the self, causes it to become overwhelmed and fragmented, with no safe space to soothe oneself (Gilbert & Procter, 2006). Self-compassion can help to reduce the activation of the psychological markers (such as shame) to the threat system (E. A. Johnson & O'Brien, 2013). Specifically self-kindness softens the effect of criticism and negative self-evaluation, common humanity reduces the perceived need for social withdrawal and isolation, while mindfulness can reduce mental avoidance and suppression of natural (and healthy) emotional reactions (E. A. Johnson & O'Brien, 2013). Where self-criticism activates the threat-system due in part to shame (Rice & Mirzadeh, 2000), self-compassion activates self-soothing through increasing social security and feelings of acceptance (Gilbert, 2016b; Gilbert & Irons, 2005). Practicing self-compassion has been shown to increase self-compassionate attitude and in turn increases the frequency with which one responds to a negative event with a self-compassionate response (E. A. Johnson & O'Brien, 2013).

There is a wealth of literature supporting an association between body image and self-compassion. Although much of this is in young female North American samples (A. C. Kelly & Stephen, 2016; Raque-Bogdan, Piontkowski, Hui, Ziemer, & Garriott, 2016; Toole & Craighead, 2016; Wasylkiw, MacKinnon, & MacLellan, 2012), there is also evidence in females of all ages (Albertson, Neff, & Dill-Shackleford, 2014; Homan & Tylka, 2015), in

male and female students (R. F. Rodgers et al., 2018, 2017) as well as in European (C. Ferreira, Pinto-Gouveia, & Duarte, 2013; Marta-Simões, Ferreira, & Mendes, 2016; Slater, Varsani, & Diedrichs, 2017) and Asian samples (Pisitsungkagarn, Taephant, & Attasaranya, 2014). Self-Compassion has also been shown to moderate the effect of BMI on body image flexibility and on eating pathology (A. C. Kelly, Carter, & Borairi, 2014); and distress tolerance and body image acceptance and action to mediate the effect of self-compassion on intuitive eating (Schoenefeld & Webb, 2013). While self-criticism mediates the effect of early shame or abuse on disordered eating and body dissatisfaction (Dunkley, Masheb, & Grilo, 2010; Gois, Ferreira, & Mendes, 2018), the effect of current shame on binge eating disorder is also mediated by self-criticism (Duarte & Pinto-Gouveia, 2017). Self-compassion directed towards one's body appears to allow for the enhancement of feelings of connectedness and shared experience (common humanity) and reduce the need to conceal or control one's body to protect from shame and criticism (Berry, Kowalski, Ferguson, & McHugh, 2010). Self-compassion has also been shown to reduce body shame (Mosewich, Kowalski, Sabiston, Sedgwick, & Tracy, 2011), reduce trait shame (Reilly, Rochlen, & Awad, 2014a; Woods & Proeve, 2014) and reduce external shame (C. Ferreira et al., 2013).

Self-compassionate interventions have also been devised to improve self-compassion and reduce self-criticism and help in body image distress in cancer patients (Przezdziecki et al., 2013), body image concern in the general population (Albertson et al., 2014; A. C. Kelly & Carter, 2015; R. F. Rodgers et al., 2018), eating restriction (Adams & Leary, 2007), binge eating disorder (Duarte & Pinto-Gouveia, 2017), eating disorders (Gale, Gilbert, Read, & Goss, 2014; Goss & Allan, 2012; A. C. Kelly, Wisniewski, Martin-Wagar, & Hoffman, 2017; Steindl, Buchanan, Goss, & Allan, 2017) as well as reducing self-criticism and shame in the general population (E. A. Johnson & O'Brien, 2013; Mosewich, Crocker, Kowalski, & DeLongis, 2013) and reducing weight gain in female students (Ouwens, Kupeli, Beadle, & Troop, 2019).

Self-compassion has been shown to be associated with external shame and eating pathology in eating disorders patients, while self-compassion has also been shown to mediate the association between shame and body image dissatisfaction on drive for thinness (C. Ferreira et al., 2013). In addition, increases in self-compassion over the course of eating disorder treatment have been shown to lead to reductions in shame, while greater reductions in shame

over 4 weeks led to faster decreases in eating disorder symptoms over the 12 weeks of treatment (A. C. Kelly et al., 2014). Self-compassion has also been shown to interact with shame in depression (E. A. Johnson & O'Brien, 2013), and is shown to moderate the effect of traumatic shame memories on eating pathology severity (C. Ferreira et al., 2014), while it has also been shown to negatively predict body shame in adolescents (Gouveia, Canavarro, & Moreira, 2018) and to predict body dissatisfaction (e.g. Lonergan et al., 2019). Higher self-compassion has also been associated with lower masculine norm adherence and lower strait shame in men, while shame was shown to moderate the relationship between masculine norm adherence and self-compassion and self-esteem (Reilly et al., 2014a).

Improvements in self-compassion have also been shown to improve body dissatisfaction and self-improvement motivation (Moffitt, Neumann, & Williamson, 2018) and moderate the effect of weight and shape concerns of disordered eating and perceived stress (Stutts & Blomquist, 2018). Self-compassionate interventions have also been shown to be effective at reducing body dissatisfaction and shame and increasing body appreciation (e.g. Albertson et al., 2014). Self-compassionate writing has been shown to increase self-compassion which is associated with increased positive body image and positive affect (Ziemer, Lamphere, Raque-Bogdan, & Schmidt, 2019), as well as reducing shame and fear of self-compassion (A. C. Kelly & Waring, 2018).

Self-compassion appears to be most useful in times of turmoil, stress, self-criticism, shame or as a response to negative self-evaluation (Albertson et al., 2014; C. Ferreira et al., 2013; E. A. Johnson & O'Brien, 2013; A. C. Kelly et al., 2014; Mosewich et al., 2011; Neff, 2003a). In other words, self-compassion might be directed towards one's body as a response to feelings of body shame.

PHYSICAL ACTIVITY, COMPASSION AND BODILY PRIDE AND SHAME

Guilt and shame have been shown to differ in their focus in regard to transgressions in behaviour (e.g. eating too much or skipping exercise) (Tangney, Stuewig, & Mashek, 2007). Guilt is able to motivate reparative action to undo any harm of this behaviour (or lack of behaviour), for example going to the gym to make up for over-eating. Conversely, Shame motivates a response of denial or social withdrawal, for example avoiding the gym further.

This can escalate the issue by meaning that missing the behaviour on one occasion, leads to more shame, and even less motivation for engagement. Both guilt and shame are negative emotions, however shame also elicits a negative response (Sabiston et al., 2010). By contrast pride, as described above, can be the result of engaging in a valued activity.

It is clear that these emotions play a key role in motivation for behaviour, and/or result from the engagement or non-engagement in this behaviour. It has been suggested that in attempting to explain the association between these emotions and behaviour, the motivational mechanisms should be explored (Lazarus, 1999). As described earlier the OIT suggests that it is the quality of one's motivation that is the key to understanding behaviour, in other words whether one is motivated to engage for reasons of reward or avoiding repercussions (external) or for more intrinsic motivations such as enjoyment (intrinsic) or because it is an important part of their self-image (integrated). Research exploring this has shown that for breast cancer survivors body shame is associated with lower physical activity, more *external* and *introjected* regulation and lower autonomous regulations; these autonomous regulations have also been shown to mediate the relationship between body shame and physical activity (Castonguay, Wrosch, Pila, & Sabiston, 2017). Body-related shame has also been shown to predict behavioural regulation for exercise in healthy samples, with negative associations with *intrinsic* regulation and positive associations with *extrinsic,* and *introjected* regulation. By contrast guilt positively predicted *introjected, identified* and *intrinsic* regulation and pride was positively predictive of *identified* and *intrinsic* regulations. Similarly, when guilt-free shame was explored, it was still negatively predictive of *intrinsic* and positively of more extrinsic regulations (*external* and *introjected*; Sabiston et al., 2010).

Authentic and hubristic pride have been shown to be negatively associated with *external* regulation and positively with *identified, integrated* and *intrinsic* regulations for physical activity, while behavioural regulation has been shown to mediate between pride and physical activity behaviour (Mack, Kouali, Gilchrist, & Sabiston, 2015). Pride has been associated with sport settings, swimming and beach settings and clothes shopping in a qualitative study; specifically, while hubristic pride was associated with evaluations and feelings of appearance superiority, authentic pride was associated with personal improvement in appearance and meeting goals as well as feelings of accomplishment (Castonguay, Gilchrist,

Mack, & Sabiston, 2013). Anticipated authentic and hubristic pride have been associated with intention to be active, which have frequently been associated with exercise behaviour (Gilchrist & Sabiston, 2018).

Body pride and shame have also been described with reference to older people and ability, health, fitness and function. These individuals, frustrated with their inability and their no longer being considered in the healthy and fit ideal, feel body shame and guilt. To negotiate this though they use body pride in their accomplishments to draw attention away from this shame and guilt (Bennett, Hurd Clarke, Kowalski, & Crocker, 2017).

Self-compassion has been shown to be associated with health behaviours like physical activity, whereby health behaviours act as a mediator between self-compassion and physical health (Dunne, Sheffield, & Chilcot, 2016; Homan & Sirois, 2017). It has also been shown to predict intentions for health promoting behaviours (Sirois, 2015). The relationship between self-compassion and health behaviours has also been suggested to be mediated by perceived stress (Homan & Sirois, 2017) and positive and negative affect (Sirois, Kitner, & Hirsch, 2015), as well as health self-esteem (Sirois, 2015). However there has also been research showing no association between self-compassion and physical activity (Hallion, Taylor, Roberts, & Ashe, 2018).

Self-compassion has shown to be useful in a number of exercise settings, predicting sporting performance in athletes over and above criticism (Killham, Mosewich, Mack, Gunnell, & Ferguson, 2018), while also positively predicting goal reengagement, and negatively predicting negative affect as a result of exercise setback, *external* regulation and state rumination (Semenchuk, Strachan, & Fortier, 2018). In female athletes, self-compassion has been shown to predict eudemonic wellbeing (subjective experience associated with "living a life of virtue in pursuit of human excellence"; Niemiec, 2014, p. 86) through positivity, responsibility and initiative (Ferguson, Kowalski, Mack, & Sabiston, 2014). Self-compassionate interventions significantly increase self-compassion, reduce state rumination, self-criticism and concern over sporting mistakes (Mosewich et al., 2013). 'Body self-compassion' (Berry et al., 2010) has been shown to regulate emotions and perceptions of sporting performance (Eke, 2018). Women participating in cardio exercise classes have described feelings of both shame and self-compassion, where self-compassion can counteract

the feelings of shame (Rogers & Ebbeck, 2016). Women viewing self-compassionate quotes show greater body satisfaction, body appreciation, self-compassion and reduced negative mood, while a combination of self-compassion and 'fitspiration' images led to positive outcomes (Slater et al., 2017).

Self-compassion has also been associated with self-determination theory with regard to physical activity. Thall (2014) demonstrated that self-compassion acted directly on exercise motivation (negatively) and indirectly through body image, while exercise motivation predicted exercise behaviour. Self-compassion has also been positively associated with *intrinsic* and *identified* regulation, while negatively associated with *introjected* and *external* regulation and *amotivation* as well as state rumination (Semenchuk et al., 2018). Self-compassion has also been associated with intrinsic reasons for exercise, as well as associated with shame proneness, social physique anxiety, objected body consciousness, fear of failure and fear of negative evaluation (Mosewich et al., 2011). Self-compassion has also been shown to negatively predict *introjected* regulation, ego goal orientation, social physique anxiety and obligatory exercise (Magnus et al., 2010).

In summary, one who experiences body shame is likely to be more externally regulated to participate in physical activity. They may (especially if also motivated by experiences of guilt) engage in physical activity in the short term but are likely to experience more bodily shame through social comparison in the fitness environment or through their own personal body-focused self-criticism. They are therefore unlikely to continue to participate for the long-term, missing on the subsequent pride in accomplishment, achievement and enjoyment they may experience in their participation. Someone with low body shame by contrast is more likely to be able to enjoy and integrate physical activity behaviour into their self-image and participate longer-term. Changes to their fitness, body weight changes, mobility, flexibility and strength as well as improvements to physical health are likely to result in acceptance of the benefits of the activity (*identified* regulation), integration of the behaviour and enjoyment in it as well as increase pride in their body (which will also increase the integration and enjoyment).

As suggested by the research discussed above, compassion in one's body in response to shameful and critical thoughts might reduce shame's impact on motivation and behaviour and even improve feelings of pride in one's body. By changing the focus from criticism and

shame to becoming more kind, accepting, less isolating and more mindfully aware (Neff, 2003a, 2003b), the person may be able to be motivated to participate with pride and find more enjoyment, leading to more internalised motivation and longer-term participation. This in-turn would help to increase feelings of achievement, enjoyment and pride, reduce shame and remove the need for guilt and shame to motivate behaviour, integrating and internalising the motivation.

3.5 SUMMARY

Based on the above it is clear that compassion and pride and shame have a role to play in self-determination and physical activity. There is also a need though to explore body-specific self-compassion, as described in qualitative studies (e.g. Berry, Kowalski, Ferguson, & McHugh, 2010; Woekel & Ebbeck, 2013), in much the same way as body shame has been shown to explain more variance in eating pathology than general shame. A more detailed discussion of body compassion is presented in the next chapter. Figure 3.2 demonstrates the relationships and variables described in this chapter and demonstrates what will be investigated in the following chapters.

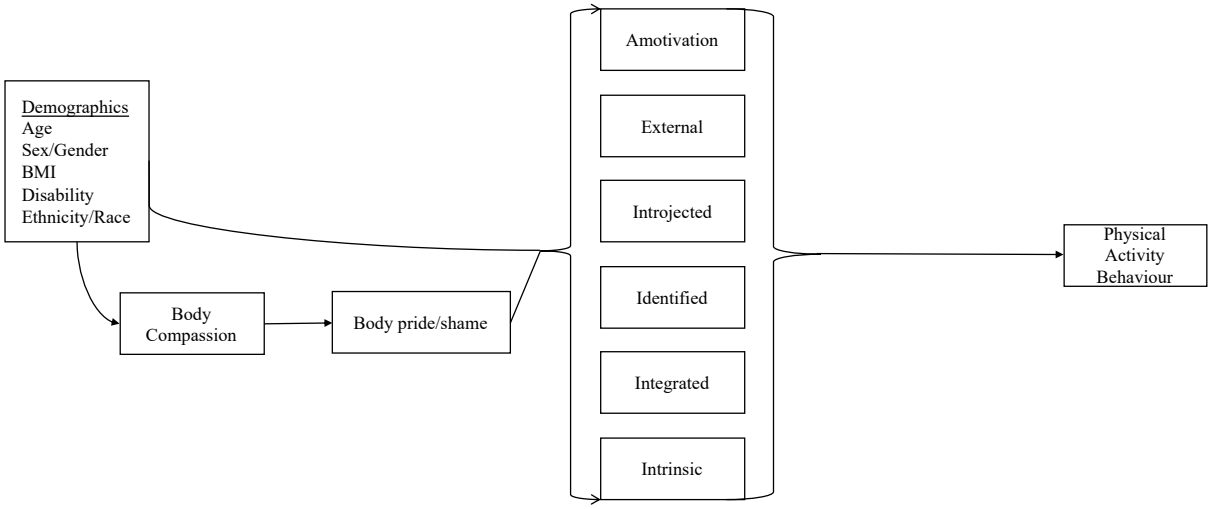

Figure 3.2 Model of the key variables from Chapter 3 to help demonstrate how the thesis will progress.

This model indicates that demographics such as age, sex and BMI will affect body compassion. Body pride and shame will act as a mediator between body compassion and behavioural regulation (motives) for physical activity. Leading from this behavioural regulation will act as a mediator between body pride and shame and physical activity behaviour. More detailed models will be presented as the individual elements of this model are tested later on in the thesis.

CHAPTER 4 DEVELOPMENT AND VALIDATION OF THE BODY COMPASSION AND CRITICISM SCALE (BOCCS)

While many studies have demonstrated the importance of self-compassion in relation to physical and mental health outcomes, recent research on self-compassion in body image has identified body compassion as a potentially important construct. This chapter develops a measure of body compassion that improves on current measures and demonstrates its potential usefulness in relation to a range of health behaviours and mental health outcomes. First definitions of compassion and self-compassion are described in order to ensure that the measure includes key concepts from current research in these topics.

4.1 BODY COMPASSION

The concept of *body compassion* or body self-compassion has been floated over the last decade, emerging as a theme in qualitative work in yoga intervention (Clancy, 2010), physical activity in paraplegic men (B. Smith, 2013), young women exercisers (Berry et al., 2010) and postpartum women (Woekel & Ebbeck, 2013). However, it has only recently begun to be explored and defined formally. Murn (2014) was the first to give a definition of body compassion as reflecting self-kindness, common humanity and mindfulness to one's own body compared to judgemental, critical, isolating and over-identification with negative feeling and emotion. *Body compassion* was also described by Tylka and Wood-Barcalow (2015) whereby they suggest that self-compassion might promote body compassion through buffering the distress that can be caused by body-image related threats. Bringing together these definitions of *body compassion* with Neff's (2003a, 2003b) self-compassion and Gilbert's (2010, 2017a) compassion; *body compassion* can be described as compassion directed to one's own body. It incorporates elements of kindness, common humanity and mindful awareness, as well as elements of sensitivity to body-related distress, pain and suffering as well as the motivation and ability to combat this.

Recently Altman, Linfield, Salmon, and Beacham (2017) described the development of a Body Compassion Scale (BCS) based around Cash's (Cash, 2002) definition of body image and Neff's (2003a, 2003b) self-compassion. Cash's definition of body image considers

attitudinal dispositions towards the physical self, includes evaluative, cognitive and behavioural components and includes appearance, competence, fitness and health or illness. However, this could be seen as contradicting Neff's conception of Self-Compassion due to the evaluative component. By definition evaluation involves some comparison of one's own internal standards to one's previous or desired achievements or to an 'ideal'. Comparison to an unattainable, unrealistic or impossible ideal (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) in the Western world typically involves a slim/thin, youthful feminine ideal (Leonhard & Barry, 1998) and a lean, muscular masculine ideal (Pope et al., 2000). The feminine ideal has been shown to be implicated in eating disorders (Leonhard & Barry, 1998; Thompson et al., 1999; Thompson & Stice, 2001) with maladaptive perfectionism appearing to impact body image and eating behaviour through negative self-evaluations (Barnett & Sharp, 2016). Additionally, men have displayed body dissatisfaction related to depression, eating pathology, performance enhancing substance use and low self-esteem related to the culture of a muscular lean body composition in males being perceived as 'desirable' (Olivardia, Pope, Borowiecki, & Cohane, 2004). Men and boys generally think women desire partners with more muscular physiques than is actually the case (Collins, 1991; Fallon & Rozin, 1985). Compassion rather than changing self-evaluations (as cognitive-behavioural therapies often do) focuses instead on changing people's relationships to self-evaluation (Leary, Tate, Adams, Allen, & Hancock, 2007).

The BCS also cements itself with mindfulness and acceptance-based (MAB) approaches which is clear from the defusion and acceptance subscales of the measure. This raises the question of whether it can really be considered 'compassion' as it appears to have more in common with mindfulness. Although these two concepts are certainly related (C. K. Germer & Barnhofer, 2017; C. K. Germer & Neff, 2013; Neff & Germer, 2013), and one can have mindfulness with compassion training and compassion within mindfulness training, a distinction can nevertheless be drawn. Mindfulness focuses on the experience while compassion focuses on the experiencer, with compassion being more emotionally activating than mindfulness and compassion training being uniquely able to help with shame (C. K. Germer & Barnhofer, 2017; Gilbert & Procter, 2006). There are additional methodological issues with the BCS. The authors also claim that the BCS is suitable for participants 15 years and older despite the participation of student samples who are 18 and over.

4.2 PSYCHOMETRIC STRATEGY

For the reasons above, the present chapter describes the development and validation of a new measure of body compassion, informed by compassion, removing the focus on evaluation and on specific elements of one's body and instead focusing on one's feelings and thoughts of any part of one's body. The development used a combined inductive and deductive approach or hypothetico-deductive approach (Walliman, 2018). The items were in part generated from expressive writing of people writing about their bodies, and as such are spontaneous expressions of self-compassion towards one's own body. This is from an inductive approach; where the items measuring body compassion were from previous observation and analysis of the compassionate thoughts and feelings of these participants (Collis & Hussey, 2014; Janzen, Nguyen, Stobbe, & Araujo, 2015; Oosterveld, 1996). This scale development also considered a deductive approach or theory-driven approach (Collis & Hussey, 2014; Janzen et al., 2015; Oosterveld, 1996) This new scale, the Body Compassion and Criticism Scale (BoCCS) incorporates elements of Gilbert's (2009, 2010, 2014, 2017a) and Jazaieri et al.'s (2013) definitions of compassion and Neff's (2003a, 2003b) self-compassion. Therefore, the theories of compassion and self-compassion were used to inform and refine the inductively formed items. Additionally the inductively formed items were themselves founded on the theory of self-compassion, as the participants were asked to write about their bodies considering first self-kindness, then common humanity and finally mindfulness (Neff, 2003a). Items were designed such that each item can be viewed in relation to any aspect of the body (not just weight and shape, health or function). The use of the BoCCS is described in relation to disordered eating and mood in order to demonstrate the breadth of its potential uses.

4.3 RELIABILITY AND VALIDITY

This chapter will assess the reliability and validity of the BoCCS in a number of ways. Here a brief summary of the reliability and validity assessments will be described, to be elaborated on in the methodology of each relevant study.

The reliability of the BoCCS is assessed in study 1 through internal consistency (Kline, 1993) and external/test-retest reliability (J. Johnson, 2001; Rattray & Jones, 2007).

The validity is initially assessed using content validity (Rusticus, 2014), ensured through examination and ratings of the original 95 items of the BoCCS and further examination of the 55 items of the BoCCS by experts in self-compassion and compassion (Hughes, 2018; Rattray & Jones, 2007). Criterion validity considers how well the scale correlates with or predicts another measure of interest (Piedmont, 2014b; Salkind, 2010). Here concurrent validity, a cross-sectional comparison (Lin & Yao, 2014), with eating disorder symptoms and body image avoidance behaviour will be considered. It is expected that, due to the previously shown associations between body image, self-compassion, eating disorders and body image avoidance (Braun, Park, & Gorin, 2016; C. Ferreira et al., 2013; A. C. Kelly et al., 2014; Stapleton et al., 2016), that increased body compassion will be associated with reduced eating disorder symptoms and body image avoidance behaviour. In addition, it is expected, given the associations between body image, self-compassion and mood, for there to be associations between body compassion and mood.

Construct validity considers the extent to which a scale measures the theoretical construct it intends to (Ginty, 2013; Piedmont, 2014a). Cronbach and Meehl's (1955) conceptualization of construct validity outlined the need to clearly describe the relations between psychological processes or concepts and the theoretical reasons behind these (M. E. Strauss & Smith, 2009). As part of construct validity the importance of specifying the nomological network of the construct is frequently highlighted (Cronbach & Meehl, 1955; Leary, Kelly, Cottrell, & Schreindorfer, 2013). Table 4.1 demonstrates the investigated constructs and the hypothesised relationships. The theoretical and empirical reasons for these predicted directions will be further described below. In addition, once the factor structure of the BoCCS is established in study 1 a more detailed nomological network will be described.

Table 4.1 Hypothesised associations in studies 1-3 for construct validity, demonstrating the nomological network of body compassion.

Study	Correlates	Body Compassion
Study 1	Self-compassion (SCS)	+
	SCS-Self-kindness	+
	SCS-Common humanity	+
	SCS-Mindfulness	+
	SCS-Self-judgement	−
	SCS-Isolation	−
	SCS-Over-identification	−
	Body pride and shame (BPS)–current	−
	Body pride and shame (BPS)–gain	−
	Body pride and shame (BPS) - loss	−
	Depression-Happiness (SDHS)	+
Study 2	Body Compassion Scale (BCS)	+
Study 3	LIWC-Positive affect	+
	LIWC-Negative affect	−
	LIWC-Anxiety	−
	LIWC-Sadness	−
	LIWC-Anger	−

Note: − indicates negative relationship, + indicates positive relationship. SCS = Self-Compassion Scale (Neff, 2003b), LIWC = Linguistic Inquiry Word Count (Pennebaker, Boyd, Jordan, & Blackburn, 2015), BCS = Body Compassion Scale (Altman et al., 2017), SDHS = Short Depression-Happiness Scale (Joseph, Linley, Harwood, Lewis, & McCollam, 2004), BPS = Body Pride and Shame Scale (Troop, 2016).

Campbell and Fiske (1959) also considered particular elements of construct validity, namely convergent and divergent validity (M. E. Strauss & Smith, 2009). Convergent validity refers to the associations between constructs that are similar or the same as the tested measure (Chin & Yao, 2014; Ginty, 2013; M. E. Strauss & Smith, 2009). For example, body compassion would be expected to be associated with self-compassion, body shame and the BCS. Discriminant validity, by contrast, assesses the measure based on its association with concepts expected to be unrelated to the construct of interest (Ginty, 2013; Hubley, 2014). For example, a weak or non-significant association is expected between body compassion and age.

COMPASSION AND SELF-COMPASSION

Items on the BoCCS were generated from an expressive writing study where participants were asked to write about their bodies from a self-compassionate perspective, considering the 3/6 main components of self-compassion: self-kindness over judgement and criticism, common humanity over isolation and mindfulness versus over-identification (Neff, 2003a, 2003b). It is therefore assumed that elements of these components will form part of the factor structure of the BoCCS and that the BoCCS will be associated positively with self-compassion. Similarly, Gilbert's (2009, 2010, 2017a) conceptualization of compassion that considers compassion as applied to oneself or to others (see chapter 3), entails 2 'psychologies' of compassion. The first of these considers motivated sensitivity, engagement and appraisal of suffering to oneself or others. This considers elements of sensitivity, non-judgement, empathy, distress tolerance, sympathy and care for wellbeing. By contrast the second psychology considers motivated action to alleviate and prevent this suffering to oneself or others. It considers imagery, reasoning, attention, feeling, sense and behaviour. Similar to the elements of self-compassion forming the basis for the factor structure, it is expected that the associations between self-compassion and more general compassion that these elements of compassion will also help to inform the structure and theoretical basis for body compassion. It is also predicted (as indicated in Table 4.1) that overall self-compassion as well as the positive components of self-compassion will be positively associated with body compassion and that the negative components of self-compassion will be negatively associated with body compassion.

BODY PRIDE/SHAME

Self-compassion has shown itself to be an important tool in combating shame including shame associated with one's body (C. Ferreira et al., 2013; Mosewich et al., 2011; Reilly, Rochlen, & Awad, 2014b; Woods & Proeve, 2014). It is predicted (see Table 4.1) greater body compassion will be associated with less shame and more pride in one's current body, while also being associated with less anticipated shame in losing or gaining weight.

AFFECT AND MOOD

Self-compassion has been shown to be associated with improvements in positive mood (Gilbert, 2009; Odou & Brinker, 2014) including in relation to body satisfaction and appreciation (Slater et al., 2017). In addition shame and self-criticism have been shown to be associated with depression and negative affect (Gilbert & Irons, 2005). Associations have also been shown between body image and body shame and mood (Harper & Tiggemann, 2008; M Tiggemann & Kuring, 2004; Marika Tiggemann & Boundy, 2008). Given these associations it is expected that body compassion will be positively associated with mood, in that greater body compassion is associated with more happiness. In study 3 the associations with positive and negative affect words and with sadness, anger and anxiety related words in expressive writing will also be assessed. It is expected that body compassion will be positively associated with positive affect and negatively with negative affect, sadness, anger and anxiety.

4.4 STUDY 1 – FACTOR ANALYSIS AND TEST-RETEST RELIABILITY

The aim of this study was to test the preliminary validity of the 48-items of the BoCCS. This study also aimed to explore the factor structure of the BoCCS and to confirm which factor structures suggested by Exploratory Factor Analysis (EFA) are the best fit for the BoCCS (higher-order and bi-factor models). Additionally, it aimed to evaluate the internal consistency of the final factor solution and examine the BoCCS's association with psychological wellbeing measures.

METHOD

PARTICIPANTS

There were 728 participants recruited online to take part in a questionnaire-based study on body image and physical activity. There were 127 males and 592 females (9 stated other/rather not say) who took part. All participants were aged from 16-76 years (M = 28.38, SD = 11.92), with current BMI statistics ranging from 13.32-66.48 kg/m2 (M = 24.74, SD = 5.86), lowest past BMI ranging from 9.47 to 46.36 kg/m2 (M = 21.43, SD = 4.35) and past highest BMI from 15.92 to 66.48 kg/m2 (M = 26.77, SD = 6.31). The majority of participants identified themselves as White British or European and the majority of participants were also from the UK or USA, most were single, had A levels or equivalent and were in education (the majority full-time), and there were 59 participants who indicated that they considered they had a disability. The split of ethnicities, country of origin, marital status, education and occupation for each part of the study can be seen in Table 4.2.

TEST-RETEST:

There were 198 participants from EFA/CFA (Confirmatory Factor Analysis) stages that gave contact details to be contacted for follow-up at four weeks. Of these, 83 participants completed the follow-up, however three of these had not completed sufficient baseline data to be of use here, leaving a final sample of 80 participants (40% uptake). Of these, 14 were male and 60 were female (6 other/unstated) and they were aged 16 to 69 (M = 32.30; SD = 13.37). Participants' current BMI ranged from 14.77 to 37.22 (M = 23.41; SD = 4.22), with a highest past BMI of between 15.92 to 38.40 (M = 26.18; SD = 4.57) and a lowest past BMI of between 12.31 to 28.62 (M = 20.49; SD = 3.44). The majority were White (74), with the rest Asian (3) or mixed race (3). The full breakdown of frequencies for ethnicity, marital status, education and job is shown in Table 4.1. The test-retest participants were significantly older than the original sample on average (p = .02), with significantly lower current BMI (p = .029) and past lowest BMI (p = .023). Past highest BMI did not differ significantly (p = .27).

Table 4.2 Demographic variables in Study 1 in EFA, CFA and test-retest samples

		EFA (N = 364)	CFA (N = 364)	Test-Retest (N = 198)
Ethnicity				
White	British, Scottish, English, Welsh	191	175	47
	European	63	58	20
	American	17	12	0
	Australian	1	3	2
	Other	16	21	5
Asian	Chinese	9	12	3
	Indian	9	6	0
	Pakistani	2	1	0
	Filipino	2	1	0
	Singaporean	0	2	0
	Other	12	10	0
Black	African	6	13	0
	Caribbean	2	6	0
	Other	3	9	0
Other	Mixed Race	13	12	3
	Hispanic/Latino	6	10	0
	Native American	0	3	0
	Mexican	2	1	0
	Other	1	2	0
	Unstated	9	7	0
Dieting to lose weight		118	129	
Dieting to maintain weight		146	160	
Marital Status				
	Single	111	132	37
	Married/Civil Partnership	79	62	19

Divorced	68	61	2
Living with Partner	23	34	15
In a Relationship	56	45	7
Widowed	1	1	0
Not Stated	26	29	0
Educational level			
GCSE's or equivalent	40	41	5
A Level or equivalent	125	117	15
Bachelor's Degree	86	99	32
Master's Degree	45	39	23
PhD or Higher	9	15	4
None	33	23	1
Not Stated	26	30	0
Job Role			
Admin/Secretarial	31	41	8
Professional	106	93	30
Managerial	14	10	2
Unemployed	17	10	2
At home	10	10	3
Self-Employed	10	15	4
Studying/Education	150	156	31
Not Stated	26	29	0

Note: EFA = Exploratory Factor Analysis sample, CFA = Confirmatory Factor Analysis sample.

MEASURES - BODY COMPASSION AND CRITICISM SCALE (BOCCS)

Items for the Body Compassion and Criticism Scale (BoCCS) were generated from a previous expressive writing experiment (Ouwens et al., 2019). This experiment asked participants to write for 15-minutes a day for three days about their bodies. Half the participants were asked to do this from a self-compassionate perspective. Day one focused on self-kindness over self-judgement, day two focused on common humanity rather than isolation and day three focused on mindfulness rather than over-identification. The texts produced by participants in

this experimental group were used to generate items representing body compassion for the present study. An initial pool of 90 items was then reviewed by four experts in compassion and self-compassion and reduced to 55 items. In this process items were removed on the basis they did not relate directly to a theoretically meaningful aspect of self-compassion, that they measured body image rather than body compassion and/or were ambiguous. Items were also re-worded, removing references to specific aspects such as weight or shape, so they could be applied to any aspect of one's body (e.g. weight, height, function, health, appearance etc.). The final measure was formatted to ask participants to indicate how often they acted/felt in the manner stated in response to each item on a scale from 1 (almost never) to 5 (almost always). Participants were administered a 55-item scale, some items of which were removed which data was collected, further reducing the number of items to 48 items which were analysed in the present study. The 55-item version administered to participants can be found in Appendix C-I.

MEASURES – CONSTRUCT VALIDATION

The 26-item Self-Compassion Scale (SCS; Neff, 2003b) was used to measure self-compassion. This scale was developed to measure thoughts, emotions and behaviours associated with the subcomponents of self-compassion. It includes items on six subscales, three including positively worded items indicating the presence of compassion and three with negatively worded items indicating an absence of self-compassion (or the presence of self-criticism). The six subscales are self-kindness (SK) as opposed to self-judgement (SJ), common humanity (CH) rather than isolation (I), mindfulness (M) versus over-identification (OI). Responses are given on a 5-point scale indicating how often they behave in the stated manner where 1 = Almost Never and 5 = Almost Always. In the present study the SCS had an overall internal consistency of .91 (SK = .83, SJ = .85, CH = .76, I = .82, M = .78, OI = .77).

The Body Pride and Shame Scale (BPS; Troop, 2016) is a 30-item questionnaire used to measure behavioural, affective and attitudinal aspects of pride and shame. The degree to which these are experienced (or anticipated) in relation to current weight, imagined weight gain and imagined weight loss gives three subscales: BPS-Current, BPS-Gain and BPS-Loss. The 10 items for each of these three subscales are identical except for the temporal perspectives. Items are scored on 10-point Likert scales where 1 = "not at all true of me" and 10 = "completely true of me"; high scores indicate more (current or anticipated) shame and low

scores indicate more (current or anticipated) pride. Internal consistency of BPS-current was .91, for BPS-gain was .91 and for BPS-loss was .92.

The Short Depression-Happiness Scale (SDHS; Joseph, Linley, Harwood, Lewis, & McCollam, 2004) was used to measure depression and happiness. Developed from the 25-item Depression Happiness Scale (DHS; Joseph & Lewis, 1998), the SDHS includes three negatively and 3 positively worded items in order to maintain the bipolarity aspect of the DHS, where higher scores indicate greater happiness and lower depression, while lower scores indicate greater depression and lower happiness. Items are scored on a 4-point scale indicating that the person has 'never', 'rarely', 'sometimes' or 'often' felt in the stated way in the last 7 days. Internal consistency of the SDHS was .88.

MEASURES – CONCURRENT VALIDATION

The Body Image Avoidance Questionnaire (BIAQ; Rosen, Srebnik, Saltzberg, & Wendt, 1991) was used to measure the behavioural tendencies that accompany body image concern. This was created from interviews about what changes young women have made in their day-to-day routines as a result of body dissatisfaction and the changes this dissatisfaction had on their behaviour. Answers reported by at least three individuals were used to create a 19-item scale rated on a six-point (5-0) scale where 5 = always, 4 = usually, 3 = often, 2 = sometimes, 1 = rarely and 0 = never engaging in the listed behaviour. The BIAQ had an internal consistency of .84.

A brief version of the Eating Disorder Examination Questionnaire (EDE-Q: Fairburn & Beglin, 1994), assessed eating pathology. Grilo, Reas, Deborah, Hopwood, and Crosby, (2015) developed a seven-item version assessing three subscales: Dietary Restraint (α = .90), Shape and Weight Overvaluation (α = .93), and Body Dissatisfaction (α = .87). The three items of the dietary restraint subscale are assessed on a 0-6 Likert scale, where participants are asked for each item to rate "on how many of the past 28 days…", where 0 = 1-5 days, 1 = 6-12 days, 2 = 13-15 days, 3 = 13-15 days, 4 = 16-22 days, 5 = 23-27 days and 6=every day. The shape and weight overvaluation and body dissatisfaction subscales are similarly assessed on a 0-6 point Likert scale but this time participants are asked to rate each item based on "over the past 28 days…", where 0=not at all and 6=extremely. Total EDEQ was computed by calculating an

overall mean of the three subscales (as in the full version) and the overall internal consistency was .77.

PROCEDURE

Data were collected online through the survey engine Qualtrics. Participants were given basic information on the aims of the surveys and asked to give their consent to take part. They were then taken through the six questionnaires listed above as well as asked to give basic demographic variables. The procedure took approximately 30 minutes to complete and then participants were debriefed. Participants were also invited to complete a four-week follow-up. Participants who agreed to be contacted in the follow-up and gave a contact email address were contacted four weeks after their initial participation with a link to the follow-up questionnaire (which included the BoCCS amongst other measures) and a reminder of their anonymity number.

DATA ANALYSIS

SPSS 24 (SPSS Inc., Chicago, IL, USA) was used for the exploratory factor analysis (EFA) of the BoCCS and SPSS Amos 23 (SPSS Inc., Chicago, IL, USA) was used to conduct the confirmatory factor analysis (CFA). For the CFA fit indices, Root Mean Square Error of Approximation (RMSEA) has been suggested to be the most informative criteria (Byrne, 2001), with values of < 0.05 (Browne & Cudeck, 1992) or <0.06 (Hu & Bentler, 1999) being suggested as indicative of a good fit, while 0.08 or less indicative of an adequate fit. In addition to this the Goodness of Fit Index (GFI), Comparative Fit Index (CFI) and Incremental Fit Index (IFI) with values approaching 1.00 were also considered (Bentler, 1990; Bollen, 1989; Byrne, 2001). Additionally, the Chi-square divided by degrees of freedom (df) was also used to indicate model fit. Pearson's r correlations were used to provide evidence of concurrent validity and intraclass correlations for test-retest reliability. T-tests were used to compare subgroups in the BoCCS.

RESULTS

These data were split in half randomly using a random number generator and allocating each participant a number. Half of these (N = 364) were used in the present study to conduct

EFA on the BoCCS, while the other half were used for the CFA. There were no significant differences in any demographic factors between participants in the EFA and CFA samples. Recommendations for sample size vary for EFA and CFA. For factor analysis recommendations of a least 100 have been supported (Gorsuch, 1983), others have suggested at least 200 (Guilford, 1954) or 250 (Cattell, 1978) while Comrey and Lee, (1992) stipulate 100 to be poor, 200 to be fair, 300 to be good, 500 to be very good and 100 or greater to eb excellent. Other recommendations have instead stipulated a ratio of 3:1 or 6:1 participant to variables (Cattell, 1978), while others suggest 20:1 (Hair, Anderson, Tatham, & Grablowsky, 1979).

For confirmatory factor analysis and structural equation modelling a minimum of 100 is required, but recommendations also vary in terms of the number of constructs being examined, communalities and under-identification of constructs (Hair, Black, Babin, & Anderson, 2014). The sample size here of >300, would allow for 7 or fewer constructs, low communalities (.45) and/or multiple under-identified constructs.

EXPLORATORY FACTOR ANALYSIS (EFA)

Data were subjected to factor analysis using Principal Axis Factoring and oblique Direct Oblimin rotation. All KMO values for the individual items (> 0.80) were above 0.5 and the KMO measure was 0.917 indicating the data were sufficient for EFA. The Bartlett's test of sphericity χ^2 (1035) = 8364.83, $p<0.001$ showed that there were patterned relationships between the items. Poor inter-correlations and no factor loading on the initial analysis led to the removal of the item "there is room for improvement in the way I feel about my body" and the item "I think body image is all about perspective". The former of these correlated with three other items and the latter with only one at the ±0.3 threshold suggested by many to be an acceptable level (e.g. Field, 2009; Yong & Pearce, 2013).

The initial factor analysis led to eight factors being rotated. However, the scree plot (Figure 4.1) suggested either a four or six factor structure might be suitable. Examination of the pattern matrix showed two items loaded poorly (> 0.25 rather than > 0.30). The six-factor solution indicated four very clear factors and two that were less clear with fewer items (e.g. factor five with two items) and it was harder to define each factor. By contrast the four-factor

solution is shown in Table 4.3. As this was clearer, had fewer cross-loadings and had a good distribution of items, this solution was preferred.

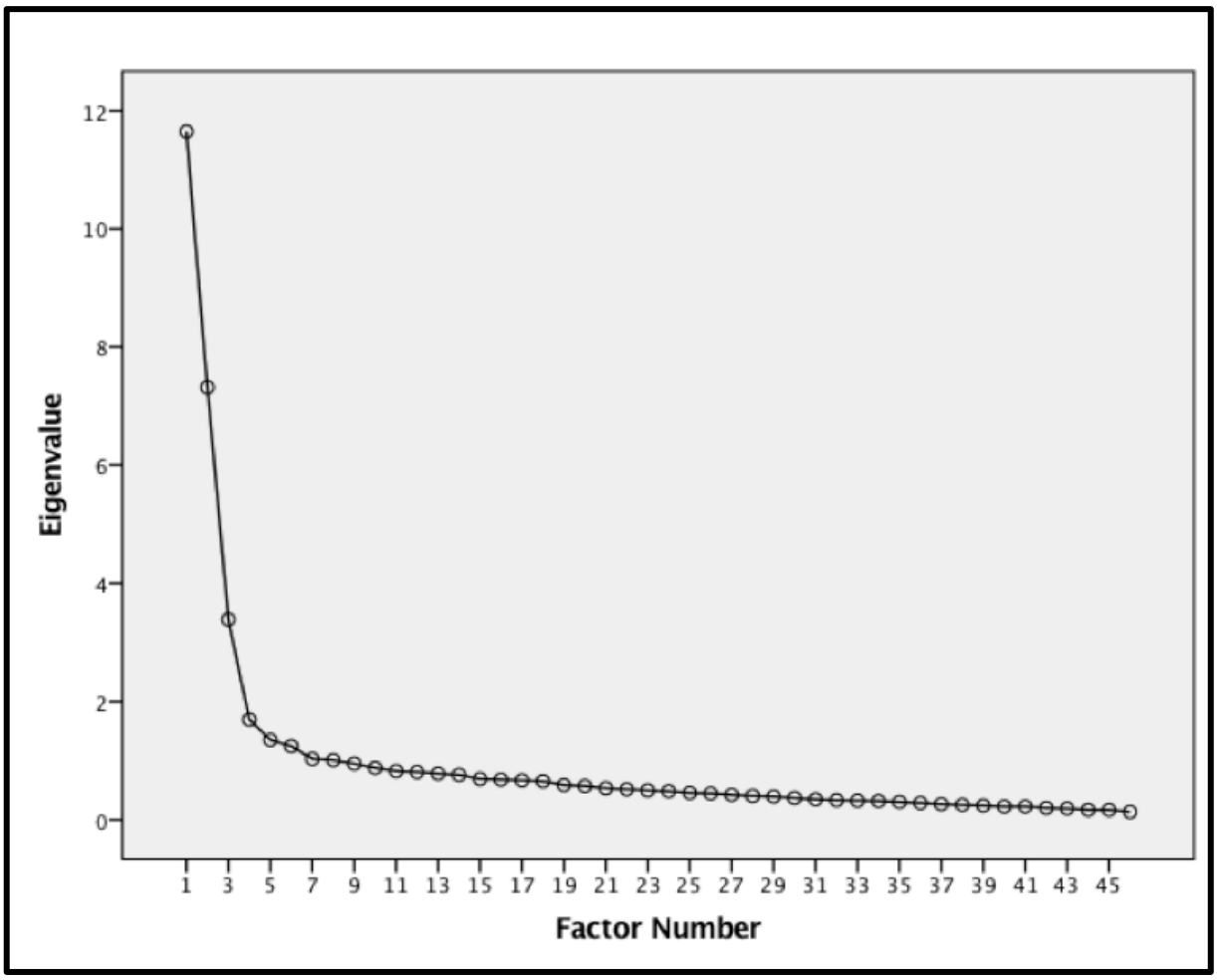

Figure 4.1 scree plot showing the EFA solution for the BoCCS

Table 4.3 Four-factor solution of the BoCCS as indicated by EFA (values below ± 3 suppressed)

	Factor			
Item	1	2	3	4
BC1: I like my body in spite of small inadequacies	.699			
BC9: I do not want a different body image, I want to like the one I have	.485			
BC11: I am happy in the body I have, no matter what size it is	.771			
BC12: I have stopped worrying about weight and body shape	.753			
BC19: I do not really think a lot about my body, I accept this is me	.771			
BC21: I am critical of the way I think and feel about my body	-.578			
BC23: I am critical of my body's flaws	-.673			
BC39: Knowing that other people feel the same way about their bodies has really helped me a lot	.320			
BC41: I accept the flaws in my body, even if I don't like them	.713			
BC42: I am really grateful for the way my body is	.684			
BC44: I am thankful for the way that I look	.627			

BC48: I feel ok with my body the way it is	.742		
BC50: I accept my body the way it is and am comfortable in my own skin	.779		
BC54: It is hard to get away from the negative feelings I have about my body	-.501		.402
BC55: I feel quite comfortable in my body	.748		
BC24: Body image is something that most people have issues with		.568	
BC25: Everyone has mixed feelings about their body		.672	
BC26: My friends complain about the same things about their bodies as I do		.351	
BC27: Everybody has something they do not like about their body		.748	
BC28: I am sure everyone has insecurities about their bodies		.784	
BC29: Everyone probably feels the same way about parts of their body that they would like to change		.694	
BC30: There are people who have the same or even worse thoughts about their body image than I do		.526	
BC31: I do not think anyone is completely satisfied with their body		.635	
BC33: nearly everyone has some negative feelings about their bodies		.754	

BC34: The way I feel about my body is probably a normal thing for everyone		.586	
BC35: I think it is pretty normal to have hang-ups about certain parts of your body		.672	
BC36: The way I feel about my body is common amongst people I know		.465	
BC2: I am trying to become more accepting of my body			.692
BC3: I try my best to accept my body			.578
BC4: I am working on making myself feel better about the way I look			.596
BC6: I try to empathise with myself and say I am ok and that I am happy with my body			.621
BC7: I think I judge my body far too harshly	-.353		.428
BC15: I tell myself that, even though I do not like my body, it is still capable of doing great things			.468
BC16: I try to be kind to myself about my body	.331		.565
BC40: Instead of thinking that I cannot like my body until it is perfect, I try and focus on the things that I do not like and try to love them	.323		.450
BC43: I need to be more accepting of my body	-.333		.581
BC45: I have positive as well as negative feelings about my body			.464

BC46: Although there are things I do not like about my body, there are also things I do like		.441	-.349
BC47: Focusing of things I do not like about my body stops me thinking about all the good points and it makes me feel a lot more negative		.320	
BC49: I feel I can be too harsh on myself at times and need to accept my body		.412	
BC17: I really wish I did not hate my body because it is something that is always on my mind	-.446		.513
BC18: It is hard to accept that bodies are all different shapes and sizes			.472
BC20: I am starting to think that I worry about my body too much	-.355		.454
BC32: I often feel like the only person in the world with these thoughts about my body			.639
BC37: Knowing everyone feels the same does not make my insecurities about my body any less			.347
BC38: I always feel alone in how negative my personal thoughts are about my body			.621

CONFIRMATORY FACTOR ANALYSIS (CFA)

Both the four and six factor solutions identified in the EFA were examined through CFA. Both four and six factor solutions were shown to have a mediocre fit initially. Examination of the modification indices showed issues with cross-loading and cross-correlated errors for items 7, 16, 21, 43, 46, 47, 49 and 54, plus an error correlation between items 26 and

36 which was allowed to correlate. Once these changes were made the six-factor model indicated moderate fit: RMSEA = .779 (90% CI = .069 – .076); CFI = .779; GFI = .750; IFI = .781; Chi-square/df = 2.66. The four-factor model indicated similar fit with a RMSEA of .074 (90% CI = .070 – .078) and with Chi-square/df (2.71) but superior fit on the CFI (.782), GFI (.760) and IFI (.784). A single factor solution was also assessed but showed poor fit with a RMSEA of .110 (90% CI = .106 – .114). For the above reasons a four-factor solution was the preferred solution. Following this, both a higher-order model and bi-factor model were assessed.

HIGHER-ORDER MODEL

Higher-order models are those where individual items load onto subscales and the subscales load onto a higher-order scale. The higher-order model is shown in Figure 4.2. This indicated moderate fit with a RMSEA of .074 (90% CI = .070 – .078), CFI of .779, IFI of .781 and GFI of .757. Chi-square/df = 2.73.

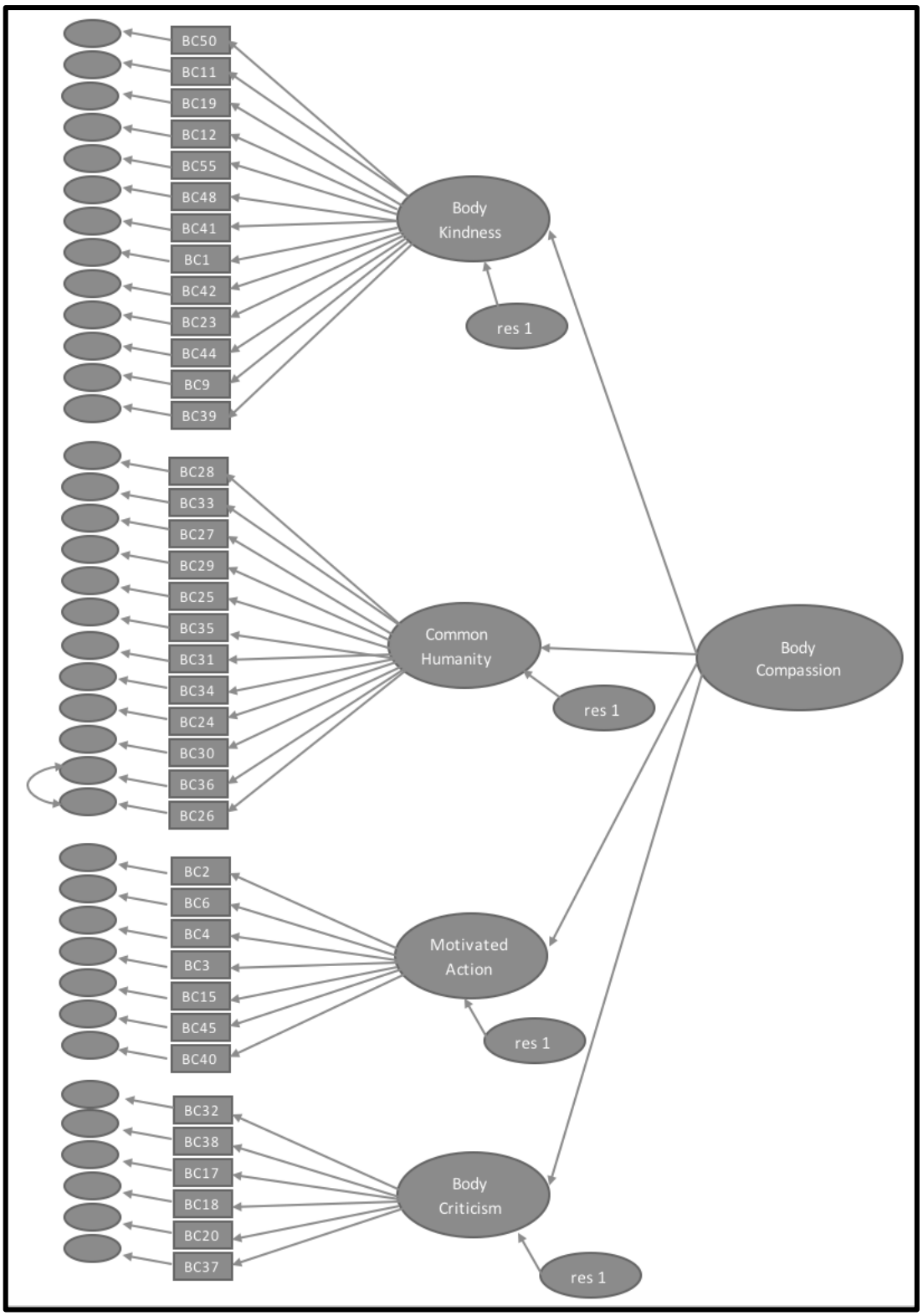

Figure 4.2 Path diagram of the second/higher-order model of the BoCCS

BI-FACTOR MODEL

Bi-factor models are models where each item loads directly onto a general factor as well as individual subscales. Although bi-factor models have received less usage than higher-order factor solutions (Cucina & Byle, 2017; Reeve & Blacksmith, 2009), bi-factor models have been suggested for the Self-Compassion Scale (Neff et al., 2017; Tóth-Király et al., 2017). The bi-factor model for the BoCCS is shown in Figure 4.3. This indicated far superior fit to all other models with a RMSEA of .065 (90% CI = .070 – .078), CFI=.838, IFI=.840, GFI =.795 and Chi-square/df closest to 2.00 of all models at 2.34.

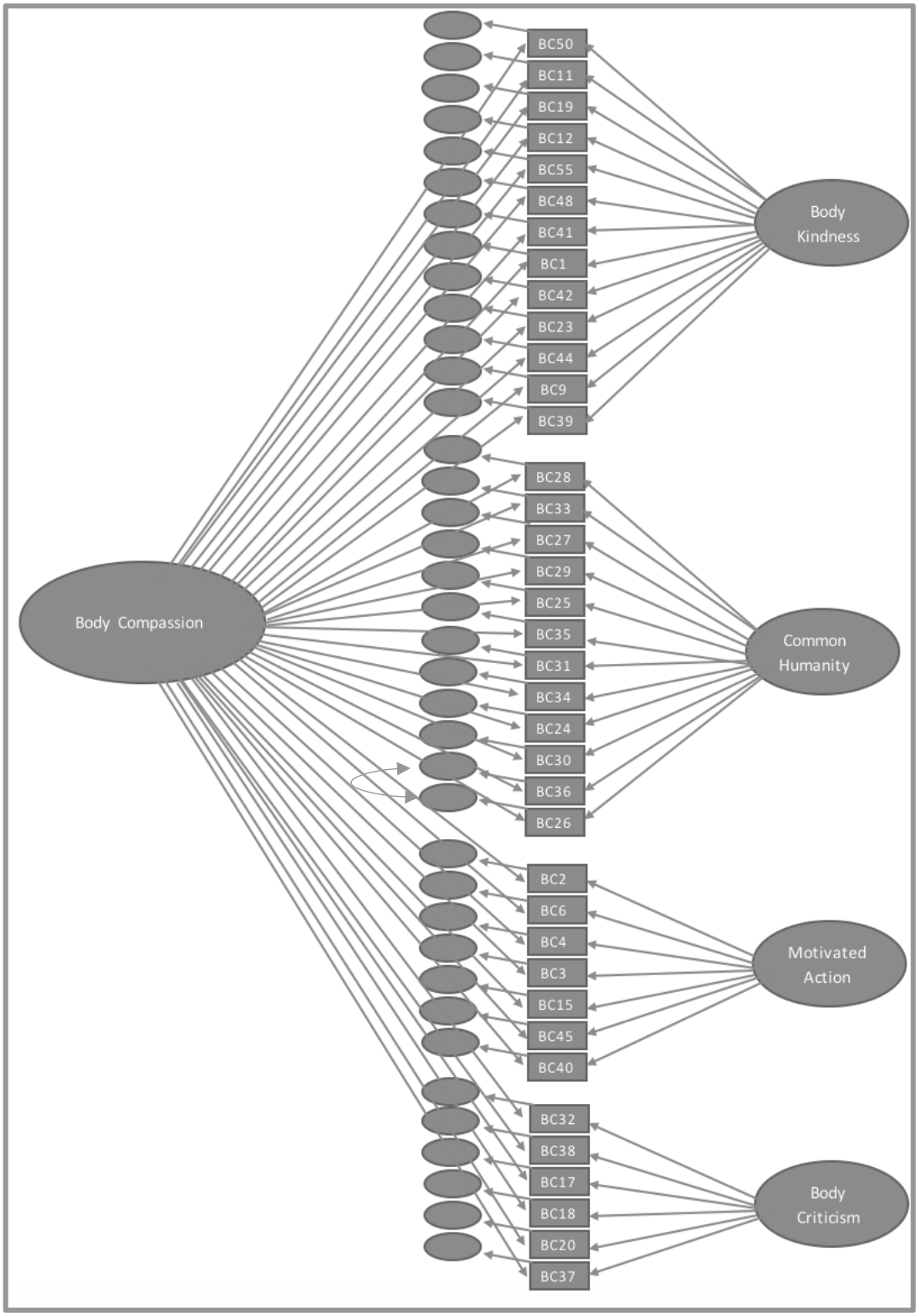

Figure 4.3 path diagram of the bifactor model of the BoCCS

Factors were named based on Gilbert's (2009; 2017b) conceptualisation of compassion and Neff's (2003a, 2003b) self-compassion. On the basis of Gilbert's compassion, theoretical elements of compassion focused on the two psychologies of compassion detailed in the introduction with motivated sensitivity and motivated action. This also focused on compassion as a social mentality (Gilbert, 2017b). On the basis of Neff, the theoretical elements of self-compassion that were utilised in naming the subscales were the six components of self-compassion: self-kindness vs. criticism, common humanity vs. isolation and mindfulness vs. over-identification (Neff, 2003a, 2003b).

Factor one was labelled *body kindness*, incorporating self-kindness, non-judgement, acceptance and sensitivity and distress tolerance from the first psychology of compassion (Gilbert, 2014, 2017b). It includes elements of people being accepting of their bodies (C. Germer & Neff, 2019; Gilbert, 2017b; Neff & Knox, 2017), emotional response focused on being happy with their body and stopping worrying (C. Germer & Neff, 2019) and sensitivity to suffering with awareness that they should be accepting, tolerant and comfortable in their own skin (Gilbert, 2017b). It also includes a negatively worded item which represents the critical aspect that is in contrast the self-kindness (Neff, 2003a; Neff & Knox, 2017). Factor two was labelled *common humanity*, incorporating items whereby one accepts and shows a cognitive understanding that one's feelings and concerns about one's body are normal, common and a part of the greater human experience (Neff, 2003a, 2003b; C. Germer & Neff, 2019; Neff & Knox, 2017). This focuses on being non-isolating (C. Germer & Neff 2019), and that this is a shared experience. Factor three was labelled *motivated action*, considering in particular the elements of the second psychology including helpful attention, reasoning, feelings, behaviour, imagery and sensory skills to help develop body compassion. Particular focus here is on helpful attention, the focus on what will help reduce shame and suffering. This also incorporates elements of mindful awareness (Neff, 2003a, 2003b) keeping painful thoughts and feelings in balanced awareness. Finally, Factor four was labelled *body criticism*, incorporating self-criticism, over-identification with flaws or negative emotion and isolation. Elements of unhelpful attention (hate of body being "always on their mind"), being unaccepting of their bodies and feelings of isolation (in contrast to common humanity). The final version

of the Body Compassion and Criticism Scale (BoCCS) and its scoring are presented in Appendix C-II.

INTERNAL CONSISTENCY, DESCRIPTIVE STATISTICS AND INTER-CORRELATIONS

Mean scores were calculated for each subscale (body kindness, common humanity, motivated action and body criticism) from the four-subscale, bi-factor solution detailed in Figure 4.3. Additionally, a total body compassion score was calculated with all the items from body criticism and item 23 from body kindness reversed and summed with the other items. Total BoCCS score was shown to be normally distributed (KMO (634) = .035, p = .07) with scores from 65.00 to 186.00 (M = 127.80, SD = 19.11).

Descriptive statistics for BoCCS are shown in Table 4.3. Internal consistencies indicated good to high reliability. Intercorrelations between the four subscales were mostly low to moderate although the (inverse) correlation between body kindness and body criticism was higher.

Table 4.4 Descriptive statistics, internal consistency and intercorrelations in Study 1

	N	Mean (SD)	Internal consistency (α)	Correlations		
				BK	CH	MA
Total BoCCS	645	127.80 (19.09)	.89			
BK	640	2.89 (.88)	.92			
CH	642	3.86 (.60)	.86	-.01		
MA	644	3.40 (.74)	.78	.34***	.31***	
BC	643	2.64 (.88)	.80	-.59***	.06	-.004

*Note: BK = body kindness, CH = common humanity, MA = motivated action, BC = body criticism. *p<0.05, **p<0.01, ***p<0.001*

Table 4.4 shows the means for BoCCS total score and the BoCCS subscale comparing males and females. It shows that females were significantly lower in body kindness, but

significantly higher in body criticism, motivated action and common humanity. No significant sex differences were seen for total score.

Table 4.5 Descriptive statistics for BoCCS scores comparing males to females

	Males (n=103)	Females (n=529)	t-value
Total BoCCS	128.55 (16.32)	127.63 (19.62)	.45
BK	3.10 (.85)	2.85 (.88)	2.69**
CH	3.64 (.66)	3.90 (.58)	-4.08***
MA	3.10 (.76)	3.45 (.72)	-4.52***
BC	2.21 (.83)	2.73 (.87)	-5.69***

*Note: **p<.01, ***p<.001. BK = body kindness, CH = common humanity, MA = motivated action, BC = body criticism.*

Table 4.5 shows the means for the BoCCS by BMI category. This showed (using Bonferroni correction post hoc) that there were significant differences between obese and underweight, healthy and overweight individuals in terms of total BoCCS (all p<.001) and body kindness (all p<.001). Obese individuals had significantly lower body compassion and kindness than all other groups. In general, the trend for body compassion and body kindness was linear with underweight having the highest and obese the lowest. Differences were also shown for body criticism, here between obese and underweight and healthy participants (both p <.001) and between obese and overweight participants (p=.001). For motivated action obese participants significantly differed from healthy (p = .031) and overweight participants (p = .026). Again, this was such that those who were obese were significantly lower in motivated action than healthy and overweight participants. Here however the trend was not linear, instead the highest score was shown in overweight individuals, followed by healthy and underweight, with obese being the lowest. Finally, in body criticism the association was also linear but in the other direction where obese was highest and underweight lowest. Therefore, obese participants were significantly more critical than underweight, healthy and overweight participants.

Table 4.6 Descriptive statistics for the BoCCS split by BMI category

	Underweight (n=35)	Healthy (n=289)	Overweight (n=126)	Obese (n=76)	F-value
Total BoCCS	133.28 (23.08)	130.85 (18.82)	127.66 (19.01)	115.87 (18.27)	13.31***
BK	3.24 (1.00)	3.06 (.85)	2.84 (.90)	2.26 (.78)	19.68***
CH	3.78 (.57)	3.85 (.62)	3.87 (.62)	3.94 (.52)	.70
MA	3.43 (.89)	3.45 (.77)	3.49 (.71)	3.18 (.70)	3.15*
BC	2.37 (.94)	2.55 (.86)	2.69 (.91)	3.18 (.86)	11.96***

*Note: *p<.05, ***p<.001. BK = body kindness, CH = common humanity, MA = motivated action, BC = body criticism.*

CONSTRUCT VALIDITY

The predicted associations and directions for overall body compassion are shown in Table 4.1. Based on the factor naming processing and the theoretical and empirical reasons for these, predictions were made based on the factor structure shown earlier in this study.

Body kindness was predicted to be positively associated with self-compassion; in particular self-kindness with weaker associations predicted for common humanity and mindfulness. It was also predicted to be negatively associated with body pride and shame (BPS) (most strongly with the current body pride and shame) and with self-judgement, isolation (I) and over-identification (OI). It was also predicted that *body kindness* in particular would be positively associated with mood (SDHS).

Common humanity was predicted to be most strongly positively associated with common humanity (CH) of the self-compassion scale and less so with self-compassion overall, self-kindness and mindfulness. It was predicted to be negatively associated with isolation and less so with self-judgement and over-identification and negatively associated with BPS. It was also predicted that it would be positively associated with the SDHS.

Motivated action was predicted to be associated positively with self-compassion, self-kindness and mindfulness, plus common humanity to a lesser extent. It was also predicted to

be negatively associated with self-judgement, isolation and over-identification plus BPS. It was also predicted that it would be positively associated with the SDHS.

Finally, *body criticism* was predicted to be positively associated with self-judgement, isolation and over-identification and BPS plus negatively with self-compassion, self-kindness, common humanity and mindfulness. *Body criticism* was predicted to be negatively associated with the SDHS. The correlations between the relevant variables are shown in table 4.7.

Table 4.7 Correlations for construct and concurrent validity of the sample overall

	BoCCS (N=635)	BK (N=640)	CH (N=642)	MA (N=644)	BC (N=643)
SCS (N=372)	.50***	.54***	-.01	.21***	-.48***
SCS-SK (N=373)	.59***	.61***	.12*	.41***	-.23***
SCS-CH (N=373)	.42***	.36***	.20***	.32***	-.18***
SCS-M (N=373)	.43***	.42***	.12*	.29***	-.25***
SCS-SJ (N=323)	-.45****	-.55***	.14*	-.08	.58***
SCS-I (N=322)	-.27***	-.34***	.16**	.00[1]	.46***
SCS-OI (N=323)	-.26***	-.35***	.18**	.02	.44***
BPS-current (N=306)	-.69***	-.76***	-.05	-.25***	.62***
BPS-gain (N=305)	-.48***	-.64***	.10	-.14*	.40***
BPS-loss (N=305)	-.26***	-.17**	-.17	-.30***	.06

SDHS (N=350)	.53***	.48**	.15	.28***	-.41***
EDE-Q (N=320)	-.53***	-.68***	.19	-.07	.59***
BIAQ (N=473)	-.54***	-.58***	-.03	-.16**	.52***

*Note: [1]r=.004, *p<.05, **p<.01, ***p<.001. BK = body kindness, CH = common humanity, MA = motivated action, BC = body criticism. SCS = Self-Compassion Scale, SCS-SK = Self-Kindness, SCS-CH = Common Humanity, SCS-M = Mindfulness, SCS-SJ = Self-Judgement, SCS-I = Isolation, SCS-OI = over-identification (Neff, 2003b). BPS = Body Pride and Shame scale (Troop, 2016). SDHS = Short Depression-Happiness Scale (Joseph et al., 2004). EDE-Q = Brief Eating Disorder Examination Questionnaire (Grilo et al., 2015). BIAQ = Body Image Avoidance Questionnaire (Rosen et al., 1991).*

This shows that the predictions were correct for *body compassion* as a whole, *body kindness* and *body criticism* (with the exception of no association with body pride and shame with weight loss). *Common humanity* was most strongly associated with *common humanity* from the SCS and also significantly (though weakly) associated with the other SCS subscales (all positively including the critical subscales of SJ, I and OI). *Motivated action* was shown to be significantly associated with the positive subscales of the SCS but not the three negative/critical subscales and was associated as predicted with BPS and SDHS. In order to further investigate these associations, given the differences between males and females, Table 4.8 shows the associations split by gender.

In general, the same patterns emerged for both sexes. BoCCS showed negative correlations with BMI (sig and greater in females), highest past BMI and lowest past BMI (females only), critical subscales of the SCS (self-judgement (SJ), isolation (I) and over-identification (OI)), EDE-Q, BIAQ and all subscales of BPS (current, gain and loss). BoCCS was positively correlated with compassionate subscales of the SCS (self-kindness (SK), common humanity (CH) and mindfulness (M)), overall SCS and SDHS.

The correlations between the overall BoCCS and other measures was similar for men and women. This was also true for correlations for *body kindness* and *body criticism*. For *common humanity* clear differences are shown between the genders with positive associations

with the critical subscales of the SCS in males and with positive subscales of the SCS in females. Similarly, for *motivated action* in males it was associated only with the SCS subscales of I and SK. While in females, positive associations with the SCS and the positive SCS subscales (SK, CH, M) were shown. Finally, for SHDS all were positively associated with females except for *body criticism* (as predicted) while for males no association was shown for common humanity and motivated action.

This suggests that the associations between the BoCCS (and *body kindness* and *body criticism*) and these other constructs are broadly consistent in both genders. However, common humanity and motivated action can act quite differently in males and females in their associations with these other constructs.

Table 4.8 Construct and concurrent validity correlations in males and females.

	Males (n=103)					Females (n=529)				
	BoCCS	BK	CH	MA	BC	BoCCS	BK	CH	MA	BC
Construct validity										
Global SCS (n=377)	.38***	.49***	-.17	-.04	-.48***	.54***	.56***	.07	.31***	-.48***
SCS – Self judgement (n=238)	-.32**	-.52***	.41***	.20	.67***	-.49***	-.55***	.04	-.18**	.56***
SCS – Isolation (n=327)	-.23	-.36**	.25*	.24*	.56***	-.29***	-.33***	.12	-.08	.43***
SCS – Over-identification (n=328)	-.24*	-.38**	.28*	.21	.55***	-.27***	-.34***	.13*	-.07	.40***
SCS – Self-Kindness (n=378)	.57***	.62***	.01	.32**	-.19	.61***	.61***	.16**	.45***	-.37***
SCS – Common Humanity (n=378)	.24*	.19	.11	.18	-.05	.47***	.41***	.23***	.37***	-.22***
SCS – Mindfulness (n=378)	.35**	.41***	-.02	.03	-.25*	.47***	.42***	.19**	.40***	-.24***
BPS-Current (n=311)	-.66***	-.65***	.01	-.26*	.48***	-.70***	-.78***	-.09	-.29***	.64***
BPS-Gain (n=310)	-.55***	-.63***	.12	-.22	.33**	-.47***	-.63***	.07	-.16*	.40***
BPS-Loss (n=310)	-.29*	-.29*	-.03	-.26*	.03	-.25***	-.15*	-.20**	-.30***	.09
SDHS (n=355)	.57***	.54***	.01	.12	-.52***	.52***	.47***	.20**	.33***	-.39***
Concurrent validity										
EDE-Q Global score (n=325)	-.50***	-.68***	.20	.02	.45***	-.55***	-.68***	.06	-.13*	.61***
BIAQ (n=476)	-.32**	-.34**	.10	.06	.49***	-.58***	-.61***	-.09	-.24***	.50***

*Note: *P<.05, **p<.01, ***p<.001. SCS = Self-Compassion Scale (Neff, 2003b), BPS = Body Pride and Shame scale (Troop, 2016), SDHS = Short Depression Happiness Scale (Joseph et al., 2004), EDE-Q = Brief Eating Disorder Examination Questionnaire (Grilo et al., 2015), BIAQ = Body Image Avoidance Questionnaire (Rosen et al., 1991). BK = body kindness, CH = common humanity, MA = motivated action, BC = body criticism.*

CONCURRENT VALIDITY

Concurrent validity was assessed through associations between body compassion and eating disorder behaviour (EDEQ) and body image avoidance behaviour (BIAQ). In addition to the predictions made in Table 4.1, it was predicted that both BIAQ and EDEQ should be negatively associated with *body kindness, common humanity* and *motivated action* subscales and positively associated with *body criticism*. Tables 4.7 and 4.8 shows these associations. In Table 4.7 it can be seen that overall for BoCCS, *body kindness* and *body criticism* it was as predicted, also with *motivated action* for BIAQ. For *common humanity* however, no significant associations were shown. Again, comparing the genders in Table 4.8, it can be seen that it was as expected for females with the exception of *common humanity* and as predicted in males except for the *common humanity* and *motivated action* subscales. For *motivated action* in males no association was shown for EDEQ, while it was present in females.

TEST-RETEST RELIABILITY

Intraclass correlations showed good test-retest reliability for the total BoCCS (ICC = .93) as well as all subscales (ICCs for BK = .93, CH = .75, MA = .74 and BC = .92).

CONCLUSIONS OF STUDY 1

The results of Study 1 demonstrate that the BoCCS is a bi-factor model whereby researchers can use the total BoCCS score and/or its four subscales; body kindness, common humanity, motivated action and body criticism. The scale has good internal consistency, validity and test-retest reliability.

4.5 STUDY 2 – CROSS-VALIDATION AND COMPARISON WITH ANOTHER BODY COMPASSION MEASURE

Study 2 further examined the validity of the BoCCS by cross-validating it with spontaneous expressions of body compassion in text generated by participants when writing about body image. Since collecting data for Study 1, another measure of body compassion has also been published, the Body Compassion Scale (BCS; Altman et al., 2017). Study 2 therefore also cross-validates the BoCCS with the BCS.

METHOD

PARTICIPANTS

As part of a larger study, 27 female psychology students participated in an expressive writing study for course credit. Participants had a mean age of 21.88 years (SD 7.05, ranged from 18-50). Participants were predominantly white (70.40%), A-level holders (85.20%) and single (63.00%).

MEASURES

In addition to the BoCCS, participants also completed the Body Compassion Scale (BCS; Altman, et al., 2017). The BCS aims to measure an individual's compassion toward their body with factors including defusion, common humanity and acceptance. A high score on the BCS equates to a greater level of body compassion. The BCS has 23-items and is measured using a five-point Likert scale (1 = almost never believe it and behave in this way to 5 = almost always believe it or behave in this way). An example item is, "When I feel out of shape, I try to remind myself that most people feel this way at some point". In the current study, the BCS total score showed a Cronbach's alpha of .71, while defusion had an alpha of .95, common humanity had an alpha of .86 and acceptance had an alpha of .87. The BoCCS had an overall alpha of .82, with subscales also showing good internal consistency (body kindness = .88; common humanity = .93; motivated action = .73; body criticism = .79).

PROCEDURE

Participants were provided with a document explaining what the study entailed and were asked to sign a consent form. Questionnaires were completed electronically, except for the expressive writing task, which in all cases was completed on paper. After the questionnaires were completed, participants were presented with an envelope containing the writing task and worksheet. Participants were asked to complete a writing exercise about their body image. Specifically, participants were given the following instructions, based on those originally developed by Pennebaker and Beall (1986) and modified by Ouwens et al. (2019):

We would like you to write about the way you think and feel about your body. What you write is entirely up to you but write about the way you think and feel about your body in as much

detail as you can. Really get into it and freely express any and all emotions or thoughts that you have about your body. As you write, do not worry about punctuation or grammar, just really get into it and write as much as you can in 15 minutes.

Participants were timed to write for 15 minutes before being debriefed and provided with an information sheet with various helplines for mental health support.

DATA ANALYSIS

The texts were rated by the author and principal supervisor in terms of expressions of body kindness, common humanity, motivated action and body criticism. Ratings were made on a four-point scale where presence of body compassion statements were given as 1 none, 2 some, 3 moderate and 4 marked presence. The first five cases were used to develop the coding. These ratings for each coder were entered into SPSS 24 (SPSS Inc., Chicago, IL, USA) and then an agreement was calculated using intraclass correlation (agreement). Spearman's Rho was used to assess the relationship between the ratings and the other measures described above including the BoCCS. The BoCCS correlations used Pearson's r as in Study 1. Missing data were excluded pairwise.

RESULTS

Means (SDs) for the BoCCS for this sample were as follows: Total = 136.69 (20.96); BK = 3.01 (.84); CH = 4.13 (.74); MA = 3.71 (.61); BC = 2.33 (.86). Means for the BCS were: Total = 75.26 (17.27); Defusion = 2.60 (1.23); CH = 3.23 (.82); Acceptance = 3.12 (.92).

Intra-class correlation for the agreement between raters on spontaneous expressions of body compassion was .76 for BK, .85 for CH, .61 for MA and .84 for BC. This shows good agreement on three of the subscales and adequate agreement on MA. Where there were differences in the investigator ratings for the spontaneous expressions of body compassion, these were resolved by discussion and the agreed score was used. Correlations between investigator ratings and participant self-reports were as follows: BK = .51 ($p = .007$, $1 - ß = .88$), CH = .11 ($p = .587$, $1 - ß = .08$), MA = .33 ($p = .092$, $1 - ß = .32$), BC = .71 ($p < .001$, $1 - ß > .99$). The total BoCCS score was correlated with total rating at .43 ($p = .027$, $1 - ß = .67$).

Table 4.9 shows the correlations between the BoCCS and the BCS showing that body kindness and criticism were significantly correlated with defusion and acceptance in the expected directions and that common humanity in both scales were significantly positively correlated. All significant results with the exception of the relationship between BoCCS total and CH was shown to be sufficiently powered (>.80).

Table 4.9 Correlations between BoCCS and BCS in Study 2

N=27	BC	MA	CH	BK	BoCCS Total
BCS	*-.65***	.25	*.13*	.78***	.73***
Defusion (BCS)	*.68***	-.09	*.10*	-.67***	-.54**
Common Humanity (BCS)	*-.06*	*.25*	*.56***	*.19*	*.41**
Acceptance (BCS)	*-.72***	.29	*-.10*	.87***	.66***

*Note: *p = .05, **p = .01, ***p < .001; BC = Body Criticism, MA = Motivated Action, CH = Common Humanity, BK = Body Kindness. BCS = Body Compassion Scale (Altman et al., 2017). Results in italics indicate Spearman's used due to non-normally distributed data.*

CONCLUSIONS OF STUDY 2

Study 2 demonstrates preliminary findings that spontaneous expressions of body compassion are consistent with BoCCS scores for body kindness and criticism. However, they are less consistent for common humanity and motivated action. This is likely due to the differences in distribution of scores for these between BoCCS and spontaneously expressed body compassion, which appear to suggest that motivated action and common humanity are harder to spontaneously express in writing or harder to identify in written texts than they are in self-report. It must be considered that this may be due to the lower sample size, and as such future research should examine body compassionate writing ratings and scores of the BoCCS in more detail in a higher sample size. However, the results examining the relationships between the BoCCS and the BCS showed sufficient power in most cases. Power in the relationships between the body compassionate writing ratings was shown to be sufficient for body criticism and kindness and moderate for body compassion overall. Study 2 also demonstrates that the BCS is significantly correlated with the BoCCS in terms of total score and subscale scores. However, motivated action appears to not be associated with BCS or any of its subscales. Since

motivated action reflects the second psychology of self-compassion, this may suggest that the BoCCS has identified an important aspect of self-compassion that has been missed by the BCS. Again, this should be examined further in more extensive research.

4.6 STUDY 3 –LINGUISTIC ANALYSIS OF BODY IMAGE WRITING

It is predicted that when asked to write about body image, individuals with higher body compassion will express more positive emotions and less negative emotions than those with low body compassion (more body criticism). The aims of Study 3 were to examine the linguistic content of body image writing and the association with body compassion.

METHOD

PARTICIPANTS

Participants consisted of 45 female psychology students participating for course credit. Their ages ranged from 18-62 (M = 27.87, SD = 13.44). Participants were predominantly white British (66.70%), and single (35.60%) or had a partner (33.30%).

MEASURES

The 38-item BoCCS was used to measure body compassion as in studies 1 and 2. To stimulate writing about body image, participants completed a structured open-ended questionnaire developed by the YWCA Social Action and Advocacy Committee of the Waterloo Region (see Appendix D). Questions asked participants to write about what self-esteem is, what body image is, how they might be related, to consider what factors influence body image and what they might change about themselves. Responses were typed up and analysed using the Linguistic Inquiry and Word Count (LIWC: Pennebaker, Booth, & Francis, 2007). The LIWC counts words and assigns them to various psychological processes including emotional, cognitive and social words and represents the use of these words as a percentage of the whole text. In the present study, only words relating to positive and negative emotions were examined: the LIWC includes categories of positive affect, anger, anxiety and sadness.

PROCEDURE

Following ethical approval for the study, participants were recruited from the University of Hertfordshire, participants signed up to complete the study for course credit. Participants were informed briefly about the outline of the study before signing up. They were then reminded of the nature of the study in more detail by an information sheet, and then were asked to complete a consent form once it was confirmed they fully understood the study. Participants then completed all questionnaires consecutively. The researchers were in the presence of participants at all times. Once all the forms were completed, participants were thanked, given a debrief sheet and a list of support resources should they need them.

DATA ANALYSIS

As described above participants' written texts were analysed using the LIWC, this was then converted into SPSS 24 (SPSS Inc., Chicago, IL, USA) along with the rest of the data from the questionnaires. Missing data were excluded pairwise and analysis by analysis.

RESULTS

The descriptive statistics and correlations for each variable are shown in Table 4.10. BoCCS total score and body kindness were significantly negatively correlated with the use of negative emotion overall, and sadness words, in particular, in writing about body image. Conversely, body criticism was positively correlated with the use of sadness words. Sufficient power for the relationships between negative affect words and BK and between sadness words and BK was shown to be good (>.80). For the relationships between negative affect and BoCCS and sadness words and BoCCS a moderate power was shown (>.70). The relationship between BC and sadness words was shown to be under-powered (<.50).

Table 4.10 Descriptive statistics and intercorrelations between BoCCS and validating measures in Study 3

Variable (N = 45)	Mean (SD)	Correlations				
		BoCCS	BK	CH	MA	BC
BoCCS total	128.50 (14.72)					
BK	2.80 (.69)					
CH	4.00 (.55)					
MA	3.41 (.62)					
BC	2.61 (.83)					
LIWC variables						
Positive Affect	6.81 (2.24)	.08	.12	-.13	.07	-.13
Negative Affect	1.44 (.77)	-.46**	-.44**	-.13	-.14	.25
Anxiety	.43 (.44)	-.06	.08	-.19	-.08	-.01
Sadness	.47 (.51)	-.37*	-.47**	.17	-.14	.34*
Anger	.25 (.42)	-.24	-.21	-.17	-.01	.08

*Note: *p = .05, **p = .01, ***p < .001, [1]p < .10. BK = body kindness, CH = common humanity, MA = motivated action, BC = body criticism. LIWC = Linguistic Inquiry Word Count (Pennebaker et al., 2015).*

CONCLUSIONS OF STUDY 3

Study 3 shows that, in writing about body image, people with higher levels of body compassion use fewer negative emotion words overall and, in particular, fewer sadness words. In terms of its subscales, people with higher levels of body kindness use fewer negative emotion words overall, and fewer sadness words in particular, while people with higher levels of body criticism use more sadness words. Conclusions drawn are limited by the smaller sample size, however the results for body kindness were shown to be sufficiently powered with moderate power shown for the BoCCS total score results.

4.7 DISCUSSION

The studies presented in this chapter describe the development and validation of a new measure of body compassion, the BoCCS. In order to confirm the contextual validity of the

BoCCS, it also aimed to demonstrate the usefulness of this measure in a range of health-related contexts including disordered eating/body image, physical activity motivation and in disability.

FINDINGS

Study 1 indicated that the BoCCS is a bi-factor model whereby researchers can use the total BoCCS score and/or its four subscales: body kindness, common humanity, motivated action and body criticism. The scales have good internal consistency and test-retest reliability. Across the studies reported, the BoCCS has demonstrable concurrent validity in terms of its associations with measures of eating pathology and body avoidance behaviour and construct validity in terms of its association with measures such as self-compassion, body pride and shame, mood and emotions. It also has good content validity since items were generated by participants writing about body image with self-compassion, and since items were reviewed and screened by four researchers/clinicians experienced in self-compassion research. It also demonstrated cross-validity with expert ratings of spontaneous written expression of body compassion, in particular for body kindness and body criticism. Study 2 also showed the validity in terms of associations with spontaneous expressions of body compassion and the associations with the BCS (Altman et al, 2017). Study 3 showed that body compassion was negatively associated with negative affect, especially sadness, in writing about body image.

This study details elements of the nomological network of the BoCCS including the associations with the constructs of body pride and shame and self-compassion as well as with mood. These were largely shown to be as expected with positive associations between body compassion and self-compassion as well as with the positive subscales of self-kindness, common humanity and mindfulness, while negative associations were shown for judgement, isolation and over-identification. Similarly, body compassion was shown to be negatively associated with body shame (i.e. greater body compassion is associated with less shame and more pride in one's body). However, associations with the subscales of the BoCCS and these variables, in particular with the subscales of common humanity and (though to a lesser extent) motivated action, were less clear cut and somewhat contrary to predictions.

This initial exploration of the construct validity of the BoCCS tells us that it is strongly associated with self-compassion. This is backed-up by the strong associations with the theory

of self-compassion (Neff, 2003a, 2003b), with items based on expressive writing from a self-compassionate perspective from the three components of self-compassion: self-kindness, common humanity and mindfulness. The components of the BoCCS also show strong theoretical associations with elements of self-compassion related to acceptance, emotional responses, sensitivity to suffering, mindful awareness, common humanity, criticism and judgement (C. Germer & Neff, 2019; Gilbert, 2017b; Neff, 2003a, 2003b; Neff & Knox, 2017) as well as with the first and second psychologies of compassion (Gilbert, 2017b) and with the components detailed in the BCS (Altman et al., 2017). These studies also show that the BoCCS is strongly associated with body pride and shame and may indicate the potential for body compassion to activate in response to body shame to help reduce feelings of criticism, isolation and judgement in favour of compassion. This may lead to more healthy wellbeing in terms of mood (also shown to be strongly associated with body compassion in study 1) and with eating and body image avoidance behaviours.

STRENGTHS AND LIMITATIONS

The studies reported here identified a theoretically and psychometrically sound measure of body compassion that is superior to existing measures and applicable to a range of outcomes and contexts. Items were generated by participants writing compassionately about their body image which also makes it likely that items in the BoCCS are worded to reflect the actual experience of body self-compassion. Validity was demonstrated through a range of measures and methods including both self-report as well as behavioural, for example relating body compassion scales to objective ratings of spontaneous expressions of body compassion and to the use of emotion words identified by computerised text analysis in expressive writing tasks. Nevertheless, the research is not without limitations.

Both EFA and CFA demonstrated the factor structure of the BoCCS, though further evaluation in more diverse samples is warranted. The lack of strong correlations between certain aspects of the BoCCS should also be considered. Though this did vary between studies, there were consistently lower correlations for common humanity and motivated action than for body kindness and body criticism. In particular, scores on the common humanity subscale were not strongly related to ratings of spontaneous expressions of common humanity in written texts. Although the items for all subscales originated from people writing compassionately about

body image, the relatively high scores on common humanity in the questionnaire may indicate the relative superficiality of this subscale. Specifically, participants readily endorsed items on the common humanity subscale of the BoCCS but did not generally express such attitudes spontaneously in their writing. While it may be possible for future research to improve the items on this subscale, it may simply be that a self-report measure is not a good way to differentiate some attitudes if they have become glib truisms (e.g. people generally acknowledging that everyone feels the same way without fully internalising this observation as an aspect of self-compassion). It may also be that there is more variation among participants in terms of the common humanity subscale such as due to cultural or ethnicity, gender or age. Nevertheless, other subscales and the overall BoCCS showed excellent validity. Indeed, that motivated action was not associated with subscales of an existing measure of body compassion (the BCS) but did contribute to the overall score of the measure developed here (the BoCCS), suggests that the BoCCS includes self-compassionate processes, specifically the second psychology, that are not included in the BCS.

Another key issue with studies 2 and 3 is the limited sample sizes. As described in more detail earlier, most associations in studies 2 and 3 had sufficient or moderate power, particularly for body kindness and the Total BoCCS score. However, results involving common humanity were generally underpowered. Nevertheless, these studies are indicative of the scale's validity and add interesting preliminary findings which future research can elaborate on and explore further. Further evaluation of the BoCCS is also needed in more specific groups, such as in clinical settings, and with more diverse samples and the longitudinal effects of the BoCCS might usefully be considered in order to determine its causal association (if any) with various health-related outcomes.

IMPLICATIONS

Future research can benefit from the addition of a compassion rather than MAB-based measure for body compassion that includes components from Gilbert's (2009, 2010, 2017b), Jazaieri et al.'s (2013) and Neff's (2003a, 2003b) compassion and self-compassion definitions. Future research should seek to develop this measure further by testing it in additional groups as detailed above and exploring its relations to health-related behaviours (e.g. physical activity), wellbeing and body image as well as with clinical and non-clinical groups.

The BoCCS brings together research from compassion (Gilbert, 2017b), self-compassion (Neff, 2003a) and body-related emotion, distress and feelings. Body compassion has been suggested to explain the relationship between self-compassion and body image threats (Tylka & Wood-Barcalow, 2015) and emerges in interviews when individuals discuss their bodies (Clancy, 2010; B. Smith, 2013). It is anticipated that the addition of a compassion-informed measure of body compassion might help to facilitate research into relevant domains such as the role of body shame in eating disorders (Troop & Redshaw, 2012), depression (Andrews, 1997) and caloric intake (Troop, 2016) as well as the links between body image in relationship satisfaction (Willis, Palermo, & Burke, 2011), disability (Farhat-ul-Ain & Fatima, 2016), physical activity and well-being.

It will be important to develop models of the role of body compassion in health outcomes and, in testing these, the degree to which body compassion is a construct which is useful over and above general self-compassion is an empirical question. Nevertheless, with an increasing range of interventions being developed to increase self-compassion in relation to body image and eating disorders, the BoCCS may be an important tool to evaluate outcomes.

CONCLUSION

The BoCCS has been shown to be a valid and reliable measure of body compassion. It is hoped that the development of this measure will encourage additional research into body compassion and facilitate investigations into the relationships between compassion and wellbeing.

In the following chapters the BoCCS is used to predict physical activity motivation and behaviour to help inform on how a body compassionate intervention may aid in improving these outcomes.

CHAPTER 5 MODELS TO PREDICT SELF-DETERMINED MOTIVATION FOR PHYSICAL ACTIVITY

The literature relevant to this chapter is described in Chapters 1-3, so here only a brief summary of the key evidence is provided in order to give a rationale for the study. Despite the obvious benefits, many do not engage in sufficient physical activity, even though for many the barriers to engagement would be reduced by them doing physical activity (e.g. weight concerns, body image, health). Body-related concerns including health (e.g. Markland & Ingledew, 2007), function (e.g. Abbott & Barber, 2011), appearance, shape and weight (e.g. Allender et al., 2006; Chang, Nitzke, Guilford, Adair, & Hazard, 2008) have been suggested as barriers or reasons why individuals do not engage in physical activity (see Chapter 2 for a review). Additionally, physical activity engagement has been shown to improve body image, therefore by not engaging, individuals might enter a vicious cycle of having poor body image and so not participating in exercise, and not participating having an impact on their body image. There have been a number of suggestions of the mechanisms through which body image might affect physical activity, and it does appear that it differs depending on a number of factors, such as culture, ethnicity, age, gender and disability. However, motivation for physical activity and self-regulation in exercise have been associated consistently with both body image and physical activity participation (e.g. Markland, 2009; Markland & Ingledew, 2007).

Self-Determination Theory (SDT; Deci & Ryan, 1985) has been used to explain motivation towards physical activity (Teixeira et al., 2012) and other health behaviours (e.g. eating behaviour; Verstuyf, Patrick, Vansteenkiste, & Teixeira, 2012). As described in Chapter 3, a sub-theory of SDT, the Organismic Integration Theory (OIT) describes motivation on a continuum from non-self-determined forms of motivation through to completely self-determined. Highly self-determined motivation is shown when internally driven and behaviour is engaged in willingly and is seen as a choice. By contrast low self-determination or non-self-determination is externally driven and behaviour is only engaged in when pressure is experienced either from oneself or others. This includes six main regulation styles (Deci & Ryan, 1985, 2002a): *amotivation* (complete lack of intention), *external* (external demands from society, peers, family, superiors etc.), *introjected* (to avoid guilt or shame or protect self-worth), *identified* (importance of outcomes e.g. health or weight), *integrated* (valued outcome

in line with core beliefs and values) and *intrinsic* regulation (inherent enjoyment or interest). *Intrinsic* and *identified* regulation have been shown to predict more adaptive behaviours, while *introjected* regulation has been associated with adaptive and maladaptive behaviours due to its association with guilt and shame (Thøgersen-Ntoumani & Ntoumanis, 2007).

Autonomous or self-determined regulation has been shown to be predicted by BMI (in males) and body image discrepancy (in females) (Ingledew & Sullivan, 2002; Markland & Ingledew, 2007), while less autonomous regulation mediated the relationship between body image discrepancy and physical activity behaviour (Markland, 2009). Weight discrepancy has also been associated with self-conscious emotions such as shame, guilt and pride in one's body (Brunet et al., 2012), which in turn have been associated with self-determined motives for physical activity (Castonguay et al., 2014; Mack et al., 2015; Sabiston et al., 2010). In addition behavioural regulation has been shown to be predicted by self-compassion (Lowry & Waller, 2018; Magnus et al., 2010; Semenchuk et al., 2018), which has also been strongly associated with body image concerns (Braun et al., 2016; Slater et al., 2017; Wasylkiw et al., 2012), as well as with body shame (Albertson et al., 2014; Breines, Toole, Tu, & Chen, 2014; C. Ferreira et al., 2013; Moffitt et al., 2018).

It has been suggested that criticism or hostility from oneself or others leads to activation of an evolved threat system which creates feelings of anxiety, anger or shame, leading to self-protective or maladaptive behaviours (Gilbert, 2014, 2017a; A. C. Kelly et al., 2014). By contrast compassion and kindness activate the soothing system which reduces one's threat sensitivity. Compassion, criticism and shame have been associated with health behaviours such as eating and exercise behaviour, whereby shame predicts eating disorders (e.g. Burney & Irwin, 2000), and eating disturbance in those with a history of eating disorders (Troop et al., 2008). It has been suggested that shame may motivate someone to deny or avoid a situation that triggers it, for example avoiding going to the gym because of shame over one's physique (Sabiston et al., 2010).

Body compassion can be described as compassion directed to one's own body. It incorporates elements of kindness, common humanity and mindful awareness, as well as elements of sensitivity to body-related distress, pain and suffering as well as the motivation and ability to combat this (see Chapter 4).

5.1 STUDY 4

Due to the association between body compassion, body pride and shame and suggested in Chapter 4, as well as the previous research described above; the roles of current and anticipated body pride and shame and body compassion in predicting behavioural regulation in exercise, and of pride and shame and behavioural regulation in predicting exercise behaviour were assessed in the present study.

The aim was to create models for the six styles of behavioural regulation in exercise: *amotivation, external, introjected, integrated, identified* and *intrinsic* regulation. Body compassion, BMI (and the interaction between these) and gender acted as predictor variables, current and anticipated bodily pride and shame acted as mediators of these predictors on each behavioural regulation.

5.2 METHOD

PARTICIPANTS

In this study (4) there were 310 participants, with 237 females and 73 males. Participants were a subset of the sample used in study 1, including participants that had completed the relevant physical activity motivation questionnaires. Participants were aged between 16 and 76 (M = 30.11, SD = 13.12) with BMI ranging from 14.77 to 66.56 (M = 24.80, SD = 5.93). The majority of participants were White (N = 232), with 37 Asian, 13 Black, 9 Mixed Race and 14 'Other', and the majority were also single (N = 124), with 70 married/civil partnership, 9 divorced, 38 cohabiting, 67 in relationships and 2 widowed. Most were also in education (N = 138), with 96 in professional, 29 in admin/secretarial, 13 in managerial work, 11 unemployed, 11 self-employed and 12 at home (e.g. with children).

MATERIALS

BODY COMPASSION

The Body Compassion and Criticism Scale (BoCCS; Chapter 4) was used to measure Body Compassion. This is a 38-item questionnaire covering 4 aspects of Body Compassion:

Kindness, Common Humanity, Motivated Action and Body Criticism. It has been shown to be reliable in both subscale and total score form, though here only the total score will be used.

BODILY PRIDE AND SHAME

The Body Pride and Shame Scale (BPS; Troop, 2016) is a 30-item questionnaire measuring behavioural, affective and attitudinal aspects of pride and shame. The degree to which these are experienced (or anticipated) in relation to current weight, imagined weight gain and imagined weight loss gives three subscales BPS-Current, BPS-Gain and BPS-Loss. The 10 items for each of these 3 subscales are identical except for the temporal perspectives. Items are scored on 10-point Likert scales where 1 = "not at all true of me" and 10 = "completely true of me"; high scores indicate more (current or anticipated) shame and low scores indicate more (current or anticipated) pride.

BEHAVIOURAL REGULATION IN EXERCISE

The Behavioural Regulation in Exercise Questionnaire 3 (BREQ-3; Markland & Tobin, 2004; Wilson, Rodgers, Loitz, & Scime, 2006) was used to measure self-determined motivation for exercise. It has 6 subscales measuring each of the regulation styles: *amotivation, external, introjected, integrated, identified* and *intrinsic* regulation.

PROCEDURE

Data were collected online through the survey engine Qualtrics. Participants were given basic information on the aims of the surveys and asked to give their consent to take part. They were then taken through each of the questionnaires listed above as well as asked to give their age, gender, ethnicity, job role, education level, height and weight and marital status. The procedure took approximately 30 minutes to complete and then participants were debriefed.

DATA ANALYSIS

Data were analysed initially using SPSS 25 (SPSS Inc., Chicago, IL, USA), in order to calculate descriptive statistics and to remove participants who had not completed the outcome measures (BREQ-3). In addition, an interaction term between BMI and the BoCCS was computed such that the moderating effect of the BoCCS could be assessed.

For the model testing Amos 24 (SPSS Inc., Chicago, IL, USA) was used. For the fit indices the chi-square (P. Barrett, 2007) and chi-square/df (Steiger, 2007; Wheaton, Muthen, Alwin, & Summers, 1977) will be considered with non-significant (α=.05) values of the former and values approaching 2.0 (Tabachnick & Fidell, 2007) or as high as 5.0 (Wheaton et al., 1977) indicating good fit. In addition to this the RMSEA with a cut-off of .06 (Hu & Bentler, 1999) as well as the Goodness of Fit Index (GFI), Comparative Fit Index (CFI) and Normed-Fit Index (NFI) with values approaching 1.00 were also considered (Bentler, 1990; Bentler & Bonett, 1980; Bollen, 1989; Byrne, 2001; Hu & Bentler, 1999).

The hypothesised models to be tested are based on the reviews of body image and physical activity, body pride and shame, SDT and compassion in Chapters 2 and 3. Specifically, body compassion (BoCCS), BMI and the interaction between these (BoCCS x BMI) as well as gender acted as independent variables, Body Pride and Shame variables (BPS-current, BPS-gain and BPS-loss) acted as mediators and the 6 outcome measures were the behavioural regulation styles (*Amotivation*, *External*, *Introjected*, *Identified, Integrated* and *Intrinsic*). Models were trimmed to eliminate non-significant paths (to a significance value of .10) with the exception of when a path is necessary to explain an interaction. Figure 5.1 shows a modified version of the model from Chapter 3, showing the areas that will be considered here.

Correction for multiplicity was applied using the false discovery rate (FDR) approach with the Benjamini-Hochberg procedure (Benjamini & Hochberg, 1995; Cribbie, 2007). FDR procedures have been shown to be a good compromise between no multiplicity control and stricter familywise error control while providing a good probability of the correct inferences in the model being made (Cribbie, 2007). In figures 5.2-5.7, an * is used to indicate significance after the correction is applied.

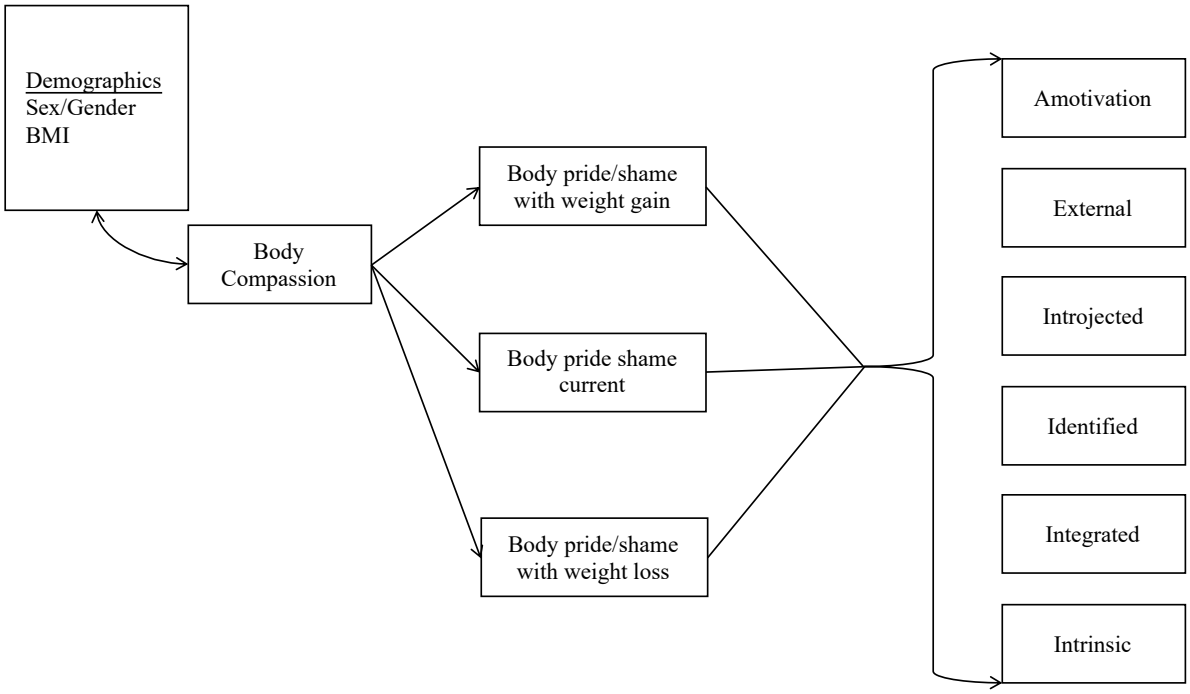

Figure 5.1 Modified model from Chapter 3 showing the variables to be considered in this chapter

5.3 RESULTS

Table 5.1 shows the means and standard deviations for the predictor measures and the behavioural regulation. Table 5.2 shows the fit indices for each model that will be described in detail below.

Table 5.1 Means and standard deviation of predictor and outcome measures

Variable	Mean	SD
Body Pride and Shame - Current	5.24	2.03
Body Pride and Shame - Gain	7.14	2.05
Body Pride and Shame - Loss	4.29	2.03
Amotivation	.50	.78
External	.80	.99
Introjected	2.18	1.12
Identified	2.91	1.03
Integrated	2.30	1.34
Intrinsic	2.59	1.26
Body Compassion and Criticism Scale Total	129.60	20.25

Table 5.2 Fit indices for each model predicting behavioural regulation

Fit Indices	Amotivation	External	Introjected	Identified	Integrated	Intrinsic
χ^2	9.11	8.65	5.62	5.36	8.08	7.77
df	6	6	5	5	6	6
χ2 p	.17	.19	.35	.37	.23	.26
χ2/df	1.52	1.44	1.13	1.07	1.35	1.29
CFI	.993	.994	.999	.999	.996	.996
NFI	.983	.982	.989	.989	.984	.985
GFI	.993	.992	.995	.995	.994	.994
RMSEA	.041	.038	.020	.015	.033	.031
RMSEA p	.55	.60	.71	.73	.63	.66

AMOTIVATION

The final model predicting *amotivation* is shown in Figure 5.2. This model explained 10.9% of variance in *amotivation* as well as 26.8% in BPS-gain, 50.1% in BPS-current and 7.3% in BPS-loss (same in *introjected*, *identified*, *integrated* and *intrinsic* regulations). As seen in Table 5.2 this model was shown to have good fit. This model suggests that for *amotivation*, increased BPS-current is associated with greater *amotivation*, while increased BPS-gain is associated with less *amotivation*. In other words, more current shame and pride associated with weight gain were both associated with greater *amotivation* for exercise. In addition, there was a significant direct interaction effect of BoCCS and BMI on *amotivation*, however the direct effects of BMI or BoCCS were not significant. As expected, it appears that BPS-current and gain act as mediators in the relationship between BoCCS and *amotivation* for exercise. There was a significant negative effect of BoCCS on BPS-current and -gain, indicating that higher body compassion is associated with less shame and more pride both currently and in anticipation of weight gain, which in turn effect *amotivation* as described above.

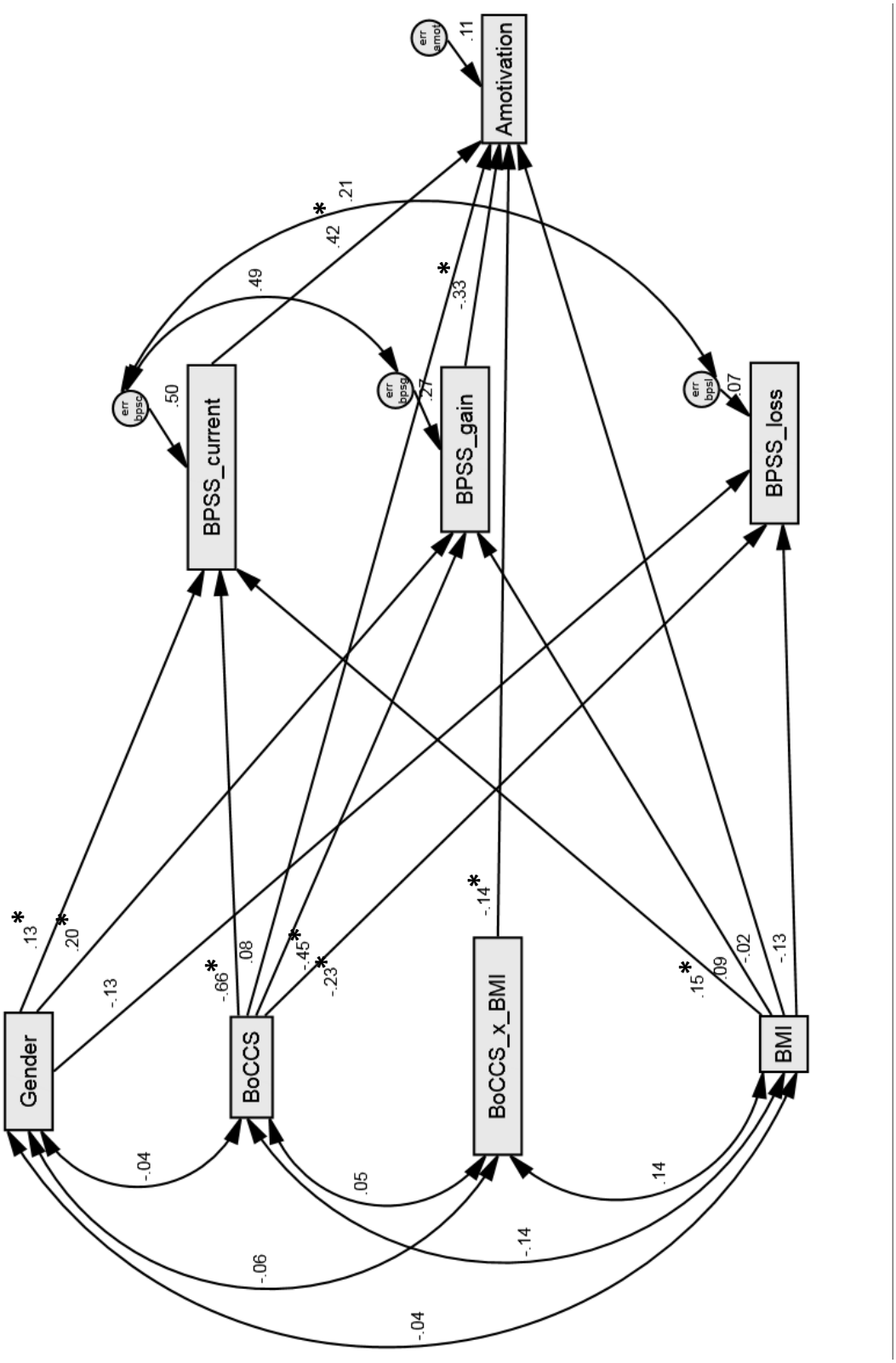

Figure 5.2 Path analysis of the model to predict amotivation.

*Note: *indicates significant path after correcting for multiplicity.*

The final model predicting *external* regulation is shown in Figure 5.3. This model explained 6.2% of variance in *external* regulation. As shown in Table 5.2 this model was also shown to have good fit. In addition, 49.6% of variance in BPS-current, 26.0% in BPS-gain and 7.3% in BPS-loss was explained.

This model suggests that for *external*, higher BPS-current is associated with more *external* regulation for exercise, while anticipated BPS with either weight loss or gain are not associated with *external* regulation. There is also a direct positive effect of BMI on *external* regulation, such that a greater BMI predicts more *external* regulation. So current shame with one's body and a higher BMI are associated with greater *external* regulation. As expected, it appears that BPS acts as a mediator between BoCCS and *external* regulation, whereby more BoCCS is associated with more BPS-current, which is associated with *external* regulation, but only with current BPS. BPS-current also acts as a partial mediator between BMI and *external* regulation, such that there is a direct positive effect of BMI on *external* plus a positive effect of BMI on BPS-current which in turn is positively associated with *external* regulation.

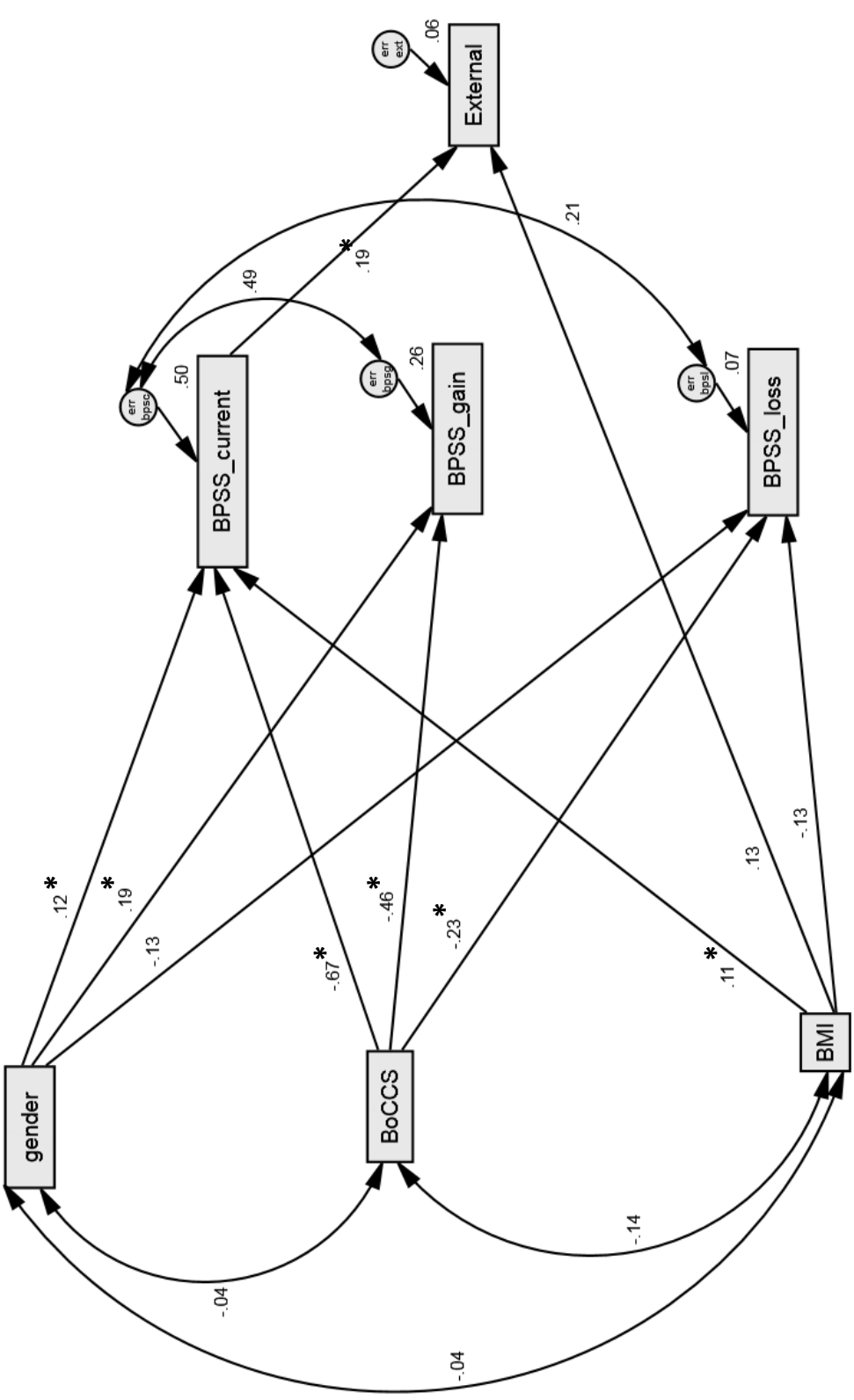

Figure 5.3 Path analysis of the model to predict external regulation.

*Note: *indicates significant path after correcting for multiplicity.*

The final model predicting *introjected* regulation is shown in Figure 5.4. This model explained 14.6% variance in *introjected* regulation. As shown in Table 5.2 this was shown to have good fit.

This model suggests that BPS-gain is positively associated with *introjected* regulation, i.e. that greater shame associated with weight gain is associated with more *introjected* regulation (a regulation style commonly associated with self-esteem and self-worth). In addition, BPS-gain acted as a partial mediator between BoCCS and *introjected* regulation, whereby increased BoCCS was associated with more BPS-gain which is associated with greater *introjected* regulation, but also a direct association between BoCCS and *introjected* regulation was present (p=.05).

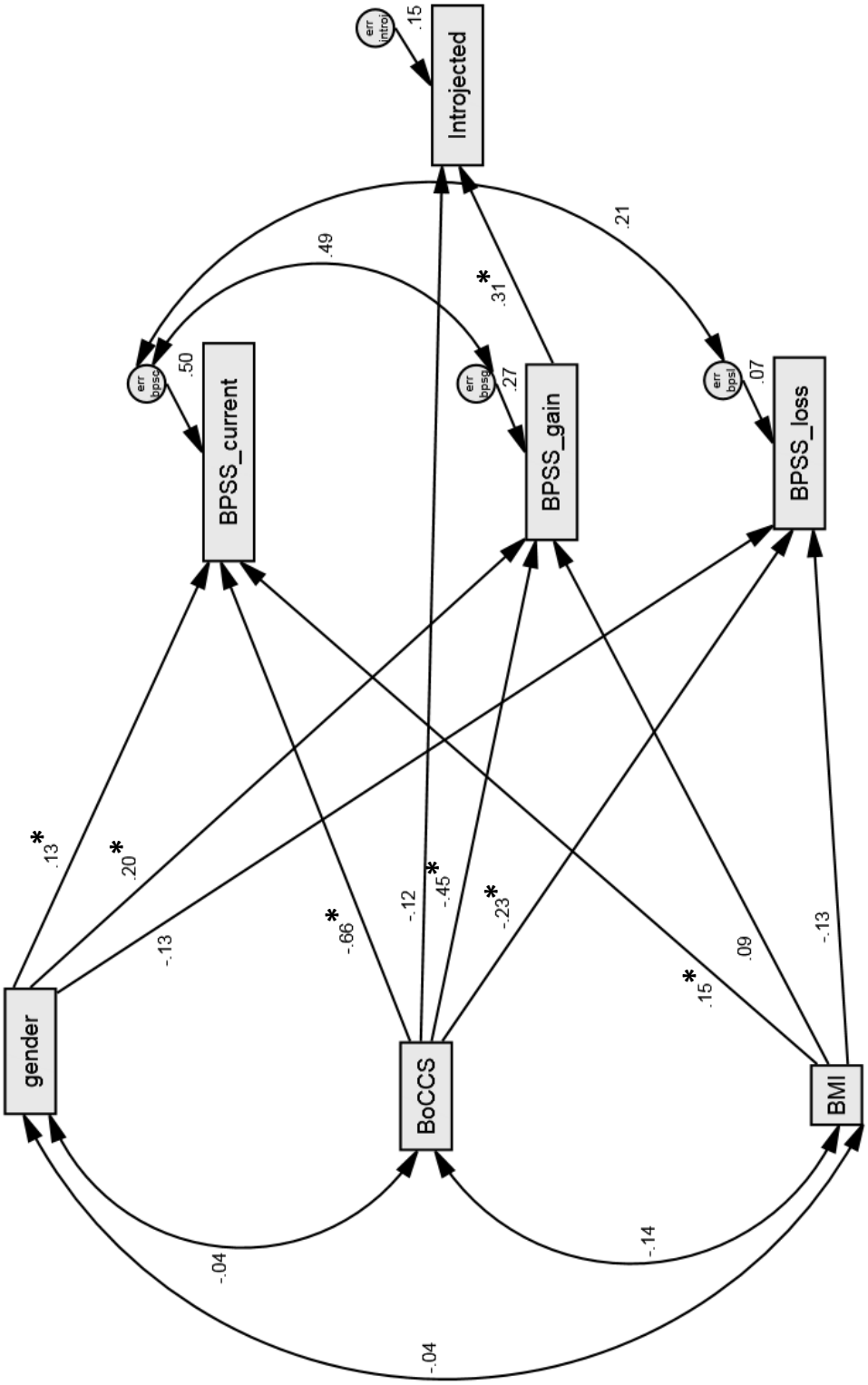

Figure 5.4 Path analysis of the model to predict introjected regulation.

*Note: *indicates significant path after correcting for multiplicity.*

For *identified* regulation (see Figure 5.5), the final model explained 10.7% of variance in *identified* regulation for exercise. As seen in Table 5.2 this model had good fit.

This model suggested that BPS-current was negatively associated, and BPS-gain positively associated with *identified* regulation for exercise. In other words, for *identified* regulation greater pride in one's current body and more shame associated with weight gain is associated with more *identified* regulation. Again, BPS-current and BPS-gain acted as mediators in the relationship between BoCCS and *identified* regulation. This is the opposite direction to that described for *amotivation*, demonstrating a shift in the motivation styles from externally to more internally regulated.

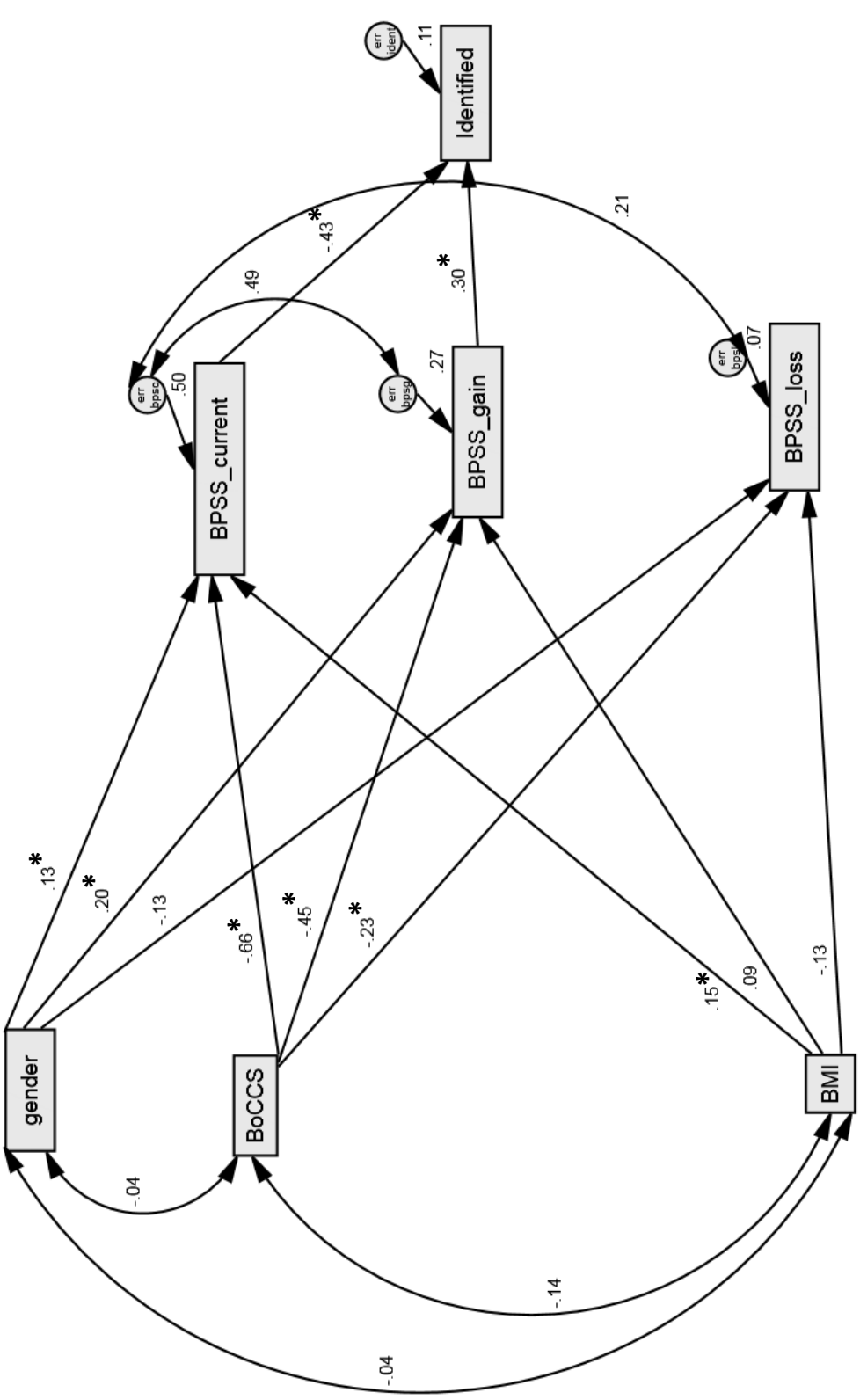

Figure 5.5 Path analysis of the model to predict identified regulation.

*Note: *indicates significant path after correcting for multiplicity.*

With *integrated* regulation (see Figure 5.6) the model explained 15.0% variance and as seen in Table 5.2 was shown to be a good fit.

This model also demonstrated a positive association from BPS-gain to *integrated* regulation and a negative association from BPS-current. Similarly, this suggests that greater pride in one's current body and shame if one were to gain weight are associated with more *integrated* regulation. However as in *amotivation* there was also a significant interaction effect between BoCCS and BMI on *integrated* regulation, this time a negative association. However again there was no significant direct effects of BMI or BoCCS on *integrated* regulation.

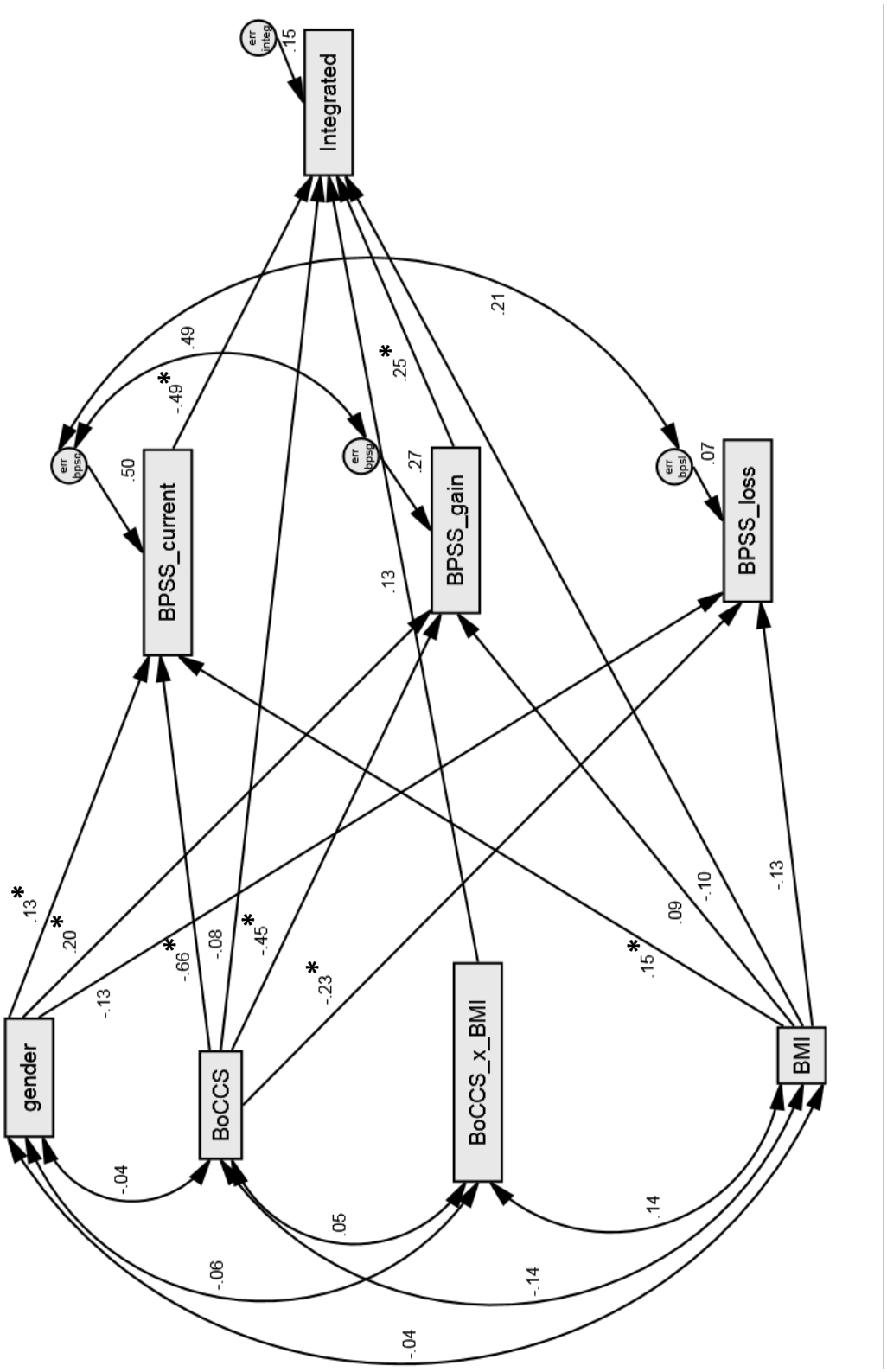

Figure 5.6 Path analysis of the model to predict integrated regulation.

*Note: *indicates significant path after correcting for multiplicity.*

Finally, for *intrinsic* regulation (see Figure 5.7), the final model explained 18.5% of variance. The associations from BPS-gain and BPS-current were the same as in *integrated* and *identified* regulation and there was also a significant interaction effect as in *integrated* regulation.

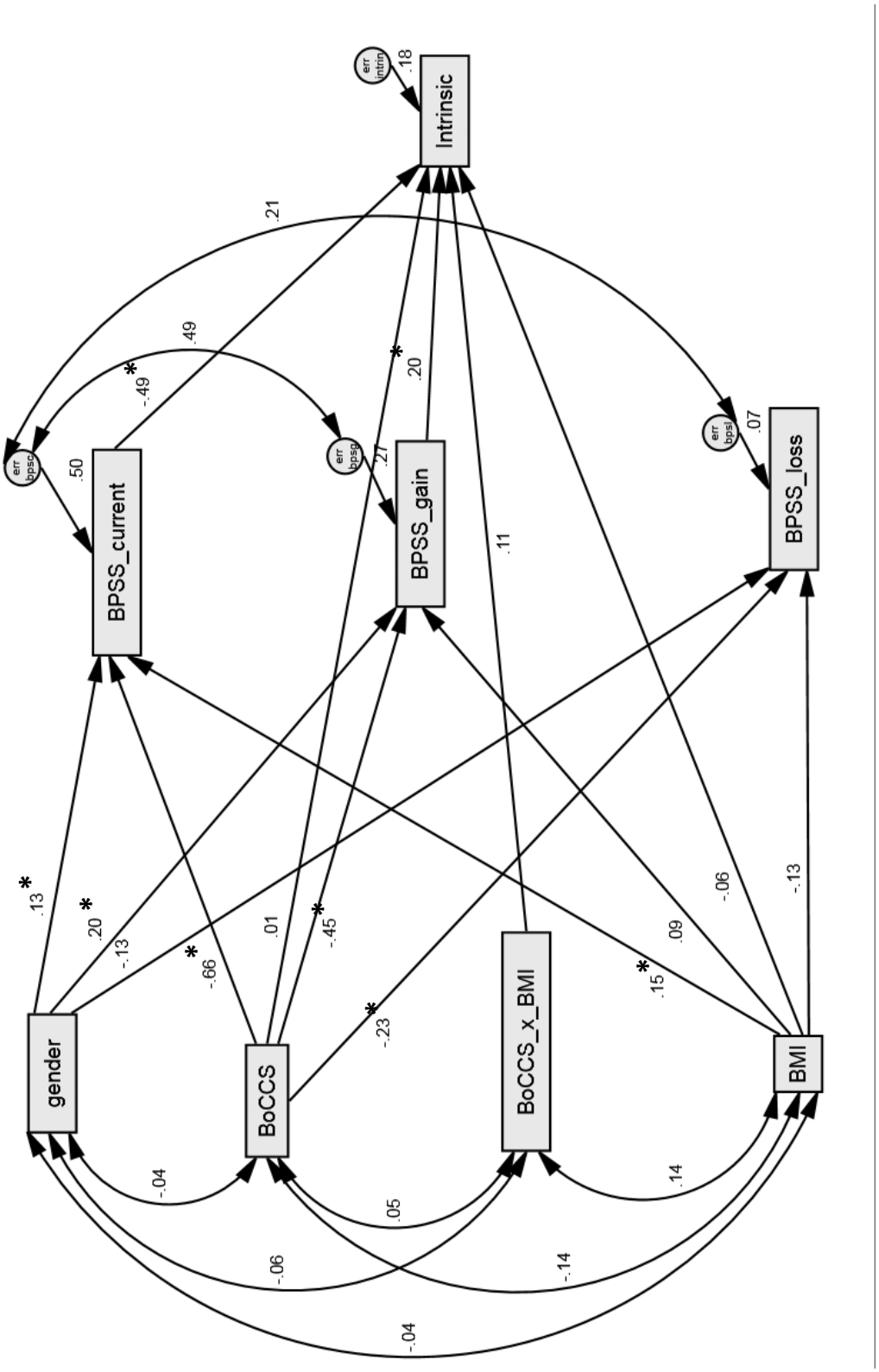

Figure 5.7 Path analysis of the model to predict intrinsic regulation.

*Note: *indicates significant path after correcting for multiplicity.*

Taken together these models suggest that current body pride and anticipation of shame with weight gain are associated with higher levels of more internally driven regulation styles (*identified*, *integrated* and *intrinsic*), while for *amotivation*, this is reversed with increased current shame and anticipated pride with weight gain being associated with increased *amotivation*. For *external* regulation it was only current body shame and BMI that had a significant effect, while for *introjected* regulation only anticipated shame with weight gain was associated, plus a direct association between BoCCS and *introjected* regulation.

5.4 DISCUSSION

FINDINGS

The predictions were largely confirmed although there were some unexpected results. It was discovered that current body shame and anticipated body pride associated with weight gain were significant predictors of *amotivation*, while current body pride and anticipate body shame associated with weight gain were significant predictors of *identified, integrated* and *intrinsic* regulation. For *external* regulation only current body shame was a significant predictor and for *introjected* regulation only anticipated shame with weight gain was significant. For body compassion there was also a significant negative direct effect on *introjected* regulation, while BMI had a positive direct effect on *external* regulation. For the most part however body pride and shame acted as perfect mediators between body compassion (and BMI) and the behavioural regulation styles.

This is largely in line with what would be predicted based on the literature on body pride and shame and compassion as well as the literature suggesting a link with behavioural regulation in exercise.

Introjected regulation is associated with a desire to avoid guilt or shame and there has been a suggestion that this may be detrimental to one's wellbeing when related to exercise or eating habits (Verstuyf et al., 2012). For this reason, it is perhaps not surprising that there was a positive effect of body shame associated with weight gain on *introjected* regulation. Nor is it surprising that there was a negative association between body compassion and *introjected* regulation (i.e. increased criticism associated with greater *introjected* regulation).

External regulation is associated with reward and punishment, so an association with BMI whereby increased BMI predicts increased *external* regulation is again to be expected, as the rewards for engaging (e.g. weight loss) and the punishments for not (e.g. weight gain/stability) might motivate these individuals.

Gender was shown to have a significant effect on body pride and shame, which is in line with previous findings that show that females are more likely to experience body shame than males (Grabe, Hyde, & Lindberg, 2007; McKinley, 1998).

STRENGTHS AND LIMITATIONS

The gender imbalance in favour of females, despite the large sample size, may be a limitation as the effects of gender on body compassion, body pride and shame and behavioural regulation may not be fully clear. Future research might aim to further examine the effects of gender on current and anticipated pride and shame. Not least due to the differences in current body pride and shame and anticipated body pride and shame associated with weight gain compared to weight loss. In the present study there were no differences found for males and females in any regulation style, however gender may still affect the relationship between these regulation styles and behaviour.

Self-reported BMI may have been inaccurate as previous research has shown that participants tend to overestimate when they are in the lower end of the BMI scale and underestimate at the higher end (Stommel & Schoenborn, 2009). This has also shown variation with age, gender and ethnic/racial background (Stommel & Schoenborn, 2009). In addition there are more general issues with BMI as a useful measure of obesity and fatness, where measures of percentage body fat or waist circumference might be more useful (Cawley & Burkhauser, 2006), especially as body fat accumulation and waist circumference can be a better indicators of health and social issues associated with obesity (Cawley & Burkhauser, 2006; Nuttall, 2015). Future research might take these more direct measurements to better see the effect of them on body pride and shame, body compassion and behavioural regulation in exercise.

These studies are the first to demonstrate the association between body compassion and body pride and shame, as well as the linking these into previous findings of the association between bodily pride and shame and behavioural regulation (e.g. Sabiston et al., 2010). This study supports previous literature suggesting an association between compassion/self-compassion and shame (e.g. Gilbert, 2017a; Neff, 2003a) as well as associations between body pride and shame and physical activity motivation (e.g. Sabiston et al., 2010).

It is suggested from the previous literature as well as the present study that body compassion affects current pride and shame as well anticipated pride and shame associated with weight loss and weight gain. It is also suggested that current and anticipated pride and shame with weight gain affect behavioural regulation styles, in particular the more self-determined forms of behaviour regulation (*introjected, identified, integrated* and *intrinsic*).

These studies open up opportunities to research interventions that target body compassion and body pride and shame to help people towards becoming more self-determined in their behavioural regulation to exercise. Based on the models discussed here it is predicted that more body compassionate individuals are likely to have lower *introjected* regulation, more pride (and therefore less shame) associated with one's current body and in anticipation of future weight gain or loss. This in turn may increase more autonomous, self-determined forms of regulation such as *integrated* and *intrinsic* regulation which may in turn increase one's physical activity levels. It is suggested that body pride and shame impact one's behavioural regulation and as such interventions to increase pride and/or reduce shame, such as compassion-based interventions, could help to increase one's self-determined motives for physical activity. Body compassion-based interventions could also lead to reductions in *introjected* regulation, which might lead to unhealthily intense physical activity or have a negative effect on long term participation as suggested in previous research (e.g. D. A. S. Silva et al., 2011; M. N. Silva et al., 2010).

The models presented here demonstrate the direct effects of current body pride and shame and anticipated body pride and shame with weight gain on behavioural regulations in

exercise. The following chapter examines the effects of these variables on physical activity behaviour.

CHAPTER 6 MODELS TO PREDICT PHYSICAL ACTIVITY BEHAVIOUR

6.1 STUDY 5

The aim of this study was to test for the effects of the regulation styles on physical activity levels and see if these regulation styles mediate the relationship between body pride and shame and physical activity. As body compassion did not have significant direct associations (only marginal in *introjected* regulation) to any of the regulation styles, these models will only consider body pride and shame, behavioural regulation and physical activity behaviour. Also given that anticipated body pride and shame associated with weight loss was not a significant predictor of any behavioural regulation, it too will not be included here. Figure 6.1 shows the model adapted from Chapter 3 showing the areas to be covered here. Body compassion was not included as the direct effects were shown to be minimal, with indirect effects through body pride and shame being shown primary. Also including it would have pushed the number of parameters beyond what was acceptable for the sample size.

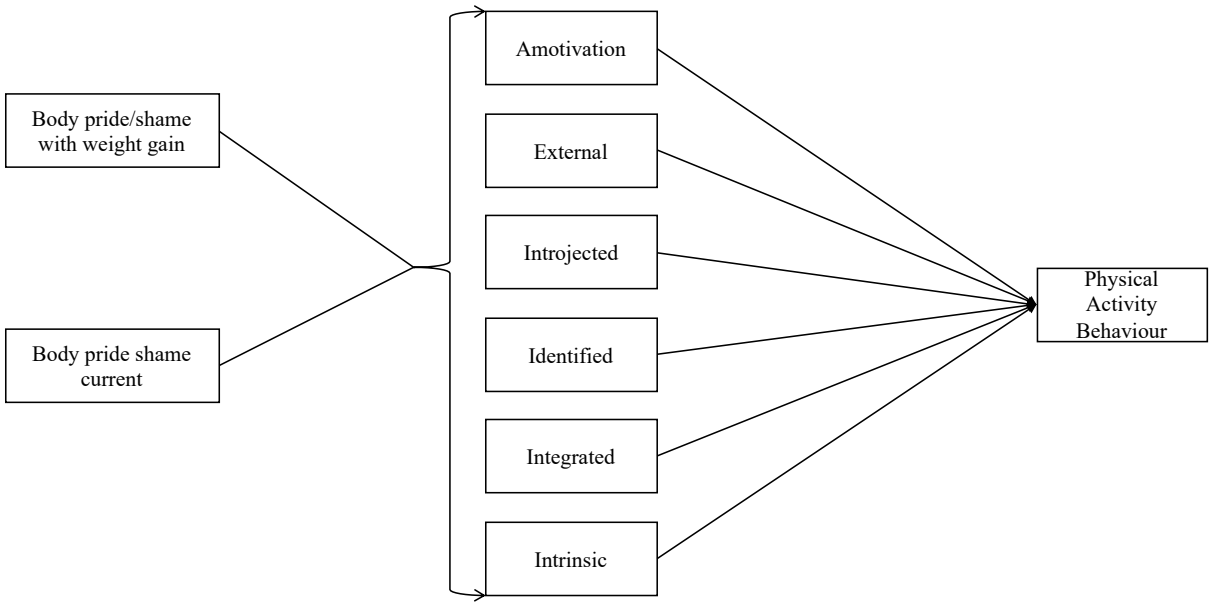

Figure 6.1 Adapted model from Chapter 3, showing the variables to be included in this chapter

6.2 METHOD

PARTICIPANTS

The participants were 80 of the original participants from Study 4, including 14 males and 60 females (6 = rather not say/other). The majority were white (N=74), with 3 Asian and 3 Mixed participants, the majority were also single (N=37), with 19 married, 2 divorced, 15 cohabiting and 7 in relationships. Most had a bachelor's degree (N=32), with 23 with a master's degree, 15 with A levels or equivalent, 4 with PhDs, 1 with no formal qualifications and 5 with GCSEs or equivalent. The majority were studying (N=31) or professionals (N=30), with 8 in administrative roles, 2 managers, 2 unemployed, 3 at home and 4 self-employed. Finally, the majority were from the UK or British Overseas Territories (N=52), with 12 from the USA, 2 from Canada, 3 from Australia, 2 from New Zealand, 1 each from Norway, Turkey, the Netherlands, South Korea, Italy, Germany and Singapore, plus 2 who did not state their country. The participants were aged from 16-69 (M=33.22, SD=14.13), and had BMI ranging from 14.77 - 34.23 kg/m2 (M=23.23, SD=3.97).

MATERIALS

BEHAVIOURAL REGULATION IN EXERCISE (BREQ-3)

The Behavioural Regulation in Exercise Questionnaire 3 (BREQ-3; Markland & Tobin, 2004; Wilson, Rodgers, Loitz, & Scime, 2006) was used to measure self-determined motivation for exercise. It has six subscales measuring each of the regulation styles: *amotivation, external, introjected, integrated, identified* and *intrinsic*.

PHYSICAL ACTIVITY (OSWEQ)

The Online Self-Report Walking Exercise Questionnaire (OSWEQ; N. J. Taylor, Crouter, Lawton, Conner, & Prestwich, 2013) is an online based physical activity questionnaire designed to measure walking and exercise activities over the last 7 days. The walking part of the questionnaire involves participants indicating the nature of the journey (e.g. walk to work, walk for leisure, walk the dog), whether it was single or return, the number of days they took that journey in the week, the time spent on the journey (one-way), the speed of walking (slow,

steady, brisk, fast). For each of the physical activity categories, participants are asked if they have done any of that activity (yes or no), if they have, they are taken to a new page where they are asked to select the type, number of days and length of a single session for each type of activity in that category. This allows for the metabolic equivalent time (MET-time) to be calculated. A total MET-time per week for each activity was calculated and then an overall MVPA-minutes total calculated for each participant. In addition, the NHS guidelines for physical activity in adults were used to calculate whether participants were engaging in sufficient strength activity and whether they meet the overall guidelines. These guidelines state that adults should engage in strength exercises on two or more days a week and either 150 minutes of moderate activity, 75 minutes vigorous activity or a combination of the two. Exercises that counted as strength exercises included all vigorous aerobic activities and conditioning activities, as well individual activities such as yoga, Pilates and martial arts and team sports like football. Meeting guidelines for strength exercises and overall guidelines was coded as 1=yes, 0=no.

BODY PRIDE AND SHAME (BPS)

The Body Pride and Shame Scale (BPS; Troop, 2016) is a 30-item questionnaire measuring behavioural, affective and attitudinal aspects of pride and shame. The degree to which these are experienced (or anticipated) in relation to current weight, imagined weight gain and imagined weight loss gives three subscales BPS-Current, BPS-Gain and BPS-Loss. The 10 items for each of these 3 subscales are identical except for the temporal perspectives. Items are scored on 10-point Likert scales where 1 = “not at all true of me” and 10 = “completely true of me”; high scores indicate more (current or anticipated) shame and low scores indicate more (current or anticipated) pride. Here only BPS-current and BPS-gain were used as BPS-loss had previously been shown not to be associated with behavioural regulation.

PROCEDURE

Participants from Chapter 4 who gave contact details were invited to take part in a short online questionnaire 4-weeks after initial participation. The procedure of the questionnaires was as in Chapter 4. The BPS, and BREQ-3 were completed at baseline and the OSWEQ was completed 4-weeks after initial participation.

DATA ANALYSIS

As in Chapter 4 data were analysed initially using SPSS 25 (SPSS Inc., Chicago, IL, USA), in order to calculate descriptive statistics. For the model testing Amos 24 (SPSS Inc., Chicago, IL, USA) was used. For the fit indices the chi-square (P. Barrett, 2007) and chi-square/df (Wheaton et al., 1977; Steiger, 2007) were considered with non-significant (p=.05) values of the former and values approaching 2.0 (Tabachnick & Fidell, 2007) or as high as 5.0 (Wheaton et al, 1977) indicating good fit. In addition to this the RMSEA with a cut-off of .06 (Hu & Bentler, 1999) as well as the Comparative Fit Index (CFI) and Normed-Fit Index (NFI) with values approaching 1.00 were also considered (Bentler, 1990; Bollen, 1989; Byrne, 2001; Bentler & Bonnet, 1980; Hu & Bentler, 1999). Models were trimmed to eliminate non-significant paths (to a significance value of .10) with the exception of when a path is necessary to explain an interaction. Baseline measurements of BPS were used, while no significant difference was found between baseline and follow-up BREQ-3 scores, and as such baseline scores were also used here.

The hypothesised models included BPS variables, BREQ-3 variables and the physical activity outcomes. It was hypothesised that BPS-current and -gain would predict the BREQ-3 variables as in Study 4 (Chapter 5), while these were hypothesised to predict physical activity outcomes, specifically the more internally regulated (*integrated* and *intrinsic*) would positively and the more externally (e.g. *amotivation* and *external*) would negatively predict physical activity.

6.3 RESULTS

The means and standard deviations for the sample are shown in Table 6.1. There were 50% of participants who met strength guidelines and 48.8% who met the overall guidelines. There were no significant differences between those who completed the baseline and the follow-up in *amotivation* (p = .36), *external* (p = .49), *introjected* (p = .72), *identified* (p = .24), *integrated* (p = .40), *intrinsic* (p = .78), BPS-current (p = .13), BPS-gain (p = .10).

Table 6.1 Means and standard deviations of the predictor and outcome measures for the models to predict physical activity

Variable	Mean	SD
Amotivation	.38	.74
External	.77	.99
Introjected	2.35	1.11
Identified	3.00	.97
Integrated	2.18	1.32
Intrinsic	2.56	1.25
BPS-current	5.69	2.34
BPS-gain	7.52	2.14
MVPA (MET-minutes)	375.41	356.25

Note: BPS = Body Pride and Shame Scale (Troop, 2016), MVPA = Moderate-Vigorous Physical Activity as measured in MET-minutes (Metabolic EquivalenT-minutes) using the OSWEQ (Taylor et al., 2013).

MODEL TO PREDICT MVPA MET-MINUTES

The first model to be tested considered the MET-minutes of MVPA. This model is shown in Figure 6.2. This explained 31.0% of variance in MVPA, as well as 3.3% in *amotivation*, 7.3% in *external*, 28.6% in *introjected*, 24.8% in *identified*. 21.1% in *integrated* and 26.8% in *intrinsic* regulation. This model was shown to have good fit based on chi-square (χ^2 (6) = 7.58, p=.27), where χ^2/df is 1.26, CFI and NFI statistics of >.95 (.996 and .983 respectively) as well as a RMSEA of <.06 (.058, p = .39).

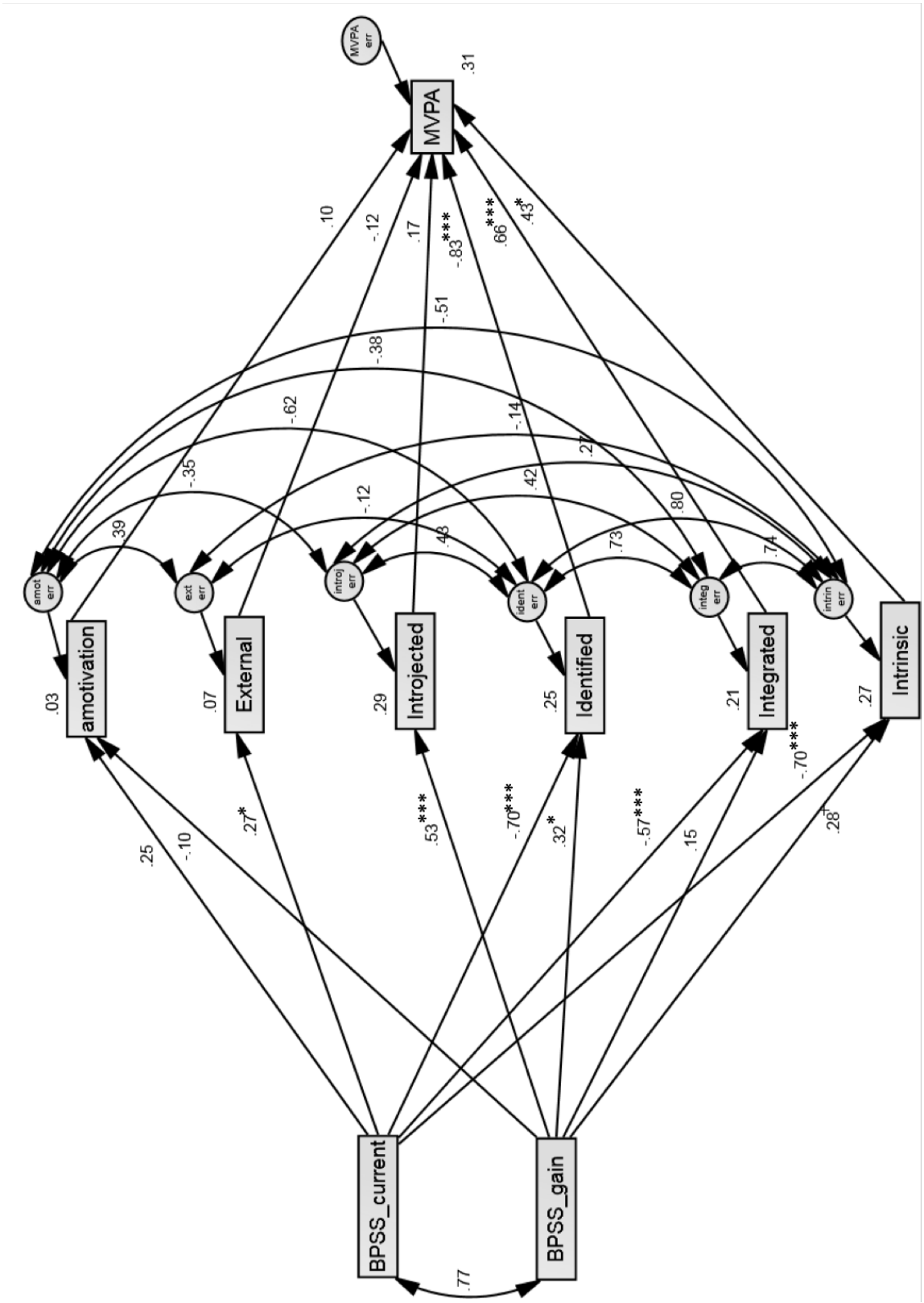

Figure 6.2 Path analysis model to predict MVPA MET-minutes

This model shows that in this sample BPS-gain and current were no longer significantly predictive of *amotivation* and BPS-gain was no longer significantly ($p<.05$) predictive of *integrated* or *intrinsic* regulation, while other previous associations were still significant. Additionally, *integrated* and *intrinsic* regulation were significantly positively predictive of MVPA, while interestingly *identified* regulation was negatively predictive. All other regulation styles were not significant predictors.

MODEL TO PREDICT STRENGTH EXERCISE

For strength guidelines, 40.1% of variance was explained by the model shown in Figure 6.3. This was shown to be a good fit (χ^2 (6) = 6.71, p = .35; χ^2/df = 1.12) by CFI (.998), NFI (.986) and RMSEA (.039, p=.47) fit indices. This shows that as in the model for MVPA MET-minutes, *intrinsic* and *integrated* were significantly predictive of strength guidelines being met and *identified* regulation was negatively predictive. In addition, *introjected* regulation was shown to be positively predictive of meeting strength guidelines.

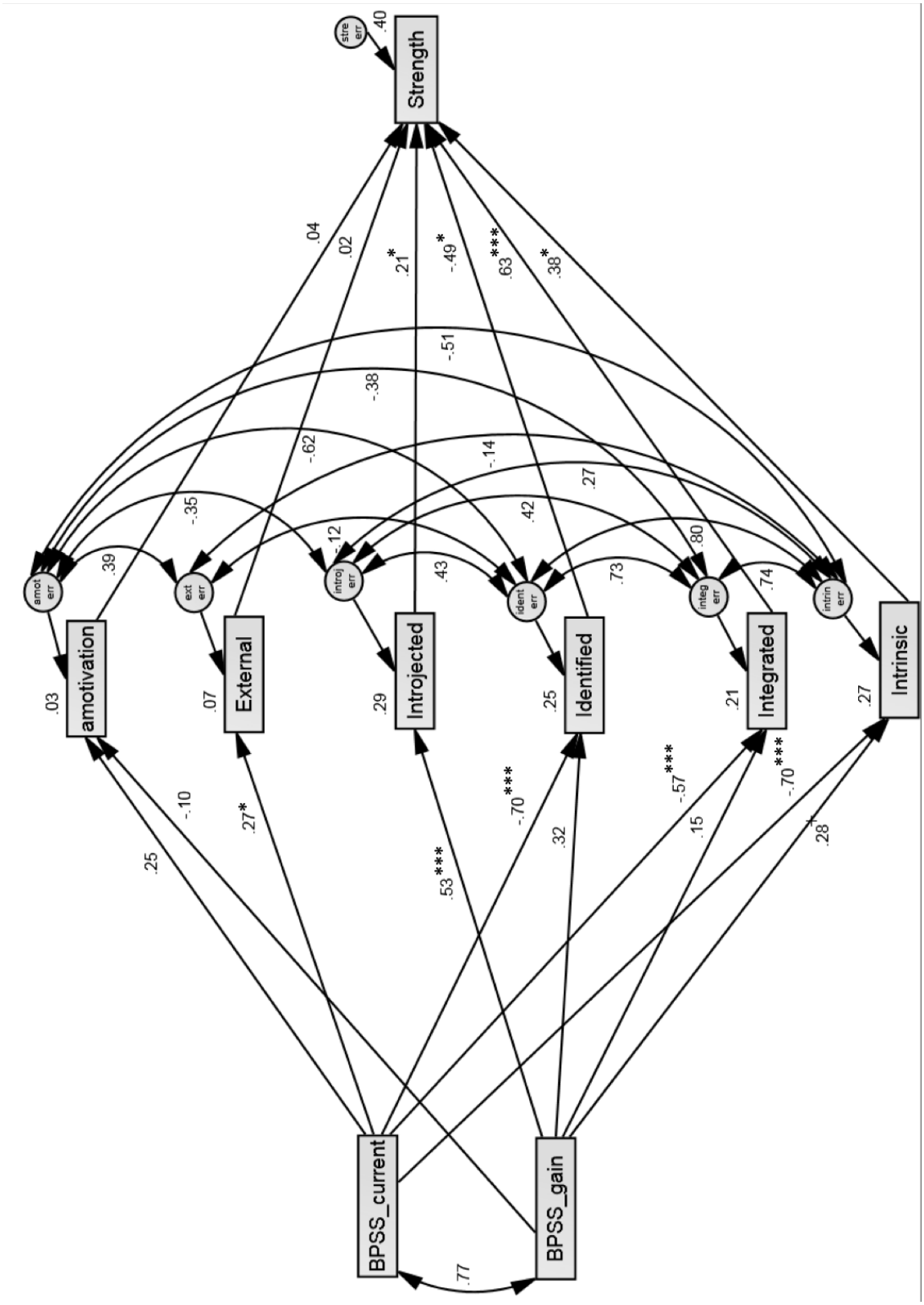

Figure 6.3 Path analysis model to predict adherence to strength exercise guidelines

MODEL TO PREDICT ADHERENCE TO OVERALL PHYSICAL ACTIVITY GUIDELINES

The same pattern was shown in the model to predict overall physical activity guidelines being met (Figure 6.4). *Introjected*, *integrated* and *intrinsic* regulation were positively and *identified* regulation was negatively predictive of physical activity guidelines being met. This model explained 47.0% of variance and showed a good fit (χ^2 (6) = 6.96, p = .32; χ^2/df = 1.16), with CFI (.998) and NFI (.985) both greater than .95 and a RMSEA of .045 (p=.45).

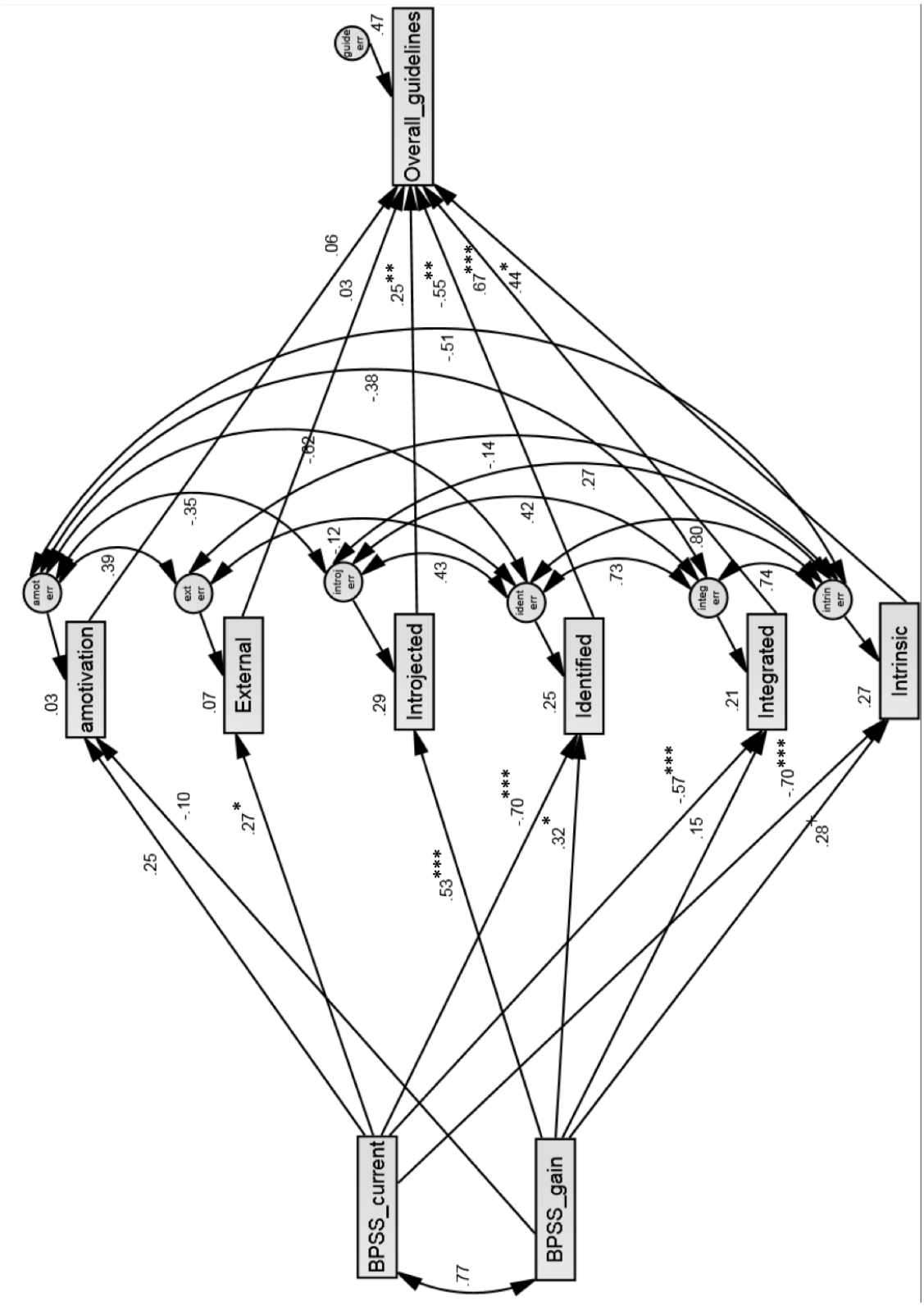

Figure 6.4 Path analysis model to predict overall adherence to NHS physical activity guidelines

Overall these results suggest that greater pride associated with one's current body predicts more *intrinsic*, *integrated* and *identified* regulation. Shame associated with one's current body predicts *external* regulation. Shame anticipated with weight gain predicts identified and *introjected* regulation. However, while *integrated* and *intrinsic* regulation are, as hypothesised, positive predictors of MVPA MET-minutes, strength and overall adherence to physical activity guidelines, *identified* regulation was negatively predictive of all of these. Furthermore, *introjected* was positively predictive of only overall guidelines being met and strength exercise.

6.4 DISCUSSION

FINDINGS

The predictions were largely confirmed although there were some unexpected results. The effect of body pride and shame on physical activity was mediated through behavioural regulation. In particular the more self-determined rather than non-self-determined regulations. However, while *integrated* and *intrinsic* regulation were positively predictive of later PA, *identified* regulation was negatively predictive.

Introjected regulation showed a slightly unexpected association with physical activity. Although not significantly associated with MVPA it was associated with strength exercises and therefore with meeting the overall physical activity guidelines. The associations between *introjected* regulation and physical activity are largely positive, though research has also found negative and no association (Teixeira et al, 2012). The association with strength exercises and meeting overall (strength and moderate-vigorous) physical activity guidelines only might be explained by those who are higher in *introjected* regulation being drawn to particular activities such as body conditioning that they feel will change their physique, musculature or shape and/or to more vigorous activities that count towards these strength exercises, rather than more moderate-light intensity levels. *Introjected* regulation has been associated with physical activity intensity in females only (L. R. Duncan et al., 2010), while *integrated* and *identified* regulation predicted frequency and *integrated* regulation predicted duration. In addition, Magnus et al., (2010) showed positive correlations between *introjected* regulation and

obligatory exercise and social physique anxiety, highlighting the potential damaging effects of *introjected* regulation.

A somewhat unexpected finding was that *identified* regulation had a negative association with physical activity, as reviews have found that the majority of research supports a positive association (Teixeira et al., 2012). However, Moreno Murcia et al., (2007) found that *identified* regulation was lower in those who engage in more physical activity (60+ minutes) than those who did less (<60 minutes). J Edmunds, Ntoumanis, and Duda (2007) similarly found a negative association in multilevel modelling, however when they tested for cross-sectional association this was positive at all time points. Equally no significant association was found between *identified* regulation and physical activity in other research (e.g. Wilson et al., 2006). By contrast the majority of the research showing associations between *intrinsic* regulation and physical activity reports positive associations, and no research appears to have shown negative associations (Teixeira et al., 2012).

Few studies have examined the effects of *integrated* regulation, with a review into behavioural regulation finding the majority showing positive associations with physical activity (Teixeira et al., 2012). Similarly, more recent studies that have included *integrated* regulation have stressed the importance of *integrated* regulation in predicting moderate-vigorous physical activity (Sevil, Práxedes, Abarca-Sos, Del Villar, & García-González, 2016) which this study supports.

STRENGTHS AND LIMITATIONS

The uptake for the follow-up was less than hoped and as such this limited the results that could be examined. However, this does demonstrate the important role of body pride and shame and is for the most part in support of other research findings in the associations between behavioural regulation styles and physical activity. Future research could usefully add to this in examining in a larger sample the effects of body pride and shame and behavioural regulation, as well as examining the effects over a longer period of time, taking account of baseline physical activity as well as longer term (i.e. changes in physical activity over a period of time).

The gender split in this study also prevented accurately examining the effect of gender on the relationship between behavioural regulation and physical activity. It has been shown in

the past that gender can influence this relationship especially with *introjected* (e.g. L. R. Duncan et al., 2010; Teixeira et al., 2012; Wilson, Rodgers, Fraser, & Murray, 2004) and *identified* regulation (e.g. Weman-Josefsson et al., 2015). While gender differences have also been shown for *intrinsic* regulation (Egli et al., 2011; Lauderdale et al., 2015) and *introjected* regulation (Gúerin et al., 2012), associations between physical activity and *amotivation*, *identified* regulation and *intrinsic* regulation were shown in females and only between physical activity and *intrinsic* regulation in males (Lauderdale et al., 2015).

In addition, the effects of BMI, age and ethnicity were not considered in this study, although the review in Chapter 2 found that research does suggest an effect of age and ethnicity on the relationship between body image and physical activity participation. Again, future research might consider the effects of these variables on the relationship between body pride and shame, behavioural regulation and physical activity.

However, this study has strengths that it demonstrates not only predictive models of aerobic physical activity, but also strength exercises, and whether participants were sufficiently active or not. It also demonstrated how different motives predict different forms of physical activity e.g. *introjected* regulation predicting strength exercises and overall physical activity but not aerobic activity.

IMPLICATIONS

This research has demonstrated the mediating effects of behavioural regulation on the relationships between current body shame and anticipated shame with weight gain on physical activity behaviour. It is suggested from the somewhat mixed results for *identified* regulation that the mechanisms through which this especially but also the other forms of behavioural regulation operate on physical activity need to be researched in more detail. For example, it is possible that qualitative research considering those who have high scores in each of the behavioural regulation styles in order to get detail on their feelings associated with physical activity. Additionally, considering the potential moderator of gender in the relationships between behavioural regulation and physical activity should also be considered. Finally, it is possible that other factors such as BMI or age might affect this association, as well as variables such as intention to exercise, goals for physical activity and personality. This clearly

demonstrates an important role of body pride and shame on physical activity motives and behaviour, both current feelings and those anticipated with weight gain. This study also adds to the previously limited research investigating *integrated* regulation, demonstrating its importance in predicting the many facets of physical activity behaviour.

CONCLUSIONS

Study 4 (Chapter 5) showed that body compassion predicts behavioural regulation, mediated by body shame, while Study 5 (Chapter 6) showed that body shame predicts PA, mediated through behavioural regulation. These models highlight the potential of a body compassionate intervention in improving body shame and subsequent motives for physical activity, and ultimately influence physical activity behaviour. This is examined in Chapter 7.

CHAPTER 7 BODY COMPASSIONATE INTERVENTION TO IMPROVE BODY IMAGE AND PHYSICAL ACTIVITY PARTICIPATION IN YOUNG PEOPLE

This chapter will describe a body compassionate writing intervention. This intervention will aim to improve body compassion and physical activity motivation, subsequently improving participants' physical activity behaviour. The effectiveness of this intervention was tested in comparison and combination with implementation intentions (II) that have been shown to be previously effective in improving health behaviours such as physical activity. II were chosen as they are a relatively fast and simple intervention which is easily combined (due to the writing element) with interventions based on expressive writing. Literature with reference to the university sample that will be tested, expressive writing and compassionate interventions and II will first be described.

7.1 PHYSICAL ACTIVITY AND MOTIVATION

Physical activity behaviour in childhood and adolescence has been shown to influence physical activity behaviour in young adulthood and in later life (Tammelin, Näyhä, Hills, & Järvelin, 2003; W. C. Taylor, Blair, Cummings, Wun, & Malina, 1999; Telama, Yang, Laakso, & Viikari, 1997), while mid-late adolescence and early adulthood have been shown to be a transitionary stage in physical activity behaviour (Nelson, Kocos, Lytle, & Perry, 2009; see Chapter 1). Research has also shown that the number of people meeting physical activity guidelines declines rapidly from age 18 to 24 (Grim et al., 2011) with the secondary school to university transition being accompanied with unhealthy behavioural change with reduced exercise and increased sedentary behaviour (Crombie, Ilich, Dutton, Panton, & Abood, 2009; Vella-Zarb & Elgar, 2009). Half of US and Canadian students (Irwin, 2004; Weinstock, 2010), around three quarters of UK students (Haase, Steptoe, Sallis, & Wardle, 2004) and 40% of Australian students are insufficiently active (Irwin, 2004). Those on campus were shown to be more inactive than those off-campus (Irwin, 2004), with an increase in sedentary behaviour (Buckworth & Nigg, 2004) often resulting in considerable weight gain during this time period (Fedewa, Das, Evans, & Dishman, 2014; Gropper, Simmons, Connell, & Ulrich, 2012). Barriers to physical activity have been shown to change over this period of time from later

secondary/high school to university/college. There is an increase in issues such as health concerns and a lack of self-confidence present in university students (Arzu, Tuzun, & Eker, 2006; Gyurcsik, Spink, Bray, Chad, & Kwan, 2006) and some barriers only present in university students and not in high school students such as a desire for more sedentary activities including relaxing, and a lack of sleep (Gyurcsik et al., 2006).

Body shame has been shown to be associated with body dissatisfaction, higher disordered eating and more appearance related exercise motives (Jankauskiene & Pajaujiene, 2012), which have been shown to be associated with reduced long term participation in physical activity (Kilpatrick, Hebert, & Bartholomew, 2005; Segar et al., 2006). Body shame has also been shown to be associated with low physical activity as well as associated with *external, introjected* and autonomous forms of behavioural regulation, where shame also predicted physical activity at 6 months. The effects of shame and guilt on physical activity were shown to be mediated by autonomous regulation (Castonguay et al., 2017). Weight self-perception discrepancy has also been shown to be associated with physical activity, whereby physical activity is lower when ideal or ought (the body weight one feels one ought to have) self-perception was greater than actual self-perceptions. Agreement between actual and ideal self were directly and indirectly related to physical activity through motivational regulations (Brunet et al., 2012). Teasing and body image concerns have also been shown to contribute to adolescent girls reduced physical activity (Lopez, 2019; Slater & Tiggemann, 2011), while body image has also been shown to be associated with physical activity behaviour in adolescent boys and girls (e.g. Kołoło, Guszkowska, Mazur, & Dzielska, 2012), young adult women (e.g. Brunet et al., 2012), disabled men (e.g. Bassett & Martin Ginis, 2009), as well as associations between physical appearance (weight) of avatars in a game and subsequent physical activity behaviour (Peña & Kim, 2014).

As described in Chapter 3, self-compassion has been shown to be associated with lower body image concerns (Wasylkiw et al., 2012), shame and explains the association between body dissatisfaction and drive for thinness in eating disorder patients (C. Ferreira et al., 2013). Self-compassion has been associated with lower eating pathology and been shown to protect against eating pathology and poor body image (see Braun et al., 2016, for a review), as well as being beneficial for weight loss, nutritional behaviours, eating behaviour and body image (see

Rahimi-Ardabili, Reynolds, Vartanian, McLeod, & Zwar, 2018, for a review). Self-compassion has been also shown to be related to pride and shame (Mosewich et al., 2011) and has shown a role in predicting *introjected* motives for physical activity along with ego goal orientation, social physique anxiety and obligatory exercise (Magnus et al., 2010). Physical activity behaviour has been directly predicted by self-compassion along with internal locus of control, social support and education in diabetes patients (Ferrari, Dal Cin, & Steele, 2017) as well as indirectly (along with other health behaviours such as sleep, eating and stress management) through positive and negative affect (see Sirois, Kitner, & Hirsch, 2015 for a review). Self-compassion and body image have also been shown to be associated with autonomous regulation which in turn is associated with increased physical activity (Thall, 2014).

Research in Chapter 5 showed that body compassion indirectly predicts behavioural regulation through bodily pride and shame. Specifically, it showed that increased body compassion predicted greater pride and less shame in one's current and anticipated (with weight loss and gain) body weight, with current body pride and shame being positively predictive of *external* regulation and *amotivation* and negatively of *intrinsic, integrated* and *identified* regulations. It also demonstrated that body pride and shame associated with weight gain was negatively predictive of *amotivation* and positively of *introjected, identified, integrated* and *intrinsic* regulations. Chapter 6 also showed that body shame and pride was indirectly associated with physical activity behaviour through these behavioural regulations, where *intrinsic* and *integrated* regulations were the best positive predictors of MVPA, strength activity and overall physical activity, while *intrinsic, integrated* and *introjected* regulations were positive predictors of strength and overall physical activity, while *identified* regulation was a negative predictor of all three outcomes. This suggests that improving one's body compassion might have an indirect effect on one's physical activity motivation and subsequent behaviour. The role of BMI was also highlighted whereby BMI predicted pride and shame and motivations for physical activity, also highlighting potential interaction effects between BMI and body compassion on *intrinsic* regulation, *integrated* regulation and *amotivation*.

7.2 COMPASSION-BASED INTERVENTIONS AND EXPRESSIVE WRITING.

Expressive writing (typically where participants write about trauma over several days for around 15-20 minutes) has been shown to be beneficial in improving physical health (Baikie & Wilhelm, 2005; Frattaroli, 2006; Kállay, 2015; Lu, Zheng, Young, Kagawa-Singer, & Loh, 2012), social and behavioural outcomes such as work or school performance (Baikie & Wilhelm, 2005; Kállay, 2015), psychological wellbeing in adolescents (Travagin, Margola, & Revenson, 2015), significant improvements in PTSD (Di Blasio et al., 2015), and improvements in emotional management in athletes (Hudson & Day, 2012). Meta-analyses have demonstrated small-medium effect sizes for expressive writing interventions (Frattaroli, 2006; Frisina, Borod, & Lepore, 2004; Smyth, 1998). Expressive writing has also been shown to be effective at reducing body-focused upward social comparisons (Arigo & Smyth, 2012), improved body image perception (Lafont, 2011; Lafont & Oberle, 2014), reduced self-criticism (Troop, Chilcot, Hutchings, & Varnaite, 2013) and adjustment to breast reconstruction following cancer (Rancour & Brauer, 2003).

Self-compassion induction has also been added to expressive writing (Leary et al., 2007). Self-compassionate expressive writing has been shown to be effective at reducing shame and negative affect (E. A. Johnson & O'Brien, 2013), improved mood (Odou & Brinker, 2014), physical health (Wong & Mak, 2016), improved self-soothing and self-esteem in hospice patients (Imrie & Troop, 2012) and less intrusive pain in those with chronic pain (Ziemer, 2014). Self-compassionate expressive writing has also been investigated with reference to body image in a number of studies. Self-compassionate writing groups had greater body appreciation immediately after writing and self-compassion and self-esteem writing showed greater body satisfaction than controls immediately and at 2-month follow-up (Seekis, Bradley, & Duffy, 2017). Self-compassion writing groups also showed significantly reduced state weight dissatisfaction and appearance dissatisfaction while showing increased self-improvement motivation. This effect was also shown to be moderated by trait body dissatisfaction, where it is most effective for those with high body dissatisfaction (Moffitt et al., 2018). Participants in self-compassionate writing groups report significantly greater body satisfaction and positive affect (Stern & Engeln, 2018). Body related self-compassionate writing has also been extensively studied in breast cancer survivors (Przezdziecki, Alcorso, & Sherman, 2016),

where self-compassionate writing participants report less body image distress, greater body appreciation and self-compassion (Sherman et al., 2018), reduced shame and negative affect (E. A. Johnson & O'Brien, 2013) as well as lower negative affect and increased self-compassionate attitude when exposed to difficult body image related memories (Przezdziecki & Sherman, 2016).

Text analysis of expressive writing using the linguistic inquiry word count (LIWC) software has been used as an indicator of the underlying psychological processes in individuals' writing (Pennebaker, Booth, Boyd, & Francis, 2015; Pennebaker et al., 2007; Pennebaker, Boyd, et al., 2015). In expressive writing studies emotional word use, such as positive and negative emotional word use, have been examined extensively (Imrie & Troop, 2012; Johnston, Startup, Lavender, Godfrey, & Schmidt, 2010; Lepore, 1997; Pennebaker, 1993). Additionally, in Study 3 in Chapter 4 of this thesis, body compassion was shown to be associated with negative affect as well as sadness. Words related to cognitive processes have also been examined in expressive writing studies. For example discrepancy (Troop et al., 2013) has been associated with improvement in self-criticism, causal words used with self-compassionate writing (Imrie & Troop, 2012) and more certainty words associated with self-compassionate writing (Urken, 2018); although self-compassion has also been associated with fewer certainty words (Khoo & Graham-Engeland, 2014; Sawyer, 2017). In the present study the content of the written texts will be examined using the LIWC2015 (Pennebaker, Booth, et al., 2015) with the cognitive processes, emotional words and summary variables new to the LIWC2015 that consider clout, authenticity, analytic thinking and emotional tone. Clout measures whether the writing is speaking with high expertise and confident in the subject matter; lower scores would indicate they are more tentative or anxious. Authenticity reflects honesty, personal and disclosing text, which lower scores indicate they are more guarded and distant. Analytic thinking reflects formality, logic and hierarchical thinking or in the case of lower scores, informal, personal and narrative thinking. Finally emotional tone reflects positivity with higher scores, anxiety, sadness or hostility with low scores and a lack of emotionality or ambivalence with mid scores (Pennebaker, Booth, et al., 2015).

Although this study aims to examine the effect of compassionate writing on physical activity, it is important to compare the effectiveness of this novel intervention with other

commonly used interventions. The following section describes implementation intentions (II), which is widely used and has been shown to be effective in a range of health behaviours.

7.3 INTENTIONS AND IMPLEMENTATION INTENTIONS

Intentions are defined as the instructions to oneself to perform a certain behaviour or to achieve a goal (Triandis, 1980). They reflect one's motivation to act and are a direct precursor to behaviour (Ajzen, 1985). Intentions for physical activity have been shown to be a predictor of physical activity behaviour (Chatzisarantis & Hagger, 2005; Hagger, Chatzisarantis, & Biddle, 2002; Hagger, Chatzisarantis, & Harris, 2006; K. Hamilton & White, 2008; Rhodes, Blanchard, Matheson, & Coble, 2006; Rhodes & Courneya, 2003), while also being influenced by affective attitudes and perceived behavioural control (e.g. Armitage, 2005; Eves, Hoppéa, & McLaren, 2003) and social norms (Lowe, Eves, & Carroll, 2002), as well as self-efficacy (Hagger et al., 2002). Intentions have also been shown to be associated with self-determined motivation for physical activity whereby autonomous motivation positively predict exercise intention (Chatzisarantis & Hagger, 2009; Hagger et al., 2002; Ingledew et al., 2014), amount and satisfaction (Ingledew et al., 2014). Specifically *intrinsic* and *identified* regulation as well as *amotivation* positively predict intentions, while *external* regulation negatively predicts intentions (Lim & Wang, 2009). Change in controlled forms of motivation has been shown to be positively predictive of changes in attitude, self-efficacy and intentions, while change in intention predicted change in physical activity (Jacobs, Hagger, Streukens, De Bourdeaudhuij, & Claes, 2011).

Despite intentions being good predictors of behaviour (e.g. Sheeran, 2002), it has been suggested that strong goal intentions alone are not sufficient to engage in a behaviour (Gollwitzer, 1993; Gollwitzer & Brandstätter, 1997). Given the associations between intentions and behaviour, planning behaviour and implementation intentions (II) were suggested as mechanisms to fill this gap (Fleig et al., 2013; Gollwitzer, 1993; Reuter, Ziegelmann, Lippke, & Schwarzer, 2009) as demonstrated in the model of action phases (Gollwitzer, 1990; Heckhausen & Gollwitzer, 1987). Paralleled with Ajzen (1985) intention formation, a deliberative phase was proposed whereby the costs and benefits of the behaviour are considered, similarly to where behaviour is predicted by attitudes, subjective norms and

perceived behavioural control in the theory of planned behaviour (Orbell, Hodgkins, & Sheeran, 1997). A post-decisional, implementation phase or intention realisation phase is also added (Gollwitzer, 1990; Heckhausen & Gollwitzer, 1987), involving efforts to promote initiation of the behaviour, through planning where and when to start.

Through implementation intentions, habit like behaviour can be formed (Fleig et al., 2013; Gollwitzer & Brandstätter, 1997), interventions have also been shown to be more effective if they aim to foster habits (e.g. in exercise; (Fleig, Lippke, Pomp, & Schwarzer, 2011). II also help aid the retrieval of intentions from one's memory and reduce the capacity of one's previous behaviour to predict future behaviour (Orbell et al., 1997). Forming implementation intentions has been shown to be effective in increasing the likelihood of behaviour (review: Gollwitzer & Sheeran, 2006), for example in epilepsy and stroke medication adherence (Kersten, McCambridge, Kayes, Theadom, & McPherson, 2015), quitting smoking (Armitage, 2007), healthy eating (Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011), uptake of cancer screening (Orbell, Campbell, & Weller, 2016), reduction of alcohol consumption and binge drinking (Norman et al., 2016; Norman, Webb, & Millings, 2019), multimedia learning (Stalbovs, Scheiter, & Gerjets, 2015), reducing speeding behaviour (S. E. Brewster, Elliott, & Kelly, 2015), reducing red meat consumption (Rees et al., 2018), improving sleep and sleep hygiene (Mairs & Mullan, 2015), blood donation behaviour (Wevers, Wigboldus, van den Hurk, van Baaren, & Veldhuizen, 2015) and reducing escape-avoidance behaviour in relation to pain (Karsdorp, Geenen, Kroese, & Vlaeyen, 2016). In relation to physical activity behaviour, II have also been shown to increase physical activity behaviour and self-regulation (Epton & Armitage, 2017), increased step count (Arbour & Martin Ginis, 2009; Liau, Neihart, Teo, Goh, & Chew, 2018; Stephanie A. Robinson, Bisson, Hughes, Ebert, & Lachman, 2019; W. M. Rodgers et al., 2014), stair use (Kwak, Kremers, van Baak, & Brug, 2007), goal progress (Carraro & Gaudreau, 2011), higher scheduling self-efficacy, overcoming of barriers to walking and greater perceived behavioural control (Arbour & Martin Ginis, 2009), improved exercise self-efficacy and exercise behaviour in high school students (Wang, Xu, Yu, & Zhou, 2019), moderate-vigorous physical activity (MVPA; Andersson & Moss, 2011; Armitage & Arden, 2010; Marquardt, Oettingen, Gollwitzer, Sheeran, & Liepert, 2017; McGowan, North, & Courneya, 2013), time-relevant exercise self-efficacy (Stephanie A. Robinson et al., 2019), exercise enjoyment (Ivanova, Yaakoba-Zohar,

Jensen, Cassoff, & Knäuper, 2016) and adherence to physical activity and scheduling self-efficacy (Murray, Rodgers, & Fraser, 2009). Roberts, Maddison, Magnusson, and Prapavessis (2010) showed that II and goal intentions acted as mediators between attitudes, subjective norms (full mediator), task and barrier self-efficacy and perceived behavioural control (partial mediator) and behaviour. Blanchard (2008) demonstrated how II acted as a complete mediator between intentions and behaviour at 3 and 6 months while intentions were predicted by attitudes, subjective norms and perceived behavioural control. They have also been shown to be effective in improving physical activity in specific groups such as young children (Armitage & Sprigg, 2010), pregnant women (Gaston & Prapavessis, 2014) and those with spinal cord injuries (Latimer, Ginis, & Arbour, 2006), as well as those in orthopaedic rehabilitation (Ziegelmann, Luszczynska, Lippke, & Schwarzer, 2007), pulmonary rehabilitation and Myocardial Infarction patients (Luszczynska, 2006) and in older people (Wolff, Warner, Ziegelmann, Wurm, & Kliegel, 2016).

However, they are not always consistent, with a number of studies finding no effect or a negative effect of planning or II formation on physical activity behaviour (Budden & Sagarin, 2007; Carrera, Royer, Stehr, Sydnor, & Taubinsky, 2018; Gerber, Mallett, & Pühse, 2011). Some explanation for this might come from studies that have found those interventions only effective in those with strong self-efficacy beliefs (Luszczynska & Haynes, 2009), in those with unstable intentions (Godin et al., 2010), in those who plan based on specific occasion cues and highly instrumental plans and those who plan less specific behavioural responses (Fleig et al., 2017), in those with high intentions (De Vet, Oenema, Sheeran, & Brug, 2009; Scholz, Schüz, Ziegelmann, Lippke, & Schwarzer, 2008) and in those high in self-efficacy (Luszczynska, Schwarzer, Lippke, & Mazurkiewicz, 2011). In addition, intentions, motivation, plan reminders, goal types, planning types, perfectionism, procrastination and stress have all been shown to be moderators of the relationship between II and behaviour (Prestwich & Kellar, 2014). Plan reminders (Prestwich, Perugini, & Hurling, 2009, 2010; M. A. V. da Silva, São-João, Brizon, Franco, & Mialhe, 2018) and the specificity or quality of II (De Vet et al., 2009; Ziegelmann, Lippke, & Schwarzer, 2006) have been shown to be especially important in their effectiveness.

Self-determined motivation has also been shown to predict planning which in turn predicts exercise frequency (Lutz, Karoly, & Okun, 2008). *Identified* regulation has also been shown to be associated with the formation of spontaneous II for exercise as well as there being an indirect effect of *identified* regulation on exercise behaviour via spontaneous II (Brickell & Chatzisarantis, 2007). Research has also suggested that motivation might be more important in predicting physical activity than planning (Rhodes et al., 2006). Pride has also been shown to be predictive of intentions for physical activity (Gilchrist & Sabiston, 2018), while self-compassion has also been shown to predict health promoting behavioural intentions (Sirois, 2015).

7.4 STUDY 6

The present study aimed to test the effect of a single session of body compassionate expressive writing alone or in combination with the formation of implementation intentions (II) on body compassion, physical activity motivation and exercise behaviour.

The primary hypotheses were that body compassionate writing and body compassionate writing in combination with II would show greater improvements in body compassion than the other groups, while all experimental (body compassionate writing, II and combined) groups would show greater improvements in self-determined motivation and physical activity compared to the control group. It was also hypothesised that the combined group would see the greatest improvements in comparison to all other groups.

7.5 METHOD

PARTICIPANTS AND DESIGN

Participants who volunteered to take part initially (N= 111) were all psychology students from the University of Hertfordshire aged between 18 and 25 (M = 19.76, SD = 1.59), who received 1 hour credit for taking part in the baseline and a chance to win £20 gift vouchers for taking part in the follow-up. The sample size was calculated following an a priori power analysis using G*Power. No previous research has been completed using this intervention in this manner and as such the analysis was completed using a moderate effect size (f = .25, see

Cohen, 1992). Assuming $\alpha = .05$ and $1 - \beta = .80$, the a priori power analysis indicated that a similar effect size would be detected using a minimum sample of 48 participants. Sample size was over-recruited to help control for drop-out from T1 to T2.

Figure 7.1 shows the flow of participants after signup, showing that the final sample once follow-up was complete was 103 (of which 76 also provided complete follow-up data). There were 10 males and 93 females overall, with the majority describing themselves as British (76); 40 were White, 23 Black, 26 Asian, 8 Mixed, and 6 Other. The majority were single (73), and full-time students (102), 64 had jobs and the majority were qualified to A-level standard (89). BMI ranged from 17.28 to 58.83 ($M = 24.55$, $SD = 6.88$), where, based on standard designations of BMI level, 9 were underweight, 63 healthy weight, 16 overweight and 14 obese (1 not stated).

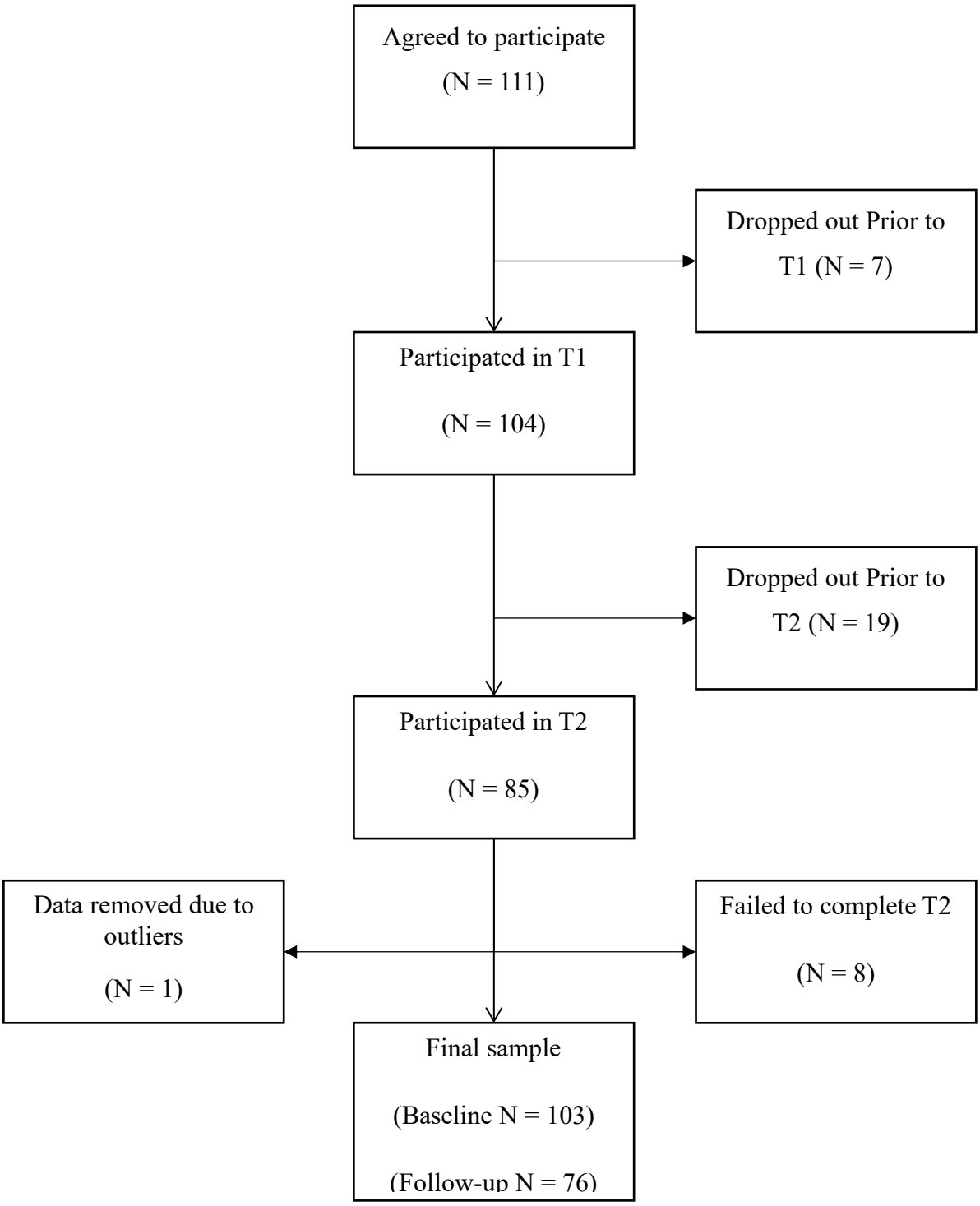

Figure 7.1 Flow of participants from recruiting to final analysis

A mixed factorial (4x2) design was used in this study, whereby participants were tested at two time-points, four-weeks apart and in four groups: Active Control (AC; N = 25), Implementation Intentions (II; N = 26), Body Compassionate Writing (BCW; N = 26) and Combined (body compassionate writing with implementation intentions; N = 26). Participants were randomly assigned to their groups. The distribution by demographic variables is shown in Table 7.1 and groups did not significantly differ on any variable at baseline.

Table 7.1 Frequencies of participant characteristics in each condition

	AC	II	BCW	Combined
Sex	X^2 (3) = 1.28, p = .73, Cramer's V = .11			
Male	2	2	4	2
Female	23	24	22	24
BMI	X^2 (9) = 9.95, p = .36, Cramer's V = .18			
Underweight	1	3	2	3
Healthy	15	15	19	14
Overweight	3	7	3	3
Obese	6	1	2	5
Nationality	X^2 (3) = .48, p = .92, Cramer's V = .07			
British	19	20	19	18
Non-British	6	6	7	8
Race	X^2 (12) = 5.42, p = .94, Cramer's V = .13			
White	12	10	8	10
Black	4	4	7	8
Asian	6	7	8	5
Mixed	2	3	2	1
Other	1	2	1	2
Marital Status	X^2 (12) = 10.06, p = .61, Cramer's V = .18			
Single	17	20	19	17
Married	0	0	0	1
Cohabitating	1	0	0	0
Relationship	7	5	7	8

Not Stated	0	1	0	0
Education		X^2 (9) = 5.35, p = .80, Cramer's V = .13		
GCSEs	0	1	0	0
A Level	22	21	23	23
Bachelor's	2	3	3	3
Master's	1	1	0	0
Study schedule		X^2 (3) = 2.99, p = .39, Cramer's V = .17		
Full time	25	25	26	26
Part time	0	1	0	0
Employment		X^2 (3) = 5.28, p = .15, Cramer's V = .23		
Job	16	16	20	12
No job	9	10	6	14

Note: AC = Active Control, II = Implementation Intentions, BCW = Body Compassionate Writing.

MATERIALS

QUESTIONNAIRE MATERIALS

The Following questionnaires were administered the same at baseline and follow-up for all participants.

BODY COMPASSION AND CRITICISM

The 38-item Body Compassion and Criticism Scale (BoCCS; Chapter 3, see Appendix C-II) was used to measure body compassion in this study. This covers four aspects of Body Compassion: Kindness, Common Humanity, Motivated Action and Body Criticism. It has been shown to be reliable in both subscale and total score form.

PHYSICAL ACTIVITY MOTIVATION

The Behavioural Regulation in Exercise Questionnaire 3 (BREQ-3; Markland & Tobin, 2004; Wilson, Rodgers, Loitz, & Scime, 2006) was used to measure self-determined motivation for exercise. It has six subscales measuring each of the regulation styles: *amotivation, external, introjected, integrated, identified* and *intrinsic*.

PHYSICAL ACTIVITY

The Online Self-Report Walking Exercise Questionnaire (OSWEQ; N. J. Taylor et al., 2013, see Appendix E) was again used to assess walking and exercise activities over the previous 7 days at T1 and T2. This allows for the metabolic equivalent time (MET-time) calculation to be calculated. A total MET-time per week for each activity was calculated (see appendix F-I for MET values for walking and F-II for MET values for other activities) and then an overall MVPA-minutes total calculated for each participant. In addition, the NHS guidelines for physical activity in adults were used to calculate whether participants were engaging in sufficient strength activity and whether they meet the overall guidelines. These guidelines state that adults should engage in strength exercises on two or more days a week, and either 150 minutes of moderate activity, 75 minutes vigorous activity or a combination of the two. Exercises that counted as strength exercises included all vigorous aerobic activities and conditioning activities, as well individual activities such as yoga, Pilates and martial arts and team sports like football (strength exercises are highlighted in Appendix F-II). Meeting guidelines for strength exercises and overall guidelines was coded as 1=yes, 0=no.

STATE BODY IMAGE

State body image was measured by using the Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). This is a measure of state body image that asks participants to respond based on how they feel 'right now, at this very moment' (Cash et al., 2002, p.106). There are 6 items that consider one's satisfaction with their overall appearance, body size and shame and weight, their feelings of attractiveness, their current feelings versus their usual feelings and an evaluation in comparison to the average person.

INTERVENTIONS

Table 7.2 shows the combinations of writing task and II components in each of the four groups of this study.

Table 7.2 Intervention components used in each group

Intervention Group	Tasks
Active Control (AC)	• 15 minutes body image writing • NHS guidelines on physical activity
Body Compassionate Writing (BCW)	• 15 minutes body image writing with self-compassion • NHS guidelines on physical activity
Implementation Intentions (II)	• 15 minutes body image writing • Develop II • NHS guidelines on physical activity
Combined (COMB)	• 15 minutes body image writing with self-compassion • Develop II • NHS guidelines on physical activity

BODY IMAGE WRITING (WITH OR WITHOUT SELF-COMPASSION)

Writing materials were used for two tasks depending on which group participants were in. All participants had to complete some form of expressive writing over 15 minutes. These instructions were adapted from a previous expressive writing study. In Ouwens et al. (2019), participants wrote compassionately about body image on three separate days: one day focused on understanding and kindness, the next on common humanity and the final day on neither denying or exaggerating thoughts and feelings. As the present study only included a single writing session, the instructions were combined. For body image writing alone, the instructions were:

We would like you to write for 15 minutes about the way you think and feel about your body. What you write is entirely up to you but write about the way you think and feel about your body in as much detail as you can. Really get into it and freely express any and all emotions or thoughts that you have about your body.

As you write, do not worry about punctuation or grammar, just really let go and write as much as you can in 15 minutes.

For body image with self-compassion writing, the instructions were:

We would like you to write for 15 minutes about the way you think and feel about your body. What you write is entirely up to you but write about the way you think and feel about your body in as much detail as you can. Really get into it and freely express any and all emotions or thoughts that you have about your body.

As you write, please think about the thoughts and feelings you describe, and write in such a way that you express:

- *understanding, kindness and concern to yourself*
- *consider how this is something that everyone may feel*
- *you are being realistic about your thoughts and feelings (i.e. neither denying nor exaggerating them)*

You may find it helpful to imagine that you are writing to a friend or family member who feels the same way and imagine what you might say to them.

As you write, do not worry about punctuation or grammar, just really let go and write as much as you can in 15 minutes.

PHYSICAL ACTIVITY INSTRUCTIONS AND IMPLEMENTATION INTENTION FORMING INSTRUCTIONS

All participants then received guidelines on physical activity based on the NHS guidelines (NHS, 2018b) for physical activity (see appendix G). These laid out the 3 options for physical activity:

1. 150 minutes of moderate aerobic activity every week and strength exercises on 2 or more days a week
2. 75 minutes of vigorous aerobic activity every week and strength exercises on 2 or more days a week.
3. A mix of moderate and vigorous aerobic activity every week and strength exercises on 2 or more days a week.

Participants in the AC and BCW groups were then given the following instructions: "Based on the guidelines given we would like you to pick 1 of these options to achieve over the next month. Please take the guideline information with you to remind you." Participants in the II and Combined groups were instead asked to form implementation intentions by following the instructions given below. No time limit was given for this task. These instructions were based on Luszczynska (2006) and Ziegelmann et al., (2006) and focuses on 5 points: what activity, what day(s), the moment/time of the activity, the location and the duration.

Based on the above we would like you to pick 1 of these options to achieve over the next month and write down your plan to help you meet this goal thinking about:

- *How many times a week do you plan to exercise?*
- *What times do you plan to exercise (i.e. between what hours)?*
- *What exercises do you plan on doing?*
    - *Be specific – will this be the same every time?*
    - *What activities on which days/times previous specified?*
    - *Where do you plan on exercising?*
    - *Locations or circumstances*
    - *Same every time or different?*
    - *What activities will you do in each location/circumstance?*

Use the blank sheets following this page to write you detailed plan of when, where and how you will exercise.

Please keep the guidelines on the previous page. Once typed up by the experimenter the plan you write will be emailed to you, so you have a personal copy.

PROCEDURE

Participants were allocated to a group before they started the experiment and they were naïve as to the group they were in for the duration of the experiment. Participants were first asked to read the information about the experiment and give their consent to take part in both parts of the study. They were then asked to complete the questionnaires listed above on a computer and give basic demographic information about themselves, as well as contact details in order to complete the follow-up. Participants were then asked to complete the relevant expressive writing task depending on their group, for 15 minutes. Participants who stopped before this time were asked to continue writing if they could, and participants who were still writing when the time had finished were allowed to finish their sentence. Finally, for the baseline part of the study, participants were asked to read the guidelines for physical activity and then given the tasks of completing one of the options given or writing implementation intentions for this (depending on the group they were in).

For the follow-up participants were emailed the same questionnaires as at baseline, to complete in their own time, four weeks after they initially participated (with a reminder being sent one week after the first follow-up email). Consent was again obtained before participants completed this stage and they were fully debriefed once this part was complete.

DATA ANALYSIS

TEXT ANALYSIS

The Linguistic Inquiry Word Count (LIWC; Pennebaker, Booth, Boyd, & Francis, 2015) software was used to help analyse participants written texts (both expressive writing and implementation intentions). Texts were transcribed following guidelines from the LIWC operator manual and then put through the software. This produced an output including word

count and linguistic metrics such as pronoun use and grammar usage, as well as content based on affect and social words, cognitive, perceptual and biological processes, core drives and needs, time and relativity and personal concerns. Due to the participants being told not to worry about punctuation and grammar these variables were not of interest, instead the new summary variables (analytic thinking, clout, authenticity and emotional tone), affect words, body related words and cognitive processes were examined as justified in the introduction. This was added to the questionnaire data from baseline and follow-up and analysed as explained below.

MAIN ANALYSIS

Analysis was conducted in SPSS 25 (SPSS Inc., Chicago, IL, USA). Descriptive and preliminary analysis included Pearson's r correlations between all relevant variables, including text-analysis output as well as screening for outliers and differences between groups at baseline. Additional variables such as BMI, demographic variables and the BISS were also checked prior to the main analysis to check for differences that might affect the main results.

The main analysis involved a series of 4 (condition) x 2 (time) mixed-way ANOVA looking for changes in body compassion, self-determined motivation and physical activity behaviour. In order to examine the effects of II and BCW separately the presence of these elements was coded (1 for present, 0 for not-present) and a series of 2 x 2 mixed-way ANOVA were conducted for the same variables as above.

Implementation intentions written by participants in the II and combined groups were rated on a scale of 1-5 in a similar manner to Ziegelmann et al., (2006), whereby they were given a mark for specifying each component of the implementation intention asked for in the instructions (day, time, activity/activities, location, duration). Scores were given based on the number of implementation intentions given (with each unique activity type being rated as a different intention), the specificity per implementation intention (total score divided by number of intentions) and the number of specific implementation intentions (number that were given a score of 5).

7.6 RESULTS

DESCRIPTIVE STATISTICS AND CORRELATIONS AT BASELINE

As shown in Table 7.1 the conditions did not have significantly different demographics. The age of participants in each group also did not significantly differ; $F(2, 99) = .16$, $p = .92$, and nor did the BMI of participants; $F(3, 98) = 2.55$, $p = .06$.

Table 7.3 shows the means and standard deviations of the age and BMI of participants in each group and overall. It also shows the mean and standard deviations for the outcome measures. One-way ANOVA demonstrated that there were no significant differences between groups at baseline in terms of any of the outcome or control variables (see Table 7.3). State body image was shown to be fairly consistent from T1 to T2 in all groups, with a reduction in all groups shown. Nor were any differences shown for Body Kindness ($F(3, 99) = 1.50$, $p = .22$), Common Humanity ($F(3, 99) = 1.14$, $p = .34$), Motivated Action ($F(3, 99) = 2.45$, $p = .07$) or Body Criticism ($F(3, 99) = .92$, $p = .44$). Only Motivated Action appeared to differ here, though examination of the means showed this was marginal.

Table 7.3 Mean (SD) for each condition for age, BMI and Study 6 outcomes and significance tests

Variable	AC	II	BCW	Combined	Overall	F	p
Age	19.76 (1.30)	19.85 (2.03)	19.58 (1.24)	19.85 (1.74)	19.60 (1.51)	.16	.92
BMI	25.82 (5.56)	22.55 (3.89)	23.04 (3.41)	26.93 (11.22)	24.98 (7.70)	2.55	.06
BoCCS T1	121.60 (18.52)	134.81 (12.67)	129.62 (17.98)	125.42 (21.56)	127.51 (18.83)	2.55	.06
BoCCS T2	125.33 (18.51)	128.93 (17.73)	127.00 (12.61)	127.16 (23.51)	127.26 (18.51)	.11	.95
BK T1	2.94 (.91)	3.46 (.73)	3.15 (.87)	3.16 (.98)	3.19 (.90)	1.50	.22
BK T2	3.15 (.95)	3.30 (.80)	3.32 (.69)	3.29 (1.04)	3.27 (.88)	.14	.94
CH T1	3.31 (45)	3.47 (.56)	3.44 (.38)	3.28 (.40)	3.36 (.47)	1.14	.34
CH T2	3.30 (.60)	3.34 (.63)	3.21 (.36)	3.17 (.44)	3.26 (.54)	.45	.72
MA T1	3.23 (.56)	3.73 (.56)	3.52 (.72)	3.48 (.78)	3.43 (.69)	2.45	.07
MA T2	3.40 (.55)	3.82 (.62)	3.43 (.54)	3.53 (.78)	3.57 (.66)	1.94	.13
BC T1	2.49 (.84)	2.32 (.60)	2.22 (.74)	2.56 (1.07)	2.37 (.80)	.92	.44
BC T2	2.50 (.87)	2.83 (.50)	2.43 (.70)	2.38 (.95)	2.56 (.78)	2.08[a]	.12
BISS T1	4.67 (1.65)	4.21 (1.13)	4.29 (1.44)	4.60 (1.67)	4.37 (1.51)	.60	.62
BISS T2	4.46 (1.59)	4.10 (1.23)	3.79 (.93)	3.97 (1.57)	4.09 (1.36)	.71	.55
MVPA mins T1	684.20 (475.11)	680.19 (607.78)	842.31 (669.14)	766.15 (547.70)	732.08 (572.30)	.46	.72
MVPA mins T2	532.78 (446.97)	517.50 (614.55)	1061.39 (1040.45)	470.75 (397.72)	644.24 (648.85)	4.37	**.007**

MVPA MET-mins T1	3399.70 (2304.58)	3076.90 (2941.90)	4407.71 (3956.18)	3703.60 (2853.61)	3550.06 (2849.66)	.88	.45
MVPA MET-mins T2	2612.39 (2353.18)	2376.73 (3007.44)	5230.50 (5788.47)	2304.70 (1967.52)	3037.33 (3156.23)	1.80[a]	.17
Amotivation T1	.30 (.46)	.73 (.94)	.80 (1.05)	.51 (.68)	.66 (.89)	1.95	.13
Amotivation T2	.66 (.74)	1.21 (1.09)	1.07 (1.12)	.72 (.94)	.92 (.99)	1.38	.26
External T1	.95 (1.14)	.77 (1.01)	.63 (.92)	.66 (.94)	.73 (1.00)	.53	.66
External T2	1.21 (1.28)	1.00 (.90)	.88 (.95)	.66 (1.04)	.93 (1.04)	.86	.46
Introjected T1	2.20 (1.32)	1.68 (1.12)	1.59 (1.21)	1.56 (1.11)	1.60 (1.23)	1.60	.20
Introjected T2	2.09 (1.30)	1.76 (1.18)	1.55 (1.13)	1.71 (1.12)	1.78 (1.17)	.60	.62
Identified T1	2.58 (.82)	2.23 (.87)	2.07 (1.09)	2.41 (.95)	2.23 (.92)	1.43	.24
Identified T2	2.81 (.94)	2.25 (.97)	2.08 (.93)	2.57 (.96)	2.43 (.97)	1.94	.13
Integrated T1	1.78 (1.35)	1.19 (1.12)	1.37 (1.35)	1.27 (1.07)	1.22 (1.20)	1.15	.33
Integrated T2	1.79 (1.34)	1.49 (1.12)	1.20 (.95)	1.53 (1.15)	1.51 (1.15)	.71	.55
Intrinsic T1	2.33 (1.10)	1.83 (1.30)	1.95 (1.37)	2.01 (1.20)	1.97 (1.14)	.75	.53
Intrinsic T2	2.41 (1.15)	1.63 (.97)	1.87 (1.04)	2.43 (1.23)	2.08 (1.14)	2.52	.07

Note: [a] Welch's value. T1 = Baseline measurement, T2 = follow-up measurement. AC = Active Control, II = Implementation Intention, BCW = Body Compassionate Writing. BoCCS =Body Compassion and Criticism Scale, BK = Body Kindness, CH = Common Humanity, MA = Motivated Action, BC = Body Criticism (Chapter 4). BISS = Body Image States Scale (Cash et al., 2002). MVPA = Moderate-Vigorous Physical Activity.

The frequency of participants meeting physical activity guidelines was considered (see Table 7.4) and demonstrated that there were no significant differences between conditions in those who did and did not meet guidelines at baseline or at follow-up.

Table 7.4 Frequency of participants meeting physical activity guidelines in each condition at baseline (T1) and 1-month follow-up (T2)

	AC	II	BCW	Combined
PA Guidelines met at T1	X^2 (6) = 4.53, p = .61, Cramer's V = .14			
None	3	1	3	3
Half	6	11	11	12
Fully	16	14	12	11
Aerobic PA Guidelines met at T1	X^2 (3) = 1.37, p = .71, Cramer's V = .12			
Yes	22	25	23	23
No	3	1	3	3
Strength PA Guidelines met at T1	X^2 (3) = 2.80, p = .42, Cramer's V = .17			
Yes	16	14	12	11
No	9	12	14	15
PA Guidelines met at T2	X^2 (6) = 3.44, p = .75, Cramer's V = .15			
None	4	5	4	5
Half	5	6	9	6
Fully	9	11	5	9
Aerobic PA Guidelines met at T2	X^2 (3) = .06, p = 1.00[a], Cramer's V = .03			
Yes	14	17	14	15
No	4	5	4	5
Strength PA Guidelines met at T2	X^2 (3) = 2.52, p = .47, Cramer's V = .18			
Yes	9	11	5	9
No	9	11	13	11

Note: [a.] exact value .996. AC = Active Control, II = Implementation Intention, BCW = Body Compassionate Writing. PA = Physical Activity.

A series of 4 (condition) x 2 (time) Mixed ANOVA were conducted to see the effects of condition on changes in body compassion total score (BoCCS), self-determined motives for physical activity (*amotivation, external, introjected, identified, integrated* and *intrinsic*) and on physical activity behaviour (MVPA).

For MVPA minutes there was a significant time x condition interaction; F (3, 69) = 3.29, p = .026, eta^2 = .13, 1 – ß = .39. There was no significant main effect for time (F (1, 69) = .79, p = .38), 1 – ß = .11, or condition (F (3, 69) = 2.22, p = .09, eta^2 = .09, 1 – ß = .78. Examination of the marginal means shown in Figure 7.2 indicates that the BCW group showed increased MVPA minutes, while other groups all decreased slightly. The increase in BCW was shown to be significant (t (15) = -2.15, p = .048), while the decreases in combined (t (18) = 1.94, p = .07), AC (t (16) = 1.45, p = .17) and in II (t (19) = .99, p = .33) were non-significant.

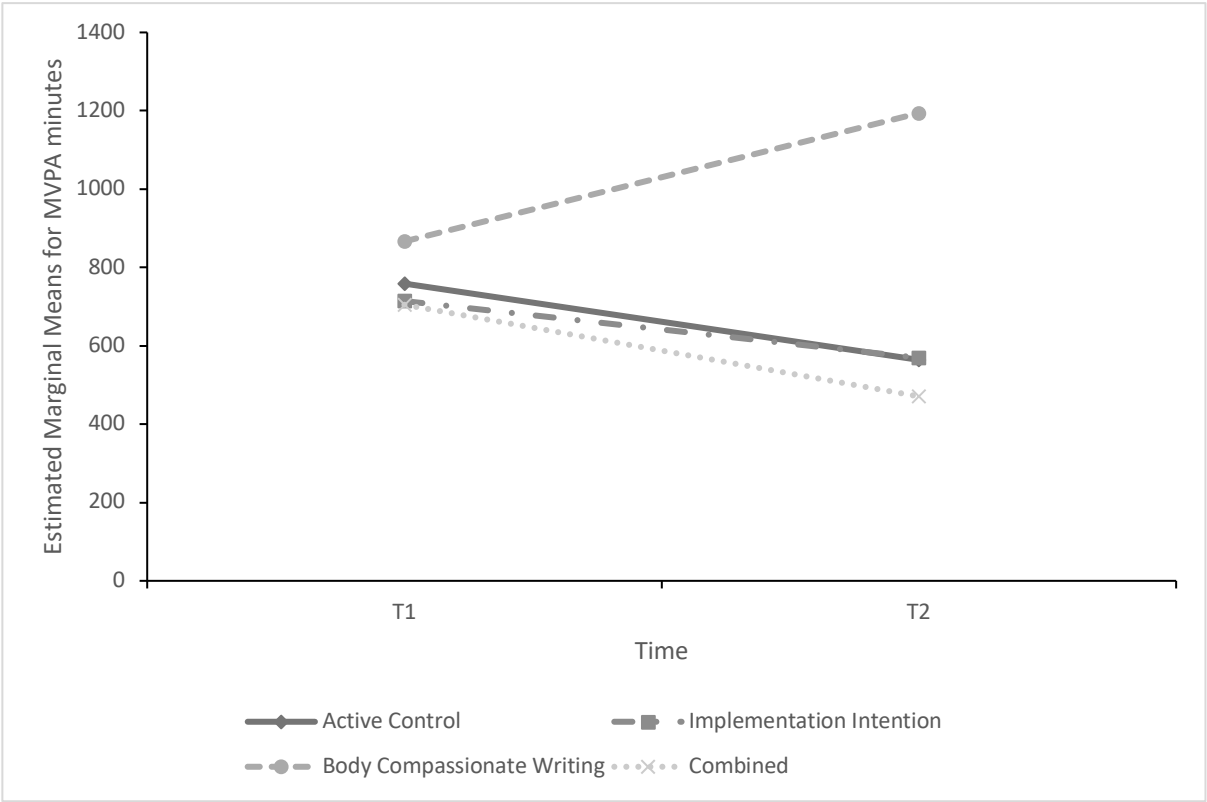

Figure 7.2 Marginal means for MVPA minutes demonstrating interaction between condition and time

This shows the increase in the BCW group which amounts to an increase of 327.50 minutes per week (5 hours and 27.6 minutes a week or 46.79 minutes a day). For the other groups there was a decrease in MVPA minutes of between 234.00 minutes (3 hours 54 minutes a week or 33.43 minutes a day) in the combined group and 145 minutes (2 hours 25.2 minutes a week or 20.71 minutes a day) in the II group (the AC group showed a decrease of 194.71 minutes a week, 3 hours 25 minutes a week or 27.82 minutes a day).

There was a significant interaction between time and condition for BoCCS; F (3, 72) = 2.89, p = .04, eta^2 = .11, 1 – ß = .18, indicating a large effect size. The main effect of time was not significant; F (1, 72) = .01, p = .94, 1 – ß = .05, suggesting no effect of time overall on BoCCS. The main effect of condition was also not significant; F (3, 72) = .97, p = .41, 1 – ß = .41, suggesting no effect of condition overall on BoCCS. Figure 7.3 shows the estimated marginal means of BoCCS in each condition and then changes overtime. Paired samples t-tests showed a significant decrease in the II group T1 to T2; t (21) = 2.09, p = .049. The increase in AC was not significant; t (17) = -1.97, p = .07. The differences in BCW (t (16) = -.06, p = .95) and for combined (t (18) = .35, p = .73) were non-significant.

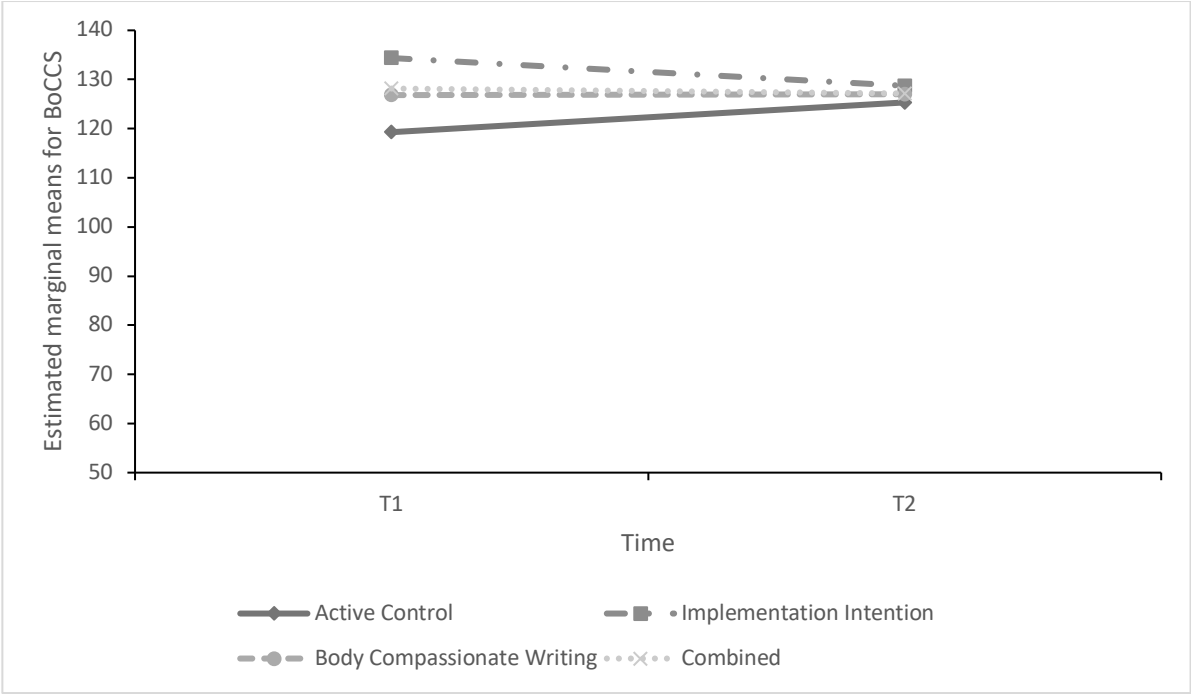

Figure 7.3 Estimated marginal means of BoCCS in each of the conditions at T1 and T2

Subscales of the BoCCS were then examined to see if this could help shed light on which elements of compassion were changed in which groups. For Body Criticism, there was a significant interaction, F (3, 72) = 3.64, p = .017, 1 – ß = .23 and a significant main effect of time, F (1, 72) = 6.56, p = .013, 1 – ß = .30. There was no main effect of condition, F (3, 72) = .39, p = .76, 1 – ß = .18. Examination of the estimated marginal means shown in Figure 7.4 and of t-tests revealed that only II changed significantly, with a significant increase from T1 to T2, t (21) = -4.12, p < .001. The mean in AC did not change at all (2.50 at both time points), which BCW (t (16) = -.72, p = .48) and combined groups (t (18) = -.48, p = .64) were shown to not significantly change.

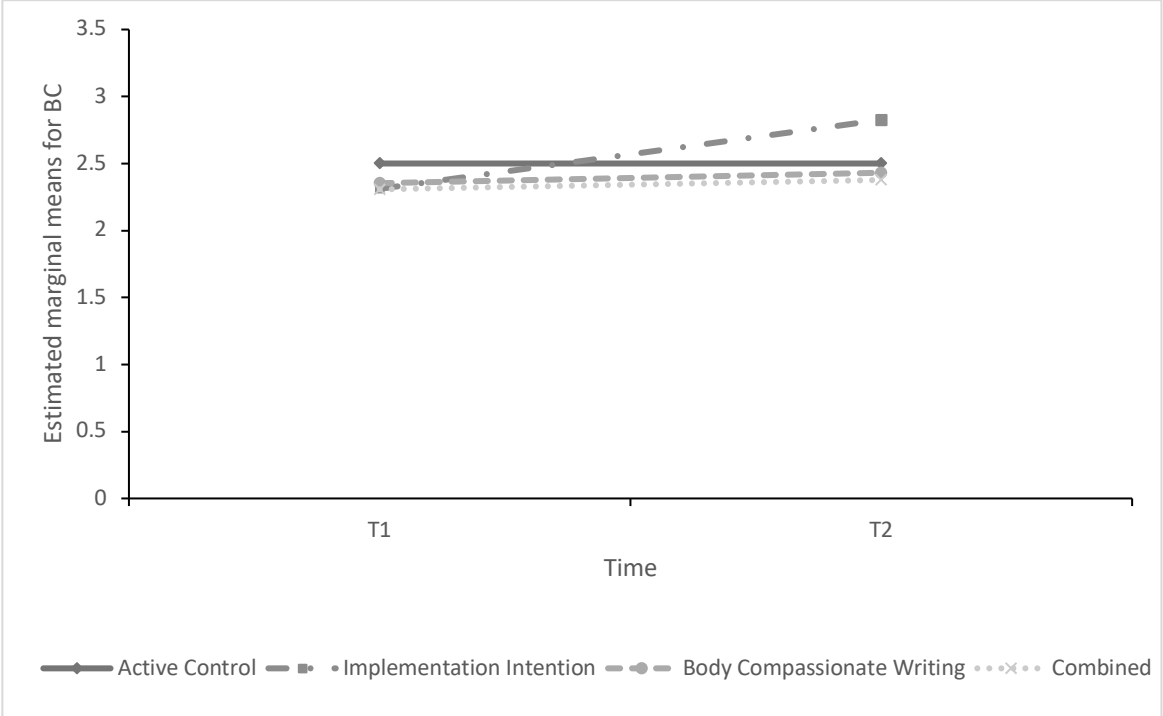

Figure 7.4 Estimated marginal means of Body Criticism (BC) in each of the conditions at T1 and T2

For Motivated Action (MA) there was no significant interaction: F (3, 72) = .64, p = .60, 1 – ß = .10. There was no significant main effect of time, F (1, 72) = 3.63, p = .06, 1 – ß = 24.; and no significant main effect of condition, F (3, 72) = 2.42, p = .07, 1 – ß = .77. Similar for Common Humanity (CH) no significant interaction (F (3, 72) = 1.70, p = .17, 1 – ß = .19), or significant main effects of time (F (1, 72) = 3.48, p = .07, 1 – ß = .22) or condition (F (3, 72) = .31, p = .51, 1 – ß = .31) were observed. Finally, for Body Kindness (BK), no significant

interaction was observed, F (3, 72) = 2.39, p = .08, 1 – ß = .14. Neither were there significant main effects of time (F (1, 72) = 1.70, p = .20, 1 – ß = .08) or condition (F (3, 72) = .60, p = .61, 1 – ß = .28).

Next self-determined motivation for physical activity was examined. For *amotivation* there was no significant interaction: F (3, 68) = 1.63, p = .19, 1 – ß = .16. There was a significant main effect for time (F (1, 68) = 7.80, p = .007, eta^2 = .13, 1 – ß = .40), but no significant main effect of condition, (F (3, 68) = 1.63, p = .10, eta^2 = .09, 1 – ß = .80). With *external* regulation there was no significant interaction between time and condition (F (3, 68) = .61, p = .61, 1 – ß = .10), an approaching significant main effect of time (F (1, 68) = 3.94, p = .051, eta^2 = .06, 1 – ß = .23) and no main effect of condition (F (3, 68) = 1.66, p = .19, 1 – ß = .64). For *introjected* regulation there was no significant interaction (F (3, 68) = .99, p = .40, 1 – ß = .08), a significant main effect of time (F (1, 68) = 4.35, p = .04, eta^2 = .06, 1 – ß = .14) and a marginally significant main effect of condition (F (3, 68) = 1.20, p = .05, eta^2 = .05, 1 – ß = .57). For *identified* regulation there was no significant interaction (F (3, 68) = .68, p =.57, 1 – ß = .08), there was a main effect of time (F (1, 68) = 9.82, p = .003, eta^2 = .13, 1 – ß = .26) and a main effect of condition (F (3, 68) = 2.78, p = .048, eta^2 = .11, 1 – ß = .93). There was no significant interaction between condition and time for *integrated* regulation (F (3, 68) = .62, p = .61, 1 – ß = .07), a significant main effect of time (F (1, 68) = 9.33, p = .003, eta^2 = .121, 1 – ß = .31) and no significant main effect of condition (F (3, 68) = 1.17, p = .33, 1 – ß = .55). Finally, for *intrinsic* regulation no significant interaction was found, (F (3, 68) = 2.49, p = .07, eta^2 = .10, 1 – ß = .15), no significant main effect of time (F (1, 68) = 1.58, p = .21, 1 – ß = .09), and no significant main effect of condition (F (3, 68) = 2.07, p = .11, 1 – ß = .78).

EFFECT OF II

There were no significant differences between II and COMB in terms of the number of II formed (F (1, 50) = .08, p = .78), the number of complete II (F (1, 50) = .33, p = .57) or specificity of II (F (1, 50) = .58, p = .45). Correlations between the number of II formed, number of complete II and the specificity of II and the physical activity based outcome variables are shown in Table 7.5. The only significant correlation was between specificity and complete II and *identified* at T1.

Table 7.5 Correlations between II specificity variables and the outcome measures

	II			COMB		
	Number of II	Complete II	Specificity II	Number of II	Complete II	Specificity II
Complete II	.44*			.39*		
Specificity II	-.17	.67***		-.06	.49**	
MVPA-mins. T1	-.002	.09	.19	-.01	.10	.23
MVPA-mins. T2	.11	-.12	-.21	-.23	-.13	.15
Amotivation T1	-.22	-.01	.25	-.14	.23	.38
Amotivation T2	-.23	-.01	.34	-.24	.24	.35
External T1	-.05	-.14	-.06	.19	.12	-.18
External T2	-.25	-.35	-.19	-.24	-.07	-.06
Introjected T1	.15	.02	.04	-.003	-.22	-.27
Introjected T2	-.35	-.29	-.04	.04	-.32	-.45
Identified T1	.37	.08	-.20	-.06	-.45*	-.41*
Identified T2	-.18	-.05	.02	-.02	-.15	-.30
Integrated T1	.20	.08	.003	-.02	-.15	-.30
Integrated T2	-.18	-.05	.02	-.02	-.15	-.30
Intrinsic T1	.18	.05	-.06	.21	-.24	-.29
Intrinsic T2	-19	-.05	-.01	.10	-.35	-.38

*Note: [1]p < .10, *p < .05. T1 = baseline, T2 = follow-up. II = Implementation Intentions. COMB = Combined group. MVPA = Moderate-Vigorous Physical Activity.*

Texts for the body image writing (with and without compassion) were analysed using the LIWC2015, the data produced that was analysed was analytic thinking, clout, authenticity, emotional tone, affect words (e.g. positive, negative emotion), cognitive processes (e.g. insight) and biological processes (e.g. body, health). The means and SD for the relevant variables are shown in Table 7.6.

In the main results, the BCW group was shown to have a significant increase in PA overtime. For that reason, the differences between this group and the other groups in terms of the key LIWC variables shown in Table 7.6 were examined using one-way ANOVA. The only significant difference was shown for certainty; $F(1, 101) = 5.92$, $p = .017$, where it was shown that the BCW participants used significantly more certainty words, than the other groups.

As the body image writing tasks were completed before the II/physical activity information was given, the BCW and COMB groups were combined to examine differences between the writing of these participants and those in the other two groups (AC and II). Clout approached significance in the difference between compassion and non-compassion groups: Welch $(1, 54.27) = 3.93$, $p = .052$; and a significant difference was shown in authenticity: Welch $(1, 71.92) = 5.31$, $p = .024$. Participants who were asked to write compassionately were shown to write with more clout but less authenticity.

Table 7.6 Means and SD of the key summary variables from the LIWC results

	AC	II	BCW	Combined	Overall
Analytic Thinking	21.94	18.71	22.34	17.01	19.98
	(15.56)	(11.37)	(13.55)	(9.00)	(12.59)
Clout	8.61	5.30	20.46	22.20	14.19
	(11.75)	(5.38)	(24.22)	(69.52)	(37.71)
Authentic	91.97	95.12	84.97	87.40	89.84
	(12.60)	(5.33)	(21.49)	(20.82)	(16.72)
Emotional Tone	55.92	74.41	70.93	59.32	65.24
	(27.73)	(23.58)	(23.82)	(32.63)	(27.88)

Affect words	6.45 (1.66)	6.50 (1.09)	6.72 (2.24)	6.39 (2.14)	6.52 (1.82)
Positive emotion	4.11 (1.63)	4.78 (1.28)	4.85 (2.03)	4.29 (2.37)	4.51 (1.69)
Negative emotion	2.27 (1.04)	1.65 (.85)	1.84 (1.00)	2.37 (1.36)	2.03 (1.10)
Anxiety	.82 (.64)	.79 (.68)	.76 (.65)	.80 (1.02)	.79 (.75)
Anger	.36 (.47)	.24 (.38)	.22 (.31)	.56 (.51)	.35 (.44)
Sadness	.50 (.49)	.20 (.24)	.33 (.41)	.55 (.49)	.39 (.43)*
Cognitive processes	17.16 (3.32)	17.81 (2.50)	17.87 (3.47)	17.05 (4.36)	17.47 (3.45)
Insight	3.68 (1.75)	3.71 (1.27)	4.17 (1.23)	4.02 (1.30)	3.90 (1.39)
Causation	2.53 (1.08)	2.75 (1.36)	2.40 (1.34)	3.46 (3.63)	2.79 (2.14)
Discrepancy	2.21 (1.15)	1.30 (1.57)	2.15 (1.40)	2.35 (1.15)	2.25 (1.31)
Tentative	3.24 (1.51)	3.99 (1.77)	3.37 (1.56)	3.35 (2.13)	3.49 (1.59)
Certainty	1.73 (.98)	1.61 (1.16)	2.20 (1.14)	1.57 (.81)	1.78 (1.05)
Differentiation	5.09 (1.71)	5.03 (1.42)	5.18 (1.86)	5.53 (1.93)	5.21 (1.72)
Biological processes	5.78 (1.72)	5.63 (1.96)	6.28 (2.12)	5.84 (2.43)	5.88 (2.06)
Body	2.99 (1.38)	3.42 (1.50)	1.36 (1.11)	3.23 (1.70)	3.36 (1.62)
Health/illness	1.80 (1.33)	1.27 (.93)	1.36 (1.11)	1.93 (1.44)	1.59 (1.22)
Sexual	.10 (.25)	.07 (.18)	.15 (.39)	.30 (.73)	.16 (.45)
Ingestion	1.59 (.75)	1.24 (1.13)	1.16 (.85)	1.56 (1.30)	1.38 (1.04)

*Note: *significant according to Kruskal-Wallis (9.28) to p = .026, η_H = 0.09. Dunn post-hoc tests indicate this difference is between II and AC (p = .014) and II and Combined (p = .018). AC = Active Control, II = Implementation Intention, BCW = Body Compassionate Writing.*

7.7 DISCUSSION

FINDINGS

This study aimed to test the effectiveness of body compassionate writing, in combination and comparison with II in improving physical activity behaviour. The main findings showed that the BCW participants showed a significant increase in physical activity overtime, while the participants in the other groups showed no significant change (but a slight decrease in physical activity). Body compassion in II participants was shown to significantly

decrease overtime (with a significant increase in criticism), while other groups remained unchanged. No significant group x time interactions were observed for behavioural regulation styles.

These results suggest that body compassionate writing can lead to an increase in physical activity behaviour. Body compassionate writing participants were shown to significantly differ in terms of the amount of certainty words used in their writing. These words include *always* and *never*. Greater use of certainty words has been associated with lower self-compassion and well-being (Khoo & Graham-Engeland, 2014; Sawyer, 2017). However research has previously shown that self-compassionate writing participants display more certainty words than control expressive writing participants (Urken, 2018), as demonstrated in the present study. In addition, BCW and combined participants were shown to significantly differ from AC and II participants, in that they showed less authenticity and more clout in their writing. A greater clout score indicates the author has high expertise in the subject matter and is confident in what they are writing (Pennebaker, Booth, et al., 2015), indicating that the participants given instructions about writing compassionately felt more confident in the subject matter than those who were given control instructions. Authenticity represents honesty, and a personal and disclosing account, while lower scores demonstrate a more guarded, distant narrative. The mean scores for the BCW and combined participants, were not low compared to the grand mean scores from Pennebaker, Boyd, Jordan, and Blackburn (2015), with scores around 50. This suggests the sample overall wrote quite honestly, personally and disclosing. However, it is possible that those without the constraints of writing compassionately, were more honest in their writing, as they were able to express their critical and judgemental thoughts as well (however this was not significant).

Results also suggest that not only were II not effective, but also that for those who formed II and did not also write compassionately (II group), body criticism increased. This is supported by Powers, Koestner, and Topciu (2005) who found that for socially prescribed perfectionists (who tend to be self-conscious and self-critical) implementation intentions tend to backfire. Specifically, implementation intentions appear to elicit self-criticism in these participants.

This study has demonstrated the potential of body compassionate writing in improving physical activity. However, it does have limitations. The drop-out of participants from part 1 to part 2 was higher than desired. The sample size also highlighted a large gender discrepancy, such that an effect of gender is still in need of investigation.

The II may have been ineffective due to the nature of the instructions. Participants were not specifically asked to form their II in the structure "If…then…" which has been shown to be especially effective (Hagger & Luszczynska, 2014). Instead in order to give participants some degree of control over their implementation intentions they were given quite in depth instructions but the form in which their IIs were written was left up to them. However this was in a similar manner to Armitage (2004), where an effect was found for reduced fat intake. It is clear that it is a balancing act between giving participants forming II control over their plans but giving them the necessary tools for these to succeed. Perhaps enforcing this structure may have proven more effective. Future research should direct participants towards more of the "if…then..." format which is more likely to be affective. The ineffectiveness of the II, as well as potentially eliciting self-criticism, may have been due to unmeasured moderators which previous research has shown to affect II. For example, participants initial intentions for physical activity behaviour. II have been shown to be most effective (or only effective) in those with strong intentions to perform the behaviour (Orbell et al., 1997; Scholz et al., 2008). Additionally self-efficacy may have played a role in the effectiveness of participants' II (Luszczynska et al., 2010; Wieber, Odenthal, & Gollwitzer, 2010). Self-concordance, that is whether the participants are autonomous or controlled in the formation of the II, may also have had an impact (Koestner et al., 2006). Participants may have felt compelled to write plans that are unfeasible for them or particularly socially desirable. The BCW and AC group participants that were simply asked to perform more physical activity and given guidelines kept their personal plans or ideas of how to do this to themselves so may not have felt this pressure to be socially desirable and be more likely to choose plans and activities and timings that suited them. Related to this, II have been shown to hurt performance of behaviours that require flexibility, in that participants who have formed plans for the activity might restrain themselves from taking alternative opportunities to be active, something that the control instructions

participants would not have issues with (Budden & Sagarin, 2007; Gollwitzer, Fujita, & Oettingen, 2008).

Considering the results overall, it is possible that limited statistical power due to the sample size calculation for moderate effect size, may have played a role in limiting the significance of some comparisons. For example, in MVPA, a non-significant effect of time was shown, with post hoc power indicated that it was underpowered. It is possible that this effect was not shown due to the low power, however the significant interaction and effect of condition still indicate a significant increase in MVPA for the BCW group. As such the intervention still shows promise for improving physical activity despite the low sample size present here.

For the other measures, power may have played a role in the lack of significance. For example, for BoCCS scores, again a significant interaction was shown, but no significant effect of time or condition. Both of these were shown to be underpowered by post hoc power. It must also be noted for this result that the starting score for the BCW group and II group were higher (and remained higher at T2) than that of the AC and combined groups. It may also, therefore, be necessary in future research to pre-screen the sample for baseline body compassion in order to ensure that the groups begin relatively similar to get an accurate reflection for the increases or decreases in body compassion. Finally, for motivation, the lack of interaction effects shown here may have been in part due to low power and may indicate additional effects of body compassionate writing and/or II on behavioural regulation. Future research needs to consider a higher starting sample size and ways to reduce drop-out to check that the effects of the intervention can be fully realised.

Many participants finished what they wished to write earlier than the allotted time for the expressive writing element, although some did continue writing until the end without prompts. These individuals who did finish early were prompted to continue though many did not manage to write continuously for the whole time. This may have influenced the effectiveness of the intervention and is something that future research should consider.

IMPLICATIONS AND FUTURE RESEARCH

This study suggests that a very brief, single session of body compassionate writing, in combination with basic information on health guidelines for physical activity is effective at

increasing moderate-vigorous physical activity behaviour by around 45 minutes a day. The formation of II appears to have a negative effect on body compassion, and an increase in criticism, which the addition of body compassionate writing seems to negate.

The effectiveness is only demonstrated here over a relatively short time-period (1 month) and with only initial baseline and final follow-up measurements taken. Future research should examine the effectiveness of this single session of writing over a longer follow-up, possibly with more frequent measurements to see the extent of its effectiveness and the mechanisms through which this might act. Additionally, the impact of longer-term writing (e.g. over 3 days as with previous studies (Ouwens et al., 2019) or over even longer periods of time should be assessed to see if these are more effective, in line with the standard expressive writing paradigm.

The content of body compassionate writing in comparison to control writing indicates significant differences which may contribute or help to explain the differences between these groups. Results indicate that this may be due to differences in certainty word use and possible clout and authenticity. Future research should aim to investigate the content of body compassionate writing further through text analysis. In particular it might examine using the 3-day format used in previous expressive writing where it is split into the different components of self-compassion per-day e.g. kindness, common humanity and mindfulness (Ouwens et al., 2019). This would allow the text differences to be examined across the different days or to see the change in individuals writing across the 3 days e.g. becoming more positive or more certain. Ascertaining the mechanisms through which body compassionate writing is effective will help determine why body compassionate writing is effective and help to give participants the tools to make it more effective, especially in those high in body criticism or low in body compassion.

Although this was applied in this context to young adults at university, it is possible that body compassionate writing may be effective in the same outcomes in younger individuals (e.g. school age) or older individuals, although the effects of gender still need to be fully determined.

CONCLUSIONS

Body compassionate writing was shown to be effective at improving moderate-vigorous physical activity behaviour. It is hoped that this intervention will be developed further and applied to other samples and that mechanisms through which it might act (e.g. through shame and pride) be examined further.

CHAPTER 8 GENERAL DISCUSSION

The preceding chapters of this thesis have all included their own individual discussions of the findings, implications, strengths and limitations of each individual study. Therefore, the aim of this final chapter is to give an overview of the findings described in the thesis, evaluate the strengths and limitations of the studies overall and the implications of the body of work it contains as well as how future research might build on this.

8.1 FINDINGS

BODY IMAGE AND PHYSICAL ACTIVITY (CHAPTERS 1 & 2)

Overall more positive body image associated with more physical activity participation. Results however varied by age, gender, ethnicity and disability. The age of 15 appears to be the turning point for individuals' body image concerns to start impacting upon their physical activity. This appears to diminish in most older participants, but in some this is still a barrier sometimes changing from weight or shape based issues to health and fitness based concerns. The effects of disability, illness and injury also appear to cause variation in this relationship, further highlighting the importance of body image measures that consider elements other than weight and shape. There is also a view held by the other scoping review into body image and physical activity (as well as the review presented in this thesis), that body image measures require greater consistency. Both reviews also highlight the importance of positive body image measures (e.g. compassion/pride) and the issues with body image discrepancy and figure rating scales, which do not assess the distress or investment in one's body image (Sabiston et al., 2018).

The effects of body image on physical activity participation can also be mediated by factors such as self-determined motivation for exercise. The effects of these as well as compassion, shame and pride were examined in Chapter 3.

SHAME, COMPASSION AND PHYSICAL ACTIVITY (CHAPTER 3)

Chapter 3 reviewed the current literature on the self-determination theory (SDT) in relation to physical activity, compassion, shame and pride, body image and individual

differences. It demonstrated the predictive nature of behavioural regulation styles on physical activity behaviour. *Amotivation* and *external* regulation tend to negatively predict exercise behaviour, while more intrinsically motivated regulations positively predict it. *Integrated* and *identified* regulation appeared to be the most consistent and strongest predictors of physical activity, especially longer-term physical activity; however *integrated* has not been researched very extensively.

The SDT also appears to be affected by individual differences of age, gender, disability and BMI. There are also associations between self-determined motives for physical activity and body image, as well as self-compassion and body pride and shame.

SCALE DEVELOPMENT (STUDIES 1-3; CHAPTER 4)

In order for the role of body compassion to be evaluated, a measure of body compassion and criticism needed to be created. The 55-item BoCCS (see Appendix C-I) was developed from body compassionate writing texts from a previous study (Ouwens et al., 2019). Through EFA and CFA this was shortened to a 38-item scale and a factor structure of four factors was shown. The four factors are described below:

- Body Kindness: expressing kindness and understanding towards one's body, without criticism or judgement. Includes elements of gratitude, acceptance and comfort in one's own skin. Incorporates self-kindness, non-judgement, acceptance and sensitivity and distress tolerance from the first psychology of compassion (Gilbert, 2014, 2017b).
- Common Humanity: realisation/understanding that one's feelings are not just experienced by oneself, but by all humans, and are common among peers, family and strangers. Incorporates items whereby one accepts that one's feelings and concerns about one's body are normal, common and a part of the greater human experience (Neff, 2003a, 2003b).
- Motivated Action: motivation and actual attempts to change one's feelings and accept the positive as well as the negative. Incorporates elements of the second psychology including helpful attention, reasoning, feelings, behaviour, imagery and sensory skills to help develop body compassion. This also incorporates elements of mindful

awareness (Neff, 2003a, 2003b) keeping painful thoughts and feelings in balanced awareness.

- Body Criticism: isolating thoughts and feelings of criticism and judgement about one's body as well as worries and concerns about one's body. Incorporates self-criticism, over-identification with flaws or negative emotion and isolation.

The internal consistency, construct validity and test-retest reliability of the BoCCS was also demonstrated in Study 1. In Study 2 cross-validation was demonstrated with spontaneous expressions of body compassion as well as another measure of body compassion (the BCS; (Altman et al., 2017). In Study 3, text analysis indicated that body compassion was associated with affect word use, in particular sadness word use.

MODELS OF MOTIVATION AND BEHAVIOUR (STUDIES 4 & 5; CHAPTERS 5 & 6)

Chapter 5 involved a cross-sectional study (Study 4) of 310 people. Body compassion was shown to predict body pride/shame experienced currently as well as that anticipated if one were to gain or lose weight. More compassion shown towards one's body predicted more current and anticipated pride in one's body. Body pride and shame in turn predicted behavioural regulation, where greater shame predicted less self-determined motives for physical activity and greater pride predicted more self-determined motives. Differences were shown for the predictive ability of current pride/shame and anticipated pride/shame associated with weight gain for each behavioural regulation study.

Amotivation was predicted by increased shame in one's current body and by increased anticipated pride associated with gaining weight. There was also a significant effect of the interaction between body compassion and BMI on *amotivation*.

External regulation was positively predicted by BMI and increased shame in one's current body. *Introjected* regulation was predicted by increased anticipated shame associated with gaining weight as well as negatively predicted by body compassion.

Identified regulation was predicted by increased anticipated shame associated with gaining weight as well as predicted by increased pride associated with one's current body. *Integrated* regulation was predicted by increased anticipated shame associated with gaining

weight and with increased pride associated with one's current body. *Intrinsic* regulation was shown to be predicted by increased anticipated shame associated with gaining weight and increased pride associated with one's current body. For both *integrated* and *intrinsic* there was also a significant positive interaction effect of body compassion and BMI.

Current body pride and shame was positively predicted by gender and BMI and negatively by body compassion. Anticipated body pride and shame with weight gain was positively predicted by gender and negatively by body compassion and anticipated body pride and shame with weight loss was negatively predicted by gender, body compassion and BMI.

In Study 5 (Chapter 6), at 1-month follow-up *amotivation* was no longer significantly predicted by body pride and shame, however most of the other effects remained. MVPA was predicted negatively by *identified* regulation and positively by *integrated* and *intrinsic* regulation. Strength exercises were predicted negatively by *identified* regulation and positively by *introjected*, *integrated* and *intrinsic* regulation. Overall guidelines being met was negatively predicted by *identified* regulation and positively by *introjected*, *integrated* and *intrinsic* regulation.

INTERVENTION (STUDY 6; CHAPTER 7)

Study 6 (Chapter 7) investigated the effectiveness of body compassionate expressive writing in a sample of 111 18-25 year old undergraduates. It showed the effectiveness of body compassionate writing combined with physical activity guideline information in increasing MVPA by an average of 45 minutes per day. The other groups; active control (AC), implementation intentions (II) and combined (COMB) showed no significant change in physical activity behaviour. Body compassion in the II group was shown to significantly decrease overtime (with a significant increase in criticism), while other groups remained unchanged. This supports of previous findings from Powers et al. (2005) which suggested that the process of forming II increased self-criticism in participants.

Text analysis of the written texts produced through the expressive writing process investigated the potential mechanisms through which body compassionate writing was effective. It demonstrated that the body compassionate writing group wrote with significantly more certainty, which has also been previously associated with self-compassionate writing

(Urken, 2018), although a negative association has also been shown (Khoo & Graham-Engeland, 2014; Sawyer, 2017). In addition, the body compassionate writing and combined groups showed significantly more clout and less authenticity in their writing.

8.2 STRENGTHS AND LIMITATIONS

This research has a number of strengths, for example the inclusion of a large cross-sectional sample that was analysed for the development of the BoCCS (Chapter 4, Study 1) and for the testing of models of exercise motivation in Chapter 5 (Study 4). This research also demonstrated the validity of the BoCCS through comparison with written body compassionate texts, demonstrating the high validity of the kindness and criticism elements. This allowed for sophisticated statistical analysis such as CFA to help to develop and test the factor structure of the BoCCS and SEM in order to test the models of motivation and behaviour.

However, despite this, there were limitations to this research. The drop-out for the longitudinal elements of Chapters 5 and 6 (studies 4 and 5) was also quite high, leaving a smaller sample size than desired for the testing of models of physical activity. This meant that the models for testing here had to be slightly simplified such that body compassion, BMI and gender were not included. Had this been greater the indirect associations from body compassion to self-determined motivation could have been examined in more detail. There were also lower than ideal numbers in studies 2 and 3 which mean that the conclusions from these studies are limited. However sufficient power was shown for some of these results, particularly for overall BoCCS scores. These conclusions are therefore indicative of the potential of the BoCCS as a measure of body compassion, but further exploration of the validity and of the applications of the BoCCS are still required. For study 6 a priori power indicated that there was sufficiently large sample size for moderate power. It is clear that the effect of body compassionate writing requires further investigation to know its full effect. But, again this study gives preliminary evidence that this intervention is feasible and is indicative of its potential to improve physical activity.

The lower number of male participants in all studies here is also a limitation. The imbalance is especially notable in the studies with smaller samples such as Chapters 6 and 7 (studies 5 and 6). This meant that the role of sex in predicting exercise behaviour and in the

effectiveness of the intervention could not accurately be assessed and is something to be considered in future research.

There is a reliance on self-report here, although the BoCCS was developed for use in this research and was shown to be valid and reliable and validated against behaviour (spontaneous expression of body compassion and word use). Of more concern are the issues with self-reported BMI (Nawaz, Chan, Abdulrahman, Larson, & Katz, 2001; Pursey, Burrows, Stanwell, & Collins, 2014) and with self-reported physical activity. However, self-reported physical activity using the OSWEQ has been shown to be consistent with accelerometer, other self-report measures and with pedometers.

Finally, the final intervention study did not measure the role of pride and shame. Due to the timescale the final studies that were conducted in, the intervention study had to start before the full findings from Chapters 4 and 5 were known. Given the role of shame and pride in predicting physical activity motives, the role of pride and shame in the intervention could have been usefully assessed. However, given the effectiveness of the intervention that was demonstrated there is scope for future research testing the intervention further to include shame and pride to see the mechanisms through which the intervention works.

8.3 IMPLICATIONS

RESEARCH

This research described the development of body compassion, from compassion and self-compassion. It combines elements of compassion such as motivated action as well as the three elements of self-compassion; self-kindness, common humanity and mindfulness. It also follows theories of separate compassion and criticism components to self-compassion (López et al., 2015; Montero-Marín et al., 2016). Body compassion, like self-compassion (Neff et al., 2017; Tóth-Király et al., 2017) appears to fit a bifactor model, with total score and subscale scores supported. Body compassion appears to be significantly predictive of current body pride and shame as well as anticipated body pride and shame associated with significant weight gain and loss.

This research also helps add to the literature surrounding the SDT and OIT, specifically the literature around *integrated* regulation has been lacking (with the BREQ-2 which does not include *integrated* regulation being used instead), despite the measure to examine this existing for some years (Markland & Tobin, 2004; Wilson, Rodgers, et al., 2006). In Chapter 5 *integrated* regulation was shown to be predicted by body pride and shame and by an interaction between body compassion and BMI in a similar manner to that of *intrinsic* regulation. Body image anxiety has previously been shown to predict *external, introjected*, *integrated* and *intrinsic* regulations for exercise (Scioli-Salter et al., 2014), and the findings shown in Chapter 5 build on this by showing *integrated* regulation is also predicted by greater current pride in one's body and by greater anticipated shame with weight loss. Research has shown that *integrated* regulation is the best predictor of maintenance of physical activity behavioural consistency (Miquelon & Castonguay, 2017; Scioli-Salter et al., 2014) as well as the best predictor of strenuous exercise (Zafeiridou, Sarafi, & Vlachopoulos, 2014). In Chapter 6 this is supported where increased *integrated* regulation predicted increased MVPA, strength exercises and the meeting of overall physical activity guidelines (where it was the strongest predictor). The role of *integrated* regulation has previously not been highlighted due to difficulties in distinguishing it from *intrinsic* regulation and *identified* regulation (Miquelon & Castonguay, 2017) and it was therefore one of the last elements of the OIT to be applied to exercise behaviour (Wilson, Rodgers, et al., 2006).

In addition, the current research adds to the SDT and the OIT by demonstrating the roles of body pride and shame not just in one's current body size as demonstrated in previous research (Castonguay, Pila, Wrosch, & Sabiston, 2015; Sabiston et al., 2010), but also anticipated body pride and shame associated with weight gain. This adds a temporal element that appears to be especially important in *introjected* regulation, where current body pride and shame does not appear to play much of a role. *Introjected* regulation was also shown in Chapter 6 (Study 5) to be an important predictor of strength exercises, a key element of the NHS's guidelines for physical activity at all ages (NHS, 2018b, 2018d, 2018c).

Finally, body compassion was shown to be associated with physical activity behaviour in Study 6 (Chapter 7) where a body compassionate writing intervention was shown to increase the amount of time spent on moderate-vigorous physical activity behaviour. Figure 8.1 shows

an extended version of the model in Chapter 2 showing the relationships that were shown throughout the thesis. Integrating body compassion and body pride and shame into the SDT further, they may play a role in the motives and gains for physical activity, which have previously been shown to be associated with self-determined motives (Ingledew et al., 2014). Specifically, those motives and gains, and those associated with one's body such as weight management and appearance, health related motives and gains associated with strength, endurance and nimbleness. It is possible, for example, that body compassion and/or body pride and shame may act as mediators between these and self-determined motives.

THEORY

This thesis details the development of the theory and nomological network of a measurement of body compassion (BoCCS). This was shown to be theoretically related to compassion through associations in the factor structure of the BoCCS to the first and second psychologies of compassion detailed in chapter 3 (Gilbert, 2017b). Body Compassion incorporated elements of acceptance, helpful attention, tolerance and comfort (Gilbert, 2017b), which are also associated with Neff's conceptualisation of self-compassion (Neff, 2003a, 2003b; C. Germer & Neff, 2019; Neff & Knox, 2017). The BoCCS was also shown to be strongly associated with the key components of self-compassion: self-kindness, common humanity and mindfulness.

Body compassion is also shown to be associated with body pride and shame. Associations between self-compassion and shame are already well established in the literature (e.g. Ferreria et al., 2013; Gilbert, 2009, 2017a), with suggestions that in response to shame, self-compassion activates self-soothing responses (Gilbert, 2016b, Gilbert & Irons, 2005). Studies 1 and 4 also suggest that body compassion may show a similar effect in body shame, where in response to shameful and critical thoughts, body compassion actives feelings of kindness, acceptance and social safeness in one's body allowing for feelings of pride to emerge.

Body pride and shame is also explored in this research, specifically the temporal element behind body pride and shame and how this relates to body compassion and physical activity. It is suggested that current body shame plays the greatest role in self-determined and internal motives for physical activity. By contrast anticipated shame associated with (imagined)

weight gain is predictive of introjected motives for physical activity. The source of motivation in introjected regulation is often attributed to shame, guilt, worry and embarrassment. The present research highlighting that the temporal element that it may be the feelings of anticipatory shame suggest that this is not necessarily just to do with one's current body but how one might perceive changes to this body. The same effect was not shown in either direction for anticipated shame or pride associated with weight loss.

In line with research into the self-determination theory for physical activity, integrated and intrinsic regulation were shown to be the strongest positive predictors for medium-term physical activity. In other words, when exercise is integrated and internalised to a person's self, they do not feel guilt or shame if they do not participate or feel obliged to. They participate because they want to and they enjoy it.

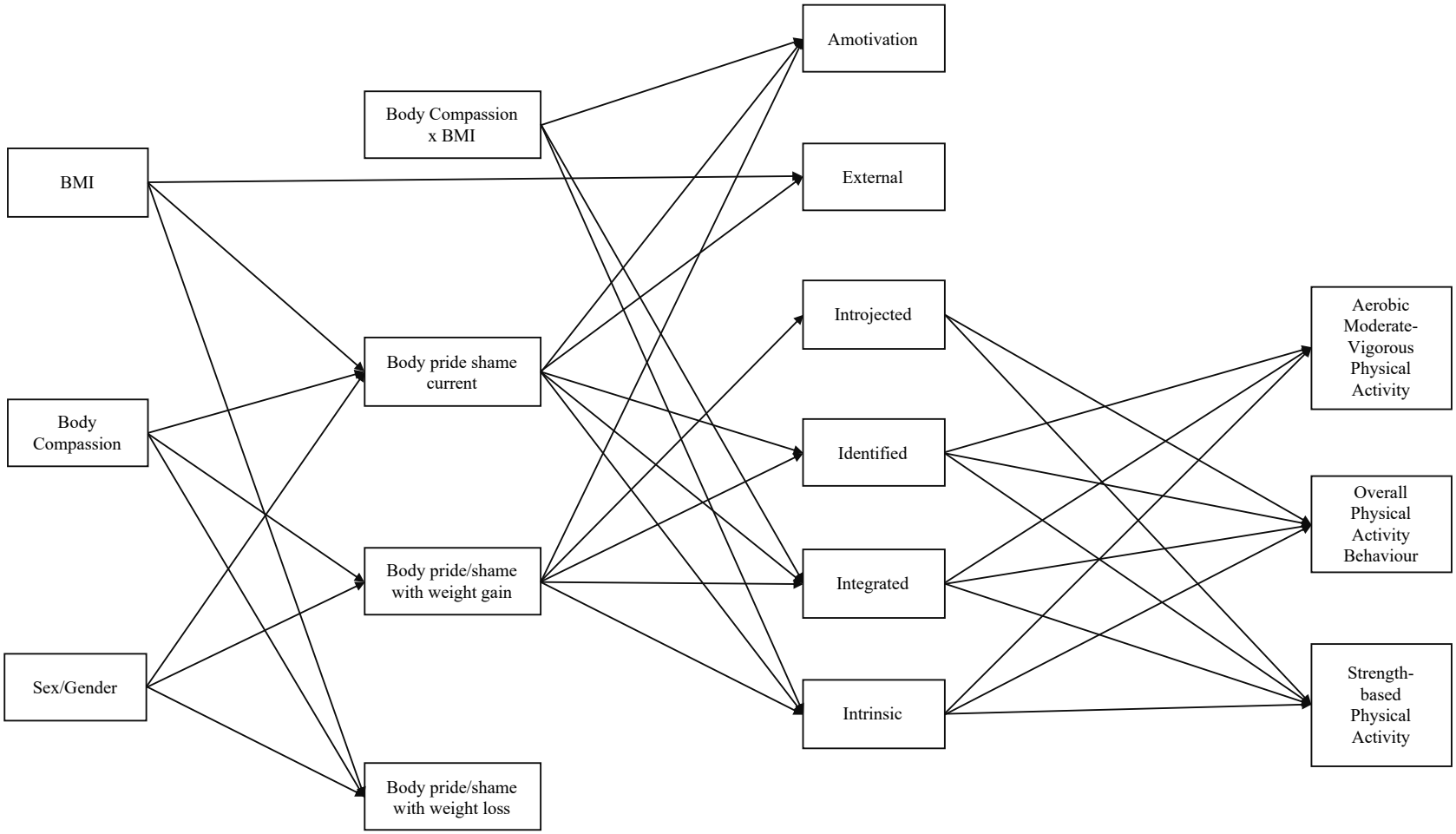

Figure 8.1 Model of the associations between body compassion, body pride and shame and physical activity motivation and behaviour, as investigated over the course of this thesis

In terms of research implications, Chapter 4 introduced and demonstrated the reliability and validity of the BoCCS to measure body compassion and criticism. This has potentially wide-reaching applications, a small sample of which is demonstrated in Chapter 4 in terms of the associations with eating pathology, physical activity (also shown in Chapter 5-7) and in terms of disability and mood. There are also research implications from Chapter 7, where the effectiveness of body compassionate writing was demonstrated. Again, this has wide reaching applications to clinical and healthy samples in order to improve body compassion, motivation for physical activity and behaviour. It may also have further applications that will be further highlighted further later on in this Chapter. The effectiveness of the intervention shown in Chapter 6 (Study 5) also has implications for practice. The demonstration of its effectiveness in a non-clinical student sample might lead to applications in younger samples where the issue of body image and physical activity participants might be similar, for example in colleges and schools such as those in the 14-18 bracket highlighted as high risk in Chapter 2. The intervention might also be applied to sport settings where similar self-compassion writing interventions have been shown to be effective (Mosewich et al., 2013). Health and clinical settings, for example in particular illness groups (e.g. cancer patients; Przezdziecki et al., 2016), might also benefit from this intervention. Given the multiple ways in which body compassion might be interpreted the body compassionate writing may be effective in those with body image issues concerning function, mobility, or health and fitness rather than appearance or weight and shape. This will be described in further detail below.

FURTHER DEVELOPMENT OF THE BODY COMPASSION AND CRITICISM SCALE

SHORT VERSION

Given the current state of the BoCCS with 38 items, concerns might be drawn about its length for studies that measure a number of different variables, for example to test complex models. In addition longer questionnaires are typically started and completed by fewer people (Galesic & Bosnjak, 2009). The subscales are also currently imbalanced and include possible overlap between items that might be confusing or unnecessary. Items such as “I am happy in the body I have, no matter what size it is” and “It is hard to accept that bodies are all different shapes and sizes” might also be too related to shape and weight to be useful in measuring other applications of body compassion. For these reasons the development and validation of a briefer

measure of body compassion and criticism would be useful in some of the potential applications mentioned below.

STATE BODY COMPASSION

In order to better assess short-term and immediate changes in body compassion, for example pre and post body compassion interventions, a state measure of body compassion is required. State measures of body image, such as the BISS (Cash et al., 2002) and physical appearance state and trait anxiety scale (PASTAS; Reed, Thompson, Brannick, & Sacco, 1991) have been shown to be useful in measuring the effectiveness of interventions for improving body image and eating disorders (Glashouwer, Neimeijer, de Koning, Vestjens, & Martijn, 2018; A. C. Kelly & Stephen, 2016; Moffitt et al., 2018). In addition a state measure of self-compassion and self-criticism has been developed and shown to be associated with depression, anxiety, stress and well-being (Falconer, King, & Brewin, 2015; Gilbert et al., 2017).

State body compassion, as opposed to the trait body compassion scale used in the present research studies might help to explain the lack of a change in Study 6, where only implementation intentions were shown to change.

APPLICATIONS OF BODY COMPASSION

DISABILITY AND MOBILITY

Body compassion may have theoretical and practical implications in areas where different elements of body image, such as functional or health/illness related body image, might play a role. For example, in disability and mobility. Research in development by Beadle et al., (2019) has shown that body compassion acts as a moderator of the relationship between disability and mood. For those with high body compassion, those with disabilities had more positive mood than those without disability, by contrast in those with low body compassion, disability was associated with lower mood than those without disabilities. Specific disabilities or mobility issues where body compassion might be applied are discussed below.

Body image concerns relating to thinness, loss of function (Potgieter & Khan, 2005), misperception of bodily features (Fuentes, Pazzaglia, Longo, Scivoletto, & Haggard, 2013), shame in one's body (T. Barrett, 2018) and the internalisation of negative social attitudes

(Taleporos & McCabe, 2002) have all been demonstrated in people with spinal cord injuries (SCI). Those with SCI also frequently report acceptance of their body changes, especially overtime as well as gratitude and appreciation and respect for their bodies (Bailey, Gammage, van Ingen, & Ditor, 2015; Potgieter & Khan, 2005; Taleporos & McCabe, 2002). This suggests a development of compassion for their bodies overtime, as they become more accepting and show respect and some even incorporate their wheelchair into their overall body image (Bailey et al., 2015; Chau et al., 2008; Potgieter & Khan, 2005). It is possible that body compassion in these individuals will develop overtime in such a way that those with recent paralysis might be more critical and less kind and accepting, with research showing they also have the tendency to separate the body (which they dislike) and the face (which they do like). But that over time those who have lived with their disability for longer would have a more compassionate, accepting and understanding approach and be more likely to integrate their entire self into their body image (Chau et al., 2008; Potgieter & Khan, 2005). Future research could examine this cross-sectionally, but also longitudinally examining the changes in body compassion overtime. Given the research demonstrated by Beadle et al. (2019) described above, it is also possible that length of time living with disability might play a role in the relationship between disability and body compassion.

Similarly, body image distress and concerns have been highlighted in those with amputations. Body image has been shown to be a significant predictor of psychological adjustment, quality of life and depression in amputees (Rybarczyk, Nyenhuis, Nicholas, Cash, & Kaiser, 1995). Those with amputations have also been shown to have significantly different appearance evaluations, fitness evaluations and orientations and health and illness orientations compared to non-amputee controls (Holzer et al., 2014) and cross-sectionally body image was shown to significantly differ in years since amputation (L. Ferreira, Meregui, Mainenti, Vigário, & Neves, 2018) and to be significantly different between older and younger amputees (Lam, Tang, Chau, Law, & Chan, 2019). Similarly, to those with SCI, these individuals might have changes in body compassion overtime that should be investigated. Relationships between self-compassion and body appreciation in amputees have been demonstrated (Farhat-ul-Ain & Fatima, 2016), suggesting a potential role of body compassion in improving body appreciation in amputees. This relationship appears to interact with prosthesis use, suggesting a role in helping with one's relationship with their prosthesis (Senra, Oliveira, Leal, & Vieira, 2012).

Those with long-term pain and discomfort have shown to have body image concerns, related to distorted body image (Lotze & Moseley, 2007). Patients with complex regional pain have been shown to misperceive the affected body parts, perceiving them larger than they are (Moseley, 2005), while patients with chronic back pain showed disrupted body image of the back while controls did not (Moseley, 2008). Pain intensity and body integrity beliefs in breast cancer patients are shown to be associated with depressive symptoms, while body image dissatisfaction is shown to mediate the relationship between pain and depressive symptoms (Teo, Novy, Chang, Cox, & Fingeret, 2015). Negative body image experimentally induced has been shown to be associated with lower pain threshold (Osumi, Imai, Ueta, Nobusako, & Morioka, 2014). Appearance concerns in those with pain were also shown to be affected by pain and mood (Sündermann et al., 2018). Relationships have also been shown between acceptance to pain and self-compassion (Costa & Pinto-Gouveia, 2011). Self-compassion is associated with coping, experiential avoidance, depression, anxiety and stress in those with chronic pain (Costa & Pinto-Gouveia, 2013). Self-compassion was also the best predictor of stress in those with chronic pain (Costa & Pinto-Gouveia, 2013). These suggest a role for body compassion in improving coping behaviour, reducing body image dissatisfaction and therefore possibly improving depressive symptoms, as suggested in Study 5 of Chapter 4 in this thesis.

Deaf women who show greater internalisation of mainstream beauty messages show a negative association with body image and disordered eating behaviour (Aldalur & Schooler, 2019). Body shame was also shown to mediate the relationship between internalisation of beauty messages and body surveillance on eating disorder symptoms (Moradi & Rottenstein, 2007). This suggests that body compassion might find a role in a number of disability groups in terms of reducing body shame and therefore eating disorder symptoms.

HEALTH/ILLNESS

Chronic illness-related shame has been shown to be associated with quality of life in social relationships and psychological health through fear of compassion from others (Trindade, Duarte, Ferreira, Coutinho, & Pinto-Gouveia, 2018). For those with irritable bowel disease, illness related shame was shown to partially mediate between symptoms and depressed mood, while self-judgement was also shown to partially mediate between illness-shame and depressed mood (Trindade, Ferreira, & Pinto-Gouveia, 2017). In breast cancer patients illness-

shame was shown to mediate between body image dissatisfaction and depressive mood (Trindade, Marta-Simões, Ferreira, & Pinto-Gouveia, 2018). Considering body compassion from an illness and health perspective may help to reduce illness-related shame in the same way as it has been shown to impact upon body-related shame, which might help to improve quality of life and mood in individuals with chronic illnesses.

Body-related shame has also been shown to impact on whether individuals engage in healthcare seeking behaviour. For example it has been shown to predict healthcare stress which in-turn predicts healthcare avoidance (Mensinger, Tylka, & Calamari, 2018). It has also been shown to predict physical health outcomes, mediated by health evaluation (Lamont, 2015). Body image has also been shown to play a role in health behaviours such as health screening (Andrew, Tiggemann, & Clark, 2016; Swami & Furnham, 2018) and in skin protection intentions (Gillen, 2015). Brought together these findings suggest a potential for body compassion to help reduce healthcare stress, improve healthcare-seeking behaviours and reduce illness-related shame.

Body image dissatisfaction or distress has been shown to be present in transplant patients (Sadeghian, Roudsari, Seyedfatemi, & Rafiei, 2016; Todd et al., 2012; Yagil, Geller, Levy, Sidi, & Aharoni, 2018; Yagil et al., 2015; Zimbrean, 2015; Zimbrean, Gan, Deng, & Emre, 2019). It has shown to be significantly correlated with psychological distress in kidney transplant patients, but not in healthy controls (Yagil et al., 2018) and with decreased quality of life indicators such as physical pain and general health (Yagil et al., 2015). Body image has also been shown to be related to wellbeing in kidney transplant patients (A. J. Hamilton, Caskey, Casula, Inward, & Ben-Shlomo, 2018) and increased anxiety and depression in liver transplant patients (Zimbrean et al., 2019). Disordered eating symptoms such as drive for thinness and body dissatisfaction were also shown to be significantly different in females with heart and lung transplants than healthy samples (Todd et al., 2012). It has been suggested that body image may be a deciding factor in transplant surgery for non-life-threatening conditions as well as potentially impacting patients' immunosuppressant regime (Zimbrean, 2015). Body compassion may aid these patients in reducing body image distress, shame and dissatisfaction, improving acceptance and kindness and helping improve their wellbeing and quality of life.

Another potential role of body compassion is in those with body changes, abnormalities or deformities. For example body image disturbance has been shown to be present in those with microtia (a form of ear deformity) and associated with lower life satisfaction (Awan, Samargandi, Aldaqal, & Sehlo, 2018). Body image concerns have also been highlighted in those with craniofacial conditions (Crerand, Sarwer, Kazak, Clarke, & Rumsey, 2017), burns (Kornhaber, Childs, & Cleary, 2018; Thombs et al., 2008), and implanted defibrillators (Frydensberg, Skovbakke, Pedersen, & Kok, 2018). The role of body shame has also been highlighted (Bergamasco, Rossi, da C.G. Amâncio, & de Carvalho, 2002; Coughlan & Clarke, 2002; Kent & Thompson, 2002; Kornhaber et al., 2018) suggesting a role for body compassion to help reduce this shame.

Body image concerns have been increasingly highlighted in patients with different forms of cancer and cancer survivors (Bai et al., 2019; Benedict et al., 2016; Chow, Chan, Leung, Wong, & Choi, 2019; Fan & Eiser, 2009; Fathi Aghdam, 2018; Fingeret, Teo, & Goettsch, 2015; Fobair et al., 2006; Lehmann, Hagedoorn, & Tuinman, 2015; Reese, Handorf, & Haythornthwaite, 2018; Rhoten, Murphy, & Ridner, 2013; Rowe et al., 2018). The importance of body image as an indicator of quality of life in these individuals has also been highlighted given the bodily changes by the disease and treatment (Hopwood, Fletcher, Lee, & Al Ghazal, 2001). In breast cancer patients and survivors the role of self-compassion and the use of self-compassionate writing in improving body image has been demonstrated (Przezdziecki et al., 2016, 2013; Sherman et al., 2018). The application of body compassionate interventions in this area and to other cancers and cancer survivors should be explored further.

PHYSICAL ACTIVITY AND SPORTS

There is a possible role of body compassion for use in athletes. Self-compassion has been shown to have potential in improving eudaimonic well-being and reducing shame in athletes (Ferguson et al., 2014; Ferguson, Kowalski, Mack, & Sabiston, 2015; Jeon, Lee, & Kwon, 2016; Mosewich et al., 2011). It has also been shown to work as a buffer against the effects of anxiety and worry, reducing avoidance-based coping in athletes (Huysmans & Clement, 2017). Brief interventions to improve self-compassion in athletes have led to reduced anxiety (Georgakaki & Karakasidou, 2017), while longer-term interventions have reduced self-criticism, rumination and concern over mistakes (Mosewich et al., 2013) plus demonstrating

reduced thin-ideal internalisation (Voelker, Petrie, Huang, & Chandran, 2019). However, brief interventions appear to have limited effectiveness for athletes (Reis et al., 2015). For those with body image related concerns, body compassion might be a useful tool to limit their effects on wellbeing and mental health of athletes. For example retired female athletes from aesthetic sports have described changes in their body image with a move towards feminine ideals, shame in their bodies and the loss of muscle leading to either satisfaction (more feminine) or dissatisfaction (increased fat) (Papathomas, Petrie, & Plateau, 2018). Retired athletes have also described lacking intrinsic motivation for exercise and being dissatisfied with their weight and shape (Plateau, Petrie, & Papathomas, 2017). Body compassion therefore has a potential as a tool to help in this transitionary period from athlete to retired athlete.

Female athletes have also been shown to have significantly lower physical self-efficacy than non-athletes. However they are also shown to be significantly lower in the self-critical subscales of self-compassion (Gummelt, 2017). This suggests that these athletes are not high in self-criticism about their bodies but still have lower perceptions of their functionality and appearance of their bodies, potentially suggesting a role of body kindness, common humanity or motivated action in these individuals. Athletes who recall critical comments about their weight or body report greater disordered eating and more intense anxiety and shame is associated with recalling these comments (Muscat & Long, 2008). The importance of dealing with self-criticism has also been highlighted however in managing setbacks in sport such as injury (Mosewich, Crocker, & Kowalski, 2014). It is possible therefore that body compassion may play a role in predicting comeback after injury; or in assisting in managing setbacks related to injury.

Perfectionism in sport has been shown to be related to shame-proneness (Ellison & Partridge, 2012), as well as related to self-compassion, rumination (Lizmore, Dunn, & Causgrove Dunn, 2017) and mediating between concern over mistakes and negative affect (Sagar & Stoeber, 2009). Perfectionism has also been shown to be related to muscle dissatisfaction and body fat dissatisfaction in males (Grammas & Schwartz, 2009). Perfectionism has also been demonstrated to have a role in health behaviours in athletes, such as steroid use in bodybuilders (Blouin & Goldfield, 1995), eating disorders in female athletes (Schwarz, Gairrett, Aruguete, & Gold, 2005) and male cyclists (Ferrand & Brunet, 2004). It

has also been shown to predict dietary restraint, mediated by body esteem, in synchronized swimmers (Ferrand, Magnan, Rouveix, & Filaire, 2007). It is notable that these sports people are in weight or aesthetic sports, where appearance or weight are deemed to be of high importance for success.

It is clear from Chapter 5-7 that body compassion has a role in predicting self-determined motives from physical activity, through body shame and pride. However, other factors may also play a role in this relationship and should be examined in future research. For example the roles of reasons for exercise (e.g. Ingledew & Markland, 2008), and goal reengagement (e.g. Semenchuk, Strachan, & Fortier, 2018), which have been associated with body image and self-compassion in previous research. The role of the fitness environment should also be considered as a place for intervention. The appearance-related focus of exercise classes has been criticised as a source of shame in exercise participants (Ebbeck & Austin, 2018; Engeln, Shavlik, & Daly, 2018; Rogers & Ebbeck, 2016), potentially leading to their stopping participation or yo-yo participation without maintained participation. This will be explored further later on, however this environment may benefit from intervention, in order to make this a less critical and shameful environment and a more compassionate one.

Body compassion/criticism may also play a role in predicting unhealthy exercise behaviour such as obligatory exercise. Research has also shown associations between obligatory exercise and athletic- and thin-ideal internalisation (Homan, 2010), body dissatisfaction and eating disorders (LePage, Price, O'Neil, & Crowther, 2012), weight related reasons for exercise, eating restriction and exercise behaviour (Thome & Espelage, 2007), drive for muscularity (M. E. Brewster, Sandil, DeBlaere, Breslow, & Eklund, 2017) and self-determined motives for physical activity (Edmunds et al., 2006; Magnus et al., 2010). Future research could examine the effects of body compassion in predicting obligatory exercise potentially through self-determined motives. There is also potential for examining the role of gender differences (Pritchard & Beaver, 2012), and the roles of shame and perfectionism in predicting obligatory exercise with body compassion (Mohammed, 2017).

BODY AND EATING DISORDERS

Body compassion has been shown to be associated with eating pathology (Beadle et al., 2019), being shown to be a better predictor of eating pathology than general self-compassion.

It has also been associated with body shame (Chapter 4, Study 1, Chapter 5, Study 4) and has clear applications for eating disorders. Body shame has been shown to be associated with depression and eating disorder symptoms (Cella, Iannaccone, & Cotrufo, 2019; Duarte, Ferreira, & Pinto-Gouveia, 2016; Fresnics, Wang, & Borders, 2019; Gois et al., 2018; Schaefer et al., 2018; Woodward, McIlwain, & Mond, 2019), as well as drive for muscularity and thinness (Girard, Chabrol, & Rodgers, 2018; Larison & Pritchard, 2019) and self-criticism (Duarte et al., 2016; Gois et al., 2018; Porter, Zelkowitz, & Cole, 2018). The cyclical nature of shame and eating disorders has also been highlighted suggesting that intervention in reducing shame and increasing compassion will reduce eating disorder symptoms, which will in turn reduce shame (A. C. Kelly & Tasca, 2016). Compassion-based interventions, such as compassion focused therapy have also been shown to be useful in the treatment of eating disorders, as well as in helping with weight loss and improving healthy eating behaviour (Pinto-Gouveia, Carvalho, Palmeira, & Castilho, 2019; Pratt, 2019; Rahimi-Ardabili et al., 2018; Steindl et al., 2017). There is also the possibility of body compassion playing a role in post-bariatric surgery patients, who may still experience the body image concerns of before surgery or have worse body image due to the excess skin and rapid weight loss (Busetto, Buongiorno, & Schiff, 2018)

The possible roles of fear of compassion (Dias, Ferreira, & Trindade, 2018; Oliveira, Ferreira, Mendes, & Marta-Simões, 2017), body surveillance (M. E. Brewster et al., 2017; Schaefer et al., 2018; Solomon-Krakus & Sabiston, 2017; Woodward et al., 2019) and individual differences such as race (Schaefer et al., 2018), age, BMI and gender should also be examined.

SDT has also been investigated with respect to eating disorders (Hricova, Orosova, & Bacikova-Sleskova, 2018; Kopp & Zimmer-Gembeck, 2011; Matusitz & Martin, 2013; Verstuyf et al., 2012). The roles of body compassion and of body pride and shame, which has already been associated with eating disorders (Troop, 2016), may therefore act in a similar way as demonstrated in Chapters 5 and 6 and as shown in Figure 8.1. This might also be investigated in future research.

Body compassionate writing has been shown to be effective in physical activity motives and behaviour. It might also be applied to populations where body-image related self-compassionate writing has previously been shown to be effective such as cancer patients (Przezdziecki et al., 2016, 2013; Sherman et al., 2018) or those with skin conditions (Sherman, Roper, & Kilby, 2019). They might also be applied to those with eating disorders, athletes and sports people, those with illness-related shame and those with disabilities as described above. However, the details of the intervention might need to be adapted for some of these applications. Brief interventions have demonstrated limited effectiveness in some samples (e.g. Reis et al., 2015) and the timescale through which this intervention is effective is currently limited to 1 month. The 3-day writing (Ouwens et al., 2019), single-day (Chapter 7) and longer-term writing time periods should be examined in future research as well as looking at the effects over the longer-term (e.g. 3, 6, 12 months), to see the longer-term effects.

Body compassionate elements might also be usefully added to other compassion-based interventions for example guided imagery. This would be useful in those who cannot or would rather not write, such as those with limited mobility or disabilities that limit writing. It might also allow for combination or programmes of interventions to be developed involving imagery and writing elements. It could also improve the range of participants that could take part as it could more easily be conducted online or at a distance from the researchers.

Compassion-based interventions have also been developed as full programmes, for use in both clinical and non-clinical populations. For example compassion focused therapy (CFT) or compassionate mind training (CMT) (Gilbert, 2009, 2010) have been used in clinical samples such as those with bipolar disorder (Lowens, 2010), psychosis (Ellerby, 2014; Kennedy & Ellerby, 2016), personality disorders (Lucre & Corten, 2013) and have been adapted for use in eating disorders (Gale et al., 2014; Goss & Allan, 2012; A. C. Kelly & Carter, 2015; A. C. Kelly et al., 2017; Steindl et al., 2017). They have also been shown to be effective in non-clinical populations by reducing smoking (A. C. Kelly, Zuroff, Foa, & Gilbert, 2010) and in reducing acne related distress (A. C. Kelly, Zuroff, & Shapira, 2009). For non-clinical populations individual exercises or sets of exercises are often used (e.g. Albertson et al., 2014) from CFT, CMT or mindful-self-compassion (MSC; Germer & Neff, 2013; Neff & Germer,

2013). For clinical populations, a specially adapted or created programme of treatment is more common. It is possible therefore that, for some of the applications of body compassion described above, it might be necessary to create or adapt a programme of body compassionate treatment. For example, in coping with disability, it is more likely to require longer process of developing compassion, and a longer-term intervention incorporating a number of exercises might be more effective. Compassion-based interventions often include elements of compassionate writing (expressive writing or compassionate letter writing), imagery and/or meditation elements and psychoeducation (e.g. introducing the key concepts of compassion). Even if different means of developing body compassion need to be applied, the BoCCS (or a state version of the BoCCS) could be useful to determine the process of change.

BEYOND BODY COMPASSION

The focus on body compassion puts the responsibility of coping with societal demands for body image with the individual. The scoping review in Chapter 2 demonstrated that elements of school sport and PE lessons around the world are affecting individuals' (especially girls) experiences of sport. For example, changes such as uniform changes or female and male only sessions might reduce the effect of body image on attitude towards and motives for physical activity, as well as physical activity behaviour outside of school and once school is completed (Coakley & White, 1992; Cockburn & Clarke, 2002; L. Cox et al., 2006; Flintoff & Scraton, 2001; James, 2000; Orme, 1991; W. C. Taylor et al., 2000; Walseth et al., 2017). Additionally, the fitness industry (fitness classes, centres, gyms) has been shown to have a focus on weight loss, toning and sculpting, with many mirrors and posters depicting 'ideal' bodies (Prichard & Tiggemann, 2008). Mirrors have been shown to produce more negative feelings (Martin Ginis, Jung, & Gauvin, 2003) and more social physique anxiety and appearance comparison (Frayeh & Lewis, 2018) compared to non-mirrored exercise environments. Beyond mirrors the fitness centre environment has been shown to have a negative effect on body image (Prichard & Tiggemann, 2005), with fitness centre members showing more self-objectification, self-surveillance and disordered eating (Slater & Tiggemann, 2006). Fitness instructors have also been shown to be appearance and weight focused, especially when it comes to aerobics classes (D'Abundo, 2009; Engeln et al., 2018; O'Hara et al., 2014). When classes are more functionally focused (improving stamina,

endurance or strength) participants have been shown to have significantly greater increase in body satisfaction compared to appearance focused (Engeln et al., 2018). These suggest that changes in fitness and sports environments such as school lessons, fitness centres and fitness classes, might reduce body criticism and shame, negating the need for these individuals to have interventions to improve body compassion. It is also possible that in developing body compassion in trainers, instructors, teachers and/or coaches that these environments might become more compassionate, to benefit these individuals as well as those they influence and effect through their training and tutelage.

It is also important to add the importance of societal ideals, such as unattainable 'ideal' images of the female and male body (Collins, 1991; Fallon & Rozin, 1985; Leonhard & Barry, 1998; McKinley, 1998, 1999; Olivardia et al., 2004; Pope et al., 2000; Thompson et al., 1999; Thompson & Stice, 2001). However the effect of this exposure to these ideal body images can be reduced through media literacy training (Yamamiya, Cash, Melnyk, Posavac, & Posavac, 2005) and by improving the range of bodies shown in advertising and shop windows. The societal body ideal, although changing throughout history, has existed for hundreds of years and is less likely to be changeable than the policy changes that might be implemented in the environments in which people exercise. Until these changes are made, however, there will be a role for more compassionate individuals and for more compassionate environments in schools and gyms. Even with these changes, there would still be a need for compassion-based intervention in order to adapt to changes, for example in disability or illness.

8.4 CONCLUDING COMMENTS

The current programme of research highlights the importance of body compassion and body pride and shame in predicting motives for physical activity and behaviour. It also demonstrates the potential use of body compassionate writing in increasing physical activity behaviour in young people.

Future research should explore the associations between body compassion, body pride and shame and the self-determination theory (especially in physical activity), in order to explore other potential variables such as reasons for engaging in exercise. It should also explore other applications for body compassion such as in predicting eating behaviour (healthy and/or disordered). The use of body compassionate writing and other body compassionate interventions should also be explored as well as investigating the mechanisms through which this is effective.

The importance of environment and society in body image and the role of exercise environments in enabling unhealthy comparison and competition must also be addressed. Changes to these environments will help to build a compassionate environment such that the focus can be placed on those who need additional support to cope with body changes and differences.

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List of Appendices

APPENDIX A SYSTEMATIC SEARCHES AT SCOPUS AND PUBMED AND THE NUMBER OF HITS FOR EACH INDIVIDUAL SEARCH AND THE COMBINED SEARCHES

Search term	Term type	Scopus hits	PubMed hits
Interventions	All fields	5,906,535	1,767,247
Randomized	All fields		
Randomised	All fields		
Trial	All fields		
Clinical Trial	Keyword/MeSH		
Clinical Trials	All fields		
Placebo	All fields		
Randomly	All fields		
Body image	Keyword/MeSH	742,726	236,057
Body image	All fields		
Body dissatisfaction	All fields		
Body satisfaction	All fields		
Appearance	All fields		
Body anxiet*	All fields		
Social physique anxiet*	All fields		
Body esteem	All fields		
Body attitude	All fields		
Body concern	All fields		
Body image disturbance	All fields		
Body dysmorphia	All fields		
Adult	All fields	9,565,737	6,927,766
Adolescent	All fields		
Self-determination theory	All fields	180,316	144,846
Motivation	Keyword/MeSH		
Exercise motivation	All fields		
Intrinsic motivation	Keyword/MeSH		
Extrinsic motivation	Keyword/MeSH		
Reasons for exercise	Keyword/MeSH	496,039	357,332

Barriers to exercise	All fields	
Physical activit*	Keyword/MeSH	
Physical exercis*	Keyword/MeSH	
Exercis*	Keyword/MeSH	
Physical inactivit*	All fields	
Barriers to exercis*	Keyword/MeSH	
All Combined	3,950	69

Note: PubMed was used as it a large database focused on medical and life sciences research, while Scopus is the largest abstract and citation database of peer-reviewed literature.

APPENDIX B SUMMARY TABLE OF STUDIES IN THE SCOPING REVIEW

No	Countries/ island(s)	Ethnicities/Race	Ages	Genders	BMI	Disabilities/ patient group	BI measure	PA measure
Garrett (2004)	Australia	X	"Final year of schooling".	F only	X	X	Qualitative	
Atalay & Gençöz (2008)	Turkey	X**	17-25 (M=20.07, SD= 1.63).	F only	32.2% UW, 61% NW; 6.8% OW.	X	Custom question	Exercisers vs. non
Duncan et al (2004)	UK	176 White, 34 Black, 67 Asian	11-14 (M=12.5±0.8)	166 M, 111 F	X	X	BES-Children	4x1 day PA recall
Bassett & Martin Ginis (2009)	Canada	X	M=42.30±11.23	M only	X M_{weight}=77.72kg $M_{waistcirc.}$=88.17cm $M_{bodyfat}$=25.39%	50% paraplegia 50% tetraplegia	Adult Body Satisfaction Questionnaire	Physical Activity Recall Assessment
Kołoło et al (2012)	Poland	X*	All 15-year olds	1086 M, 1191 F	X	X	Customised body image subscale of HBSC	Moderate-Vigorous PA scale of HBSC
Chen et al (2010)	Taiwan	X***	13-16 years	F only	24.1-31.6 kg/m^2 (5 obese, 8 OW)	X	Qualitative	

Abbott & Barber (2011)	Australia	82% Caucasian, 7% Asian, 2% Aboriginal/ Torres Strait Islander, 9% other.	13-18 (M=14.6±1.08)	F only	9-62 kg/m^2 (20.7±3.84)	X	Embodied Image Scale	Custom Sport and PA questions
Sands et al (1997)	Australia	X	10-12 years	35 M, 26 F	X	X	BES. "Eating and Me"-modified EDI.	Custom
Laus et al (2011)	Brazil	X****	14-18 (M=16.2±1.0)	139 M, 136 F	M: 16.0-35.6 (M=22.0±3.8) F: 16.9-35.6 (M=21.7±3.5)	X	Contour Drawing Scale	IPAQ
Mama et al (2011)	USA	262 African Am., 148 Hispanic or Latina	M=45.2±9.3	F only	M=34.6±8.7	X	Adapted Pulver's Body Image Questionnaire	IPAQ
Kopcakova et al (2014)	Slovakia	X*	11-15 years (M=13.13±1.35)	48.6% M, 51.4% F.	M_m: 19.75±3.33 M_F: 18.96±2.99	X	HBSC	HBSC
Deforche et al (2006)	Belgium	"Predominantly white origin"	13-15 year olds: M_{NW}=14.6±0.9 M_{OW}=14.8±1.0 M_{Ob}=14.4±1.1	Mostly F: NW=70% OW=79% Ob=68%	M_{NW}=18.8±1.2 M_{OW}=25.9±1.3 M_{ob}=33.7±4.1	X	"Barriers and benefits to PA"	Modified Baecke PAQ
Cox et al (2006)	UK	87% White, 12% Asian, 1% Black	15-19-year-olds	F only	X	X	Qualitative	

Markland & Ingledew (2007)	UK	X	M_{male}=16.9±0.74 M_{fema}=16.88±0.79	50 M, 48 F	M=14-27.1 (M=20.5±2.83) F=15.5-27.0 (M=21.36±2.38)	X	Body size discrepancy with SFRS	Godin LTEQ
Anton et al (2000)	USA	85% Caucasian, 9% Hispanic, 4% African Am., 1% Asian Am., 1% other	18-29 years (M=20.5±2.3)	F only	17.5-32.4 kg/m^2 M=22.2±3.0	X	Body Discrepancy Scale	Baecke PAQ
Markland (2009)	UK	X	18-55 years (M=29.16±11.41)	F only	X	X	Body Size discrepancy SFRS	Godin LTEQ
Sabiston et al (2010)	Canada	84.3% Caucasian, 9.32% Asian, 2.05% Black, 2.71% Hispanic, 1.62% 1st Nations /Aboriginal.	18-68 years (M=29.82±15.20)	F only	X	X	Body Related Self-Conscious Emotions	Godin LTEQ
Pila et al (2016)	Canada	36% Caucasian, 23% Aboriginal, 14% Asian, 11% Arabic/W. Asian, 3% S. Asian, 7% African Can., 6% other	18-26 years (M=20.92±1.84)	40 M, 47 F	17.97-33.06 M_{fem}=22.04±3.31 M_{male}=25.46±0.99	X	Appearance subscale of MBSRQ	Total minutes per day of Moderate-Vigorous PA.
Kantanista et al (2015)	Poland	X*	14-16 years (M_{fem}=15.05 M_{male}=15.10)	1547 M 1702 F	X	X	Feelings & Attitudes Towards the Body Scale-BIS	MVPA using PA screening measure

Coelho et al (2015)	Brazil	X****	35-64 year olds (24.71% 35-44; 43.93% 44-54; 31.36% 55-64)	54.4% female	37.20% NW 39.87% OW 22.93% Ob	X	Custom and Silhouette Rating Scale	IPAQ
Coakley & White (1992)	UK	85% White British 15% other (inc. Black African, Asian, Indian or West Indian)	13-23 years	34 M 26 F	X	X	Qualitative	
Flintoff & Scraton (2001)	UK	"Mostly White"	15 years	F only	X "Mostly mesomorph"	X-"mostly able-bodied"	Qualitative	
Cockburn & Clarke (2002)	UK	X	13-14 years	F only	X	X	Qualitative	
Zabinski et al (2003)	USA	OW: 78.8% White 6.3% Hispanic, 2.5% African Am., 3.8% Asian, 1.3% Native Am., 7.5% multi/other. Non-OW: X-population similar to OW.	M_{OW}=12.6±2.2 M_{Non}=12.1±0.9	OW 70% female Non-OW 49% female	M_{OW}=32.2±5.7 M_{non}=18.0±2.2	X	Barriers to PA scale	
Kruger et al (2008)	USA	7218 White, 1279 Black, 924 Hispanic, 600 Other (e.g. Asian, Native Hawaiian etc.)	≥18 years (no further detail given)	4396 M 5625 F	UW=214 NW=4137 OW=3552 Ob=2118	X	Custom body satisfaction	Custom MVPA questions

Symons et al (2013)	Australia	X	M_{yr7}=12.23±0.48 M_{yr11}=16.18±0.69	F only	M=21.2±3.9	X	WHO cross-national survey	Custom
Withall et al (2011)	UK	1: 90.6% white, 5% Black/Afro-Caribbean, 1.4% Asian, 2.95 other	<18=16.4%, 18-34=14.3%, 35-54=10.7%, ≥55=58.6%	22.2% M 77.8% F	5% UW 49.6% NW 45.5% OW/ob	X	X-motives	Duration and regularity
		2: 31 White, 1 Asian, 1 Black	18-24=3, 25-34=8 35-44=11, 44-54=9, ≥55=2	10 M 23 F	X	X	Qualitative	
Wetterhahn et al (2002)	USA	X	20-89	36 M 20 F	X	Lower limb amputees	MBSRQ Amputee BI Scale	"Active" or "minimally active"
Neumark-Sztainer et al (2006)	USA	48.3% White 18.9% African Am 5.8% Hispanic 19.6% Asian 3.6% Native Am. 3.8% Mixed/ Other	1/3 in younger group M=12.8±0.8 2/3 in older group M=15.8±0.8 M_{Young}=17.2±0.6 M_{older}=20.4±0.8	44.9% M 55.1% F	Measured but unreported. Controlled for in results.	X	Body Shape Satisfaction Scale	LTEQ
Jensen & Steele (2009)	USA	6.6% African Am. 5.8% Asian 59.2% Euro. Am. 9.7% Hispanic 6.3% Native Am. 10% Other 2.1% Biracial	M=10.8±6.5	54% M 46% F	X	X	Collins' Figure Rating Scale	Self-Administer. PA checklist

Finne et al (2011)	Germany	X Migrant status 17.4%	11-17 (M=14.62±0.018)	48.7% M 51.3% F	X $M_{BodyFat}$=22.74±0.166	X	Custom	Custom
Felts et al (1996)	USA	54.2% White 19.6% Black 19.7 Hispanic Rest excluded	14-18 years	48.8% M 51.2% F	X	X	Custom Youth Risk Behaviour Surveillance	Youth Risk Behaviour Surveillance
Taylor et al (1999)	USA	TX (n=13): 12 African Am., 1 Latino CA (n=21): 16 African Am., 5 Latino.	M_{TX}=13.6 (12-15) M_{CA}=12.3 (11-14)	F only	X	X	Qualitative	
Yancey et al (2006)	USA	2477 White 2484 Latino 658 African Am. 678 Asian/Pacific Islander	18-64	44.6% M 55.4% F	2915 Average W 2256 OW 1287 Ob.	X	Perception of being OW	IPAQ
Frisén & Holmqvist (2010)	Sweden	X*	M=14.07±0.26	F only	X	X	Qualitative	
James (2000)	Australia	X	Approx. 16 years	F only	X	X	Qualitative	

Smith (2013)	UK	Caucasian only	21-37 years	M only	X	Spinal Cord Injuries	Qualitative	
Slater & Tiggemann (2011)	Australia	X	12-16 years (M=14.47-0.62)	382 M 332 F	M_{Male}=20.33±3.33 M_{Fem}=19.96±2.82	X	Appearance Anxiety Scale	Custom Sport & PA
Slater & Tiggemann (2010)	Australia	X	13-15 years	F only	X	X	Qualitative	
Mabry et al (2003)	USA	35 African American 14 White	14-18 years	F only	X	X	Qualitative	YRBS-less or more active
Ashton et al (2017)	Australia	X	M=20.8±2.3	M only	M=25.3±5.1	X	Qualitative	
Aguirre-Loaiza et al (2017)	Colombia	X****	18-60 years (M=27.5±10.0)	65.4% M 34.5% F	Measured but figures not given	X	Figure Rating Scale	Custom PAQ

Patte et al (2016)	Canada	F: 80.2% White, 2.1% Black, 5.5% Aboriginal, 1.9% Asian, 1.6% Hispanic, 8.8% Mixed/other. M: 79.2% White, 3.7% Black, 4.5% Aboriginal, 2% Asian, 1.7% Hispanic, 8.9% Mixed/other	14-18 years	7425 M 8256 F	X	X	Weight perception	Custom PA
Lodewyk & Sullivan (2016)	Canada	86% Caucasian (no other details)	M=15.13±3.25	196 M 198 F	X	X	Body Size 'Discrepancy'Measure altered to dis-satisfaction	Fitness Indices in PE, fitness grade in PE, Fitness level, Freq of active exercise
Porto et al (2016)	Brazil	X****	19-60 years (M=34.3±8.5)	M only	X	Acquired paraplegia	New scale for Body & Sexual esteem	Athletes vs. non-athletes
Arigo et al (2016)	USA	58% Caucasian, 18% Asian, 11% Black, 13% Other	M=18±0.44	F only	M=23.65±2.88	X	MBSRQ	Pedometer
Dikareva et al (2016)	Canada	X	35-61 years	F only	23.0-43.8 kg/m^2 (post-surgery)	X	Qualitative	IPAQ

Nikniaz et al (2016)	Iran	X*****	18-60 (M=26.62±9.17)	F only	M=25.58±6.43	X	SFRS	IPAQ
Blanchett-Sylvestre & Meilleur (2016)	Canada	64.7% Caucasian 2.3% Hispanic 17.9% Asian 2.9% African 4.6% other 7.5% mixed	12-19 years (M=14.77±1.5)	F only	12.94-30.90 kg/m^2 (M=20.03±3.05)	X	BSQ EDI-2	Custom PAQ
Goodwin et al (2016)	UK	97.3% British. 97.3% White British	14-16 years (M=14.80±0.67)	168 M 249 F	M_{Male}=21.12±3.06 M_{fem}=20.73±3.27	X	EDI	Custom and LTEQ
Biolcati et al (2016)	Italy	X	15-18 years (M=16.36±0.70)	336 M 507 F	M_{Male}=21.49±2.56 M_{Fem}=20.35±2.70	X	Body Investment Scale	Custom PAQ
Tennant (2017)	USA	All African American	21-60 years (M=40.86±5.34)	F only	34.60-55.58 kg/m^2 (M=40.86±5.34)	X	Body Areas Satisfaction Scale-MBSRQ	Godin LTEQ
Stapleton et al (2016)	Australia	Gym: 83% Caucasian Non-Gym: 80% Caucasian	Gym: 18-65 years (M=33.83±11.44) Non: 18-63 years (M=38.93±10.87)	M only	Not reported but groups did not significantly differ: p=0.717	X	BIAQ EDE-Q	Gym users vs. non-gym-users.

Jachyra & Gibson (2016)	Canada	X	12-14 years	M only	X	X	Qualitative	
Coelho et al (2016)	Portugal	X*	10-18 years (M=13.32±1.59)	53.7% M 46.3% F	77.1% NW, 18.5% OW, 4.3% Obese	X	SBRS	Sports frequency level
Ornelas et al (2016)	Mexico	X****	18-33 years (M=21.15±2.61)	M only	X	X	Contour drawing rating scale	372 sports players, rest not.
De Mesa et al (2016)	Spain	X*	M=21.40 years	26 M 44 F	X	X	BSQ	Play sports: yes or no?
Fraguela-vale et al (2016)	Spain	X*	≤17=13.8% 18=43.3% 19=24.7% 20+=18.2%	49.8% M 50.2% F	X	X	Custom	Leisure-time activities
Sampasa-Kanyinga et al (2017)	Canada	58.9% White 7.0% Black 10.4% East/SE Asian 11.4% South Asian 12.3% Other	11-20 years	51.6% M 48.4% F	Measured but not reported	X	Body weight perception Dissatisfaction with body weight	Custom: how many days ≥60 min/day of last 7 days?
Del mar bibiloni et al (2017)	Balearics	66% Balearic 21.1% Spain 9% South American 2.9% other	704 18-25 years 377 36-55 years	451 M 630 F	M=24.6±4.9	X	SFRS	IPAQ

Chae et al (2017)	South Korea	X******	15-18 years	41.7% M 58.3% F	6.6% UW 80.4% NW 7.3% OW 5.7% Ob	X	BES-Adolescents & adults	PAQ-Adolescents
Michels & Amenyah (2017)	Ghana	Akan=45.7% Ga-Adengme=24.6% Ewe=16.5% Northern=12.4% Other=0.8%	11-18 years (M=15.5±1.8)	47.6% M 52.4% F	4.6% UW 75.9% NW 19.5% OW/ob	X	SFRS	IPAQ
Wilkinson et la (2017)	USA	Mexican Americans: 372 US-born 126 Mexican-born	14-19 years	477 M 498 F	US M: 14.67-53.64 US US F: 14.88-58.0 MX F: 14.57-35.9	X	Figure Rating Scale	YRBS
Sani et al (2016)	Iran	X*****	20-60 years (M=35.24±6.53)	F only	M=26.36±3.96	X	SFRS	Perceived Physical Fitness Scale
Edman et al (2015)	Hawai'i	89 Native Hawaiian 106 Filipino 151 Japanese	M_{Male}=22.26±6.41 M_{fem}=22.73±6.15	40% M 60% F	M_{Male}=25.65±6.0 M_{fem}=23.94±5.7	X	Figure Rating Scale	No. weekly hours exercised and intensity (mild-intense)
Alipour et al (2015)	Iran	X*****	18-35 years (M=22.16±2.19)	F only	M=22.19±3.40	X	SFRS	Min/week
Aşçi et al (1997)	Turkey	X**	Grades 9-11 (approx. 15-17 years)	M only	X	X	Berscheid BIQ	Athletes (174) vs. non (174)

Bastug (2011)	Turkey	X**	Athletes: 28.3% 18-20, 20.8% 21-23, 27.5% 24-26, 13.3% 26+ Sedentary: 28.1% 18-20, 45.5% 21-23, 23.1% 24-26, 3.3% 26+	M only	X	X	MBSRQ	120 Athletes vs. 120 sedentary
Beltrán-Carrillo et al (2016)	Spain	X*	17-18 years	13 M 7 F	X	X	Qualitative	Active vs. inactive
Bevans et al (2010)	USA	79.2% White 19.7% African Am. 1.2% Other 5.9% Hispanic	10-14 years (M=12.2±1.2)	48.1% M 51.9% F	X	X	Health Pathways Child-report BI scale	Engagement in PE (custom) & Health Pathways Child-report PA Scale
Boujut & Déchamps (2012)	France	X	M=18.7±1.4	381 M 690 F	X	X	Koleck et al BIQ	Frequency of activities
Bowker et al (2003)	Canada	"Mostly white"	M=16.1 years	40 M 60 F	X	X	BES	Sports participation (custom)
Bratland-Sanda & Sundgot-Borgen (2012)	Norway	X*	12-18 years	599 M 550 F	M_{male}=20.4±2.7 M_{fem}=19.7±2.9	X	EDI-2	Custom

Butt et al (2011)	USA	"Similar racial distribution to the US" "10-20% African American"	13-16 years	460 M 703 F	X	X	Expected outcomes and barriers to PA	Self-administered PA checklist.
Carmon et al (2015)	Spain	X*	M_{PE}=36.94±7.78 M_{adol}=14.00±1.41	PE: 81.5% M 18.5% F Adol: 51.1% M 48.5% F	$M_{PETeachers}$=24.35± 3.29 M_{AdolM}=21.64±3.83 M_{AdolF}=21.22±3.48	X	Gardner et al (1999) Figure Scale BIAQ	Physical Activity Index
Chen & Wang (2012)	USA	African Americans	10-13 years	50.5% M 49.5% F	37% OW (33.4% for M & 41.6% for F).	X	SFRS Weight perception	Custom
Çok (1990)	Turkey	X**	11-18 years	M&F no exact figures given	X	X	BI satisfaction questionnaire	Custom
Davison et al (2007)	USA	Non-Hispanic White	11 year olds (M=11.33±0.28)	F only	X	X	BES-Adolescents & Adults	Children's PA scale Accelerometer
De Bruin et al (2009)	Nether-lands	X*	13-18 years (M=15.3±1.1)	F only	M_{Non}=19.73±1.67 M_{NPart}=19.54±2.44 M_{WPart}=21.3±2.6	X	Contour Drawing Rating Scale	Non-participants vs. non-weight part. Vs. Weight Part.

Duin et al (2015)	USA	Unclear-for most focus groups but 2 groups were Hispanic women & American Indian women	18+	1) 213 M 187 F 2) 24 M 110 F	X	X	Qualitative	
Dwyer et al (2006)	Canada	35% Asian 24% White 22% Black 1% Latin American 8% other 10% multi	15-16 years	F only	X	X	Qualitative	
Evans (2006)	UK	X	13-16 years	F only	X	X	Qualitative	
Francisco et al (2013)	Portugal	X*	M=15.34±2.12	272 M 453 F	M_{FElite}=19.16±2.15 M_{FNE}=19.52±2.55 M_{Fcon}=20.36±2.88 M_{MElite}=20.43±2.71 M_{MNE}=21.43±3.29 M_{Mcon}=21.10±3.30	X	Contour Drawing Rating Scale	Elite aesthetic athletes, non-elite aesthetic athletes and controls
Fulkerson et al (1999)	USA	90% Caucasian	15-18 years	369 M 309 F	M_{MAth}=22.5 M_{MNA}=22.3 M_{FAth}=21.5 M_{FNA}=21.6	X	EDI	Athletes vs. non-athletes
Gillison et al (2011)	UK	X	13.88-15.64 years (M=14.93-0.3)	157 M 153 F	M_{Male}=19.82 (drop) - 20.78 (avoid) M_{Fem}=20.08 (take)-21.53 (maintainers)	X	Body Change Inventory	LTEQ-Maintainers, Dropouts, Take-ups and Avoiders

Greguol et al (2014)	Brazil & Italy	X	8-14 years	23 M 18 F	Overall: 13.7-27.7 (M=19.76±3.67) Brazil: 15.7-27.7 (M=21.18±3.96) Italy: 13.7-24.4 (M=18.55±2.96)	X	Offer Self-Image Questionnaire	PAQ-Children
Guinn et al (1997)	USA	Mexican Americans	13-15 years (M=14.4)	F only	15.30-36.58 (M=22.42±4.22)	X	Secord-Jourard Body Cathexis Scale	Public Health Service activity index
Hausenblas & McNally (2004)	USA	72.1% Caucasian 19.2% African American	M=19.75±3.92	76 M 140 F	Measured as covariate but figures unreported.	X	EDI-2	LTEQ
Hulens et al (2002)	Belgium	X	16-65 years	F only	214 OW ≥27.5 82 Lean ≤26.0	X	Body Attitude Scale	Baecke PAQ
Hurley et al (2013)	USA	92% Caucasian 5% Hispanic	50-97 years (M=64.8±10.9)	106 M 203 F	61% OW/ob	X	Barriers custom questionnaire	
Hurst et al (2017)	UK	86% White	17-30 years (M=19.77±2.0)	F only	M=22.38±4.28	X	Body Appreciation Scale; Self-discrepancy Index	LTEQ

Im et al (2013)	USA	78.9% US born 29 White 23 Hispanic 21 African American 17 Asian	M=49.4±5.2	F only	M=28.4±7.2 41.1% NW 24.4% OW 34.4% Ob	X	Qualitative and custom questionnaires	
Ingledew & Sullivan (2002)	Germany	X	11-19 years-split into young M, old M, young F, old F.	90 M 90 F	M_{YM}=17.92±2.43 M_{OM}=23.13±2.66 M_{YF}=17.54±2.20 M_{OF}=20.57±2.49	X	Collins' Figure Rating Scale	Pan-European WHO survey
Jachya (2016)	Canada	X	12-14 years	M only	X	X	Qualitative	
Johnson (2000)	UK	Asian communities: 55 Indian 62 Pakistani 50 Bangladeshi 27 "Allied Dunbar National Study" in black & minority ethnic groups	Various samples: 16-74	139 M 92 F	X	X	Qualitative	
Johnson et al (2013)	USA	X	18-72 years	215 M 217 F	X	X	Custom BS scale	LTEQ
		90.6% non-Hispanic White, 9.4% Other	18-90	505 M 950 F			MBSRQ	
Kelly et al (2011)	USA	Baseline: 12.2% White, 82.7% African American.	M=13.66±1.83	31.6% M 68.4% F	≥95th Percentile	X	MBSRQ	PA Recall

		Follow-up: 75% African American.	M=13.84±1.72	31.2% M 68.8% F				
Koyunca et al (2010)	Turkey	X**	18-60 years (M=24.0±10.0)	F only	X	X	BI satisfaction questionnaire	Exercisers vs. non-exercisers
Kubayi & Surujlal (2014)	South Africa	X	16-23 years	120 M 131 F	X	X	Peltzer & Pengpig Benefits and Barriers questionnaire	
Lascar et al (2014)	UK	X	M=21-65 (M=42.66±13.3) F=21-62 (M=40.76±13.9)	14 M 12 F	X	X Type 1 diabetes patients	Qualitative	
Lodewyk & Pybus (2013)	Canada	77.5% Caucasian 6.3% Asian 7.2% Euro-Canadian 9.1% Other (Hispanic, African Can., Arabic, Native & Samarian).	16 years	109 M 118 F	X	X	Silhouette Figure Rating Scale to calculate Body size discrepancy.	PE enrolment; out of PE exercise; PE grade
Loman (2008)	USA	18 African American 10 White	14-18 years (M=16)	F only	X	X	Qualitative	

Lowery et al (2005)	USA	327 Euro-American 40 Latino 18 African American 16 Asian American 8 International students 4 Native Americans 4 Other	17-32 years (M=18.42±1.32)	156 M 267 F	X	X	Objectified Body Consciousness; Contour Drawing Scale	Health Related Behaviours
Luszczynska & Abraham (2012)	Poland	X*	15-18 years (M=16.43±0.60)	233 M 318 F	M_M=22.32±2.94 M_F=21.59±3.37	X	Body Areas Satisfaction Subscale of MBSRQ	Godin LTEQ
Kelly et al (2005)	USA	45.1% Caucasian, 20.1% African Am., 5.2% Hispanic, 20.7% Asian Am., 3.9% Native Am., 4.4% mixed/other	Junior High (grade 7-8: aged 12-14 years) and High (grade 9-12: aged 14-18 years)	F only	95 UW, 1270 NW, 407 OW, 257 Obese	X	Body Shape Satisfaction Scale	Custom PA.
Meyer et al (2013)	UK	X	17-28 years (M=20.1±1.42)	F only	16.60-39.68 kg/m^2 M=21.9±2.83	X	EDI	Hours exercise per week
Myers & Roth (1997)	USA	70.1% White, 26.9% Black, 3% Other	M=19.7	183 M 249 F	X	X	Benefits and Barriers to Exercise	Exercise Participation Questionnaire
Nair et al (2013)	USA	X	18-24 years (M=20.33±1.53)	F only	M=24.05±7.88	X	BI States Scale; PASTAS; Body Shape Questionnaire	Godin LTEQ

Nerini (2015)	Italy	Caucasian decent	M_{dance}=12.28±1.1 M_{Sed}=12.56±1.15	F only	M_{dance}=18.71±2.71 M_{Seden}=20.03±3.10	X	Italian Body Shape Questionnaire	Ballet dancers vs. Sedentary
Neumark-Sztainer et al (2004)	USA	48.5% Caucasian 19.0% African Am 19.2% Asian Am 5.8% Hispanic 3.5% Native Am 3.9% Mixed/other	11-18 years (M=14.9)	50.2% M 49.8% F	30% F and 28% M were OW.	X	Body Shape Satisfaction Scale	LTEQ
Rakfalska & Schier (2008)	Poland	X*	18-46 years	M only	X	X	BES; BI Drawing Test	43 intensively training force sports; 37 sedentary
Ravaldi et al (2003)	Italy	X	$M_{FBallet}$=16.2±4.1 M_{Fgym}=19.6±6.0 M_{FCon}=19.6±6.3 M_{MBodyB}=28.3±7.3 M_{MCon}=28.3±6.8	74 M (Body-builder & controls) 272 F (dancers, gym & controls)	$M_{FBallet}$=19.1±2.1 M_{Fgym}=22.1±3.5 M_{FCon}=21.8±2.7 M_{MBodyB}=23.3±2.8 M_{MCon}=22.8±2.3	X	Body Uneasiness Test; EDE-12	M: Bodybuilders, Controls F: Dancers, Gym, controls.
Riccardelli et al (2000)	Australia	"Majority Anglo-Australian" 15% "non-English speaking background"	Grade 7: 12-13 years Grade 9: 14-15 years	M only	M_{Grade7}=20.60±3.41 M_{Grade9}=23.51±5.40	X	Qualitative	

Robinson & Ferraro (2004)	USA	X	M=19.9	F only	BMI controlled for & used to calculate perceived weight	X	Perceived weight; EDI	55 Non-athletes vs. 53 athletes
Runfola et al (2013)	USA	92.3% white 4.4% African Am. 0.8% Asian 0.1% American Indian, Alaskan Native 1.1% other 1.2% Multi (2.7% Hispanic white, 7% non-white non-Hispanic, 90.3% white non-Hispanic)	M=59.1±6.8	F only	M=27.4±6.5	X	Body Size Satisfaction; Weight and shape concerns	Hours exercise per week.
Schwerin et al (1996)	USA	X	Overall: 17-49 years (M=24.38±6.40) ASBB: 18-48 years Control: 17-44 years	M only	X	X	Body Dissatisfaction Index	35 anabolic-steroid using bodybuilders, non-AS using bodybuilders, active control, inactive control.
Seidel (2015)	Poland	X*	19-29 years	M only	X	X	Bodybuilder Image Grid	77 exercisers & 74 non-exercisers

Shriver et al (2013)	USA	76.6% Caucasian 15.9% Native Am. 1.9% African Am. 1.9% Hispanic	8-10 years (M=9.2±0.4)	115 M 99 F	2-100 percentile, M=66.8±28.3	X	BES-modified for children	Self-administered PA checklist
Sigrist et al (2005)	USA	X	88% aged 40-50 years	93% M, 7% F	X	X	Qualitative	
Silva et al (2011)	Brazil	M: 88.5% White, 7.5% 'light-skinned black', 3.8% 'darker-skinned black' F: 91.0% White, 4.2% 'light-skinned black', 4.8% 'darker-skinned black'	20-29: M=34.8%, F=30.9% 30-39: M=22.8%, F=22.9% 40-49: M=18.7%, F=26.0% 50-59: M=18.7%, F=20.2%	761 M 959 F	NW: M=47.3% F=55.7% OW: M=37.8% F=27.2% Ob: M=14.8%, F=17.1%	X	SFRS	PA yes or no?
Sit et al (2008)	Hong Kong	X*******	30-39 years	F only	X	X	PA Risk Reduction used to measure barriers to PA	
Steinfeld et al (2011)	USA	75% White 11% Black 6% Multi 4% Asian American 1% Hispanic 3% other	M=19.74±1.31	F only	M=23.73±3.51	X	BES	Sports and non-sports people

Swami et al (2009)	UK	Euro Caucasian: 85.4% Track; 83% Martial; 72.9% non. Asian: 4.9% Track; 2.1% Martial; 18.2% non. Afro Caribbean: 4.9% Track; 4.3% Martial; 4.5% non. Other: 4.9% Track; 10.6% Martial; 4.5% non.	16-61 years M_{track}=34.71±9.38 M_{MA}=23.49±3.98 M_{Non}=22.70±4.03	F only	M_{track}=20.25±4.48 M_{MA}=23.49±3.98 M_{Non}=22.70±4.03	X	Photographic Figure Rating Scale	Lifetime & current sporting activity (1=never, 7=regularly)
Thompson et al (2003)	Canada	X	1) Initially 7 year old boys & 7-10 year old girls 2-3) Follow-up & interviewed approx. 25 years later	1) 207 M 148 F 2) 70 M 44 F 3) 16 M 15 F	X	X	Qualitative	Checklist of PAs, walking, vig/mod/light PA, sedentary behaviour, at 2) used to split 3) into active, average & inactive.
Tiggelmann & Williamson (2000)	Australia	>95% White	16-60 years YM=18.4±1.8 OM=36.4±11.9 YF=18.4±1.8 OF=33.6±9.9	109 M 143 F	X	X	Body Cathexis Scale	List of activities, how frequently in last month & how long (hours/month)

Vinkers et al (2012)	Nether-lands	X*	17-50 (M=32.88±9.86)	F only	M=22.03±2.15	X	BES for adolescents & adults	Days/week & duration per session
Walseth et al (2017)	Norway	X*	15 years	F only	X	1 girl had physical disability	Qualitative	
Wasilenko et al (2007)	USA	X	Not given-undergraduates	F only	Median=23.2	X	Body Parts Satisfaction Scale	Exercise time in gym/fitness centre
Zamboni et al (2008)	USA	89.7% Caucasian 3.6% Hispanic/Latino 2.6% African Am. 1% Asian 3.1% Unspecified	24-72 (Median=35)	M only	X	X	BES	Main sports activity & frequency
Bramham (2003)	UK	Mostly white British	15-year-olds	M only	Not stated. Described as "mostly meso-morphic"	X	Qualitative	
Orme (1991)	UK	X	14-15 year-olds	F only	X	X	Qualitative	Health Related Behaviour Questionnaire

Robertson (2003)	UK	"Consideration was given to include ethnic minority" but area has a "small ethnic minority population" making confidentiality difficult.	27-43	M only	X	6 participants with disabilities (little-no detail given)	Qualitative	
Donnelly et al (2012)	Qatar	Arabic Qatari citizens or residents-born in countries from around the Middle East	30-39: 4% 40-49: 14% 50-59: 36% 60-69: 28% 70+: 18%	F only	X	X	Qualitative	Qualitative
Berger & Peerson (2009)	UAE	Arabic UAE college students	18-27 year-olds	F only	X	X	Qualitative	Qualitative
Al-Kaabi et al (2009)	UAE	X 85.6% UAE nationals.	<40: 12.1% 41-49: 23.3% 50-59: 34.4% 60+: 29.7%	38.2% M 61.8% F	UW: 0.5% NW: 16.9% OW: 34.4% Ob: 44.6%	X	Qualitative	Time spent walking outdoors; time practicing sport/exercise; domestic chores
Denison et la (2015)	UK	X	25-34 years	Pregnant women	All ≥ 40kg/m^2	X	Qualitative	Qualitative

Petrov Fieril et al (2014)	Sweden	X Mostly Swedish, but also Finnish, French & Canadian	25-29: 4 30-34: 7 35+: 6	Pregnant women	Not measured	X	Qualitative	4 interview questions: Why exercise? How does it feel? Are you as physically active as before? Anything else?
Weir et al (2010)	UK	13/14 were white	20-37 years	Pregnant women	OW: 6 Ob: 8	X	Qualitative	Qualitative
Marquez et al (2009)	USA	13 Latina 7 non-Latina white	Latina M=25.1±4.8 White M=28.6±4.1	Pregnant women	Latina M=27.8±4.8 White M=24.0±4.1	X	Qualitative	Qualitative
D'Arcy (2007)	Canada	Athletes: 78% Caucasian; 3% African Canadian; 4% Asian; 15% other. Non-athletes: 28% Asian; 46% Caucasians; 3% African Canadian; 22% other	18-29 years. Athletes (18-26); non-athletes (18-29).	F only	Athletes: 25.2 Non-athletes: 23.5	X	Figure rating Scale; Athletic Image Scale; EDI-3	Baecke PAQ. Athletes vs. non-athletes

DiBartolo & Schaffer (2002)	USA	Non-athletes: 69% Caucasian; 14% Asian; 4% Black; 1% Hispanic; 10% Other. Athletes: 84% Caucasian; 7% Asian; 2% Black; 6% Other	Non-athletes: M=18.8±1.2. Athletes: M=19.4±1.4.	F only	None reported	X	Body Image Survey	Athletes vs. non-athletes
Hoag (2012)	USA	87.4% Caucasian; 5.8% Black; 3.1% mixed-race; 1.5% Asian. Rest American Indian, Pacific Islander/ Hawaiian	M=19.65±1.12	F only	Mean: 23.49 (3.75)	X	Body appreciation, Body dissatisfaction scale; Athletic Image Scale.	Athletes vs. non-athletes
Wiggins & Moode (2000)	USA	Not reported	Athletes: 17-22 years non-athletes: 18-35 years.	F only	Not reported	X	Body Esteem Scale	Athletes vs. non-athletes
Vancampfort et al (2014)	Belgium	Not reported	M_{BED}=41.0±10.9 M_{Ob}=41.4±10 $M_{Control}$=40.4±11	BED: 5 M 35 F Ob: 3 M 17 F Cont: 5M 34 F	M_{BED}=39.2±6 M_{Ob}= 38.2±7.2 M_{Cont}= 23.8±2.9	X	Body Attitude Test; EDI	Baecke PAQ.
Gozalez-Carrascaosa et al (2013)	Chile	X*	19-37 years (M=23.8±3.03)	28.1% M 71.9% F	17.30-27.39 kg/m^2 (M=21.6±2.28)	X	BSQ; Silhouette FRS (Thomson & Grey, 1995)	Custom PA

Hernandez & Jimenez (2013)	Costa Rica	X	M=20.4±3	106 M 73 F	X	X	MBSRQ	IPAQ
Davis & Cowles (1991)	Canada	X	14-64 years	88 M 112 F	$M_{M<25yr}$=22.95±2.9 $M_{M>24yr}$=24.9±3.06 $M_{F<25yr}$=20.78±2.17 $M_{F>24yr}$=21.30±2.16	X	BI inventory	Lifestyle questionnaire
Davison et al (2010)	USA	Non-Hispanic White	13 years (M=13.33±0.3), reassessed at 15 years (M=15.34±0.3)	F only: 115 at 13 years; 109 at 15 years	13 years: 14% OW, 11% Obese. 15 years: 11% OW, 10% Obese.	X	Disinclination for PA Scale	Accelerometer
Fikenberg et al (1993)	USA	X	X-not given	38 M 116 F	X	X	BES	Inactive/less active vs. vigorously active
Kim (2013)	South Korea	X******	M_{NW}=14.9±0.9 M_{OW}=14.8±0.9 M_{Ob}=15.2±0.9	417 M 356 F	381 NW: M=19.3±1 262 OW: M=24.5±1.2 130 Ob: M=33.9±2	X	Decisional Balance Scale for PA	Godin LTEQ
Loland (1998)	Norway	X*	M=38.8±13.9	787 M 768 F	$M_{MActive}$=24.6±2.6 $M_{MInactive}$=26±3 $M_{FActive}$=22.1±2.8 $M_{FInactive}$=23.9±3.5	X	MBSRQ	Inactive, low activity, moderate activity or high activity.
Rauff & Downs (2011)	USA	92% Caucasian 5.3% Asian 1.3% Hispanic 1.3% Other	20-40 years (M=30±4)	Pregnant women	Pre-pregnancy: M=24.2±5.0	X	Body Areas Satisfaction Scale	LTEQ

Richman & Shaffer (2000)	USA	85% White, 10% African American, 2.3% Asian, 3% Native American, Biracial, Latino/Hispanic, International or other	M=19.65 & their parents (not given)	F only	X	X	BES	PA score (11-97) composed of: school team member years, sport years, school sport, list of sports.
Trout & Graber (2009)	USA	X	13-18 years	5 M 7 F	X	X	Qualitative	
Varnes et al (2015)	USA	9.9% Asian, 9.3% Black/African American, 61.2% Non-Hispanic White, 2.8% Multi, 16.2% Hispanic, 0.6% Missing	M=19.77±1.44	F only	M_{NonAth}= 23.12±4.26 $M_{>ObjAth}$= 22.28±2.29 $M_{<ObjAth}$= 22.39±2.67	X	Objectified Body Consciousness: Body Surveillance & Body Shame; BES	Athletes (more objectified & less objectified) vs. non-athletes
Lopez (2019)	USA	Latina	12-15 years	F only	X	X	Qualitative	
Piateck et al (2018)	Poland	X*	13.5±2.3	F only	X	Idiopathic Scoliosis patients	Trunk Appearance Perception Scale	Extracurricular PA (Y/N)
Hartson et al (2018)	USA	Hispanic	11.01±1.91	20 M & 20 F	95.23% (SD = 5.78)	X	Body Esteem Scale	MEND physical activity questionnaire

Zarychta et al (2019)	Poland	All Caucasian	13-18 (16.37±.78)	58.3% F	15.59 – 40.35 (21.99±3.26)	X	Body Areas Satisfaction for MBSRQ	Godin LTEQ
Aguirre-Loaiza et al (2017)	Brazil	X****	18-60 (27.5±10.0)	162 M & 85 F	X	X	Skunkard Figure Rating Scale	Frequency and Duration of PA
Jones et al (2017)	UK	X	18-36	Transgender	X	X	Qualitative	
Lopez-Castedo et al (2018)	Spain	X	12-17 (M = 14.90; SD = 1.75)	48.9% M, 51.1% F	X	X	Self- Report on Barriers to Exercising (ABPEF), Self-Report of Motives for the Practice of Physical Exercise (AMPEF)	
Ahmadi et al (2018)	Iran	X*****	18-45	165 M, 204 F	10% UW, 78.3% HW, 11.70% OW+	X	Skunkard Figure Rating Scale, Body Weight Discrepency	Active/non-active
Saller & Khaled (2018)	Qatar	Qatari students	13-20	550 M, 607 F	M: 25.0 (SD 7.8) F: 24.1 (SD 7.5)	X	BES	Custom
Mathew Joseph et al (2018)	X-review	X	X	X	X	X	X	X

Austin et al (2017)	USA	Mexican/Mexican-American	20-65	F only	X	X	Body Shape Questionnaire	Steps per day (Pedometer)
Soulliard etal (2019)	USA	208 Caucasian, 20 Asian, 9 Black, 1 Native American, 9 Multi, 7 other	18-38 (19.51±1.64)	73 M, 180 F, 1 Transgender	X	X	Body Appreciation Scale-2. Functionality Appreciation Scale	Athlete vs. non-athlete
Mendo-Lázaro et al (2017)	Spain	X	9-12 (10.76±1.11)	548 M 396 F	X	X	Skunkard Figure Rating Scale	PA Y/N
Añez et al (2016)	Spain	71.8% Spanish, 12.8% Latin-American, 2.2% European, 5.6% African, 8% Mixed/Other	13-17 (14.2±1.1)	M&F	X	X	EDI-3	EAT project inventory items for PA (customised)
Lunde & Gattario (2017)	Sweden	X	15-20 (18.20±1.53)	F only	X	X	Qualitative	
More et al (2019	USA	80% Caucasian	18-41 (19.14±2.04)	71% F	X	X	Body Shape Satisfaction Scale	IPAQ
Gilchrist et al (2018)	Canada	89.6% Caucasian	20.34±1.47	60 M 50 F	X	X	Fitness Pride (body related self-	Godin LTEQ

							conscious emotions)	
		X	19.64±1.62	66 M 107 F	X	X	Appearance Pride	Godin LTEQ
		80.8% Caucasian	23.55±7.77	122 M 279 F	X	X	Appearance and Fitness Pride	Custom from Prochaska et al (2001)
Peróčková et al (2018)	Slovakia	X	15-18 (sport = 16.21±1.54; non-sport = 16.99±.76)	F only	Sport = 20.89±2.67 non-sport = 21.28±2.91	X	MBSRQ	Sport/non-sport
McCabe et al (2017)	Australia	X	8.77±.72	172 M 163 F	X	X	BES	Self-description questionnaire PA subscale
Fuller-Tyszkiewicz et al (2018)	Australia	59.6% Caucasian, 27.5% Asian, 1.1% Hispanic, 6% Middle East, 11.2% Other	22.15±5.14	F only	22.92±4.58	X	BIS subscale of BI&BCI, State appearance awareness adapted from OBCSSS, custom state body satisfaction	Exercise y/n
Min et al (2018)	China	Chinese	16-17	787 M 749 F	M – 136 UW, 494 HW, 157 OW F – 169 UW, 478 HW, 102 OW	X	Silhouette matching task	Custom PA

Cerar et al (2017)	Slovenia	X	19-42	2033 M 3238 F	X	X	Motives for physical activity	Custom PA
Jones et al (2018)	UK	X	30.15±11.89 (transgender), 30.15±11.87 (cisgender)	Transgender and cisgender	X	X	Hamburg Body Drawing Scale	Rapid Assessment of Physical Activity
Ribero et al (2018)	Brazil	55.9% Caucasian, 26.5% south American, 7.8% African, 9.8% Asian	58.3±10.3	Female breast cancer survivors	29.1±4.8	X	Silhouettes scale	Baecke et al PAQ
Sun et al (2018)	X-review	X-review	X-review	X-review	X	X	X-review	X-review
Sündermann et al (2018)	Sweden	X	19-56	6 F 1 M	X	X	Qualitative	Qualitative
Plevinsky et al (2018)	USA	82% Caucasian, 7% Black, 1% Hispanic, 10% other	11-18 (14.5±1.8)	45% F	X	X	BI domain from IMPACT-35	Physical health from IMPACT-35
Robbins et al (2017)	USA	27.1% White, 49.8% Black, 23.1% Other/mixed	12.05±1.01	F only	2.9% UW, 45.4% HW, 20.1% OW, 31.6% Ob.	X	BI discrepancy and Contour Drawing Rating Scale	Sedentary behaviour, custom MVPA, accelerometer

Monge-Rojas et al (2017)	Costa Rica	X	14-17	F only	X	X	Qualitative	Qualitative
Miranda et al (2018)	Brazil	X	14-19 (16.5±1.5 years)	F only	77.6% NW, 20.7% OW	X	Body shape questionnaire, body silhouette scale	24-hour PA recall and sedentary behaviour

APPENDIX C BODY COMPASSION AND CRITICISM SCALE

I. 55 ITEM VERSION

Please indicate how often you behave or feel in the stated manner…						
		1	2	3	4	5
		Almost never	Occasionally	About half of the time	Fairly often	Almost always
1	I like my body in spite of small inadequacies					
2	I am trying to become more accepting of my body					
3	I try my best to accept my body					
4	I am working on making myself feel better about the way I look					
5	I feel comfortable in my appearance					
6	I try to empathise with myself and say I am ok and that I am happy with my body					
7	I think I judge my body far too harshly					
8	There are things that I would like to improve about my body but it is not that bad.					

9	I do not want a different body image, I want to like the one I have.					
10	I try and focus on the parts of my body that I like.					
11	I am happy in the body I have, no matter what size it is					
12	I have stopped worrying about weight and body shape					
13	There is room for improvement in the way I feel about my body.					
14	My appearance means less to me than my personality.					
15	I tell myself that, even though I do not like my body, it is still capable of doing great things					
16	I try to be kind to myself about my body					
17	I really wish I did not hate my body because it is something that is always on my mind.					
18	It is hard to accept that bodies are all different shapes and sizes					
19	I do not really think a lot about my body, I accept this is me.					
20	I am starting to think that I worry about my body too much					

21	I am critical of the way I think and feel about my body.					
22	I think body image is all about perspective					
23	I am critical of my body's flaws					
24	Body image is something that most people have issues with.					
25	Everyone has mixed feelings about their body					
26	My friends complain about the same things about their bodies as I do					
27	Everyone has something they do not like about their body					
28	I am sure everyone has insecurities about their bodies					
29	Everyone probably feels the same way about parts of their body that they would like to change.					
30	There are people who have the same or even worse thoughts about their body image than I do					
31	I do not think anyone is completely satisfied with their body					
32	I often feel like the only person in the world with these thoughts about my body					

33	Nearly everyone has some negative feelings about their bodies					
34	The way I feel about my body is probably a normal thing for everyone					
35	I think it is pretty normal to have hang-ups about certain parts of your body.					
36	The way I feel about my body is common amongst people I know					
37	Knowing everyone feels the same does not make my insecurities about my body any less					
38	I always feel alone in how negative my personal thoughts are about my body					
39	Knowing that other people feel the same way about their bodies has really helped me a lot					
40	Instead of thinking that I cannot like my body until it is perfect, I try and focus on the things that I do not like and try to love them					
41	I accept the flaws in my body, even if I don’t like them					
42	I am really grateful for the way my body is					

43	I need to be more accepting of my body					
44	I am thankful for the way that I look					
45	I have positive as well as negative feelings about my body					
46	Although there are things I do not like about my body, I there are also things I do like					
47	Focusing on things I do not like about my body stops me thinking about all the good points and it makes me feel a lot more negative					
48	I feel ok with my body the way it is					
49	I feel I can be too harsh on myself at times and need to accept my body					
50	I accept my body the way it is and an comfortable in my own skin					
51	I am valued for more than the way I look					
52	I am at ease with my body and the way I look					
53	When I think about my body it makes me feel worse about myself					

54	It is hard to get away from the negative feelings I have about my body					
55	I feel quite comfortable in my body					

II. 38-ITEM VERSION

		To the left of each item, indicate how often you behave or feel in the stated manner, using the following scale:	Almost Never				Almost Always
			1	2	3	4	5
1	*BK*	I like my body in spite of small inadequacies					
2	*CH*	Body image is something that most people have issues with.					
3	*BK*	I do not want a different body image, I want to like the one I have.					
4	*MA*	I am trying to become more accepting of my body					
5	*BC*	I really wish I did not hate my body because it is something that is always on my mind.					
6	*CH*	Everyone has mixed feelings about their body					
7	*BK*	I am happy in the body I have, no matter what size it is					
8	*MA*	I try my best to accept my body					
9	*CH*	My friends complain about the same things about their bodies as I do					

10	*BC*	It is hard to accept that bodies are all different shapes and sizes					
11	*BK*	I have stopped worrying about weight and body shape					
12	*CH*	Everyone has something they do not like about their body					
13	*MA*	I am working on making myself feel better about the way I look					
14	*CH*	I am sure everyone has insecurities about their bodies					
15	*BK*	I do not really think a lot about my body, I accept this is me.					
16	*BC*	I am starting to think that I worry about my body too much					
17	*MA*	I try to empathise with myself and say I am ok and that I am happy with my body					
18	*CH*	Everyone probably feels the same way about parts of their body that they would like to change.					
19	*BK*	Knowing that other people feel the same way about their bodies has really helped me a lot					
20	*CH*	There are people who have the same or even worse thoughts about their body image than I do					
21	*BC*	I often feel like the only person in the world with these thoughts about my body					
22	*BK*	I accept the flaws in my body, even if I don't like them					
23	*MA*	I tell myself that, even though I do not like my body, it is still capable of doing great things					

24	*BK*	I am really grateful for the way my body is					
25	*CH*	I do not think anyone is completely satisfied with their body					
26	*BK*	I am thankful for the way that I look					
27	*BC*	Knowing everyone feels the same does not make my insecurities about my body any less					
28	*CH*	Nearly everyone has some negative feelings about their bodies					
29	*BK*	I feel ok with my body the way it is					
30	*MA*	Instead of thinking that I cannot like my body until it is perfect, I try and focus on the things that I do not like and try to love them					
31	*BK*	I accept my body the way it is and am comfortable in my own skin					
32	*BC*	I always feel alone in how negative my personal thoughts are about my body					
33	*CH*	The way I feel about my body is probably a normal thing for everyone					
34	*BK*	I feel quite comfortable in my body					
35	*CH*	I think it is pretty normal to have hang-ups about certain parts of your body.					
36	*MA*	I have positive as well as negative feelings about my body					
37*	*BK**	I am critical of my body's flaws*					

38	*CH*	The way I feel about my body is common amongst people I know					

* Item is reverse scored. All BC items are reverse scored to calculate total body compassion score. Column in italics not shown to participants.

To calculate total body compassion, body criticism items and item 37 are reverse scored and a total score calculated. To compute subscales scores, scores for each item are summed and then divided by the number of items in each subscale:

BK = body kindness, expressing kindness and understanding towards one's body, without criticism or judgement. Includes elements of gratitude, acceptance and comfort in one's own skin. 1, 3, 7, 11, 15, 19, 22, 24, 26, 29, 31, 34, 37reversed (13 items)

CH = common humanity, realisation/understanding that one's feelings are not just experienced by you, but by all humans, are common among peers, family and strangers. 2, 6, 9, 12, 14, 18, 20, 25, 28, 33 (12 items)

MA = motivated action, motivation and actual attempts to change one's feelings and accept the positive as well as the negative. 4, 8, 13, 17, 23, 30, 36 (7 items)

BC = body criticism, isolating thoughts and feelings of criticism and judgement about one's body as well as worries and concerns about one's body. 5, 10, 16, 21, 27, 32 (6 items)

APPENDIX D YMCA SOCIAL ACTION AND ADVOCACY COMMITTEE BODY IMAGE WRITING INSTRUCTIONS

Body Image Questionnaire

In response to society's obsession with beauty and its impact on the lives of women and girls, the ***Social Action and Advocacy Committee of Waterloo Region*** *are developing a resource guide to help women and girls think more critically about what they think about themselves. The following questionnaire was developed to give us a better understanding of what women and girls are thinking about the issue of body-image and self-esteem. In answering the questions please be as specific as you can and please use examples when applicable. Please use the back if need more space to write.*

Please be aware that your answers may be used in an upcoming publication. Answers will be kept confidential, only your age will be used as an identifier if necessary.

1. Self-esteem is . . .

_____

_____

_____

_____

_____

2. Where does your self-esteem come from?

_____

_____

_____

_____

_____

3. Body image is . . .

_____

_____

_____

_____

_____

4. Are body image and self-esteem related? If so why?

_____

_____

_____

_____

_____

5. What influences your body image?

_____

_____

_____

_____

_____

6. If I could change one thing about myself it would be my _____ because . . .

_____

_____

_____

_____

_____

_____

_____

7. What do you do to make yourself feel better about yourself?

_____

_____

_____

_____

_____

_____

8. When I think about myself and my body I think . . .

_____

_____

_____

_____

_____

9. What messages do you get about what it is to a girl today? Where do these messages come from?

_____

_____

_____

_____

_____

_____

10. A beautiful person is . . .

_____

_____

_____

_____

_____

11. Imagine that you are completely satisfied with your body and yourself and you really appreciate the person you are. Describe what you think that would feel like and how that would impact your life.

_____

_____

_____

_____

_____

_____

_____

12. Describe a time you felt confident

_____

_____

_____

_____

_____

_____

13. What prevents you from feeling confident all the time?

_____

_____

_____

_____

_____

14. What can/should be done to improve body image and help girls and women feel better about themselves?

_____

_____

_____

_____

_____

_____

APPENDIX E OSWEQ SCREENSHOTS AND DESCRIPTION

Participants are initially asked about the walking activities they engaged in over the past 7 days. They are given information on the 4 walking speeds (see figure I) and then there is space for 7 journeys (see figure II). There are 18 types of journey (see appendix E for full list and MET values for each activity at each speed). Participants were asked for each activity they listed whether there was a return journey made (yes/no), the number of days in the last week they walked that journey (1-7 days), the duration of the journey one-way (10 minutes – more than 3 hours) and the speed/pace (slow, steady, brisk, fast).

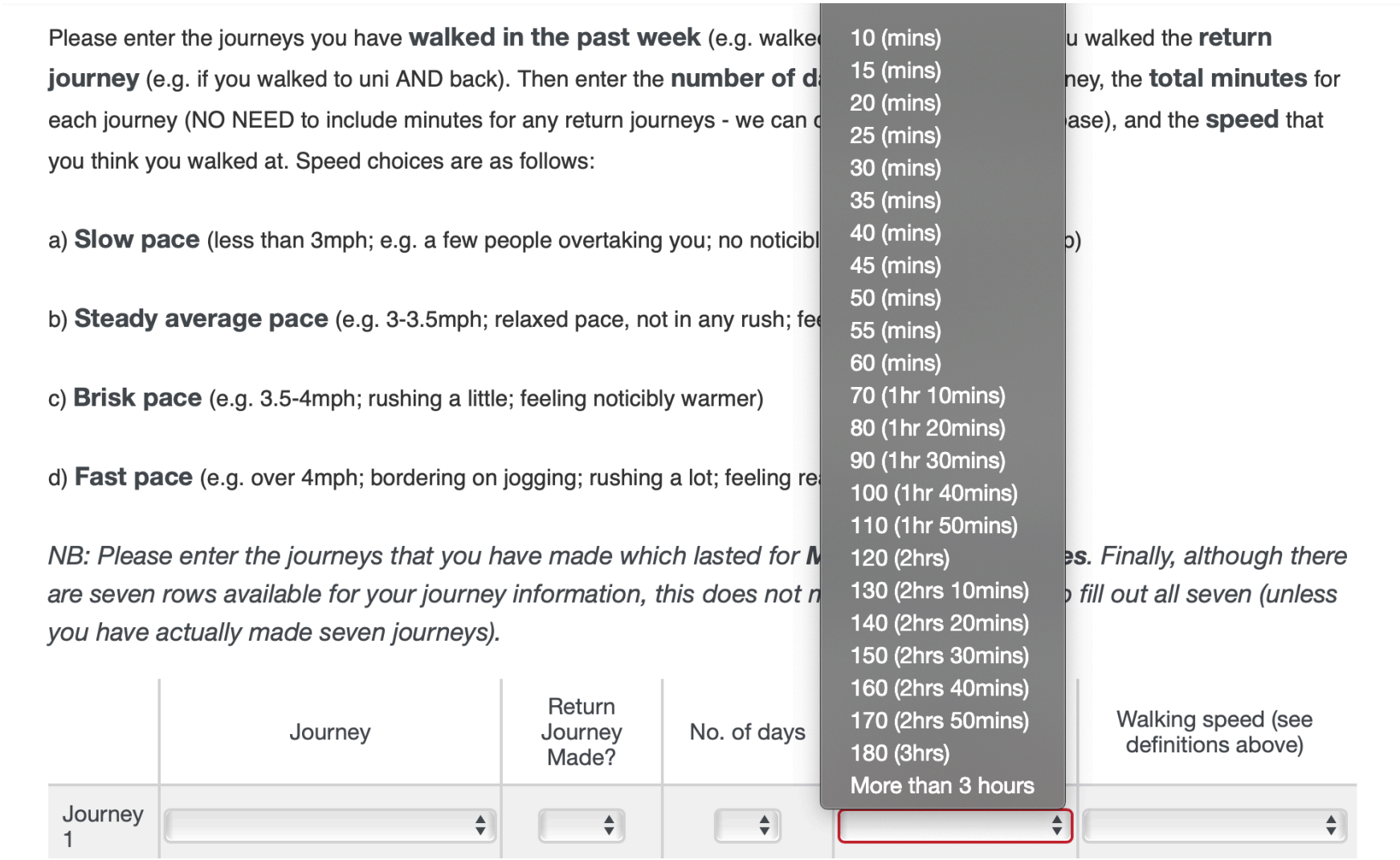

Figure II Screenshot from question 1 of the OSWEQ, enquiring about participants walking behaviour.

*NB: Please enter the journeys that you have made which lasted for **MORE than 10 minutes**. Finally, although there are seven rows available for your journey information, this does not mean we expect you to fill out all seven (unless you have actually made seven journeys).*

	Journey	Return Journey Made?	No. of days	Duration (for a SINGLE journey)	Walking speed (see definitions above)
Journey 1	walked around town/city	Yes	4	10 (mins)	Steady average pace
Journey 2	walked whilst at work	No	6	60 (mins)	Slow pace
Journey 3	walked to uni	Yes	4	20 (mins)	Brisk pace
Journey 4					
Journey 5					
Journey 6					
Journey 7					

walked to uni
walked to friends house
walked to town/city
walked around town/city
walked to supermarket
walked around supermarket
carried groceries home
walked to work

Figure III Screenshot from question 1 showing the 7 journey slots and some options available.

Participants are then asked about other activities they did over the past 7 days, with the question shown in figure III. These questions use link functions to link participants to the relevant questions depending on their responses. If the participant states they have done other activities they are taken through 12 other yes/no questions asking them whether they do various activities (see below). For each activity they are asked for the specific activity (see appendix E for full list), the number of days (1-7) and the duration on one day (10 minutes – more than 3 hours) (see figure IV for example).

- Aerobic activities (13 types)
- Outdoor bicycling (8 types)
- Indoor bicycling (5 types)
- Strength/conditioning (12 types)
- Dance (6 types)
- Home (23 types)
- Stationary rowing (5 types)
- Jogging/running (12 types)
- Individual/racket sports (34 types)
- Team sports (23 types)
- Water sports (24 types)
- Winter sports (16 types)

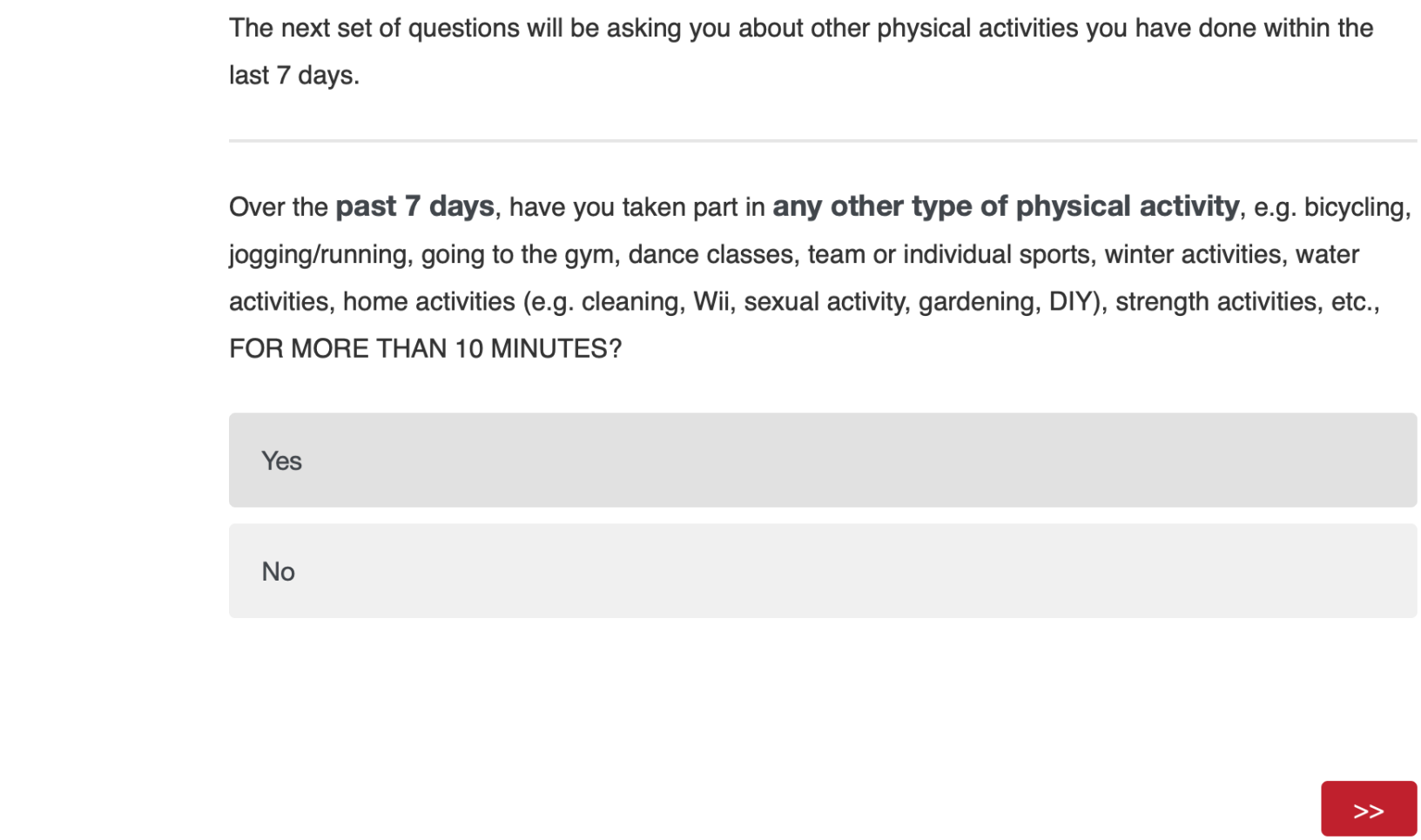

Figure IV Yes/No style question example from the OSWEQ.

What **type of outdoor bicycling activity** have you done in the past 7 days and **how long** did you do it for?

(If you have done **one TYPE** of this activity, use one row; if you have done **more than one type**, there are additional rows that you can use. If you did the **same type** of activity on **more** than one day, but for **differing lengths of time**, use one row & enter the APPROXIMATE MEAN (AVERAGE) time for all days).

If you cannot find the activity you have undertaken on the list provided, there will be an opportunity to type any information you wish to add later on.

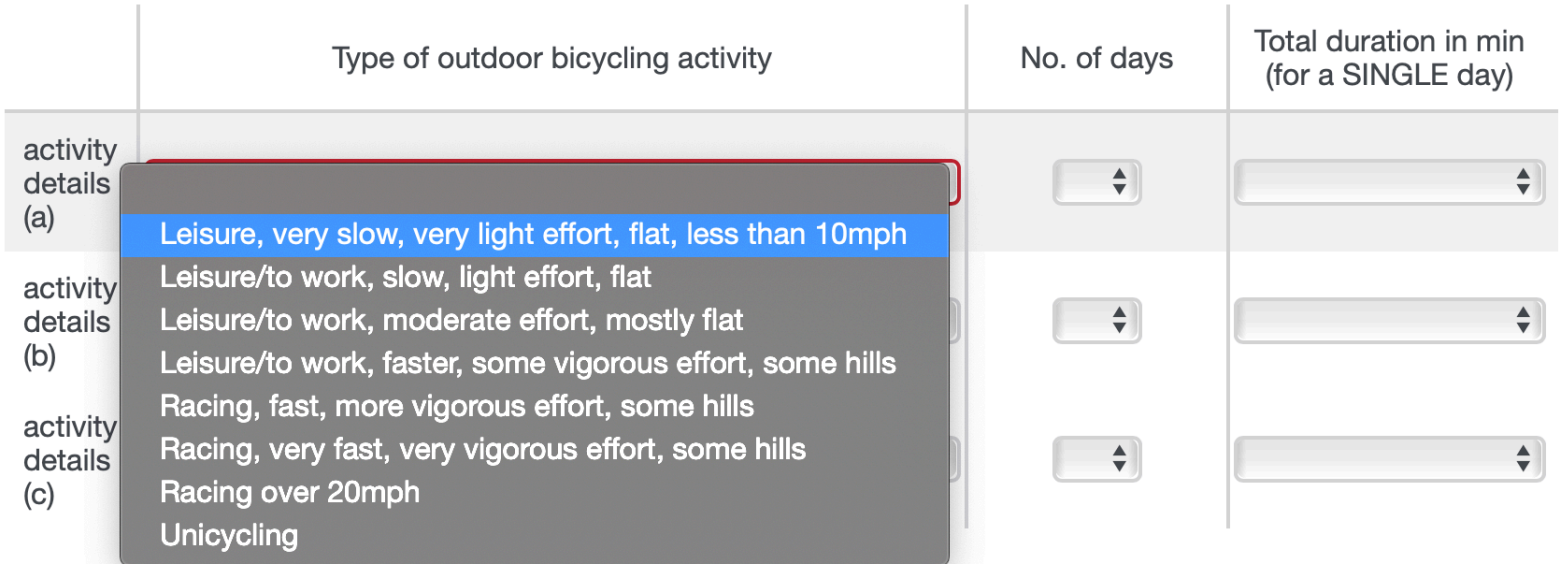

Figure V Example of page to select specific activity type, duration and number of days.

Participants were then given options to add any walking (2 additional) that they forgot or if they had 2 additional journeys to add from before (see figure V).

This page is available for you to enter in any additional information about your physical activity over the past 7 days, for example,

- If there was an activity that you did which WAS NOT on any of the lists, or
- If there was an activity that you did, but that you FORGOT to tell us about earlier.

FEEL FREE TO SKIP THIS PAGE IF YOU HAVE NO FURTHER INFORMATION TO ADD.

---

1. Since completing the WALKING ACTIVITY information, have you **remembered** any other walking activity that you have done over the past week, **but forgot to enter it earlier**? If so, please enter it below.

Remember that the speed choices are as follows:

a) Slow pace (less than 3mph; e.g. a few people overtaking you; no noticible difference to body temp)
b) Steady average pace (e.g. 3-3.5mph; relaxed pace, not in any rush; feeling slightly warmer)

Figure VI Option to add forgotten or additional activities

Participants were also given room to add in other activities they had forgotten or that were not given as options in the previous questions (See figure VI).

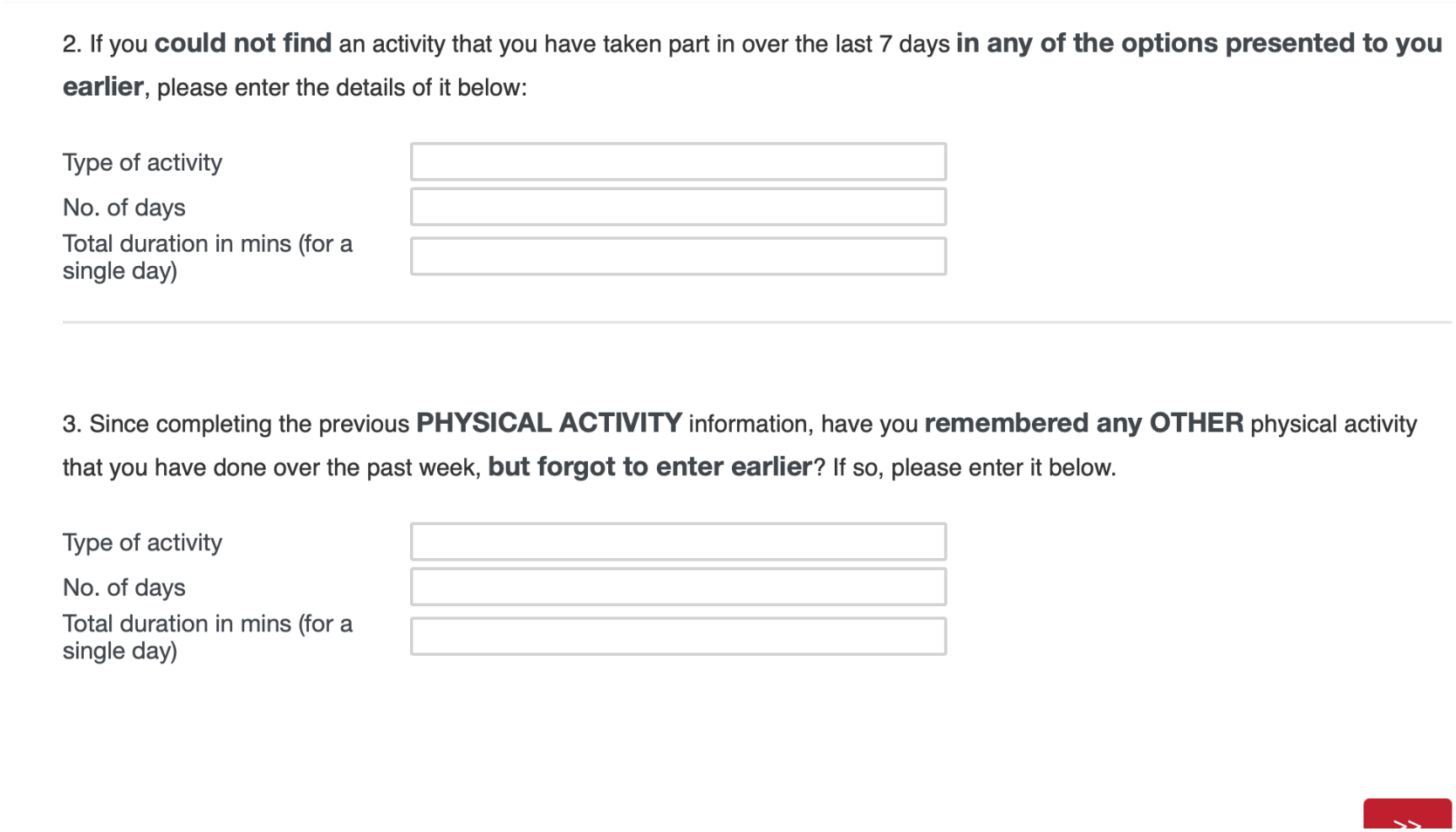

Figure VII Area to add other activities forgotten or that were not previously available to select.

APPENDIX F MET VALUES FOR PHYSICAL ACTIVITIES USED IN THE OSWEQ

I. MET VALUES FOR WALKING

		Slow	Steady	Brisk	Fast
Walk to/from …					
	University	4.0	4.3	5.0	7.0
	Friend's house	2.5	4.3	5.0	7.0
	Town/city	3.5	4.3	5.0	7.0
	Supermarket	3.5	4.3	5.0	7.0
	Work	4.0	4.3	5.0	7.0
	Cinema	2.5	4.3	5.0	7.0
	Restaurant	2.5	4.3	5.0	7.0
	Local shop	3.5	4.3	5.0	7.0
	Bus stop	3.5	4.3	5.0	7.0
	Walk home	2.5	4.3	5.0	7.0
	Somewhere else	3.5	4.3	5.0	7.0
	Carry groceries home	5.0	5.0	5.0	7.0
Walk around…					
	Supermarket	3.5	4.3	5.0	7.0
	At work	3.5	4.3	5.0	7.0
	Town/city	3.5	4.3	5.0	7.0
Walk for pleasure		3.5	4.3	5.0	7.0
Walk the dog		3.0	4.3	5.0	7.0

II. MET VALUES FOR OTHER ACTIVITIES

Activities highlighted in blue counted as strength activities by NHS guidelines for adults – see Appendix G.

		MET value
Aerobic activities		
	Low-medium impact	5.0
	High impact	7.3
	Step (low)	5.5
	Step (high)	7.5
	Boxercise	5.5
	Circuit training	8.0
	Cross-trainer/Ski-machine – light effort	4.0
	Cross-trainer/Ski-machine – medium effort	5.0
	Cross-trainer/Ski-machine – vigorous effort	6.8
	General	7.3
	Stepper – light effort	4.0
	Stepper – medium effort	6.8
	Stepper – vigorous effort	9.0
Outdoor cycling		
	Leisure, very slow, very light effort, flat, <10 mph	4.0
	Leisure/to work, slow, light effort, flat	5.8
	Leisure/to work, moderate effort, mostly flat	6.8
	Leisure/to work, faster, some vigorous effort, some hills	8.0
	Racing, fast, more vigorous effort, some hills	10.0
	Racing, very fast, very vigorous effort, some hills	12.0
	Racing, > 20 mph	15.8
	Unicycling	5.0
Indoor/stationary cycling		
	Very light effort (50 watts)	3.5
	Light effort (100 watts)	6.8

	Moderate effort (150 watts)	8.8
	Vigorous effort (200 watts)	11.0
	Very vigorous effort (250 watts)	14.0
Strength/Conditioning		
	Body conditioning general	7.8
	Calisthenics (push-ups, sit-ups etc.) light/moderate effort	3.5
	Calisthenics (push-ups, sit-ups, pull-ups etc.) vigorous effort	8.0
	Legs, bums and tums	7.8
	Mild stretching	2.3
	Pilates	3.0
	Powerplates (still)	3.5
	Powerplates (calisthenics)	5.0
	Weight lifting, light/moderate effort	5.0
	Weight lifting, powerlifting, vigorous effort	6.0
	Weights to music	3.5
	Yoga	2.5
Dancing		
	Ballet, modern, twist, jazz, tap, jitterbug	5.0
	Ballroom fast (e.g. disco, folk, square, line, Irish)	5.5
	Ballroom slow (samba, waltz, foxtrot, salsa, tango, mambo, cha cha)	3.0
	Anishinaabe jingle or other traditional Indian dances	5.5
	Greek/Middle Eastern, hula, flamenco, belly, swing	4.5
	General	7.8
Home		
	Cleaning light (e.g. dusting, change linen, carry rubbish)	3.3
	Cleaning heavy (e.g. wash car, wash windows)	3.5
	Exercise DVD light/moderate effort	4.0
	Exercise DVD vigorous effort	6.0
	Hoovering up	3.3
	Ironing	1.8
	Mopping	3.5

	Moving furniture, household items, carrying boxes	5.8
	Sweeping up	4.0
	Wii	2.3
	Wii-fit	3.8
	DIY (general)	4.5
	Assemble furniture	4.0
	Painting, plastering, papering, scraping etc.	4.5
	Painting outside	5.0
	Clearing land, hauling branches, wheelbarrow work etc.	6.3
	Gardening (general)	3.8
	Mow lawn (general)	6.0
	Planting seeds, shrubs	4.3
	Trimming shrubs, trees, clipping hedges (manual cutter)	3.5
	Sexual activity light	1.3
	Sexual activity moderate	1.8
	Sexual activity vigorous	2.8
Stationary rowing		
	Light effort (50 watts)	4.8
	Moderate effort (100 watts)	7.0
	Vigorous effort (150 watts)	8.5
	Very vigorous effort (200 watts)	12.0
	General	4.8
Jogging/Running		
	Mixture of walking and jogging	6.0
	Jogging	7.0
	Running slowly (5 mph)	8.3
	Running steadily (6 mph)	9.8
	Running swiftly (7 mph)	11.0
	Running moderately fast (8 mph)	11.8
	Running quite fast (9 mph)	12.8
	Running fast (10 mph)	14.5
	Running faster than 10 mph	16.0

	Running cross-country	9.0
	Running on track/team practice	10.0
	General	8.0
Individual/racket sports		
	Archery	4.3
	Badminton (competition)	7.0
	Badminton (social)	5.5
	Bowling	3.0
	Boxing (ring)	12.8
	Boxing (bag)	5.5
	Boxing (sparring)	7.8
	Broomball	7.0
	Darts	2.5
	Drag racing	6.0
	Fencing	6.0
	Golf (general)	4.8
	Gymnastics	3.8
	Horseback riding	5.5
	Jai ali	12.0
	Martial arts	10.3
	Juggling	4.0
	Motorcross	4.0
	Racquetball (competition)	10.0
	Racquetball (casual)	7.0
	Rock climbing (ascending)	7.5
	Rock climbing (rappelling)	5.0
	Skateboard	5.0
	Squash	12.0
	Roller-skating/blading	7.0
	Table tennis	4.0
	Tai chi	3.0
	Tennis doubles	6.0

	Tennis singles	8.0
	Tennis wheelchair	7.3
	Trampolining	3.5
	Track and field throwing (shot, discus, hammer)	4.0
	Track and field jumping (jump, javelin, pole vault)	6.0
	Track and field hurdling (steeplechase/hurdles)	10.0
Team sports		
	American football (competition)	8.0
	American football (touch, flag, general)	8.0
	Basketball (game)	8.0
	Basketball (non-game, general)	6.0
	Basketball (baskets)	4.5
	Basketball (wheelchair)	7.8
	Cricket	4.8
	Croquet	3.3
	Curling	4.0
	Floorball	7.8
	Football/soccer (competition)	10.0
	Football/soccer (casual/general)	7.0
	Frisbee, non-game	3.0
	Frisbee, ultimate	8.0
	Handball	12.0
	Hockey (field/ice)	8.0
	Lacrosse	8.0
	Netball	6.5
	Orienteering	9.0
	Rugby	8.3
	Softball/baseball	5.0
	Volleyball (competition)	6.0
	Volleyball (non-competition)	3.0
Water sports		
	Canoeing, light effort rowing	2.8

	Canoeing, moderate effort rowing	5.8
	Canoeing, vigorous effort rowing	12.5
	Diving, springboard or platform	3.0
	Kayaking	5.0
	Sailing, board or boat, windsurfing, ice sailing	3.0
	Sailing competition	4.5
	Water skiing	6.0
	Snorkeling	5.0
	Surfing, body or board	3.0
	Swimming, freestyle, slow, light/moderate effort	5.8
	Swimming, freestyle, fast, vigorous effort	9.8
	Swimming, backstroke, general	9.5
	Swimming, breaststroke, general	10.3
	Swimming, butterfly, general	13.8
	Swimming, leisurely, non-laps	6.0
	Swimming, sidestroke, general	7.0
	Synchronized swimming	8.0
	Treading water, moderate effort	3.5
	Treading water, vigorous effort	9.8
	Water aerobics	5.5
	Water polo	10.0
	Water volleyball	3.0
	White water rafting	5.0
Winter sports		
	Ice skating, slow	5.5
	Ice skating, fats	9.0
	Speed skating	13.3
	Jumping	7.0
	Skiing/snowboarding, general	7.0
	Skiing, cross-country, slow, light effort, 2.5 mph, snow walking	6.8

	Skiing, cross-country, moderate effort and speed, 4 to 4.9 mph	9.0
	Skiing, cross-country, fast, vigorous effort, 5 to 7.9 mph	12.5
	Skiing, cross-country, racing, > 8mph	15.0
	Skiing, cross-country, hard snow, uphill, maximum	15.5
	Downhill skiing, light effort	4.3
	Downhill skiing, moderate effort	5.3
	Downhill skiing, vigorous effort	8.0
	Sledding, tobogganing, bobsledding	7.0
	Snowshoeing	5.3
	Snowmobiling	3.5

APPENDIX G NHS GUIDELINES

The NHS recommends that adults aged over 18 years should try to do one of the following:

Option 1	Option 2	Option 3
At least 150 minutes of moderate aerobic activity every week AND Strength Exercises on two or more days a week that work all major muscles	75 minutes of vigorous aerobic activity AND Strength Exercises on two or more days a week that work all major muscles	A mix of moderate and vigorous aerobic activity every week AND Strength Exercises on two or more days a week that work all major muscles

Moderate Activity	Vigorous Activity	Strength Exercises
Moderate activity is any activity that raises your heart rate, and make you breathe faster and feel warmer. If you are working at a moderate level, you will still be able to talk but cannot sing along to a song!	Vigorous activity makes you breathe hard and fast. You will not be able to say more than a few words without pausing for breath.	Muscles strengthening exercises are counted in repetitions and sets. A repetition is one complete movements of an activity, a set is a group of repetitions. For each strength exercise try at least one set with 8-12 repetitions per set.
Examples include (but are not limited to): • Brisk walking • Water aerobics • Riding a bike on level ground or with few hills	Examples include (but are not limited to): • Jogging or running • Swimming fast • Riding a bike fast or on hills/mountains • Singles tennis/badminton/squash etc.	Examples include (but are not limited to): • Lifting weights • Working with resistance bands • Exercises that use your own body weight – e.g. push-ups or sit-ups

• Doubles tennis/badminton etc. • Pushing a lawnmower • Hiking • Skateboarding • Rollerblading • Volleyball • Basketball	• Football • Rugby • Skipping rope • Hockey • Aerobics • Gymnastics • Martial arts	• Heavy gardening – e.g. digging, shovelling • Yoga
	Some vigorous activities count as both aerobic and muscle strengthening including:	
	• Circuit training • Aerobics • Running • Football	• Rugby • Netball • Hockey