Physical activity, body (dis)satisfaction and mental health in the transgender population

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Physical activity, body (dis)satisfaction and mental health in the
transgender population

by
Bethany Alice Jones

Doctoral Thesis
Submitted in partial fulfilment of the requirements for the award of
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Abstract

Background and aims: Prior to gender affirming medical interventions, transgender people often experience high levels of body dissatisfaction and poor mental health in comparison to the cisgender (i.e., non-transgender) population. Body dissatisfaction and poor mental health have been associated with eating disorder psychopathology within the cisgender population. Transgender people are therefore an important group to target for intervention development. Participating in physical activity and/or sport within the cisgender population has been associated with body satisfaction and mental well-being. The overarching aim for the research reported on in this thesis was therefore to explore the role of body (dis)satisfaction, mental health and medical transition on physical (in)activity and eating disorder symptoms within the transgender population. Studies that have evaluated gender affirming medical interventions have been limited by the outcome tools used and therefore this thesis also aimed to develop and validate a new measure to assess intervention and treatment outcomes.

Participants: Treatment seeking transgender people were invited to take part in all of the empirical studies reported on in this thesis. For some studies, transgender people from the community and/or cisgender participants were also recruited.

Main findings: Despite being motivated, many transgender people reported having negative experiences engaging in physical activity and/or sport due to numerous internal and external barriers. Many of these barriers are directly or indirectly related to body dissatisfaction. Cross-sex hormones appeared to increase physical activity participation, possibly by alleviating body dissatisfaction and increasing mental well-being. It was also found that body dissatisfaction played a key role in the existence of eating disorder symptoms. Transgender people who had taken cross-sex hormones reported lower levels of eating disorder symptoms, possibly due to an increase in body satisfaction. Finally, this thesis successfully developed a new outcome measure in collaboration with transgender people and experts working in transgender healthcare. This measure was named the Gender Congruence and Life Satisfaction Scale (GCLS) and was found to be valid and reliable.

Implications: Spreading awareness of the barriers that transgender people face in relation to physical activity and sport engagement may help this population to become more active.
Being more active is important for transgender people as it may have body image and mental health benefits. Cross-sex hormones appear to be crucial in reducing body dissatisfaction and increasing mental well-being. Possibly because of this, physical activity levels are higher among people who have taken cross-sex hormones. Additionally, cross-sex hormones also appear to reduce eating disorder symptoms. However, the research in this thesis is cross-sectional. Future research should adopt a longitudinal research design, particularly now that a new tool to evaluate intervention and treatment outcomes (the GCLS) has been developed. This tool is likely to make important advances in research which will contribute towards increasing the well-being of the transgender population.
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Glossary of key terms used within this thesis

**Body dissatisfaction:** A complex interaction between psychological and social factors which leads to subjective negative evaluation of one’s body image.

**Body image:** A person’s subjective perception of their body, which can be positive or negative.

**Body satisfaction:** Subjective positive evaluation of one’s body image.

**Chest surgery:** This is a gender neutral term which describes a surgical intervention that some transgender people may choose to undergo. Transgender males (or non-binary people assigned female at birth) may choose to undergo a mastectomy and chest reconstructive surgery to remove breast tissue and create a flat chest. Transgender females (or non-binary people assigned male at birth) may choose to undergo breast augmentation to increase the size of their chest.

**Cisgender:** A person who does not experience incongruence between their gender assigned at birth and their gender identity.

**Competitive elite sport:** The highest level of national and international sporting competition where the emphasis is on winning prestigious competitions for career gains. Elite or professional athletes are a minority in terms of their exceptional sporting ability.

**Competitive recreational sport:** Activity that involves physical exertion and skill in which an individual or team competes against another or others for entertainment, leisure and fitness.

**Cross-sex hormone treatment (sometimes abbreviated to CHT):** Sex hormones (oestrogens or testosterone) that initiate the development of secondary sex characteristics.

**Disordered eating:** Unhealthy eating attitudes and behaviours (e.g., restrictive eating, binge eating, compensatory behaviours) that do not necessarily fulfil a clinical eating-related diagnosis.
**Eating disorder psychopathology:** Maladaptive and dysfunctional thoughts and/or behaviours relating to eating, body shape or weight.

**Eating disorder symptoms:** Unhealthy eating attitudes, behaviours and psychopathology that do *not* necessarily fulfil a clinical eating-related diagnosis.

**Gender:** Comprises a person’s sex, gender expression and gender identity.

**Gender affirming medical interventions**: Medical treatments used to align a person’s body with their gender identity.

**Gender affirming surgery**: Surgeries to align a person’s body with their gender identity.

**Gender assigned at birth**: The gender a person is assigned at birth based on their sex.

**Gender confirming medical interventions**: See gender affirming medical interventions.

**Gender confirming surgery**: See gender affirming surgery.

**Gender expression:** A person’s expression of their gender identity through their clothing, mannerisms, behaviour, hairstyle, voice, and body characteristics.

**Gender dysphoria:** The distress a person experiences as a result of their gender assigned at birth and gender identity being incongruent.

**Gender identity:** The internal sense of how a person feels and identifies in relation to their gender (e.g., male, female, non-binary).

**Gender neutral:** A person who consider themselves to have no gender and will present their gender in an ambiguous manner. Gender neutral people fall under the umbrella term of non-binary people.

**Gender queer:** A person who identifies and presents in a way that is outside the gender dichotomy of male and female. Gender queer people fall under the umbrella term of non-binary people.
Gender role: The social gender role a person learns and performs which is appropriate to their gender identity according to social and cultural ‘rules’ (i.e., their mannerisms, demeanour, play preferences, recreational interests, clothing, speech).

LGBT: An acronym that refers to people who are lesbian, gay, bisexual and/or transgender.

LGBTQI: An acronym that refers to people who are lesbian, gay, bisexual, transgender, queer and/or intersex.

Medical transition: See gender affirming medical interventions.


Non-binary: An umbrella term used to describe people who identify (and present) outside the binary gender system (i.e., neither male nor female).

Non-gender: See gender neutral.

Physical activity: Any activity that involves muscular-skeletal movement and energy expenditure (e.g., while working, playing, carrying out household chores, or engaging in recreational pursuits such as football, swimming, gymnastics, running or walking).

Primary sex characteristics: Body structures that are directly related to reproduction such as the testes and ovaries.

Sex: The biological differences between males and females such as sex chromosomes (i.e., XX, XY), reproductive organs (e.g., ovaries, testes) and secondary sex characteristics.

Sex assigned at birth: See gender assigned at birth.

Sex reassignment surgery: See gender affirming surgery.

Sexual reassignment: See gender affirming medical interventions.

Secondary sex characteristics: Physical characteristics that are developed at puberty which differentiate between the male and female sex but are not directly involved in reproduction (e.g., development of breasts, distribution of fat tissue, and muscularity).

Sex-specific body parts: See secondary sex characteristics.
**Glossary**

**Sexual characteristics**: Traits and behaviours that differentiate the male and female sex.

**Social transition**: The social change that a person goes through (i.e., through clothing and appearance) in accordance with their gender identity and not with their gender assigned at birth.

**Sport-related physical activity****: See physical activity.

**Transgender (sometimes abbreviated to trans)**: A person who experiences incongruence between their gender assigned at birth and gender identity.

**Treatment seeking transgender people**: A person who wishes to undergo, or is undergoing, gender affirming medical interventions.

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* In chapters 6, 7, & 9 the word *mastectomy* is used to describe the surgical intervention that some transgender men or non-binary people (assigned female at birth) may choose to undergo to reduce breast tissue. As part of this intervention, the chest is also reconstructed (to create a flatter chest), although it should be noted that this isn’t explicitly stated within these chapters. In other chapters within this thesis, the phrase “mastectomy and chest reconstructive surgery” is used. This is a reflection of changes to accepted terminology which have occurred over time.

† In chapter 3, the term *sexual reassignment* is used. In chapters 2 & 6 *gender confirming medical interventions* is used. In chapters 1, 4, 5, 7, 8, 9, & 10 *gender affirming medical interventions* is used. This is a reflection of how accepted terminology has changed over time and to satisfy requirements of journals. The meaning of these terms is the same.

‡ In chapter 3, *sex reassignment surgery* is used. In chapters 2, 6, & 9 *gender confirming surgery* is used. In chapters 1, 4, 5, 8, & 10, *gender affirming surgery* is used. This is a reflection of how accepted terminology has changed over time and to satisfy requirements of journals. The meaning of these terms is the same.

§ In chapter 3, *natal gender* and *sex assigned at birth* are used. In chapter 7, *sex assigned at birth* is used. In chapters, 1, 2, 4, 5, 6, 8, & 9, *gender assigned at birth* is used. This is a reflection of how accepted terminology has change over time and to satisfy requirements of journals. The meaning of these terms is the same.

** In chapter 2, *sport-related physical activity* is used. However, in the other chapters of this thesis *physical activity* is used. The difference in this terminology is a reflection of journal requirements. The meaning of these terms is the same.
Chapter 1: General introduction

1.1. Introduction
This chapter will begin by describing who transgender people are followed by a discussion about the prevalence of transgender people and the diagnostic classification systems used by clinicians working within the field of transgender health. The treatment pathway followed at transgender health services in the United Kingdom (UK) will then be described and a brief overview will be provided of support organisations available for transgender people within the UK. The chapter will then present a discussion of the prevalence of mental health problems within the transgender population and will close by outlining the initial aims of this thesis. The information presented in this chapter will be discussed with reference to transgender adults as the research reported on in this thesis is conducted with transgender people aged 17 and over.

1.2. Who are transgender people?
Sex encompasses the biological differences between males and females, such as sex chromosomes (i.e., XX, XY), reproductive organs (e.g., ovaries, testes), and secondary sex characteristics (e.g., penis, vagina). Gender is the internal sense of being a man or woman. Gender is presumed at birth based on the biological sex of the baby which is determined from sex characteristics (i.e., genitals). Babies born with a penis are gendered as a boy (male) and babies born with a vagina are gendered as a girl (female). In Western society, the gender assigned to a child (based on its sex characteristics) can determine the name parents give to the baby, the clothes the child is dressed in, and the toys the child is given. Many parents will expect their child’s gender role (which is defined as the behaviour a person learns and performs appropriate to their gender and society; i.e., their mannerisms, demeanour, play preferences, recreational interests, clothing, speech; Arcelus & Bouman, 2017a) to be consistent with the gender they were assigned at birth (based on their sex characteristics) throughout their life. This is true for the majority of people who will give little consideration to or concern for their gender. However, there are some people who, even from a young age, will experience incongruence (i.e., a discrepancy) between the gender they were assigned at birth and their gender identity. These people are called transgender (sometimes abbreviated to trans). Transgender is an umbrella term used to describe people whose gender identity is...
felt to be different from the gender they were assigned at birth (Arcelus & Bouman, 2017a). Under this umbrella, transgender males are people who were assigned female at birth (based on sex characteristics) but identify as male. Transgender females are people who were assigned male at birth (based on sex characteristics) but identify as female. Over the years, professionals working in the field of transgender health have become more aware that gender isn’t a binary concept (i.e., male and female) but that it is better described on a continuum. There are now an increasing number of people who identify outside the binary gender system (Richards et al., 2016). For example, these people may choose to identify as gender neutral (feeling one is neither male nor female), non-gender (having no gender in relation to presentation), or gender queer (identifying and presenting in a way that is outside the gender dichotomy of male and female) (Richards et al., 2016). Some people may also be more fluid with their gender identity whereby they do not have a fixed gender and it can therefore vary over time. Although it is acknowledged that the term transgender may not capture everyone’s experiences due to the diversity in gender identities experienced (Arcelus & Bouman, 2017a), in this thesis, transgender will be used to describe people who experience incongruence between their gender assigned at birth and their current gender identity. The term cisgender will be used to describe people who do not experience incongruence between their gender assigned at birth and the gender they identify with.

Many transgender people will choose to transition from the gender they were assigned at birth to the gender they identify with. This will usually include a social gender role transition, where the individual will transition so that they socially present (i.e., through clothing and appearance) their gender in accordance with how they identify (and not in accordance with their gender assigned at birth). For many people it is necessary to make a social gender role transition in all aspects of their lives when at home, with friends, family and at work (if the person is currently employed). This will usually involve people ‘coming out’ as transgender, asking people to use different pronouns (i.e., he, she or they) and using a different name. As part of a social gender role transition, many people will change their name to one that the individual feels better reflects their gender identity (e.g., from Jessica to Andy). Name change can be done officially in the UK via a legal document known as a deed poll. Transgender people will usually also change their name and gender signifier (i.e., Ms, Mr, Mx (when possible)) on legal documents such as their passport, bank cards, and driving licence. As part of this transition, many transgender people will also wish to undergo gender affirming medical interventions which may include cross-sex hormone treatment and also sometimes
surgeries to align their body with their gender identity. This is referred to within this thesis as a medical transition. Interventions that may comprise a medical transition can be accessed at transgender health services. It is agreed by professionals working in the field of transgender health that no irreversible interventions should be offered to children (Steensma & Risori, 2017). Undergoing a medical transition is a personal preference, which not every person will feel is necessary for their body to feel congruent with their gender identity (Arcelus & Bouman, 2017a; Beek, Kreukels, Cohen-Kettenis, & Steensma, 2015). The specifics of the different gender affirming medical interventions that people may choose to undergo as part of a medical transition will be discussed in more detail in section 1.5. To distinguish between people who do and do not wish to undergo a medical transition, the former group will be described as treatment seeking transgender people throughout this thesis.

1.3. The global prevalence of being transgender

Determining the prevalence of transgender people is important for predicting how many people might need to access transgender health services so that provisions can be prepared. Prevalence studies of transgender people have been conducted all over the world and usually use clinical data (i.e., data from people who have accessed transgender health services). In the United States of America (USA), the first epidemiological study to be conducted reported a prevalence of 0.45 per 100,000 people (Pauly, 1968). In more recent years, a prevalence of 5.91 per 100,000 people has been reported in Sweden (Olsson & Möller, 2003), 3.88 per 100,000 in Spain (Gómez-Gill et al., 2006), 4.28 per 100,000 in Belgium (De Cuypere et al., 2007), and 6.77 per 100,000 in Ireland (Judge, O’Donovan, Callaghan, Gaoatswe, & O’Shea, 2014). In an effort to synthesise these findings, a systematic review and meta-analysis of the clinical transgender epidemiological literature was recently conducted which concluded the prevalence rate to be 4.6 per 100,000 people (Arcelus, Bouman, Witcomb, Van De Noortgate, & Fernandez-Aranda, 2015). This study also concluded that the prevalence of transgender people has increased considerably over the last 50 years (Arcelus et al., 2015). This is likely to be related to the increase in visibility of transgender people (especially in the media and on the internet) which has contributed towards a reduction in the stigmatisation, discrimination and prejudice of transgender people (i.e., transphobia) and, consequently, means that people feel more comfortable and confident identifying as transgender (Arcelus & Bouman, 2017b). For instance, Caitlyn Jenner, a former Olympic medallist, came out as transgender during a television interview which was viewed all over the world (Dooley et al.,
2015). In addition, there is an increasing amount of information freely available on the internet about gender diversity.

However, not every transgender person will wish to undergo gender affirming medical interventions or access transgender health services (e.g., Arcelus & Bouman, 2017b; Beek et al., 2015) and, for this reason, clinical prevalence studies may be seen as unreliable at estimating the number of transgender people. In response to this, more recent research has been concerned with people who identify as transgender within the community (not just those accessing clinical services). In the Netherlands, a survey on gender incongruence was conducted and a prevalence of 110 per 100,000 people assigned male at birth and 80 per 100,000 people assigned female at birth was reported (Kuyper & Wijsen, 2014). In a study conducted in Belgium, a prevalence of 70 per 100,000 people assigned male at birth and 60 per 100,000 people assigned female at birth was reported (Van Caenegem et al., 2015). These data indicate that when community samples are also included, the prevalence of transgender people is considerably higher than when only clinical samples are used.

Another threat to the reliability of these prevalence studies is that the terminology used to describe transgender people has changed over the years. As discussed in section 1.2., the term transgender has widened in recent years to include people who identify outside the binary gender system (as well as those who do). The way transgender people are defined in a given study will determine the participants who are recruited into the study and this will, in turn, affect the conclusions drawn regarding the prevalence of transgender people and the generalisability of the findings. Prevalence rates can also be affected by the geographical location that the data are collected from. Some countries are more tolerant of transgender people than others which will impact how comfortable people feel in identifying as transgender. This is reflected in studies that have been conducted in different parts of the world. For instance, the prevalence of transgender females in Sweden (a country accepting of transgender people) was found to be 16.6 per 100,000 people (Dhejne, Öberg, Arver, & Landén, 2014) which contrasts with a prevalence of 0.7 per 100,000 people reported in a study from Iran (a country not accepting of transgender people) (Ahmadzad-Asl et al., 2010). The time period when the research was conducted can also impact prevalence rates. A prevalence rate of 23.60 per 100,000 people reported in Singapore in the 1970s (Tsoi, 1988) can be explained by the fact that during the 1970s Singapore was known for its large
transgender community and, hence, people were likely to feel more comfortable identifying as transgender during the time when Tsoi’s study was conducted.

In light of the issues discussed above, calculating prevalence rates of transgender people is evidently extremely complex and therefore it is difficult to determine exactly how many people identify as transgender. The findings from prevalence studies need to be considered in light of whether the data were collected from a clinical or community sample, the geographical location and time period the data were collected from, and the terminology used to define the population recruited. All of these factors are likely to contribute towards the prevalence rate of transgender people found in a given study.

1.4. Diagnostic classification for transgender people: Revisions and current debates

As mentioned in section 1.2., some transgender people may wish to make their body congruous with their gender identity by undergoing a medical transition (e.g., cross-sex hormones and surgeries). In some parts of the world (including the UK), healthcare funding systems are configured in such a way that transgender people cannot access gender affirming interventions without a related diagnosis (Beek et al., 2016; Richards et al., 2015). There are two classification systems that include diagnosis relating to transgender people: (1) the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association (APA)); and, (2) the International Classification of Diseases (ICD; World Health Organization (WHO)). The DSM is used most popularly in the USA to diagnose mental disorders and is in its fifth edition (DSM-5; APA, 2013) having been most recently updated in 2013. The DSM-5 classifies the distress that is experienced as a result of gender assigned at birth and gender identity not being congruent as Gender Dysphoria (APA, 2013). The DSM-5 defines this diagnosis as a marked incongruence between one’s gender assigned at birth and gender identity, lasting for at least six months. A strong desire to have the primary and/or secondary sex characteristics of, and to live and behave as, another gender must also be present. In Europe, the ICD is most commonly used to diagnose health conditions (physical and mental) and is currently in its 10th edition (ICD-10). It was last updated in 1992 and the new edition is expected in 2019 (ICD-11). The ICD-10 uses the diagnostic label of Transsexualism (WHO, 1992) and defines this as “a desire to live and be accepted as a member of the opposite sex, usually accompanied by a sense of discomfort with, or inappropriateness of, one’s anatomic sex, and a wish to have surgery and hormonal treatment to make one’s body as congruent as possible with one’s preferred sex”. This desire must be
persistently present for a minimum of two years. These classification systems (ICD and DSM) are an integral part of providing transgender healthcare within the UK and around the world but having a diagnosis of Transsexualism (WHO, 1992) or Gender Dysphoria (APA, 2013) can be heavily stigmatising for the individual (e.g., Bouman & Richards, 2013; Richards et al., 2015).

Gender Dysphoria in the DSM-5 is a revision of Gender Identity Disorder (DSM-IV; APA, 1994). Although it is one of the most contested entries in the DSM-5, the revision is seen to be greatly improved from the DSM-IV diagnosis of Gender Identity Disorder (APA, 1994) as it has attempted to remove the connotation that the individual is *disordered* thereby aiming to avoid the stigmatisation of transgender people. The DSM-5 working group encouraged the change from ‘disorder’ to ‘dysphoria’ in the diagnostic label (Knudson, De Cuypere, & Bockting, 2010). The diagnosis ‘Gender Dysphoria’ also now has its own chapter in the DSM-5 (APA, 2013) and has been removed from the chapter that included Sexual Dysfunctions and Paraphilic Disorders in the DSM-IV (APA, 1994). In addition, the DSM-5 (APA, 2013) has changed the language used to encapsulate people with non-binary gender identities (e.g., gender neutral, non-gender, gender queer) as well as people who wish to transition to the opposite gender (i.e., male or female).

Although the ICD revision has not been synchronised with the DSM-5 release, the new edition, ICD-11, is due in 2019 and is expected to remove the diagnosis of Transsexualism from the psychiatric section and rename this *Gender Incongruence*. The language used within the new ICD-11 Gender Incongruence diagnosis is expected to be inclusive of individuals who do not identify within the binary gender system (i.e., male or female). It is also expected to remove the presence of distress and impairment of functioning as a requirement of the Gender Incongruence ICD-11 diagnosis. It is important to note that people who experience incongruence between their gender assigned at birth and gender identity may or may not experience associated distress (i.e., a profound state of unease and dissatisfaction) and therefore this will allow people who experience gender *incongruence* but not gender *distress* (dysphoria) to have access to the treatment offered at transgender health services. When transgender people, their relatives and healthcare providers from the Netherlands, Belgium and the UK were asked about the proposed new diagnosis of Gender Incongruence within ICD-11, the majority were in agreement with these changes (Beek et al., 2016).
Although the revisions made to the DSM-5, and the proposed revisions to the ICD in 2019 (ICD-11), are likely to help to minimise the stigmatisation associated with these diagnoses, it cannot be ignored that these diagnoses are included within classification systems intended for the diagnosis of mental health disorders. Therefore, it is possible that the very presence of these diagnoses as part of these classification systems will mean that some transgender individuals will potentially still incur (or that individuals will perceive) stigmatisation from others. It has been established that experiencing incongruence between one’s gender assigned at birth and gender identity is not a mental health disorder (e.g., Richards et al., 2015). In light of this, it could therefore be seen as inappropriate to have a gender-related diagnosis in the DSM and the ICD. However, the current consensus remains that the DSM and ICD should continue to include diagnoses relating to gender identity so that transgender people can access the treatment offered at transgender health services if they wish to (Beek et al., 2016; Megeri & Khoosal, 2007; Richards et al., 2015). The recent changes in this school of thought relating to diagnostic classification systems are reflected within the chapters of this thesis. In chapter 3, reference to Gender Dysphoria (APA, 2013) and Transsexualism (WHO, 1992) is made. However, for chapters 2 and 4 to 10 this is not the case as, during the course of this PhD, changes in thinking about diagnoses resulted in a widely held view that a diagnosis of Gender Dysphoria (APA, 2013) or Transsexualism (WHO, 1992) is only relevant for clinical pragmatic reasons. Only the individual truly knows how they feel in relation to their gender. In light of this, no participants were required to have a diagnosis of Gender Dysphoria (APA, 2013) or Transsexualism (WHO, 1992) to be included within the empirical studies of this thesis (chapters 6 to 9). Instead, participants were required to self-identify as transgender.

1.5. The treatment pathway in the National Health Service: A UK perspective

Within the UK, treatment for transgender people is offered by the National Health Service (NHS) and is free at the point of access. Transgender health services are funded by NHS England rather than by local commissioning groups. It is important to acknowledge that not every transgender person will have a desire to undergo a medical transition to feel congruent with their gender identity or require any support regarding their transition and, therefore, not everyone will wish to access transgender health services (Arcelus & Bouman, 2017a; Beek et al., 2015). As the majority of the data for this thesis were collected from a transgender health service within the UK (the Nottingham Centre for Transgender Health), the sections that follow outline the typical treatment pathway for transgender health services within the UK.
The Nottingham Centre for Transgender Health is an adult service which accepts referrals for people aged 17 and over and, therefore, the treatment pathway discussed in this section refers to the procedures followed with adults (i.e., people aged 17 and over). There are seven national transgender health services for adults in England and Wales. The Nottingham Centre for Transgender Health is the second largest service within the UK and one of the largest in Europe in relation to the number of referrals it receives annually (approximately 1000 per year).

1.5.1. Referral to a transgender health service
To access transgender health services within the NHS, a person must first be referred by their general practitioner (GP) or secondary care service. People cannot self-refer to transgender health services in the UK.

1.5.2. Waiting time at transgender health services after referral
The waiting time to access a NHS funded transgender health service after referral is currently between 12-24 months (Bouman & Richards, 2013; UK Trans Info, 2016). This is a consequence of a recent surge in demand for these services, which is likely to be at least partially linked to the increase in visibility and acceptability of transgender people (Arcelus & Bouman, 2017b; see section 1.3.).

1.5.3. Stage of transition at the point of referral
Patients are not required to have initiated a social or medical transition for a referral to be made to a transgender health service. Consequently, when referred to a transgender health service, people will be at varying stages of social and medical transition. For instance, some people may be questioning their gender identity and therefore have not made a social gender role transition, whereas other people might have made a full social gender role transition and be taking cross-sex hormone treatment obtained through a private provider or via the internet (Mepham, Bouman, Arcelus, Hayter, & Wylie, 2014). Obtaining hormone treatment through these sources is usually fuelled by the extensive waiting times experienced by many transgender people accessing care through the NHS. There are some health risks associated with cross-sex hormone treatment such as high haematocrit (high proportion of red blood cells) which can occur with testosterone therapy and venous thromboembolism (blood clotting disorder) which can be a side effect of oestrogen therapy. However, when this treatment is monitored by a healthcare professional, risk is greatly minimised (Mepham et al.,
2014; Seal, 2017). Oestrogen and testosterone therapy will be discussed in more detail in sections 1.5.6.1 and 1.5.6.2.

1.5.4. Initial assessment at a transgender health service

During the first appointment at a transgender health service, the initial assessment will commence. At the Nottingham Centre for Transgender Health the assessment will usually span three separate appointments; the first two appointments with different clinicians and the final appointment involving the two clinicians from the previous appointments, the patient and a person of the patient’s choice (usually a family member or friend who knows the individual well). It is not compulsory for the patient to bring a person of support to the final assessment appointment. During the assessment, the clinician(s) involved with the patient’s care will collect a gender history to help determine whether a diagnosis (usually Transsexualism (WHO, 1992), although some clinicians may use Gender Dysphoria (APA, 2013)) can be confirmed. Confirmation of a diagnosis is sought for pragmatic reasons (see section 1.4.) as only the individual truly knows how they feel in relation to their gender. It is also important during the assessment process to collect information that confirms that a social gender role transition has been made, including a name change and ensuring that changes have been made to official documentation such as bank details or driving licence. During the initial assessment process, the presence of any mental health issues will also be determined. It is not uncommon for transgender people to present with mental health problems, such as anxiety, depression and self-harm (e.g., Arcelus, Claes, Witcomb, Marshall, & Bouman, 2016; Bouman, Davey, Meyer, Witcomb, & Arcelus, 2016a; Dhejne, Van Vlerken, Heylens, & Arcelus, 2016; Reisner et al., 2016; see section 1.7.) and these symptoms do not prevent a person from accessing transgender health care (Wylie et al., 2014). In fact, poor mental health within the transgender population has been found to reduce once a medical transition has been initiated (Davis & Meier, 2014; De Cuypere, Elaut, Heylens, & Monstrey, 2006; Fisher et al., 2014; Gorin-Lazard et al., 2012; Heylens, Verroken, De Cock, T’Sjoen, & De Cuypere, 2014; Lindqvist et al., 2017; Murad et al., 2010; Ruppin & Pfafflin 2015; van de Grift et al., 2017a; van de Grift, Elaut, Cerwenka, Cohen-Kettenis, & Kreukels, 2017b). However, for people experiencing severe mental health problems, such as schizophrenia or bipolar disorder, it is important that these conditions are stabilised prior to any gender affirming interventions to ensure the individual can understand the irreversibility of these interventions and is able to provide informed consent.
At the end of the initial assessment process, typically lasting six months, a decision regarding the initiation of cross-sex hormones will be made (if this is what the patient wishes). For some patients, it may be necessary to extend the assessment process. For instance, a small but growing number of transgender patients also present with autism spectrum disorder (ASD (DSM-5; APA, 2013)) which can make the assessment process more complex due to communication difficulties, rigid thinking, limited self-awareness, and problems with executive functioning associated with ASD (Glidden, Bouman, Jones, & Arcelus, 2016; van der Miesen & de Vries, 2017).

1.5.5. Ongoing assessment at a transgender health service
After the initial assessment process has ended, it is necessary throughout the treatment process for the patient to have ongoing assessment at the transgender health service. Patients can usually expect to have three or four appointments a year. During these appointments, gender affirming medical interventions will be offered, if appropriate, and outcomes evaluated. Support on issues relating to social, occupational, family and relationship issues will also be offered. Some transgender people may wish to obtain a Gender Recognition Certificate (GRC) which allows the individual to change their name and gender on their birth certificate. It is not possible to make such changes without a GRC and the clinician(s) involved in the patient’s care can facilitate and support the individual with obtaining a GRC.

1.5.6. Cross-sex hormone treatment
Cross-sex hormone treatment refers to the administration of sex hormones that are different to the naturally occurring sex hormones associated with a person’s sex. Cross-sex hormones will facilitate the development of the secondary sex characteristics (e.g., hair, fat and muscle distribution) associated with the person’s gender identity (Seal, 2017). To achieve this, transgender males will be prescribed testosterone and transgender females will be prescribed oestrogen. Some people who identify outside the binary gender system may also request sex hormones that are different from the sex hormones that are associated with their gender assigned at birth. Cross-sex hormone treatment in the UK is funded by the NHS. Prior to the prescription of cross-sex hormone treatment, discussions about the negative effects on fertility and potential health risks should be discussed at length and, following this, informed consent obtained (Wylie et al., 2014).
1.5.6.1. Cross-sex hormone treatment: Testosterone

Treatment seeking transgender males, as well as some transgender people who identify outside the binary gender system (but were assigned female at birth), will usually request the prescription of testosterone. Testosterone therapy will induce the development of facial hair after six to nine months and is maximal after 48-56 months (Hembree et al., 2009). Testosterone therapy will also encourage body hair to grow in a male pattern (i.e., chest, abdomen, back; Meyer et al., 1986). At the same time, testosterone therapy may induce male baldness (Seal, 2017). Testosterone therapy will also increase muscle mass in a male pattern and decrease body fat, especially around the hips and buttocks (Meyer et al., 1986). After three to four months of testosterone therapy, the clitoris will increase in size and approximately two to three cycles after the administration of testosterone, cessation of menses (amenorrhea) will occur (Seal, 2017). About nine to 12 months into testosterone treatment the voice will start to break and deepen (Hembree et al., 2009). To maintain these changes, testosterone is prescribed for life. In some circumstances, transgender males (or non-binary people) may pause their testosterone treatment for child birth (if the uterus hasn't been removed).

1.5.6.2. Cross-sex hormone treatment: Oestrogen

Treatment seeking transgender females, as well as some transgender people who identify outside the binary gender system (but were assigned male at birth), will usually request the prescription of oestrogen. Oestrogen therapy induces the development of breasts after about two to three months and full breast growth will be achieved after approximately two years (Seal, 2017). Oestrogen therapy will also soften the skin and reduce the production of facial hair. The effects of oestrogen therapy on facial hair are maximal after four months and many people will seek further treatment, such as electrolysis or laser therapy (Seal, 2017). Oestrogen therapy will reduce muscle mass and increase body fat (average weight gain 3.8 kg) mainly around the hips and buttocks (Elbers et al., 2003). Oestrogen therapy will also reduce penile function and libido (Seal, 2017), but oestrogen therapy does not change the tone or pitch of the voice. As with testosterone therapy, oestrogen therapy is prescribed for life. However, oestrogen therapy is paused approximately 6 months prior to undergoing any non-emergency surgery (not just gender affirming surgery), so as to minimise the risk of deep vein thrombosis (i.e., blood clots).
1.5.6.3. Testosterone blockers

People who are prescribed oestrogen will also sometimes be prescribed testosterone blockers (i.e., GnRH analogues). The aim of this intervention is to suppress the production of testosterone. Testosterone blockers do not change secondary sex characteristics. If the testes (where testosterone is produced) are removed, it is no longer necessary to take GnRH analogues. However, not every individual will wish to undergo genital affirming surgery.

1.5.7. Surgical interventions

Some transgender people will feel that cross-sex hormone treatment alone is sufficient to align their body with their gender identity and therefore choose not to undergo gender affirming surgeries. Others may be concerned about surgical outcomes or be fearful of undergoing such procedures and therefore choose not to. However, there are a significant proportion of transgender people who will choose to undergo surgeries to align their body with their gender identity. The amount of surgery a person chooses to undergo is a personal choice. The different surgeries transgender people may choose to undergo are discussed below separately for people who were assigned female at birth and male at birth.

1.5.7.1. Surgical interventions for people assigned female at birth

As testosterone therapy has little effect on the breast tissue, many transgender males or people with a non-binary gender identity (who were assigned female at birth) will wish to undergo a mastectomy (where the breast tissue is removed) and chest reconstructive surgery (Yelland, 2017). People can be referred for these interventions six months after the initiation of testosterone therapy (Wylie et al., 2014). Some patients may wish to undergo a phalloplasty which is a series of complex operations to create a phallus usually undertaken in three stages (although more than one operation may be required per stage) which can span approximately 18 months as operations are scheduled at least three months apart for adequate healing to take place (Christopher et al., 2017). This procedure will create a cosmetically acceptable phallus which can be used for penetrative sexual intercourse (Christopher et al., 2017). If a patient does not wish to use their penis for penetrative sexual intercourse, they may choose to undergo a metoidioplasty to create a phallus. This is a much less complex and risky procedure than a phalloplasty and can usually be completed in two or three operations (Christopher et al., 2017). People can be referred for phalloplasty 12-18 months after social gender role transition and cross-sex hormone treatment (Christopher, Ralph, & Garaffa, 2017;
Wylie et al., 2014). Both chest and genital surgery for transgender people assigned female at birth is funded by the NHS.

1.5.7.2. Surgical interventions for people assigned male at birth

Some transgender females or people with a non-binary gender identity (who were assigned male at birth) may also wish to be considered for genital surgery to create a vagina, labia and clitoris (vaginoplasty) which is recommended at least 12 months after a social gender role transition has been made (Wylie et al., 2014). In this UK, this treatment is funded by the NHS. When speech and language therapy has not been successful, patients may be referred for phonomicrosurgery (vocal cord surgery) to change the tone and pitch of the voice. This intervention is not funded by the NHS. Due to insufficient breast growth, some transgender women (or non-binary people) may seek breast augmentation, although this treatment is currently not funded on the NHS (Yelland, 2017). Some transgender women (or non-binary people) may also seek facial feminisation surgery and/or a cricothyroid (Adam’s apple) shave; neither of which are funded by the NHS. Although the latter four treatments are not funded by the NHS they are associated with positive outcomes, such as an increase in perceived gender congruence and mental well-being (e.g., Wylie et al., 2014), and therefore people may seek to undergo these treatments privately.

1.5.8. Aftercare

After the patient feels that they have reached the end of their transition (i.e., they feel their body aligns with their gender identity) and no longer require support, they can be discharged from the transgender health service. The service will provide information and guidance to the individual’s GP so that they can take responsibility for the patient’s care thereafter. As noted above, patients who are taking cross-sex hormones will do so for the rest of their lives and therefore it is important that this is monitored in the long term to minimise the health risks associated with this type of intervention (Seal, 2017; Unger, 2016; Wylie et al., 2014).

1.6. Support organisations for transgender people within the UK

Transgender people may also seek support though dedicated organisations. Across the UK there are several support organisations and charities specifically for transgender people (e.g., Gender Trust, Gendered Intelligence, Nottingham Chameleons). Some support networks operate through the internet, while others organise support meetings and events within the local community. The type and level of support offered by these organisations and charities
can differ greatly. Some support organisations will solely offer an opportunity to socialise with other transgender people while others will provide peer support or formal information and advice about various aspects of being transgender, making a social gender role and medical transition, and mental health. These support organisations are usually open to anyone who identifies as transgender, including people who identify outside the binary gender system (although some groups may be dedicated to transgender males or females only, for example). Some organisations are also open to the family and friends of transgender people so that they themselves can seek advice and support. Some transgender people may seek support (in various forms) through these organisations and never attend a transgender health service, while others may have been in contact with both outlets. Some transgender people may never access a support organisation. As not all transgender people will wish to undergo gender affirming medical interventions, transgender support organisations are likely to be in contact with a broader range of transgender people than transgender health services. In recognising this, transgender support organisations within the UK were contacted to facilitate the recruitment of transgender people for some of the studies reported on in this thesis.

1.7. Mental health within the transgender population

1.7.1. General mental health

Although being transgender is not considered a mental health problem (as discussed in section 1.4.), treatment seeking transgender people who have not initiated a medical transition have been found to report higher levels of depression, anxiety and non-suicidal self-injury in comparison to the cisgender population (e.g., Arcelus et al., 2016; Bouman et al., 2016a; Dhejne et al., 2016; Reisner et al., 2016). Several academics have attributed the high levels of mental health problems in the transgender population to minority stress. Hendricks and Testa (2012) and Meyer (2003) stated that people with minority identities (e.g., transgender, gay, lesbian) may experience stigma, prejudice and discrimination (i.e., transphobia) as a result of their identity which can put them at risk of mental health problems. Internalising these negative attitudes can also lower self-esteem (Hendricks & Testa, 2012; Meyer, 2003). It is, however, important to note that a recent systematic review of the mental health and transgender literature concluded that serious psychiatric and mental health disorders (e.g., bipolar, schizophrenia) in the transgender population are no higher than in the cisgender population (Dhejne et al., 2016).
1.7.2. Body dissatisfaction and disordered eating

Treatment seeking transgender people often report very high levels of body dissatisfaction; much higher than levels of body dissatisfaction typically found within the cisgender population (e.g., Kozee, Tylka, & Bauerband, 2012; Witcomb et al., 2015). The majority of research concerned with body dissatisfaction in transgender individuals has focused on sex characteristics that are associated with gender assigned at birth (e.g., genitals) which this population is unsurprisingly often severely dissatisfied with (e.g., van de Grift et al., 2016a; 2016b; 2016c). Body dissatisfaction within the transgender population has been associated with disordered eating attitudes and behaviour (e.g., Ålgars, Alanko, Santtila, & Sandnabba, 2012). This is not surprising as body dissatisfaction has also been associated with disordered eating attitudes and behaviour within the cisgender population (Stice & Shaw, 2002). It has been hypothesised that transgender people engage in disordered eating to suppress body features associated with the gender assigned at birth and to accentuate features associated with their gender identity (Ålgars et al., 2012). When body dissatisfaction in transgender people has been compared to people with eating disorders and to controls (cisgender people with no eating disorders), transgender people who had not undergone gender affirming surgery were found to report levels of body dissatisfaction that were much higher than controls and were similar to people with an eating disorder (Bandini et al., 2013). In contrast, for transgender people who had undergone gender affirming surgery, body dissatisfaction was significantly lower than for people with an eating disorder but was not as low as for those in the control group (Bandini et al., 2013). Why transgender people still report levels of body dissatisfaction that are higher than the cisgender population after gender affirming surgery might be explained by the fact that transgender people often report dissatisfaction with all body parts and not just sex-specific body parts that are affected by gender affirming medical interventions (e.g., Becker et al., 2016; van de Grift et al., 2017a; 2017b; Witcomb et al., 2015). In some ways, body dissatisfaction is likely to be similar to dissatisfaction experienced by the cisgender population (i.e., dissatisfaction with general body shape). At the same time, dissatisfaction with shape and weight within the transgender population might differ from the shape and weight dissatisfaction experienced by cisgender people. Transgender people may be dissatisfied with parts of their body they feel do not align with their gender identity. For instance, transgender males may feel they are too curvaceous or are lacking muscle on their upper torso. In contrast, transgender females might feel that they are too muscular on their upper torso and would prefer a more curvaceous body shape. Taking cross-sex hormones (if this is what a person wishes) will change body shape in accordance

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with gender identity to a certain degree. However, there is no medical or physical intervention that can, for example, increase the size of the pelvis (to give a feminine hourglass shape) or decrease the size of the pelvis (to diminish a feminine hourglass shape) (Elbers et al., 2003; Meyer et al., 1986). It is therefore evident that interventions other than gender affirming medical treatments need to be considered to help alleviate broader body dissatisfaction within the transgender population.

1.7.3. Alleviation of mental health problems and body dissatisfaction

1.7.3.1. Gender affirming medical interventions

There has been very little research which has considered the effects that gender affirming medical interventions might have on gender incongruence and gender distress. This is concerning seeing as this is the primary reason transgender people access transgender health services and seek gender affirming medical interventions. The lack of empirical data on these important outcomes can be attributed to the lack of measures available to assess such outcomes. To compensate for this, research has tended to focus on mental health and body dissatisfaction as an outcome of gender affirming medical interventions. While this is still important to assess due to the high prevalence of mental health problems and body dissatisfaction experienced within this population (e.g., Dhejne et al., 2016; Witcomb et al., 2015; see sections 1.7.1. and 1.7.2.), alleviating poor mental health and body dissatisfaction is not the primary aim of gender affirming medical interventions and interventions that address poor mental health and body dissatisfaction are not usually offered at transgender health services (Arcelus & Bouman, 2015; Dhejne et al., 2016).

Although the literature is limited, on the whole studies that have explored outcomes of gender affirming medical interventions have reported improvements in mental health (Davis & Meier, 2014; De Cuypere et al., 2006; Gorin-Lazard et al., 2012; Heylens et al., 2014; Lindqvist et al., 2017; Murad et al., 2010; Ruppin & Pfäfflin 2015). Gender affirming medical interventions have also been found to be successful at alleviating dissatisfaction with sex-specific body parts (Fisher et al., 2014; Kraemer, Delsignore, Schnyder, & Hepp, 2008; Smith, Van Goozen, Kuiper, & Cohen-Kettenis, 2005; van de Grift et al., 2017a). It could be assumed that if body dissatisfaction is associated with disordered eating within the transgender population (Ålgars et al., 2012), then eating disorder symptoms would also alleviate following gender affirming medical interventions. However, research concerned
with disordered eating and gender affirming medical interventions is scarce and therefore conclusions cannot be drawn.

Although these findings on the most part are positive, it is important to consider that not every transgender person will wish to undergo a medical transition with cross-sex hormones and gender affirming surgeries and therefore these interventions are not suitable to alleviate mental health problems and body dissatisfaction in all circumstances. In addition, for transgender people who are treatment seeking, accessing transgender health services can be a lengthy process (see section 1.5.2.) and therefore it may be necessary to recommend mental health and body dissatisfaction interventions that can take immediate effect. For some treatment seeking transgender people, poor mental health and body dissatisfaction may also continue even after they have undergone a medical transition. For instance, higher levels of body dissatisfaction when first referred to a transgender health service have been associated with higher levels after gender affirming medical interventions (van de Grift et al., 2017a). In such circumstances, frequent physical activity and/or sport engagement may be a particularly beneficial intervention in order to address poor mental health and body dissatisfaction in the transgender population.

1.7.3.2. Physical activity and sport
Within the cisgender literature, it is well established that engaging in regular physical activity and/or sport is associated with alleviating mental health problems, especially symptoms of anxiety and depression (e.g., Carter, Morres, Meade, & Callaghan, 2016; Herring, Jacob, Suveg, & O’Conner, 2011; McMahon et al., 2017; Rebar et al., 2016). The NHS also currently recommends engaging in frequent physical activity (at least three times a week) to alleviate mild to moderate levels of depression (National Institute for Health and Care Excellence (NICE), 2016). Body satisfaction has also been positively associated with physical activity and/or sport engagement in cisgender individuals (e.g., Cox, Ullrich-French, Howe, & Cole, 2017; Kruger, Lee, Ainsworth, & Macera, 2008; Lantz, Hardy, & Ainsworth, 1997). In light of this, it would seem that populations who are particularly vulnerable to poor mental health and body dissatisfaction, such as transgender people, would benefit from frequent engagement in physical activity and/or sport. However, research conducted with the transgender population in relation to physical activity and sport is scarce and there are several limitations with the small amount of research that has been conducted (this is discussed in more detail in section 1.7.5.2.). Considering this, determining whether physical activity
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and/or sport would be a feasible mechanism to alleviate poor mental health and body dissatisfaction within the transgender population is currently difficult.

1.7.4. Physical health of the transgender population

In addition to the mental health benefits that physical activity and/or sport participation are likely to have for transgender people, physical activity and/or sport may also be beneficial for physical health, especially for people who choose to medically transition with cross-sex hormones and gender affirming surgeries. Prior to undergoing gender affirming surgeries, it is necessary for transgender people to have a suitable Body Mass Index (BMI). A suitable BMI is usually considered 30 or below. However, in some circumstances, surgeons may accept patients with BMIs greater than 30. In addition, cross-sex hormones may put transgender females (or people taking oestrogen therapy) at risk of cardiovascular disease, and transgender males (or people who take testosterone therapy) might be more susceptible to factors associated with cardiovascular disease (Unger, 2016). Therefore, to maintain a suitable BMI for gender affirming surgery and a healthy heart, physical activity and/or sport engagement is likely to be essential for the treatment seeking transgender population.

1.7.5. Limitations of the extant transgender physical activity, body dissatisfaction and mental health literature

1.7.5.1. Measurement issues

The challenges encountered by transgender people which put them at greater risk of mental health problems and body dissatisfaction need to be addressed. However, research within these areas has largely used self-report measures that have been developed and validated with the cisgender population (e.g., the Hospital Anxiety and Depression Scale; Zigmond & Snaith, 1983), or other specific populations, such as people with eating disorders (e.g., the Eating Disorder Inventory-2; Garner, 1991). This is somewhat problematic as these measures are unlikely to be specific enough to be used with the transgender population (i.e., because they do not assess mental health and body dissatisfaction in relation to gender identity issues). The use of such measures might have limited the current understanding of mental health problems and body dissatisfaction within the transgender population and, in particular, how and why these might differ from experiences of the cisgender population. Without understanding mental health issues and body dissatisfaction specifically among transgender people, targeted interventions to better support this population cannot be identified and developed. The research concerned with mental health problems and body dissatisfaction in
the transgender population is also inconsistent in relation to the measures employed across studies. This is problematic because the results are not comparable across studies and this then limits the ability to draw conclusions from research concerned with mental health problems and body dissatisfaction within the transgender population. After systematically reviewing the mental health literature, Dhejne et al. (2016) concluded that the findings within this area are limited by such measurement issues. However, an important omission is that the literature concerning body dissatisfaction was not synthesised. The body dissatisfaction literature would benefit from its findings being drawn together so that a current knowledgebase can be developed and so that limitations and areas for future research can be identified.

1.7.5.2. Sample issues

For the most part, research investigating physical activity, body dissatisfaction and mental health within the transgender population has recruited very small sample sizes. While this research has made important inroads, the generalisability of such findings is limited. Research in these fields has also recruited transgender people who are at varying stages of social and medical transition. This is significant as the stage of social and medical transition, and whether or not a person is treatment seeking, will likely impact physical activity levels, body dissatisfaction and mental health. After reviewing the literature, Dhejne et al. (2016) concluded that mental health symptoms in transgender people dissipate to levels found within the cisgender population following gender affirming medical interventions. However, the findings regarding body dissatisfaction need to be unpacked further and subsequently synthesised in order to establish at what stage of social and medical transition transgender people are most vulnerable to body dissatisfaction and which gender affirming medical interventions are associated with good outcomes.

The evidence that has been presented in sections 1.7.3.2. and 1.7.4. shows that physical activity and/or sport engagement is likely to have benefits for transgender people’s mental and physical health. Physical activity and sport research is extremely limited. To date, research has been conducted with both transgender people who engage recreationally in physical activity and/or sport for leisure and fitness, as well as transgender people who engage in competitive sport at an elite level. As the experiences of people who engage in physical activity and/or sport recreationally compared to those who engage at an elite level are likely to greatly differ, it is very difficult to determine from the existing literature whether
physical activity and/or sport would be a feasible mechanism to improve mental and physical health within the transgender population. Synthesising the research in this area would facilitate a better understanding of whether physical activity and/or sport can feasibly be used to alleviate poor mental health and body dissatisfaction within the transgender population. Additionally, the physical activity and sport literature would benefit from being drawn together so it can be determined at what point of a transition physical activity and/or sport might be able to alleviate mental health problems and body dissatisfaction, whether physical activity and sport are accessible to the transgender population and, if necessary, how physical activity and sport can be made more accessible to transgender people.

1.8. Chapter summary

Poor mental health, body dissatisfaction and subsequent vulnerability to disordered eating impose significant challenges for the treatment seeking transgender population. Research suggests gender affirming medical interventions (for transgender people who are treatment seeking) may be particularly beneficial in alleviating mental health problems and body dissatisfaction (as well as vulnerability to disordered eating). In addition, physical activity and/or sport may be beneficial for the mental and physical health of the transgender population. However, the conclusions drawn from this literature concerned with physical activity, body dissatisfaction and mental health are limited due to that fact that self-report measures do not assess these constructs in relation to gender incongruence. There is also variability in the self-report measures employed which makes it hard to compare findings across studies. In addition to this, research to date has tended to employ small samples who are heterogeneous in relation to the stage of transition which has affected research findings. For these reasons, it is evident that conducting a systematic review of literature that pertains to physical activity and sport, as well as systematically reviewing literature related to body dissatisfaction and disordered eating, is required to advance the field. Conducting such reviews of the existing literature will serve to synthesise the current knowledge and establish areas for future research so that challenges relating to physical activity engagement, body dissatisfaction and poor mental health can be addressed within the transgender population.
1.9. Initial aims of the thesis

Based on the limitations with past research outlined above, including the use of numerous different measures with different samples in existing research with the transgender population, the initial aims of this thesis are to:

1) Systematically review the literature concerned with physical activity and sport in the transgender population.

2) Systematically review the literature concerned with body dissatisfaction and disordered eating within the transgender population.
Chapter 2

Sport in transgender people: A systematic review of the literature relating to sport participation and competitive sport policies

This chapter has been published in *Sports Medicine* (impact factor: 6.84) as:


The content of chapter 2 is largely the same as the published paper, however some small changes have been made to the formatting and presentation to ensure it is consistent with the rest of the chapters that comprise this thesis.

**Statement of authorship**

*Research conception and design:* BJ, JA & EH.

*Data collection:* BJ.

*Data analysis and interpretation:* BJ, JA & EH.

*Drafting of article:* BJ.

*Article editing and revisions:* BJ, JA, WB & EH.
2.1. Abstract

Whether transgender people should be able to compete in sport in accordance with their gender identity is a widely contested question within the literature and among sport organisations, fellow competitors, and spectators. Due to concerns surrounding transgender people (especially transgender females) having an athletic advantage, several sport organisations place restrictions on transgender competitors (e.g., must have undergone gender confirming surgery). In addition, some transgender people who engage in sport, both competitively and for leisure, report discrimination and victimisation. To the authors’ knowledge, there has been no systematic review of the literature pertaining to sport participation and competitive sport policies in transgender people. Therefore, this review aimed to address this gap in the literature. Eight research articles and 31 sport policies were reviewed. In relation to sport-related physical activity, this review found the lack of inclusive and comfortable environments to be the primary barrier to participation for transgender people. This review also found transgender people had a mostly negative experience in competitive sport due to the restrictions sport policy placed on them. The majority of transgender competitive sport policies that were reviewed were not evidence-based. In conclusion, currently there is no direct or consistent research that suggests transgender females (or males) have an athletic advantage at any stage of their transition (e.g., cross-sex hormones, gender confirming surgery) and, therefore, competitive sport policies that place restrictions on transgender people needs to be considered and potentially revised.
2.2. Introduction

Transgender people are those who experience incongruence between the gender that they were assigned at birth (based on the appearance of their genitals) and their gender identity/experienced gender. Gender identity, or experienced gender, can be defined as a person’s internal sense of gender, whether this be male, female, neither or somewhere along the gender continuum. Some transgender people, but not all, will choose to affirm their gender identity by socially transitioning (i.e., living as their experienced gender socially, at work or education, with friends and family, outside the house) and some in addition will choose to medically transition with cross-sex hormones and gender confirming surgeries (Coleman et al., 2012; Wylie et al., 2014). Although over time various different terms have been used, the term transgender female will be used to describe individuals assigned male at birth, based on their genital appearance, but who later identify as female. Transgender male will be used to describe people who are assigned female at birth, based on their genital appearance, but later identify as male. Cisgender will be used to describe people who do not experience incongruence between their gender assigned at birth and their gender identity.

Recent reports indicate that the number of transgender individuals who attend transgender health services has increased substantially over the years in many European countries (Arcelus et al., 2015; Aitken et al., 2015; de Vries, Kreukels, T’Sjöen, Álgars, & Mattila, 2015). There has also been a significant increase in the number of people who self-identify as transgender and do not necessarily attend transgender health services (Kuyper & Wijsen, 2014). For example, Kuyper and Wijsen (2014) found that 4.6% of people who were assigned male at birth and 3.2% of people who were assigned female at birth in their Dutch population sample reported an ambivalent gender identity (equal identification with the other gender as with the gender they were assigned at birth). The authors also reported that 1.1% of the people who were assigned male at birth and 0.8% of the people who were assigned female at birth identified as transgender. It remains unknown how many of these people will seek treatment through a transgender health service. The increase in people who identify as transgender may be at least partly explained by the increase in visibility of transgender people within Western society (Aitken et al., 2015; de Vries et al., 2015). For example, Caitlyn Jenner, a former athlete and current television personality, recently came out as transgender during a television interview which was viewed all over the world (Dooley et al., 2015). Increases in visibility may have prompted some people to reflect and question their gender identity (Bouman, de Vries, & T’Sjöen, 2016).
Some transgender people experience stigma, transphobia, prejudice, discrimination and violence as a consequence of their gender identity (i.e., transphobia) (Claes et al., 2015; Hill & Willoughby, 2005; Mizock & Mueser, 2014). Ellis, McNeil and Bailey (2014) found that transgender people were more likely to avoid situations when they were afraid of being harassed, identified as transgender, or ‘outed’, such as clothes shops, public toilets and gyms. Gyms are a popular outlet to engage in sport-related physical activities (i.e., gym fitness exercises) and therefore it is important to create an inclusive environment given the established mental and physical health benefits of physical activity and sport (De Moor, Beem, Stubbe, Boomsma, & De Geus, 2006; Maltby & Day, 2001). This is particularly important for transgender people as they have been found to report a high prevalence of depression and anxiety (Dhejne et al., 2011; Hepp, Kraemer, Schnyder, Miller, & Delsignore, 2005), which could be managed with physical activity. Furthermore, physical activity and sport can also contribute towards maintaining the appropriate weight necessary to undergo gender confirmation surgery, acknowledging that not every transgender person will wish to do so (Beek, Kreukels, Cohen-Kettenis, & Steensma, 2015; Coleman et al., 2012; Wylie et al., 2014).

The premise of competitive sport is fairness (i.e., inclusion in the absence of advantage) and, due to fears surrounding the perceived athletic advantage of transgender people, the question of whether or not transgender people should be permitted to compete in accordance with their gender identity has been raised and greatly contested within the literature, among sport organisations, fellow competitors and spectators. It is a commonly held belief that androgenic hormones (especially testosterone) confer an athletic advantage in competitive sport. Therefore transgender females, because of high endogenous testosterone levels, are perceived to hold an advantage in sport (when testosterone has not been blocked to a cisgender female level). Transgender men are not thought to possess an athletic advantage, despite being injected with testosterone if they chose to medically transition with cross-sex hormones. However, there has been a paucity of research that has directly explored how androgenic hormone levels are associated with athletic competence in both cisgender and transgender populations (e.g., running time).

To facilitate the inclusion of transgender competitors, in 2004, the International Olympic Committee (IOC) announced that transgender people could participate in all future Olympic games providing they had fully medically transitioned (i.e., had been prescribed cross-sex
hormone treatment for 2 years and undergone gender confirming surgery). Although the requirements of this policy appear to concur with the commonly held belief that transgender people hold an athletic advantage, they have been criticised for not being underpinned by evidence-based rationale (Cavanagh & Sykes, 2006). The IOC (2016a) has recently updated its policy to be more inclusive of transgender athletes (i.e., fewer restrictions); however the 2004 policy has been extremely influential on other sport organisations’ policy development. The new (2016a) IOC policy will be considered in the results section of this review.

In an attempt to draw a consensus as to whether transgender people should be able to compete in accordance with their gender identity or not, Reeser (2005) conducted a review in 2005 of the literature pertaining to gender identity issues in competitive (elite) sport. Reeser paid particular attention to the evolution of gender verification in competitive sport and whether current competitive sport policies for transgender people are fair. He concluded that, while gender verification has made significant advances, there is a lack of physiological performance-related data in transgender people. This is preventing an overall consensus from being made as to whether transgender sport policies are fair or not (i.e., fairness in the absence of advantage). Reeser’s review, although important, has some limitations. He did not adopt a systematic methodology and therefore did not include the majority of transgender sport policies. Additionally, Reeser only considered the implications of such policies in relation to elite competitive sport and did not consider the experiences of transgender people who engage in sport or sport-related physical activity for leisure or fitness (e.g., gym fitness activities, jogging).

With the intention of addressing the limitations of the previous literature review, this systematic review has two aims. First, to systematically analyse and critically review the available literature regarding transgender people’s experiences in relation to competitive sport (elite and recreational) and sport-related physical activity participation (e.g., jogging, gym fitness activities). Second, to systematically review the available transgender competitive sport policies regarding their fairness (i.e., competition in the absence of advantage). It is hoped that this systematic review will further enhance the understanding of sport participation and competition amongst transgender people. It may be expected that, as more people define themselves as transgender, the issues that transgender people experience in competitive sport and sport-related physical activity will become more pronounced. It is therefore important that those who work to facilitate and promote sport and develop policies
for their own sport organisations (e.g., sport medicine specialists, sport policy makers) are informed about the issues that this vulnerable population face. This will allow for a non-discriminatory atmosphere in sport, whilst ensuring a fair system for all participants and competitors (regardless of their gender identity).

2.3. Method

2.3.1. Search strategy

PRISMA guidelines were followed to undertake this systematic review (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009). To obtain relevant peer reviewed articles, an electronic search of literature published between January 1966 and August 2015 was conducted using the following search engines: ScienceDirect, Web of Science, Scopus, and PubMed. Within each search engine, the following search terms were entered: gender dysphoria, gender identity disorder, trans people, trans individual, transgender, and transsexual. These terms were combined with three terms relating to sport (physical activity, exercise and sport) using the “AND” operator. The reference lists of eligible papers were searched for potentially relevant publications. Sport policies were obtained through a Google search using the above search terms with the addition of “policy” at the end of all sport related terms.

2.3.2. Inclusion and exclusion criteria

To address the first aim, articles that were selected were concerned with the experiences and issues surrounding physical activity and sport participation for transgender people. This systematic review only considered articles eligible if they were research articles, as opposed to discussion papers. Case studies were also considered eligible, as research articles were limited. Peer reviewed articles that were written in English only were included. For the second aim, all available national and international policies on competitive sport in transgender people were selected and reviewed.

2.3.3. Study selection

Thirty-one research articles were considered potentially relevant to the remit of this review. The search also identified 31 competitive sport policies for transgender people. After screening the abstracts, 10 research articles were excluded as six were concerned with LGBT (lesbian, gay, bisexual and transgender) sport, one was a Scottish non-academic survey, one was a book chapter, one was concerned with an irrelevant topic, and another with cisgender
Chapter 2: Sport review

participants. The remaining 21 articles were downloaded for full text review and 13 papers were excluded as they were discussion papers, as opposed to research articles. Therefore, eight research articles fulfilled the inclusion criteria and were consequently included within this systematic review (see Figure 2.1.). All 31 competitive sport policies for transgender people were reviewed and included within this systematic review.

Figure 2.1. The process of identifying eligible research articles

*LGBT*: Lesbian, gay, bisexual, transgender

2.4. Results

This section presents the findings from the research articles and sport policies included within this systematic review. First, the findings from the research articles that explored participation in sports (both elite and recreational standards) and sport-related physical activities (i.e., gym fitness activities, jogging) are provided. Second, findings from the reviewed competitive sport policies relating to transgender inclusion are given.

2.4.1. Transgender people and sport participation

2.4.1.1. Characteristics of the eligible research studies

The oldest research article included was published in 2004 (Gooren & Bunck, 2004) and the most recent publication was from 2015 (Hargie, Mitchell, & Somerville, 2015). The majority
of the studies were qualitative in nature, all of which employed interviews (Caudewell, 2012; Cohen & Semerjian, 2008; Hargie et al., 2015; Semerjian & Cohen, 2006; Tagg, 2012; Travers & Deri, 2011). The remaining two research articles included an experimental study (Gooren & Bunck, 2004) and a cross-sectional survey (Muchicko, Lepp, & Barkley, 2014). Most of the studies were concerned with transgender people who participated in sport competitively, at an elite or recreational level (Reeser, 2005; Gooren & Bunck, 2004; Caudwell, 2012; Cohen & Semerjian, 2008; Semerjian & Cohen, 2006; Tagg, 2012; Travers & Deri, 2011). Some authors focused on a specific sport; ice hockey, netball and softball (Cohen & Semerjian, 2008; Tagg, 2012; Travers & Deri, 2011) while others were concerned with transgender people engaging in any sport (Caudwell, 2012; Semerjian & Cohen, 2006; Travers & Deri, 2011). Broadly across all sports, Gooren and Bunck (2004) explored whether transgender athletes have a physiological advantage in competitive sport. One study explored participation in competitive sports and sport-related physical activity (Hargie et al., 2015) and another study discussed participation in sport-related physical activity only (Muchicko et al., 2014). Details of all of the research articles included within this systematic review can be found in Table 2.1.
**Table 2.1. Study characteristics of research articles included within the review**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year</th>
<th>Country</th>
<th>Aim(s)</th>
<th>Sample size (N)</th>
<th>Study design</th>
<th>Main finding(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caudwell</td>
<td>2012</td>
<td>UK</td>
<td>To explore two transgender males’ experience of sport in an educational and recreational environment</td>
<td>2</td>
<td>Qualitative (semi-structured interviews) and a narrative review</td>
<td>Four themes emerged: school sport, their embodied subjectivities, transitioning and sport participation.</td>
</tr>
<tr>
<td>Cohen &amp; Semerjian</td>
<td>2008</td>
<td>USA</td>
<td>To explore the experience of a transgender female participating in women’s national ice hockey tournaments</td>
<td>1</td>
<td>Qualitative (four open-ended interviews)</td>
<td>Five main themes: policed identity, internal conflict, traits of masculinity, affirmation and creating gender norms.</td>
</tr>
<tr>
<td>Gooren &amp; Bunck</td>
<td>2004</td>
<td>Netherlands</td>
<td>To explore androgen deprivation and androgen administration in transgender people</td>
<td>36</td>
<td>Retrospective study</td>
<td>Androgen deprivation in transgender females increases the overlap in muscles mass with women but does not reverse it.</td>
</tr>
<tr>
<td>Hargie et al.</td>
<td>2015</td>
<td>UK</td>
<td>To explore transgender people’s experiences of sport in relation to social exclusion and minority stress theory</td>
<td>10</td>
<td>Qualitative study (semi-structured interviews)</td>
<td>Four themes emerged: intimidating nature of locker rooms, the impact of alienating sport experiences at school, fear of public space, and being denied the social, health and well-being aspects of sport.</td>
</tr>
<tr>
<td>Muchicko et al.</td>
<td>2014</td>
<td>USA</td>
<td>To explore the relationship between gender identity and physical activity</td>
<td>80</td>
<td>Cross-sectional survey</td>
<td>Transgender people reported less physical activity and reported lower social support and physical self-perception than the cisgender participants.</td>
</tr>
<tr>
<td>Semerjian &amp; Cohen</td>
<td>2006</td>
<td>USA</td>
<td>To explore the experiences of transgender athletes, paying particular attention to whether gender identity or performance was related to participation</td>
<td>4</td>
<td>Qualitative (semi-structured interviews)</td>
<td>Athletes discussed a number of barriers and challenges in relation to their sport participation (i.e., incorrect pronouns use, discomfort in changing rooms).</td>
</tr>
<tr>
<td>Tagg</td>
<td>2012</td>
<td>Australia and New Zealand</td>
<td>To understand the issues surrounding transgender athletes sport participation, specifically in relation to men’s netball in New Zealand</td>
<td>2</td>
<td>Qualitative (semi-structured interview) and a narrative review</td>
<td>Transgender inclusive policies have medicalised gender. Instead of being protective they have done little to make sport fair for transgender participants. Transgender people who are undergoing physical transition have no place to openly participate in netball in New Zealand.</td>
</tr>
<tr>
<td>Reference</td>
<td>Year</td>
<td>Country</td>
<td>Aim(s)</td>
<td>Sample size (N)</td>
<td>Study design</td>
<td>Main finding(s)</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>---------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Travers &amp; Deri</td>
<td>2011</td>
<td>Canada</td>
<td>To examine the re-negotiation of sex based boundaries within the context of transgender inclusion in North American lesbian softball leagues</td>
<td>12</td>
<td>Qualitative (semi-structured interviews)</td>
<td>Positive experiences were more often reported by transgender women than transgender men in relation to inclusion despite the re-negotiation of sex boundaries.  Several participants perceived testosterone as an athletic advantage in transgender males (when injected) and females (endogenous).</td>
</tr>
</tbody>
</table>
2.4.1.2. Review of transgender people and competitive sport participation (elite and recreational): Research articles

The same data were extracted from all research articles reviewed (see Table 2.1.). Below, we provide the most prominent findings in relation to competitive sport participation from each of these articles. Six research articles were concerned with competitive sport participation within this systematic review (Gooren & Bunck, 2004; Caudwell, 2012; Cohen & Semerjian, 2008; Semerjian & Cohen, 2006; Tragg, 2012; Travers & Deri, 2011). The only experimental study was by Gooren and Bunck (2004) who aimed to explore whether transgender people on cross-sex hormone treatment can fairly compete in sport. The authors measured transgender people’s muscle mass (via magnetic resonance imaging) and hormone levels (via urine and blood analysis) before and one year after cross-sex hormone treatment. They found that one year after transgender males had been administered cross-sex hormone treatment, testosterone levels significantly increased and these levels were within a cisgender male range. They also found that one year after cross-sex hormone treatment, transgender males’ muscle mass had increased and was within the same range as transgender females (assigned male at birth) who had not been prescribed cross-sex hormone treatment. In relation to transgender females, Gooren and Bunck found testosterone levels had significantly reduced to castration levels after one year of cross-sex hormone treatment. Muscle mass had also reduced after one year of cross-sex hormone treatment. However, muscle mass remained significantly greater than in transgender males (assigned female at birth) who had not been prescribed cross-sex hormone treatment. Therefore, Gooren and Bunck concluded that transgender males are likely to be able to compete without an athletic advantage one year after cross-sex hormone treatment. To a certain extent this also applies to transgender females, however there still remains a level of uncertainty due to a large muscle mass one year after cross-sex hormones. While this study was the first to explore, experimentally, whether transgender people can compete fairly, the sample size was relatively small (N=36). Additionally, they did not explore the role of testosterone blockers and did not directly measure the effect cross-sex hormones had on athletic performance (e.g., running time). Many, but not all, transgender females are prescribed testosterone blockers in order to help them to reach cisgender female testosterone levels, when administration of oestrogen alone is not enough to reduce testosterone levels. This is particularly important if the person aims to undergo gender confirming surgery as six months of testosterone suppression is a requirement for such procedures. However, if a transgender woman does not wish to undergo
surgery or does not wish to have their testosterone blocked to cisgender female levels (e.g., as they wish to use their penis), their testosterone levels will be above cisgender female levels. Differentiating not only between those on cross-sex hormones and not on cross-sex hormones, but also transgender females on testosterone blockers, may be necessary when discussing athletic advantage.

The remaining studies considered within this section are qualitative, and although they have provided insight into the experiences of transgender people participating in competitive sport, the findings cannot be generalised. Semerjian and Cohen’s (2006) narrative account provides a good overview of how diverse and individual the issues and experiences of transgender people participating in competitive sport can be. Some participants felt anxious when engaging in sport because they felt their genitals may be revealed (e.g., when changing). In contrast, one participant used sport as a safe space to escape from the harassment he received at school. It must be considered though, that participants within the study engaged in different sports and their experiences could therefore be associated with the specific sport (i.e., some sports could be more inclusive than others).

Three qualitative studies described the implications that sport policies had on the experiences of transgender people who engaged in sport (Cohen & Semerjian, 2008; Tagg, 2012; Travers & Deri, 2011). Cohen and Semerjian (2008) published a case study about a transgender woman (before gender confirming surgery) who was playing in the women’s national ice hockey tournament, but who was eventually banned from playing in the tournament because it was felt she had an athletic advantage. She described how she felt under constant surveillance when she was playing and at times felt ambivalent about what gendered team she should play on. It was apparent that although teammates were supportive, the issues she experienced in relation to inclusion in the tournament were primarily related to constraints put in place by competitive sport policies. Similarly, the discussions held by two former New Zealand transgender female netball players in Tagg’s (2012) study gave the impression that although transgender sport policies were supposedly implemented to increase the inclusivity of transgender people, this was not always the case. They discussed how policy would allow a transgender women who had not under gone gender confirming surgery to compete in a male or mixed gender netball team only and they must obey male dress codes. However, the participants in this study were former netball players and therefore their discussions may not have been based on the current state of netball in relation to transgender participation. In
contrast to the previously mentioned studies, all of the participants (N=12) in Travers and Deri’s (2011) study discussed the positive experiences they had in relation to transgender participation in competitive sport. However, some of the transgender men did discuss how they had hostile experiences (e.g., incorrect pronoun use). Several of the participants in this study also felt that testosterone gave transgender women (endogenous) and men (when injected) an athletic advantage.

For the two young transgender males in Caudwell’s (2012) study, the stage of transition appeared to be instrumental in disengagement from participation in competitive sport. The discussion held by the participants highlighted how accessing sport during their transitional period was difficult as they would not be accepted or feel comfortable on either a male or female team during this period. However, this study again discussed sport very broadly and therefore it is unknown whether the participants’ experiences were associated with specific sports or whether they are generalisable across other sports.

In summary, there is limited research from which to draw any conclusion about whether transgender people have an athletic advantage in competitive sport or not. The limited physiological research conducted to date has informed the development of transgender sport policies that are implemented by sporting organisations all over the world. It is these sport policies that appear to be instrumental in transgender people’s experiences with competitive sport, most of which are negative.

2.4.1.3. Review of transgender people and sport-related physical activities: Research articles

Within this systematic review, only two studies explored sport-related physical activities Hargie et al., 2015; Muchicko et al., 2014). Muchicko et al. (2014) set out to quantitatively explore the relationship between gender identity and physical activity. They compared levels of physical activity between cisgender and transgender people. The study found that self-identified transgender participants (n=33) reported engaging in less physical activity than cisgender participants (n=47). Social support and self-perception were found to mediate the relationship between gender identity and physical activity. The authors suggested that their study highlights how leisure centres need to be more inclusive, and transgender people need to be given more social support to encourage physical activity. However, this study was limited by the sampling methods employed. The cisgender participants were recruited from a
university campus where they potentially had more opportunity to walk around campus, and opportunity for discounted gym memberships, whereas the transgender participants were recruited from a support group for transgender people and were not associated with the university.

As with transgender people who engage in sport at a competitive level, transgender people who engage in sport-related physical activity also appear to experience a range of different barriers. Hargie et al. (2015) found in their qualitative study that transgender people prefer to engage in individual, as opposed to group, sport-related physical activities. This was reportedly due to their fear of being ‘outed’. Regardless of whether sport-related physical activities are engaged in individually or in a group, changing rooms appeared to be a significant barrier. Being excluded from sport-related physical activities was distressing for participants, as they could not maintain physical fitness, which they felt was important in preparation for gender confirming surgery. Despite these interesting findings, the study is limited by the lack of socio-demographic information provided about participants. Within qualitative research, because of the small sample size, it is often desirable to provide a large amount of socio-demographic detail about participants so that the findings can be interpreted in relation to this information. For instance, in the context of sport-related physical activities, the stage of transition may be an important factor when interpreting the individuals’ current experiences of sport-related physical activities.

The limited research studies concerned with sport-related physical activities suggest that inclusive environments are not created for transgender people engaging in such activities, which may deter engagement.

2.4.2. Transgender inclusive sport policies

2.4.2.1. Characteristic of the eligible sport policies

Out of the 31 transgender inclusive policies reviewed, 13 were from the USA (Ladies Professional Golf Association, 2010; National Collegiate Athletic Association, 2011; The Association of Boxing Commissions, 2012; USA Gymnastics, 2015; USA Senior Softball, 2014; USA Triathlon, n.d; USA Boxing, 2013; USA Sailing, 2013; USA Track and Field, 2005; USA Swimming, 2013; US Soccer Federation, 2013; US Rowing, 2015; World Out Games, 2015). Ten of the policies reviewed were from the UK (Amateur Swimming Association, 2015; Badminton England, 2013; British Universities and Colleges Sport, 2012;
British Rowing, 2013; Rugby Football Union, n.d; Scottish Football Association, 2008; The Football Association, 2014; The Lawn Tennis Association, n.d; UK Roller Derby Association, 2014; Women’s Flat Track Derby Association n.d). One policy was from Australia (Disability Sport Australia, 2014). The rest of the policies (n=7) were international (Federation International de Volleyball, 2014; IOC, 2004, 2016a; International Association of Athletics Federation, 2011; International Gay and Lesbian Football Association, 2014; International Tennis Federation, n.d; International Quidditch Association, 2015). Details of all of the sport policies included within this review can be found in Table 2.2.
Table 2.2. Transgender inclusive sport policies included within this systematic review

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Pre-puberty</th>
<th>Post-puberty</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Olympic Committee (2004)</td>
<td>If had GCS then may compete in line with gender identity.</td>
<td>Provide legal recognition of their gender.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Had GCS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Been on CHT for at least two years.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lived in their newly assigned gender for at least two years.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transgender males: no restrictions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transgender males: declared gender as female for at least four years and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>have testosterone levels below 10nmol/L for at least 12 months prior to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>competition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IOC 2004 policy is adopted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transgender females: declared gender as female for at least four years and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>have testosterone levels below 10nmol/L for at least 12 months prior to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>competition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IOC 2004 policy is adopted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transsexual females must comply with the IOC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transsexual males must provide legal evidence of their gender and be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prescribed CHT.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transgender females who are receiving a testosterone suppressant must compete as a man until two years of medical treatment has been prescribed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transgender males must be being prescribed CHT.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IOC 2004 policy is adopted.</td>
</tr>
<tr>
<td>Amateur Swimming Association (UK; 2015)</td>
<td>IOC 2004 policy is adopted.</td>
<td>Transgender females may compete as a male or in mixed competition.</td>
</tr>
<tr>
<td>Association of Boxing Commissions (2012)</td>
<td>Allowed to complete in line with gender identity providing they have had</td>
<td>Transgender females may compete as female or in mixed competitions providing</td>
</tr>
<tr>
<td></td>
<td>GCS.</td>
<td>testosterone levels are within the normal range for a female or they have had</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a gonadectomy.</td>
</tr>
<tr>
<td>Badminton England (UK; 2013)</td>
<td>IOC 2004 policy is adopted.</td>
<td>If a transgender female has not started treatment then they may compete as</td>
</tr>
<tr>
<td>British Rowing (UK; 2013)</td>
<td>If hormone treatment has not been started a transgender female may compete</td>
<td>a man or in mixed competition.</td>
</tr>
<tr>
<td></td>
<td>as a male.</td>
<td>A transgender girl pre-puberty may compete as a female or in mixed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>competition.</td>
</tr>
<tr>
<td>British Universities &amp; Colleges Sport (UK; 2012)</td>
<td>Not applicable.</td>
<td>Recommended that when transgender issues arise, then the policy of each</td>
</tr>
<tr>
<td>Disability Sport Australia (2014)</td>
<td>Encourages participation in line with experienced gender but suggests</td>
<td>national governing body for that sport should be adopted.</td>
</tr>
<tr>
<td></td>
<td>completion of a TUE form if necessary.</td>
<td>Encourages participation in line with experienced gender but suggests</td>
</tr>
<tr>
<td></td>
<td>Gender must be confirmed via birth certificate.</td>
<td>completion of a TUE form if necessary.</td>
</tr>
<tr>
<td>Fédération Internationale de Volleyball (2014)</td>
<td>Female players may be required to submit a gender certificate and/or</td>
<td>Gender must be confirmed via birth certificate.</td>
</tr>
<tr>
<td></td>
<td>medical examination.</td>
<td>Female players may be required to submit a gender certificate and/or undergo</td>
</tr>
<tr>
<td>International Tennis Federation (n.d)</td>
<td>IOC 2004 policy is adopted.</td>
<td>a medical examination.</td>
</tr>
<tr>
<td></td>
<td>Undergo uninterrupted hormone treatment for at least one year prior to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>competition.</td>
<td>Provide legal recognition of their gender.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undergo uninterrupted hormone treatment for at least one year prior to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>competition.</td>
</tr>
<tr>
<td></td>
<td>Evidence of GCS.</td>
<td>Evidence of GCS.</td>
</tr>
<tr>
<td></td>
<td>Details of post-surgery treatment and monitoring to date.</td>
<td>Details of post-surgery treatment and monitoring to date.</td>
</tr>
<tr>
<td>Organisation</td>
<td>Pre-puberty</td>
<td>Post-puberty</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ladies Professional Golf Association (USA; 2010)</td>
<td>A transgender female may compete as a female if they have undergone GCS. Or, a transgender female who is treated with testosterone suppression must compete as a man until they have completed hormone treatment for one year. After this time they may compete as a female. A transgender male who is treated with testosterone may compete in a men’s event but not in a women’s.</td>
<td>A transgender female may compete as a female if they have undergone GCS. Or, a transgender female who is treated with testosterone suppression must compete as a man until they have completed hormone treatment for one year. After this time they may compete as a female. A transgender male who is treated with testosterone may compete in a men’s event but not in a women’s.</td>
</tr>
<tr>
<td>Lawn Tennis Association (UK; n.d)</td>
<td>Allowed to play in line with gender identity providing they have undergone GCS.</td>
<td>Surgical anatomical changes have been completed, including external genitalia changes and gonadectomy (removal of ovaries or testes). Legal recognition of their assigned sex has been conferred by the appropriate official authorities. CHT has been administered for a sufficient length of time to minimise gender-related advantages in sport competitions. Eligibility should begin no sooner than two years after gonadectomy.</td>
</tr>
<tr>
<td>National Collegiate Athletic Association (2011)</td>
<td>To compete on a men’s team, a transgender male must be taking CHT and have a diagnosis of gender dysphoria. They are not allowed to play on a women’s team. Transgender females must be taking CHT and have a diagnosis of gender dysphoria. They are allowed to play on a men’s team until they have completed one year of CHT. A transgender male who is not taking CHT may participate on a women’s or men’s team.</td>
<td>To compete on a men’s team, a transgender male must be taking CHT and have a diagnosis of gender dysphoria. They are not allowed to play on a women’s team. Transgender females must be taking CHT and have a diagnosis of gender dysphoria. They are allowed to play on a men’s team until they have completed one year of CHT. A transgender male who is not taking CHT may participate on a women’s or men’s team.</td>
</tr>
<tr>
<td>Rugby Football Union (UK; n.d.)</td>
<td>A transgender female who is not taking CHT may not compete on a women’s team. IOC 2004 policy is adopted.</td>
<td>A transgender female who is not taking CHT may not compete on a women’s team. IOC 2004 policy is adopted.</td>
</tr>
<tr>
<td>UK Roller Derby Association (2014)</td>
<td>No evidence of gender identity or hormone levels is required to participate. Must be living full time as their chosen gender.</td>
<td>No evidence of gender identity or hormone levels is required to participate. Must be living full time as their chosen gender.</td>
</tr>
<tr>
<td>US Rowing (2015)</td>
<td>All rowers in men’s events are male and all rowers in women’s events are female. Gender is determined by legal recognition of gender.</td>
<td>All rowers in men’s events are male and all rowers in women’s events are female. Gender is determined by legal recognition of gender.</td>
</tr>
<tr>
<td>US Soccer Federation (2013)</td>
<td>Transgender people are asked to provide legal or another form of documentation to reflect that the athlete’s gender identity is sincerely held and part of their core identity.</td>
<td>Transgender people are asked to provide legal or another form of documentation to reflect that the athlete’s gender identity is sincerely held and part of their core identity.</td>
</tr>
<tr>
<td>USA Senior Softball (2014)</td>
<td>IOC 2004 policy is adopted.</td>
<td>IOC 2004 policy is adopted.</td>
</tr>
</tbody>
</table>

Chapter 2: Sport review
## Organisation

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Pre-puberty</th>
<th>Post-puberty</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA Triathlon (n.d)</td>
<td>Follows the United States Anti-Doping Agency rules regarding the use of testosterone, which requires a TUE in order to avoid violating policy.</td>
<td>Follows the United States Anti-Doping Agency rules regarding the use of testosterone, which requires a TUE in order to avoid violating policy.</td>
</tr>
<tr>
<td>USA Boxing (2013)</td>
<td>IOC 2004 policy is adopted.</td>
<td>IOC 2004 policy is adopted.</td>
</tr>
<tr>
<td>USA Sailing (2013)</td>
<td>IOC 2004 policy is adopted.</td>
<td>IOC 2004 policy is adopted.</td>
</tr>
<tr>
<td>USA Track &amp; Field (2005)</td>
<td>IOC 2004 policy is adopted.</td>
<td>IOC 2004 policy is adopted.</td>
</tr>
<tr>
<td>USA Swimming (2013)</td>
<td>Discrimination against any member or participant on the basis of gender, sexual orientation, and gender expression is prohibited.</td>
<td>Discrimination against any member or participant on the basis of gender, sexual orientation, and gender expression is prohibited.</td>
</tr>
<tr>
<td>Women’s Flat Track Derby Association (UK; n.d)</td>
<td>Transgender women are allowed to compete as a woman as long as their hormone levels are within a typical female range. Information about healthcare provided must be submitted.</td>
<td>Transgender women are allowed to compete as a woman as long as their hormone levels are within a typical female range. Information about healthcare provided must be submitted.</td>
</tr>
<tr>
<td>World Outgames (USA; 2015)</td>
<td>Transgender people are asked to provide legal or another form of documentation to reflect that the athlete’s gender identity is sincerely held and part of their core identity.</td>
<td>Transgender people are asked to provide legal or another form of documentation to reflect that the athlete’s gender identity is sincerely held and part of their core identity.</td>
</tr>
</tbody>
</table>

**Note:** GCS (gender confirming surgery); CHT (cross-sex hormone treatment); IOC (International Olympic Committee); TUE (Therapeutic Use Exemption); n.d (no date); gender dysphoria is the diagnostic name included within the Diagnostic and Statistical Manual for Mental Health, fifth edition for people who experience an incongruence between their gender assigned at birth and gender identity.
2.4.2.2. Review of the sport policies

Policies within this section were systematically reviewed in relation to their inclusiveness of transgender competitors (i.e., maintaining fairness in the absence of advantage for all competitors). The fairness of the policy requirements was judged against the available physiological research that has explored athletic advantage. The time restrictions associated with each requirement were also reviewed (e.g., cross-sex hormones must have been administered for at least 2 years prior to competition). The requirements from each policy are summarised within Table 2.2. and the most salient points of these policies are then presented in the section that follows.

In 2004, the IOC (2004) announced that transgender people who transition after puberty are permitted to compete in sport in line with their experienced gender identity providing they have had gender confirming surgery, can provide legal recognition of their gender, have been prescribed cross-sex hormone treatment for at least 2 years, and have lived in their experienced gender for the same amount of time (IOC, 2004). Additionally, transgender people who had undergone gender confirming surgery pre-puberty are eligible to compete in sport in line with their experienced gender identity (IOC, 2004). This is an international policy and has been adopted by sport organisations all over the world.

While the 2004 IOC policy has been praised for its efforts to address the inclusion of transgender athletes (Carroll, 2014), several flaws have been identified (Teetzel, 2006). First, the policy excludes transgender people who choose not to have gender confirming surgery due to a lack of genital dysphoria (distress), for medical reasons, fears about risk during operations, and/or for other personal reasons (Lucas-Carr & Krane, 2011; Tagg, 2012; Teetzel, 2006). The 2004 IOC policy also excludes transgender people who are in the process of transitioning. For instance, a transgender athlete may be prescribed cross-sex hormone treatment, but be yet to undergo gender confirming surgery. The 2004 IOC policy therefore adopts a very narrow definition and excludes a large proportion of transgender people (Cavanagh & Sykes, 2006). In addition to this, the policy appears to have been developed with only transgender females in mind, possibly as transgender males are not thought to possess athletic advantages in the majority of sports, and therefore the policy discriminates against transgender males (Reeser, 2005). Moreover, the 2004 IOC policy fails to take into consideration the regional, national, and international differences in accessing cross-sex hormone treatment and gender confirming surgery (IOC, 2004; Lucas-Carr & Krane, 2011;
Pieper, 2012; Sykes, 2006). Within this policy there also appears to be a lack of evidence-based rationale as to why a period of 2 years was chosen as the length of time cross-sex hormone treatment must be administered prior to sport competition and why individual differences in blood hormone levels are not considered (Sullivan, 2011). As mentioned previously, the role of testosterone blockers in transgender women is also not considered. Although the rationale for the 2 year time period is not made explicit, it may be related to the fact that this time period was imposed by the IOC in 2004, when banning athletes from competitive sport to discipline them for doping violations. The evidence-based rationale for gender confirming surgery is also not clear (Carroll, 2014); whether an athlete has a penis or vagina appears irrelevant as this will not change the physiology of the body or the physiological advantage of the person (Lucas-Carr & Krane, 2011).

Approximately 200 days before the 2016 Rio Olympic Games, the IOC announced changes to their competitive sport policy for transgender people. The new 2016 IOC policy suggests that transgender male athletes are able to compete in a male category without any restrictions. Transgender females may compete in a female category if they have declared their gender as female for at least 4 years and their blood testosterone levels are below 10 nmol/L for at least 12 months prior to competition. However, the latter requirement is a general guideline, and each case will be reviewed individually to determine whether 12 months is a sufficient amount of time or not to suppress testosterone levels to an appropriate level. If transgender females do not meet these requirements, they will be able to compete in a male category. This is a great improvement in sport policy which considers gender assigned at birth, individual difference in relation to blood hormone levels and moves away from the requirement of surgery to compete in their experienced gender category. However, we could not find any evidence to support the requirement for testosterone to be below 10nmol/L for at least 12 months.

Despite its flaws, the 2004 IOC policy has been adopted by several other sport organisations. Within this systematic review, 11 sport organisations adopted the policy outlined by the IOC in 2004 (Amateur Swimming Association, 2015; Badminton England, 2013; International Tennis Federation, n.d; Rugby Football Union, n.d; Scottish Football Association, 2008; The Lawn Tennis Association, n.d; USA Sailing, 2013; USA Boxing, 2013; USA Senior Softball, 2014; USA Track and Field, 2005; USA Gymnastics, 2015). All but one (the International Tennis Federation) of these sport organisation policies are employed at a national level. Not
only is it problematic that other sport organisations adopted the 2004 IOC policy, but elements of the 2004 IOC policy concerning children pre-puberty are not applicable to sport organisations in the UK and many other countries. Within the UK (and many other countries), children presenting with gender incongruence cannot undergo gender confirming surgery before the age of 18, by which time puberty has usually started.

Three policies stated that it is only necessary to provide legal recognition of gender and to be prescribed cross-sex hormone treatment for a ‘sufficient amount of time’ (international policy) (International Gay and Lesbian Football Association, 2014) or so that hormone blood levels are within cisgender female or male ranges (national policy) (The Football Association, 2014; Women’s Flat Track Derby Association, 2015). Policies from the National Collegiate Athletic Association (2011) and British Rowing (2013) also state that only cross-sex hormone treatment is required, however the specifics of this requirement differ for both transgender males and females. With both of these policies, transgender females have to provide more evidence of cross-sex hormone treatment and their blood hormone levels in comparison to transgender men. Similarly, the Association of Boxing Commissions (2012) in its national policy has different cross-sex hormone treatment requirements dependent on gender assigned at birth and how the athlete identifies themselves (transgender or transsexual). The language used within the Association of Boxing Commissions’ policy (2012) may be seen as offensive by some transgender people and the difference between “transsexuals” and “transgender” people remains unclear. Policies held by the Ladies Professional Golf Association (international policy) (2010) and the International Association of Athletics Federations (2011) differ dramatically in relation to gender and gender confirming surgery as a requirement. In both cases it is necessary for transgender females to have undergone this procedure, but not for transgender males. Although some of the requirements of these policies are unreasonable and not evidence based (e.g., gender confirming surgery), the gender difference in relation to the amount of evidence that is required about their gender change seems acceptable considering that only transgender females (and not transgender males) are currently seen to potentially have an athletic advantage (Gooren & Bunck, 2004).

The more inclusive sport policies reviewed here only required legal or medical recognition or do not ask for any evidence of gender; thus they encourage competition in line with experienced gender (five were national policies and two were international) (Disability Sport
Australia, 2014; International Quidditch Association, 2015; US Soccer Federation, 2013; US Rowing, 2015; UK Roller Derby Association, 2014; USA Swimming, 2013; World Out Games, 2015). The Fédération Internationale de Volleyball (2014) had the most invasive policy considered within this systematic review. They ask players to provide a birth certificate to verify gender. Additionally, female players may be asked to provide a gender certificate or submit themselves to a medical examination if the medical evidence is not sufficient. Both British Universities & Colleges Sport (2012) and USA Triathlon (n.d.) do not have their own policies, but suggest the adoption of other policies (i.e., those relevant to the sport in question or guidelines of the United States Anti-Doping Agency, respectively).

Currently, the majority of sport policies unfairly exclude transgender people from competitive sport as the requirements they place on them are not underpinned by evidence-based medicine. Until (and if) there is consistent and direct evidence to demonstrate transgender people have an athletic advantage it seems unreasonable to exclude them on any basis.

2.5. Discussion

The first aim of this systematic review was to explore the experiences of transgender people in relation to competitive sport participation (elite and recreational) and sport-related physical activity. The majority of the studies within this body of literature are qualitative in nature, which may be at least partly a reflection of the low numbers of transgender people in the general population. It is therefore difficult to draw any definite conclusions due to the lack of quantitative research. By its very nature, the findings from qualitative research cannot be generalised but the findings can be used to form a platform from which generalisations can be made. The research articles reviewed here described a generally negative experience of sport participation and sport-related physical activity for transgender individuals. It was evident from these studies that transgender people are facing barriers when engaging in competitive sport and sport-related physical activity. In relation to sport-related physical activity, lack of accessibility to an inclusive and comfortable environment appeared to be the primary barrier to participation. Charities and support organisations working with transgender people should consider developing campaigns to raise awareness about different gender identities. Leisure centres should also be made more aware of potential gender differences (i.e., via training and greater information provision) and be given advice on how to make such environments more inclusive of transgender people (e.g., gender neutral changing facilities with cubicles). In
Chapter 2: Sport review

relation to competitive sport participation, the findings from this systematic review suggest that the requirements that transgender competitive sport policies place on competitors were instrumental in transgender athletes’ negative experiences.

While a distinction needs to be made between the issues and experiences transgender people have with regard to participation in sport and competitive sport, it also needs to be acknowledged that there is an overlap. Transgender males and females have anecdotally discussed that access to sport participation (such as becoming part of the local football team) is restricted as even community and local sport organisations who play at a recreational level implement transgender competitive sport policies.

The second aim was to review the available sport policies regarding the fairness for transgender people in competitive sport (i.e., fairness in the absence of advantage). Due to over interpretation and fear of the athletic advantage in transgender athletes, the majority of the policies reviewed were discriminatory against transgender people, especially transgender males (i.e., exclusion in the absence of advantage). Although the updated IOC policy may be perceived as more inclusive then the 2004 version, there are still flaws. The requirement for a transgender female to have declared their gender as female for at least 4 years is excessive. In the UK and many other countries, once a transgender person has accessed a transgender health service, it is likely to be less than 4 years before a person legally changes their name, undergoes irreversible treatments and, hence, fully commits to their experienced gender. There appears to be a lack of rationale regarding the 4 year time period for transgender athletes, although this time restriction is consistent with the current disciplinary action for cisgender athletes when a doping incident occurs (IOC, 2016b). The 2016 IOC transgender policy also states that to avoid discrimination against transgender females, they are allowed to complete in a male category if they do not meet the requirements for transgender female athletes. For most transgender females, competing in a male category, when their experienced gender is female, would be distressing and may deter engagement in competitive sport altogether. This particular requirement may be promoting exclusion of transgender females in competitive sport, rather than avoiding discrimination.

Several sport policies, including the recently updated IOC 2016 policy, have based their requirements for transgender competitors on indirect, inconsistent and unambiguous evidence. Physiological research involving cisgender people has shown that testosterone
deficiency in young men is associated with a decrease in muscle strength (Mauras et al., 1998) and testosterone injections in cisgender men are associated with an increase in some aspects of muscle strength (Storer et al., 2003). However, this research did not determine whether these decreases and increases in muscle mass are within ranges for cisgender females and males and the time required to reach cisgender male or female levels. Elbers, Asscheman, Seidell and Gooren (1999) expanded on this research by explored the effects of oestrogen supplements and androgen deprivation on fat distribution and thigh muscle mass (by using magnetic resonance imaging) in 20 transgender females. They found 12 months after cross-sex hormone treatment, transgender females had a more feminine pattern of adiposity and their thigh muscles had decreased. Other research has found that transgender female athletes who have hormonally and surgically transitioned have reported feeling weaker and their testosterone levels tend to be lower than average compared to cisgender women (Cavanagh & Sykes, 2006; Schultz, 2011). However, this research does not tell us anything about the relationship between androgenic hormones and athletic ability. To date, Harper’s (2015) study is the only one to directly explore androgenic hormones and athletic ability. The aim of the study was to explore the long distance (5 km to 42 km) running times of eight transgender females before and after testosterone suppression. It was found that after testosterone suppression, running times were significantly slower in comparison to before testosterone suppression. Harper stated that due to reductions in testosterone and haemoglobin, transgender females who had undergone transition would have the same endurance capabilities as a cisgender female. However, the sample size was very small (N=8) and participants were asked to self-report their race times which might have been subject to recall or social desirability bias.

On average, men perform better than women in sport, however no empirical research has identified the specific reason(s) why. Based mainly on indirect research with cisgender people, it is commonly believed that androgenic hormones (specifically high testosterone levels) confer an advantage in competitive sports (i.e., enhance endurance, increase muscle mass) and, while this belief has informed several sporting policies, testosterone may not be the primary, or even a helpful, marker in determining athletic advantage (Karkazis, Jordan-Young, Davis, & Camporesi, 2012). Karkazis et al. (2012) have argued that there is no evidence to suggest that endogenous testosterone levels are predictive of athletic performance (apart from doping), as there is variation in how bodies make and respond to the hormone. Testosterone is only one part of a person’s physiology and there are other important factors
(both biological and environmental) that should be considered if fairness (the absence of advantage) is the aim in competitive sport. For instance, having large hands is key for manipulation in some sports (e.g., basketball), but this is not seen as an unfair advantage. Establishing what an athletic advantage is in competitive sport would facilitate inclusion of all athletes (regardless of their gender identity) on the premise of fairness.

The Canadian Centre for Ethics in Sport (2016) recently released a document which offers guidance to sport organisations on how to develop inclusive competitive sport policies for transgender people. An expert panel maintained the viewpoint that everyone has the right to compete in accordance with their gender identity at a recreational and elite level. Cross-sex hormones and gender confirming surgeries should not be a requirement at any level of sport. If any sport organisation requires transgender competitors to take cross-sex hormones for a specified time, they will have to provide evidence to support that this is reasonable. The panel suggests that when sporting organisations are concerned about safety, based on the size or strength of competitors, such organisations should develop skill and size categories, such as in wrestling.

The issues and challenges that transgender people experience when engaging in competitive sport and sport-related physical activity will undoubtedly become more prominent as the visibility and prevalence of transgender people becomes more pronounced. Consequently, health professionals working in sport will need to become more familiar with the specific issues and challenges that a transgender person may experience when engaging in sport. By doing this, these professionals will be able to ensure transgender people can start or continue to engage in sport in a safe and inclusive manner. The most common question of people working within the sport domain will likely be: *When it is safe and fair to permit a transgender person to compete in sport in line with their experienced gender?* At the current time, this is going to be a difficult issue to address considering that there is a lack of direct and consistent physiological performance-related data with transgender people, which is preventing a consensus from being made as to whether transgender people (especially transgender females) do or do not have an athletic advantage. It may be sensible to suggest that until there is direct and consistent scientific data to suggest that transgender competitors have an advantage, transgender people should be allowed to compete in accordance with their gender identity with no restrictions (e.g., no requirement to have cross-sex hormones, gender confirming surgery). The athletic advantage transgender females are perceived to have (based
on indirect and ambiguous evidence) may be no greater than widely accepted physiological (e.g., large hands) and financial (e.g., training opportunities) advantages that some cisgender people possess in competitive sport. Sport organisations wanting to exclude a transgender person from competing in their experienced gender category would need to demonstrate that the sport is gender-affected and that exclusion is necessary for fair and safe competition (Canadian Centre for Ethics in Sport, 2016; House of Commons, 2016). At the current time, this would be difficult considering there is no evidence to suggest that androgenic hormone levels consistently confer competitive advantage (Canadian Centre for Ethics in Sport, 2016; House of Commons, 2016).

2.5.1. Limitations of the area and directions for future research
Within the area of sport, physical activity and transgender individuals, research is limited and mainly qualitative. More quantitative research needs to be conducted to increase the applicability and generalisability of the research findings and so that conclusions about transgender people and sport can be drawn. At a medical level, more physiological research is needed with the transgender population to accurately determine whether transgender people have an advantage in competitive sport or not. Future studies should investigate when a person can be considered physiologically as their experienced gender. This in turn should aid more inclusive (i.e., inclusion in the absence of advantage) sport policies for transgender individuals and a fair system for all. To date, the few studies which have explored the experiences of transgender people have mainly been concerned with exploring experiences in relation to competitive sport. This research now needs to be extended to those who participate in sport-related physical activity for leisure and fitness. It is also important to understand transgender people’s experiences in the context of different sports. The barriers to, and facilitators of, football participation, for example, may greatly differ to those experienced when engaging in gymnastics, athletics, swimming or aquatic activities. For the latter four sports, clothing may be revealing and an indication of one’s gender. For example, feeling comfortable in swimwear may be an issue for transgender people, especially when they are in the process of transitioning, as the body is often more exposed than in other sportswear (e.g., a football kit) and swimwear is heavily gendered (i.e., swimming trunks are worn by males and swimming costumes by females). In light of this, it would be interesting to explore the experiences of transgender people who have previously participated, or are currently participating, in aquatic activities, gymnastics and/or athletics.
2.5.2. Conclusion

Overall, it appears that the majority of transgender people have a negative experience of competitive sport and sport-related physical activities. Accessibility to sport-related physical activity needs to be improved. Within competitive sport, the athletic advantage transgender athletes are perceived to have appears to have been over interpreted by many sport organisations around the world, which has had a negative effect on the experiences of this population. When the indirect and ambiguous physiological evidence is dissected, it is only transgender females who are perceived to potentially have an advantage due to androgenic hormones. Within the literature, it has been questioned as to whether androgenic hormones should be the only marker of athletic advantage or, indeed, if they are even a useful marker of athletic advantage. Given the established mental and physical health benefits of engaging in physical activity and sport (De Moor et al., 2006; Maltby & Day, 2001) the barriers transgender people experience are a significant limitation to the promotion of healthy behaviours in transgender individuals. There are several areas of future research that are required to significantly improve our knowledge of transgender people’s experiences in sport, inform the development of more inclusive sport policies, and most importantly, enhance the lives of transgender people, both physically and psychosocially.
Chapter 3

Body dissatisfaction and disordered eating in transgender people: A systematic review of the literature

This chapter has been published in the International Review of Psychiatry (impact factor: 2.24) as:


http://www.tandfonline.com/doi/abs/10.3109/09540261.2015.1089217

The content of chapter 3 is largely the same as the published paper, however some small changes have been made to the formatting and presentation to ensure it is consistent with the rest of the chapters that comprise this thesis.

Statement of authorship

Research conception and design: BJ, EH & JA.
Data collection: BJ.
Data analysis and interpretation: BJ, EH & JA.
Drafting of article: BJ.
Article editing and revisions: BJ, JA, SM & EH.

The findings of chapter 3 have also been presented at the following academic conferences:


### 3.1. Abstract

Body dissatisfaction plays a prominent role in gender dysphoria. Body dissatisfaction, in some individuals, appears to manifest disordered eating in order to suppress bodily features of natal gender and accentuate features of gender identity. To date, there has been no systematic review of the literature pertaining to body dissatisfaction and disordered eating in trans individuals. Such a review may highlight important implications for clinicians working with trans people. Therefore, the aim was to critically and systematically review the available literature examining body dissatisfaction or disordered eating in a trans population, and also the literature pertaining to how body dissatisfaction and disordered eating are related in trans people. This review found three studies that explored disordered eating in trans people, five studies that explored body image and disordered eating in trans people, and 18 studies that explored body image in trans people. The findings from this review suggest that body dissatisfaction is core to the distress trans people experience and that this dissatisfaction may also put some individuals at risk of developing disordered eating. Additionally, the findings appear to suggest that gender dysphoria treatment is successful at increasing body satisfaction and improving body image. The clinical implications are discussed.
3.2. Introduction

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychiatric Association, 2013) classifies the incongruence that trans individuals experience between their assigned sex at birth (and the associated gender role and/or primary and secondary sex characteristic) and gender identity (how they see themselves with respect to gender) as Gender Dysphoria. Transsexualism is defined by the International Classification of Diseases, edition 10 (ICD-10; World Health Organization, 1992) as a desire to live and be accepted as a member of the opposite sex, usually accompanied by a sense of discomfort with, or inappropriateness of, one's anatomic sex, and a wish to have surgery and hormonal treatment to make one's body as congruent as possible with one's preferred sex. The new edition, ICD-11, is expected to acknowledge individuals who do not necessarily wish to transition from one binary gender to the other (male to female or female to male). Although there are several different terms used within the literature to describe people who feel an incongruence between their assigned sex at birth and gender identity, throughout this chapter the terms trans people/individuals, trans women and trans men will be used. Trans women are those who were assigned male at birth on the basis of genital appearance but who later identify themselves as female. Trans men are those who were assigned female at birth based on their genital appearance but identify as male. Recent studies have reported an overall meta-analytical prevalence for transsexualism of 4.6 in 100,000 individuals; 6.8 for trans women and 2.6 for trans men, which is primarily based on studies looking at individuals attending clinical services (Arcelus et al., 2015).

Body dissatisfaction is referred to as the negative evaluation of one’s appearance and it is central to the distress and unhappiness that trans individuals experience (Bandini et al., 2013). It is not surprising that this distress is particularly related to body parts that are a reminder of the individual’s unwanted assigned sex (e.g., Becker et al., 2016). Much of the research in the area of gender dysphoria and body image has focused on sex-specific body parts which may be transformed by cross-sex hormone treatment (CHT) and surgical treatment. Several studies have found that such treatment is capable of relieving body dissatisfaction (e.g., de Vries, Steensma, Doreleijers, & Cohen-Kettenis, 2011; de Vries et al., 2014).

Body dissatisfaction is also thought to be central to the distress experienced by those with an eating disorder (e.g., Fairburn, 2008) and it has been shown to be one of the main contributors towards the onset and maintenance of eating disorder psychopathology (Stice &
Shaw, 2002). Within the trans literature, Ålgars, Alanko, Santtila, and Sandnabba (2012) discuss the role of eating restriction in trans women as a way to strive for thinness in order to suppress features of their birth sex or to accentuate features of their desired gender. In addition, trans women may internalise the message portrayed by the Western media that thin is beautiful (Witcomb et al., 2015). The internalisation of this message is thought to be a risk factor for the development of disordered eating in cisgender (non-trans) women (Kroon Van Diest & Perez, 2013; Witcomb, Arcelus, & Chen, 2013) and therefore it may put trans women at a particular risk for developing disordered eating (e.g., Ålgars, Santtila, & Sandnabba, 2010).

To date, the literature suggests that body dissatisfaction plays a prominent role in gender dysphoria, and in some cases body dissatisfaction appears to be a risk factor for the development of disordered eating. To the authors’ knowledge, there has been no systematic review of the available literature pertaining to trans people, body dissatisfaction and disordered eating. Such a review will likely highlight important implications for clinicians working with trans people. In light of this, the aim is to critically and systematically review the available literature examining body dissatisfaction or disordered eating in a trans population, and also the literature pertaining to how body dissatisfaction and disordered eating are related in trans people.

3.3. Method

3.3.1. Inclusion and exclusion criteria

Articles selected were those that explored body dissatisfaction and/or disordered eating in trans people, as well as articles that explored how body dissatisfaction and disordered eating are related in trans individuals. Articles that may have not explored body dissatisfaction and/or disordered eating as a main outcome, but included a measure of body dissatisfaction and/or disordered eating, were included. Peer reviewed studies that were written in English, Spanish or Dutch languages were considered eligible. Studies were excluded if they were a case study or if they recruited participants who were intersex (i.e., people in which development of chromosomal, gonadal, or anatomical sex is atypical).

3.3.2. Search strategy

The PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009) were followed to undertake this review. An electronic literature search was conducted using Web
Chapter 3: Body dissatisfaction and disordered eating review

of Science, PubMed and PsychInfo search engines. The searches included papers published from 1966 to April 2015. To obtain potentially relevant papers the following search terms were used in relation to trans people: gender dysphoria, gender identity disorder, transgender, transsexual, LGBT. Within each search engine, these terms were combined with terms relating to disordered eating using the “AND” operator: Anorexia Nervosa, Bulimia Nervosa, disordered eating, Eating Disorders not Otherwise Specified, eating concerns, eating problems. Additionally, the trans terms were combined (using “AND”) with body image terms: body image, body uneasiness, body dissatisfaction, body satisfaction. The reference lists of relevant papers were also searched to identify any additional papers and corresponding authors were contacted for unpublished data.

3.3.3. Article selection

Seventy-four publications were identified from the literature search as being potentially relevant to the aims of this review (see Figure 3.1.). Of these papers, 47 related to body image and trans people, 19 related to eating disorders and trans people, and eight related to body image, eating disorders and trans people. After screening the abstracts of these articles, 45 were excluded as they were a dissertation, conference paper, case study, or included participants who were intersex. Twenty-nine papers were then downloaded and, after full text review, 26 papers were included, all of which were peer reviewed and written in English (see Figure 3.1.).
Figure 3.1. The process of identifying eligible studies for inclusion within this review

3.3.4. Quality assessment

To determine the methodological quality of the studies included in this review, the National Institute of Health and Clinical Excellence (NICE, 2007) checklists for cohort studies and qualitative studies were utilised (see Table 3.1.). To complement the NICE (2007) checklist, Gilbert's (2009) checklist for assessing cross-sectional studies was also employed as there are no NICE guidelines for studies using this methodology (see Table 3.1.). The NICE (2007) and Gilbert (2009) guidelines were consulted for each study in turn and each criterion was rated as: well covered, adequately covered, poorly covered, not addressed, not reported, or not applicable. Additionally, each study was rated using NICE (2007) guidelines from good quality (++) (when most of the criteria have been satisfied), reasonable quality (+) (when
some of the criteria have been satisfied), or poor quality (-) (when few or no criteria have been satisfied) (see Table 3.2.). Based on the NICE (2007) and Gilbert (2009) guidelines, most studies (n=17) were rated poor quality (-). Most studies failed to recruit a representative sample as most samples were consecutive referrals to a gender clinic or recruited through an LGBT organisation. The majority of studies provided good coverage of the inclusion/exclusion criteria and sample characteristics which aided the interpretation of findings.

Table 3.1. Gilbert (2009) and NICE (2007) methodological criteria used for rating the quality of the studies considered in the systematic review

<table>
<thead>
<tr>
<th><strong>Gilbert (2009)</strong></th>
<th><strong>Criteria</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1: Internal Validity</td>
<td>1.1 The study assessed an appropriate and clearly focused question</td>
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<td></td>
<td>1.2 Recruitment is appropriate to the aims of the research</td>
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<td></td>
<td>1.3 Representative cases from relevant population</td>
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<td></td>
<td>1.4 The study indicates how many of the people asked to take part did so</td>
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<td></td>
<td>1.5 Comparison is made between participants and non-participants</td>
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<td>1.6 Inclusion criteria are made explicit and sample characteristics sufficiently described</td>
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<td></td>
<td>1.7 Were subjects recruited over the same period of time?</td>
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<td>Data Collection</td>
<td>1.8 Confidence in the quality of individual responses</td>
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<td></td>
<td>1.9 Outcome is measured in an objective, standard, valid and reliable way</td>
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<td></td>
<td>1.10 Reliance on real information rather than recall/hypothetical scenarios</td>
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<tr>
<td>Confounding</td>
<td>1.11 The main potential confounders are identified and taken into account in the design and analysis</td>
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<td></td>
<td>1.12 Minimisation of bias – (e.g., participant bias observer bias, halo effect)</td>
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<tr>
<td>Statistical Analysis</td>
<td>1.13 Appropriate use of statistical analysis</td>
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<td></td>
<td>1.14 Actual p value reported</td>
</tr>
<tr>
<td>Section 2: Overall assessment of the study</td>
<td>2.1 Taking into account clinical considerations, your evaluation of the methodology used and the statistical power of the study, are you certain the findings could be replicated?</td>
</tr>
<tr>
<td>NICE (2007) rating criteria</td>
<td>++ The majority of criteria have been satisfied and where they have not, the conclusions from the study are unlikely to change.</td>
</tr>
<tr>
<td></td>
<td>+ Some of the criteria have been satisfied and those criteria that are not satisfied are not thought to alter the conclusions of the study.</td>
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<tr>
<td></td>
<td>- Very few or none of the criteria are satisfied. The conclusions of the study are thought to alter.</td>
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Table 3.2. Methodological quality of studies in accordance with NICE (2007) and Gilbert (2009)

<table>
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<td>WC</td>
<td>WC</td>
<td>AC</td>
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<td>PR</td>
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<td>de Vries et al. (2014)</td>
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<td>Lindgen &amp; Pauly (1975)</td>
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<td>Wiseman &amp; Moradi (2010)</td>
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<tr>
<td>Witcomb et al. (2015)</td>
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<tr>
<td>Wolf retract &amp; Neumann (2001)</td>
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<td></td>
</tr>
</tbody>
</table>

Note: AC (Adequately covered), NA (not addressed, NA (not applicable), NR (not reported), PA (poorly addressed), WC (well covered). ++ (when most the criteria have been satisfied), + (when some of the criteria have been satisfied), - (when few or no criteria have been satisfied).
3.4. Results
What follows is a presentation of the findings from the studies included within this systematic review. Study characteristics will be explored and, following this, studies exploring firstly body dissatisfaction in a trans population, secondly disordered eating in a trans population, and lastly body dissatisfaction and disordered eating in a trans population will be discussed. At the start of each section, the measures employed to assess these constructs will be outlined. A summary of all the studies included within this review can be found in Table 3.3.
**Table 3.3.** Body dissatisfaction and/or disordered eating in trans people

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Country that the study was conducted in</th>
<th>Participants</th>
<th>Outcome measures (relevant)</th>
<th>Classification System</th>
<th>Stage of Transition</th>
<th>Main finding(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ålgars et al.</td>
<td>2012</td>
<td>Finland</td>
<td>N=20 (n=11 trans males, n=9 trans females)</td>
<td>EDI</td>
<td>None</td>
<td>Four participants had no medical intervention, 16 had undergone CHT (12/16 had undergone SRS). No trans people report clinically significant eating disorders.</td>
<td></td>
</tr>
<tr>
<td>Ålgars et al.</td>
<td>2010</td>
<td>Finland</td>
<td>N=1,142 (Gender Conflict n=571, cisgender n=571)</td>
<td>EAT</td>
<td>None</td>
<td>Information not collected</td>
<td></td>
</tr>
<tr>
<td>Bandini et al.</td>
<td>2013</td>
<td>Italy</td>
<td>N=295 (Gender Dysphoria n=100, Eating Disorder n=88, Controls n=107)</td>
<td>BUT</td>
<td>DSM</td>
<td>Before SRS. Eating disorder participants were at the assessment stage Trans individuals without SRS had &gt; body uneasiness, similar to those with eating disorders</td>
<td></td>
</tr>
<tr>
<td>Becker et al.</td>
<td>2016</td>
<td>Germany</td>
<td>N=250 (n=135 trans males, n=115 trans females)</td>
<td>Hamburg Body Drawing Scale</td>
<td>DSM</td>
<td>Assessment stage Trans reported body dissatisfaction regarding all female body parts Trans males reported body dissatisfaction with sex-specific body parts</td>
<td></td>
</tr>
<tr>
<td>Bozkurt et al.</td>
<td>2006</td>
<td>Turkey</td>
<td>N=160 (n=52 trans females, n=36 homosexuals, n=72 controls)</td>
<td>BCS</td>
<td>DSM</td>
<td>Not reported Trans people are not more dissatisfied with their bodies in comparison to homosexuals and controls</td>
<td></td>
</tr>
<tr>
<td>Cella et al.</td>
<td>2013</td>
<td>Italy</td>
<td>N=325 (n=132 homosexuals, n=178 heterosexuals, n=15 Gender Dysphoria)</td>
<td>EDI-2 BUT</td>
<td>DSM</td>
<td>Assessment stage Trans participants &gt; body dissatisfaction and eating disorder behaviour and attitudes in comparison to homosexuals and heterosexuals</td>
<td></td>
</tr>
<tr>
<td>Colizzi et al.</td>
<td>2015</td>
<td>Italy</td>
<td>N=118 (n=82 trans females, n=36 trans males)</td>
<td>BUT</td>
<td>DSM</td>
<td>All CHT (n=22 SRS) Trans patients with a dissociative disorder &gt; body uneasiness in comparison to trans patients who did not report a dissociative disorder</td>
<td></td>
</tr>
<tr>
<td>de Vries et al.</td>
<td>2014</td>
<td>Netherlands</td>
<td>N=55 (n=22 transwomen, n=33 transmen)</td>
<td>BIS</td>
<td>DSM</td>
<td>Participants were assessed at intake before treatment (T0), during treatment (T1, initiation of CHT) and post-treatment (T2, one year after SRS) Body image concerns continued to remit after SRS</td>
<td></td>
</tr>
<tr>
<td>de Vries et al.</td>
<td>2011</td>
<td>Netherlands</td>
<td>N=70 (n=33 natal males, n=37 natal females)</td>
<td>BIS</td>
<td>DSM</td>
<td>Participants were assessed twice: once shortly after their first visit (T0) and shortly before starting CHT (T1). During T0 and T1 participants started on puberty suppression (GnRH) GnRH does not significantly reduce levels of body dissatisfaction between T0 and T1</td>
<td></td>
</tr>
<tr>
<td>Author(s)</td>
<td>Year</td>
<td>Country that the study was conducted in</td>
<td>Participants</td>
<td>Outcome measures (relevant)</td>
<td>Classification System</td>
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<td>Main finding(s)</td>
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</tr>
<tr>
<td>Fisher et al.</td>
<td>2013</td>
<td>Italy</td>
<td>N=140 (n= 92 trans females, n= 48 trans males)</td>
<td>BUT</td>
<td>DSM, ICD</td>
<td>All had not undergone SRS</td>
<td>There was a prevalence of 0.7% of eating disorders. Trans females dislike more body parts than trans men</td>
</tr>
<tr>
<td>Fisher et al.</td>
<td>2014</td>
<td>Italy</td>
<td>N=125 (n=66 trans females, n=59 trans males)</td>
<td>BUT</td>
<td>DSM</td>
<td>Trans females: 24 had never take CHT, 42 were taking CHT. Trans males: 33 had never taken CHT and 26 were on CHT. All pre-SRS.</td>
<td>CHT can alleviate body uneasiness without surgery in trans females</td>
</tr>
<tr>
<td>Fleming et al.</td>
<td>1982</td>
<td>USA</td>
<td>N=44 (n=22 postsurgical trans males, n=22 controls)</td>
<td>BCS</td>
<td>None</td>
<td>Nine had not had hysterectomy, 8 had hysterectomy but not phalloplasty, and 5 had phalloplasty</td>
<td>SRS &gt; bodily satisfaction</td>
</tr>
<tr>
<td>Koosal et al.</td>
<td>2009</td>
<td>England</td>
<td>N=40 (compared to Garners normative data)</td>
<td>EDI</td>
<td>ICD</td>
<td>Had undergone sexual reassignment surgery</td>
<td>SRS &gt; body satisfaction</td>
</tr>
<tr>
<td>Kraemer et al.</td>
<td>2008</td>
<td>Switzerland</td>
<td>N=45 (n= 23 pre-operative, n= 22 post-operative)</td>
<td>Body Image Measure (FBeK)</td>
<td>DSM</td>
<td>23 pre-SRS, 22 post-SRS</td>
<td>SRS &gt; body satisfaction</td>
</tr>
<tr>
<td>Kozee et al.</td>
<td>2012</td>
<td>USA</td>
<td>Study 2: N=342</td>
<td>Transgender Congruence Scale</td>
<td>None</td>
<td>Information not collected</td>
<td>Transgender congruence &lt; body dissatisfaction</td>
</tr>
<tr>
<td>Lai et al.</td>
<td>2010</td>
<td>China</td>
<td>N=5010 (gender dysphoria n= 225, cisgender n= 4785)</td>
<td>Adult self-report Inventory-4</td>
<td>DSM</td>
<td>Information not reported</td>
<td>Body dysmorphic disorder was associated with gender dysphoria in female (35.2%) and males (40.8%)</td>
</tr>
<tr>
<td>Lindgren &amp; Pauly</td>
<td>1975</td>
<td>USA</td>
<td>N=32 (n=16 trans males, n=16 trans female)</td>
<td>BIS</td>
<td>None</td>
<td>Some participants were tested during the assessment period and others after the start of hormone treatment (exact numbers are not given). One participant had undergone SRS</td>
<td>Sexual reassignment &gt; body satisfaction</td>
</tr>
<tr>
<td>Marone et al.</td>
<td>1998</td>
<td>Italy</td>
<td>N=30 (n=15 trans females, n=15 trans males)</td>
<td>Sensory Integration Body Imagery Test</td>
<td>None</td>
<td>None had SRS</td>
<td>Trans females are most dissatisfied with their whole body</td>
</tr>
<tr>
<td>Pauly &amp; Lindgren</td>
<td>1976</td>
<td>USA</td>
<td>N=131 (n=66 gender dysphoria, n=65 controls)</td>
<td>BIS</td>
<td>None</td>
<td>30 assessment, 27 post-CHT, 9 SRS</td>
<td>Trans males are most dissatisfied with their chest</td>
</tr>
<tr>
<td>Silverstein &amp; Carpman</td>
<td>1990</td>
<td>USA</td>
<td>N=188</td>
<td>Disordered eating was measured by questions found by Silverstein et al. (1988) Draw-A-Person test</td>
<td>None</td>
<td>Not reported</td>
<td>Participants who reported a conflicted gender identity were also more likely to report eating disorder behaviours</td>
</tr>
<tr>
<td>Smith et al.</td>
<td>2005</td>
<td>Netherlands</td>
<td>N=162 (n=104 trans females, n=58 trans males)</td>
<td>BIS</td>
<td>DSM</td>
<td>52 participants: breast augmentation. 10 participants: phalloplasty</td>
<td>SRS &gt; body image satisfaction</td>
</tr>
</tbody>
</table>
### Chapter 3: Body dissatisfaction and disordered eating review

<table>
<thead>
<tr>
<th>Author(s)</th>
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<th>Main finding(s)</th>
</tr>
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<tbody>
<tr>
<td>Steensma et al.</td>
<td>2013</td>
<td>Netherlands</td>
<td>N=127 (n=79 boys and n=48 girls)</td>
<td>BIS</td>
<td>DSM</td>
<td>47 of the participants reapplied to the gender clinic in adolescents, requested medical treatment. Those who reapplied to the gender clinic in adolescence reported more body dissatisfaction in comparison to those who did not reapply.</td>
<td></td>
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<tr>
<td>Vocks et al.</td>
<td>2009</td>
<td>Germany, Austria and Switzerland</td>
<td>N=356 (n= 88 trans females, n= 43 trans males, n= 72 eating disorders, n= 163 controls)</td>
<td>Eating Disorder Examination Questionnaire</td>
<td>None</td>
<td>57% of trans females on CHT and 18% had SRS 61% of trans males on CHT and 33% had SRS</td>
<td>Trans participants &gt; body dissatisfaction and eating disorder behaviour and attitudes in comparison to controls but these levels were not as high as the eating disorder patients</td>
</tr>
<tr>
<td>Wiseman &amp; Moradi</td>
<td>2010</td>
<td>USA</td>
<td>N=231 (2% transgender and 97% as cisgender)</td>
<td>Objectified body consciousness scale</td>
<td>None</td>
<td>Information not reported</td>
<td>Eating problems and body image concerns rarely experienced</td>
</tr>
<tr>
<td>Witcomb et al.</td>
<td>2015</td>
<td>UK</td>
<td>N=600 (n=200 transsexuals, n=200 eating disorder patients and n=200 controls)</td>
<td>EAT-26</td>
<td>ICD</td>
<td>Trans were at the assessment stage</td>
<td>Trans individuals do not have clinically significant eating disorders, but they may exhibit &gt; eating disorder symptomology compared to controls</td>
</tr>
<tr>
<td>Wolfradt &amp; Neumann</td>
<td>2001</td>
<td>Germany</td>
<td>N=90 (n=30 trans females, n=60 controls)</td>
<td>The Body-Image Questionnaire</td>
<td>None</td>
<td>SRS and voice operation</td>
<td>SRS &gt; body image satisfaction.</td>
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</table>

**Note:** EAT (Eating Attitudes Test), EDI (Eating Disorder Inventory), BUT (Body Uneasiness Test), BCS (Body Cathexis Scale), BIS (Body Image Scale), SRS (sexual-reassignment surgery), GnRHa (gonadotrophin-releasing hormone agonists), CHT (cross-sex hormone therapy), DSM (Diagnostic Statistical Manual), ICD (Internationally Classification of Diseases).
3.4.1. Study characteristics

The oldest paper was published in 1975 (Lindgren & Pauly, 1975) and the newest papers were published in 2015 (Becker et al., 2016; Colizzi, Costa, & Todarello, 2015; Witcomb et al., 2015). Out of the 26 papers which met the criteria for inclusion in this review, 18 explored the prevalence of body image in a trans population (Bandini et al., 2013; Becker et al., 2016; Bozkurt et al., 2006; Colizzi et al., 2015; de Vries et al., 2011, 2014; Fisher et al., 2013, 2014; Fleming, MacGowan, Robinson, Spitz, & Salt, 1982; Kozee, Tylka, & Bauerband, 2012; Kraemer, Delsignore, Schnyder, & Hepp, 2008; Lai, Chiu, Gadow, Gau, & Hwu, 2010; Lindgren & Pauly, 1975; Marone, Lacoella, Cecchini, & Ravenna, 1998; Pauly & Lindgren, 1976; Smith, Van Goozen, Kuiper, & Cohen-Kettenis, 2005; Steensma, McGuire, Kreukels, Beekman, & Cohen-Kettenis, 2013; Wolfradt & Neumann, 2001). Three studies explored disordered eating in trans individuals (Älgars et al., 2012; Khoosal, Langham, Palmer, Terry, & Minajagi, 2009; Silverstein, Carpman, Perlick, & Perdue, 1990). Five papers related to both disordered eating and body image and explored the prevalence of these constructs (Älgars et al., 2010; Cella, Iannaccone, & Cotrufo, 2013; Vocks, Stahn, Loenser, & Legenbauer, 2009; Wiseman & Moradi, 2010; Witcomb et al., 2015). It is important to note that the studies included within the review that examined eating disorder psychopathology did not explore clinically significant eating disorders because diagnostic tools were not employed.

In relation to the methodology of these studies, the majority were cross-sectional. This type of research design is limiting because cause and effect cannot be determined. A longitudinal research design can be employed to determine cause and effect and five studies included in this review employed this type of design (de Vries et al., 2011, 2014; Khoosal et al., 2009; Smith et al., 2005; Steensma et al., 2013). Only one study employed an experimental research design (Marone et al., 1998). Of the 26 studies, only eight had a control group (Bandini et al., 2013; Becker et al., 2016; Bozkurt et al., 2006; Fleming et al., 1982; Pauly & Lindgren, 1976; Vocks et al., 2009; Witcomb et al., 2015; Wolfradt & Neumann, 2001). For four of these studies, their control group included participants from the general population (i.e., they did not have a diagnosis of Gender Dysphoria) (Becker et al., 2016; Fleming et al., 1982; Pauly & Lindgren, 1976; Wolfradt & Neumann, 2001). Three studies compared data from a trans population to a cisgender population and to an eating disorder control group (Bandini et al., 2013; Vocks et al., 2009; Witcomb et al., 2015) and one study compared to a homosexual and cisgender control group (Bozkurt et al., 2006). Fourteen studies obtained an official
DSM or ICD diagnosis relating to gender identity issues which was determined by a clinician or a self-report measure (Bandini et al., 2013; Becker et al., 2016; Bozkurt et al., 2006; Colizzi et al., 2015; de Vries et al., 2011, 2014 Fisher et al., 2013, 2014; Khoosal et al., 2009; Kraemer et al., 2008; Lai et al., 2010; Smith et al., 2005; Steensma et al., 2013; Witcomb et al., 2015). In relation to sample size of trans participants, 12 studies had 100 or more trans participants, seven studies had 50-100 trans participants, and nine studies had fewer than 50 trans participants.

3.4.2. Body dissatisfaction in trans people

3.4.2.1. Body dissatisfaction in trans people: Measures used

Ten different measures were used by studies considered in this review to assess body image. Some papers employed more than one measure to assess their outcomes.

**Body Image Scale (BIS) (Lindgren & Pauly, 1975):** This was the most frequently employed body image measure which was used in six of the studies within this review (de Vries et al., 2014, 2011; Lindgren & Pauly, 1975; Pauly & Lindgren, 1976; Smith et al., 2005; Steensma et al., 2013). The BIS was developed specifically for assessing body image in trans people. It lists 30 body parts and the individual has to rate on a five-point satisfaction scale each body part and whether they may want this feature to be altered through medical or surgical treatment. The higher the score, the more body dissatisfaction reported.

**Body Uneasiness Test (BUT) (Cuzzolaro, Vetrone, Marano, & Garfinkel, 2006):** This was employed by five studies in this review (Bandini et al., 2013; Cella et al., 2013; Colizzi et al., 2015; Fisher et al., 2013, 2014). The measure has two parts: part A which measures weight phobia, body image concerns, avoidance, compulsive self-monitoring, detachment and depersonalisation; and part B which assesses worries about specific body parts (e.g., ‘I would do anything to change some parts of my body’). A high score indicates a higher level of body uneasiness. The BUT was developed and evaluated with an eating disorder population.

**Body Cathexis Scale (Secord & Jourard, 1953):** This measure was employed by two studies reported on within this review (Bozkurt et al., 2006; Fleming et al., 1982) and was developed with a US college population. It assesses the strength and direction of feeling which the individual has about each part or function of their body and also includes 55 items that represent the various conceptual aspects of the self. Participants are asked to choose one of
five responses (e.g., 1 = ‘Have strong feelings and wish change could somehow be made’, 5 = ‘Consider myself fortunate’). A higher score indicates that an individual is more satisfied with their body.

**Body Checking Questionnaire (Reas, Whisenhunt, Netemeyer, & Williamson, 2002):** This tool was employed by Vocks et al. (2009). It has three subscales: checking related to overall appearance, checking of specific body parts, and idiosyncratic checking rituals. A higher score indicates more intense body dissatisfaction. It was developed with an eating disorder population and US college women.

**Body Image Measure (FBek) (Strauß & Richter-Appelt, 1996):** This was employed by Kraemer et al. (2008) and is recommended for use with psychiatric and psychosomatic disorders and for assessing body image concepts under sexological considerations. It is a multidimensional body self-relation questionnaire and has three subscales; insecurity/concern (e.g., ‘My body does whatever it wants’), attractiveness/self-confidence (e.g., ‘I am satisfied with my body weight and body height’), and accentuation of body appearance (e.g., ‘My appearance is important to me’). A high score indicates more body image concerns.

**Objectified Body Consciousness scale (OBC) (McKinley & Hyde, 1996):** This was employed by Wiseman and Moradi (2010) and has three subscales; body surveillance, body shame and appearance control beliefs. A high score on the OBC would indicate a more negative body experience. It was developed and validated with a non-clinical, female population.

**Drive for Muscularity Scale (McCreary & Sasse, 2000):** This measures attitudes and behaviour regarding one’s looks and muscularity (e.g., ‘I think that my arms are not muscular enough’) was employed by Vocks et al. (2009). Higher scores indicate a greater drive for muscularity. It was developed and validated with the general population.

**Body Image Questionnaire (BIQ) (Clement & Löwe, 1996):** This measure was employed by Wolfradt and Neumann (2001) and assesses ‘the dynamic body image’ (e.g., ‘I feel very fit’) and ‘rejected body image’ (e.g., ‘My body often annoys me’). It was developed for psychosomatic patients and a higher score is related to a more negative body image.
Hamburg Body Drawing Scale (Appelt & Strauss, 1988): This was employed by Becker et al. (2016) and Witcomb et al. (2015). This tool is a pictorial measure that assesses 33 different body parts in relation to body (dis)satisfaction and has recently been validated with a trans population (Becker et al., 2016). In Becker et al.’s version, a higher score indicates a low level of body dissatisfaction.

Transgender Congruence Scale (Kozee et al., 2012): This was developed and employed by Kozee et al. (2012). The measure has two subscales; ‘Gender Identity Acceptance’ and ‘Appearance Congruence’ (e.g., the degree to which a trans person perceives their external appearance to represent their gender identity). A higher score indicates a higher level of transgender congruence. It was developed and empirically tested with a trans population.

3.4.2.2. Body dissatisfaction in trans people: Review of the studies

Eighteen studies identified in this review addressed gender dysphoria and body image without looking into disordered eating (see Table 3.3.). The findings appear to suggest that lower transgender congruence between external presentation and internal self is related to lower levels of body satisfaction (Kozee et al., 2012). This low level of body satisfaction is not thought to be found within cisgender populations. As an example, Steensma et al. (2013) recruited trans individuals who met all or some of the criteria for Gender Identity Disorder (GID; DSM-IV) during childhood and followed them up in adolescence. They found that those who reapplied to the gender clinic in adolescence (n=47) reported more body dissatisfaction in comparison to those who did not reapply (n=80) (it was presumed that their gender dysphoria had desisted). These findings suggest that body image is related to gender dysphoria although it must be considered that not all participants met all the DSM-IV criteria. Body dissatisfaction may be experienced in relation to specific body parts. Marone et al. (1998) found a gender difference in relation to eye gaze for specific body parts. Both trans males and females gazed at their feet for the shortest amount of time, indicating that they perceived less dissatisfaction regarding this body part. Trans females gazed longest at their whole body whereas trans males gazed longest at their chest, therefore suggesting that these body parts caused the most dissatisfaction. In comparison to trans males, trans females gazed at their genitals longer, suggesting they were more dissatisfied with these body parts than trans males. In support of these findings, trans females have been found to dislike more body parts than trans men (Fisher et al., 2013). Recently, Becker et al. (2016) also found trans males to perceive body dissatisfaction regarding all female body parts, not just sex-specific
body parts. In contrast, trans females reported being extremely dissatisfied with sex-specific body parts (e.g., body hair, genitals). They concluded that whilst sexual reassignment (i.e., hormones and/or sex reassignment surgery; SRS) may increase body satisfaction for a trans person, enhancing body image should also take a more holistic stance, paying more attention to the psychological component of body image. In contrast to these findings, Bozkurt et al. (2006) found that although there was some difference in body satisfaction with some parts of the body, overall body satisfaction did not significantly differ in trans females (n=52), when compared to homosexual people (n=36) and aged matched heterosexual cisgender people (n=72). They concluded that trans people experience similar levels of body dissatisfaction in comparison to homosexual and cisgender people.

The successfulness of gender dysphoria treatment in relieving body dissatisfaction suggests that body image plays a central role in gender dysphoria (Fleming et al., 1982; Kraemer et al., 2008; Lindgren & Pauly, 1975; Pauly & Lindgren, 1976; Smith et al., 2005; Wolfradt & Neumann, 2001). Lindgren and Pauly (1975) and Pauly and Lindgren (1976), who were the first to explore the effectiveness of gender dysphoria treatment, found that after sexual reassignment treatment (i.e., hormones and/or SRS), body dissatisfaction levels reduced in both trans females and males.

To determine at what stage of treatment trans individuals become more or less satisfied with their bodies, de Vries et al. (2011) assessed trans people (n=70) at two different time points; once shortly after their first visit to the gender identity clinic (T0; mean age=13.65 years) and once shortly before starting CHT (T1; mean age=16.64 years). They found that between T0 and T1 (mean age=14.75 years), participants started puberty suppression (Gonadotrophin-releasing hormone agonists; GnRHa). GnRHa did not significantly reduce levels of body dissatisfaction between T0 and T1. Interestingly, between T0 and T1, natal females (trans males) became more dissatisfied with their secondary and neutral sexual characteristics compared to males (trans females). The authors concluded that body dissatisfaction only suppresses once trans individuals undergo CHT. However, it must be noted that the participants in this study were adolescents, a demographic for whom body dissatisfaction is more prevalent in comparison to other age groups (e.g., Tiggemann, 2004) although body dissatisfaction exists in women of all ages (Runfola et al., 2013). de Vries et al. (2014) followed up this study with 55 trans individuals (from the original dataset) and with an additional time point, one year after SRS (T2). Body image concerns continued to remit after SRS for both primary and secondary sex characteristics. There was no significant difference
for neutral body characteristics between T0 and T2. In combination, de Vries et al.'s (2011, 2014) studies suggest that body dissatisfaction only starts to remit after sexual reassignment, which appears to be in relation to sex-specific body parts. However, Fisher et al. (2014) suggested that it is not always necessary for trans people to undergo invasive treatment (i.e., SRS) to feel satisfied with their bodies. They found that when trans females received a cumulative dose of CHT, body uneasiness was relieved.

To put body dissatisfaction into context at different stages of treatment, Bandini et al. (2013) compared body image scores from 100 trans people with a DSM-IV GID diagnosis (50 without SRS and 50 with SRS), 88 eating disorder patients, and 107 controls. They found that in comparison to controls, trans individuals without SRS had higher levels of body uneasiness, similar to those with eating disorders. Additionally, trans individuals who had SRS reported body uneasiness levels that were not as low as controls, but they were lower than the trans people who had not had SRS and lower than the eating disorder participants’ levels. This study’s findings support the view that SRS relieves body uneasiness.

Gender dysphoria has been reported to co-occur with other disorders that affect body image. Lai et al. (2010) recruited 5010 first year university students, 225 of whom self-reported GID, and found that body dysmorphic disorder (a condition included within DSM-5 that causes a person to have a distorted perception of their body and consequently feel anxious about their appearance) co-occurred with GID in trans males (40.8%) and females (35.2%). Levels of body dysmorphic disorder in participants that did not report GID were 15.2% and 20.2% in cisgender males and cisgender females, respectively. Colizzi et al. (2015) explored the comorbidity of dissociative disorder in trans patients. Dissociative disorder is a DSM-5 condition that alters a person's sense of reality. People with this condition may feel their body is unreal and they may have different identities, and therefore it is thought to be similar to gender dysphoria (Colizzi et al., 2015). Colizzi and colleagues found that trans patients with a dissociative disorder also reported higher levels of body uneasiness in comparison to trans patients who did not report a dissociative disorder. As a result of these findings the authors questioned whether body uneasiness is a genuine symptom of gender dysphoria or an expression of pathological dissociative experiences. Dissociation may also be a result of gender dysphoria, in the sense that trans people may be unable to connect with their bodies.
The body image and gender dysphoria findings, when taken together, appear to indicate that there is an association between body dissatisfaction and gender dysphoria. Body image concerns appear to be core to the distress that trans individuals experience prior to gender dysphoria treatment, given the evidence which suggests that treatment appears to alleviate at least some of the unhappiness trans individuals experience in relation to their bodies.

3.4.3 Disordered eating in trans people

3.4.3.1 Disordered eating in trans people: Measures used

Three different disordered eating measures were employed by studies considered in this review.

-Eating Disorder Inventory version 1, 2 and 3 (EDI-1-2-3) (Garner, Olmstead, & Polivy, 1983; Garner, 1991; Garner, 2004): This was the most frequently used measure, which was used four times by studies considered within this review (Ålgars et al., 2012; Cella et al., 2013; Khoosal et al., 2009; Witcomb et al., 2015). This measure was developed for an eating disorder population and explores symptoms and psychological characteristics commonly related to eating disorders. The first three subscales (drive for thinness, bulimia and body dissatisfaction) relate to features of eating disorders. High scores indicate more disordered eating.

-Eating Attitude Test (EAT-26) (Garner, Olmsted, Bohr & Garfinkel, 1982): This tool was employed twice by studies considered in this review (Ålgars et al., 2010; Wiseman & Moradi, 2010). It assesses the cognitive, attitudinal and behavioural dimensions of eating behaviour. It has three subscales: dieting; bulimia and food preoccupation; and, oral control. High scores indicate more disordered eating.

-Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Cooper, 1993): This was employed once by Vocks et al. (2009). It assesses eating behaviour and weight concerns (e.g., ‘Over the past 4 weeks, have you wanted your stomach to be empty?’) and has four subscales: restraint, eating, shape and weight concern. Higher scores indicate higher levels of eating disorder psychopathology.
3.4.3.2. Disordered eating in trans people: Review of studies

It has been suggested that individuals diagnosed with Gender Dysphoria are also at risk of disordered eating (e.g., Álgars et al., 2010). Within this review, three studies explored the relationship between disordered eating and gender dysphoria (see Table 3.3.). Silverstein et al. (1990) recruited 188 women at a university in the US. They found that women who reported a gender identity conflict were more likely to also report purging or frequent binging in comparison to the women in the study who did not report a conflicted gender identity. However, this study did not establish whether participants who reported a gender identity conflict had an ICD or DSM related diagnosis. Álgars et al. (2012) also set out to explore disordered eating by measuring eating behaviour and cognitions in a trans population. They found that the majority of trans individuals reported current or past disordered eating in an attempt to suppress features of their biological gender or to accentuate features of their gender identity, although the trans participants did not report clinical levels of disordered eating on the EDI-3. These findings suggest that the participants were dissatisfied with their bodies as they were not congruent with their gender identity and so were engaging in disordered eating behaviours, potentially as a way to address this. A limitation of this study was the small sample size (N=20) and self-identification of being trans.

Khoosal et al. (2009) explored how features of eating disorder behaviour may change over the course of physical treatments in a sample of trans females (N=40) with an official ICD-10 diagnosis. They found that six months after SRS, trans females reported lower levels of eating psychopathology and body image dissatisfaction in comparison to people with an eating disorder and to the general population.

3.4.4. Body dissatisfaction and disordered eating in trans people

3.4.4.1. Body dissatisfaction and disordered eating in trans people: Review of the studies

So far, the literature appears to suggest that body dissatisfaction plays a key role in the development of disordered eating (Álgars et al., 2012; Khoosal et al., 2009; Silverstein et al., 1990). Within this review, five papers were identified which explored disordered eating as well as body image in trans people (see Table 3.3.). Three of these studies found that the trans participants had higher levels of body dissatisfaction and disordered eating (e.g., bulimic behaviour) in comparison to cisgender populations (Álgars et al., 2010; Vocks et al., 2009) and heterosexual and homosexual men and women (Cella et al., 2013). In contrast, Wiseman and Moradi (2010) explored body image and disordered eating in a sexual minority
population and found eating problems and body image concerns were rarely experienced. However, only 2% of this sample identified themselves as trans and therefore these findings are unlikely to be representative of the trans population. Strengthening these findings, Witcomb et al. (2015) found levels of disordered eating and body dissatisfaction to be higher in trans (n=200) than cisgender people (n=200), suggesting trans may exhibit higher levels of disordered eating than controls. However, eating disorder patients (n=200) had significantly higher levels of disordered eating and body dissatisfaction in comparison to trans people.

The studies presented in this section appear to suggest that trans individuals do not have clinically significant eating disorders but may display disordered eating and body dissatisfaction, although empirical research into potential explanations as to why trans people may engage in disordered eating is sparse.

3.5. Discussion

The aim of this review was to critically and systematically review the available literature examining body dissatisfaction or disordered eating in a trans population, and also the literature pertaining to how body dissatisfaction and disordered eating are related in trans people. Overall this review found that body dissatisfaction is core to the distress of trans people which may put some people at risk for disordered eating.

Body dissatisfaction appears to be core to the distress trans people experience prior to gender dysphoria treatment. This is likely to be a result of the incongruence between biological assigned sex and gender identity (e.g., Ålgars et al., 2012). In addition, trans women may internalise the commonly emphasised message in Western culture that thin is beautiful. Thin-ideal internalisation is defined by the extent to which a person engages in behaviours designed to produce an approximation of these ideals (Thompson & Stice, 2001). Additionally, trans women have reported striving for thinness to appear more feminine (Ålgars et al., 2012), which may suggest that trans women are vulnerable to these cultural messages. In cisgender populations, thin-ideal internalisation is thought to directly foster body dissatisfaction as this ideal is virtually unattainable for most females (e.g., Fitzsimmons-Craft, 2011; Thompson & Stice, 2001). Achieving this ideal may be even more unrealistic for trans females as some bodily features cannot be altered medically or physically (i.e., broad shoulders). The male equivalent to drive for thinness is the drive for muscularity (McCreary & Sasse, 2000). In a cisgender population, appearance comparisons and
internalisations are associated with muscularity-orientated body dissatisfaction and risky body change behaviour (Karazsia & Crowther, 2010). This is evidenced by Goodwin, Haycraft and Meyer (2014) who found that peer and family messages to become more muscular predicted compulsive exercise in teenage boys. In light of the review’s findings and previous literature, clinicians working with trans people must be mindful that body dissatisfaction may be driven by gender dysphoria and also by culturally emphasised gender-specific ideals (which are probably unattainable) in order to achieve a more feminine or masculine body shape, depending on their gender identity.

This review also found that gender dysphoria treatment is capable of increasing body satisfaction (e.g., de Vries et al., 2014). This increase in body satisfaction is thought to be a result of sex-specific body parts becoming more congruent with gender identity (e.g., de Vries et al., 2014). However, interestingly, Becker et al. (2016) found trans males were dissatisfied with all female body parts (not just sex-specific) and therefore concluded that body image concerns in trans people should not be reduced to sex-specific body parts. This finding can be explained by the fact that not all body parts associated with natal females (e.g., curvaceous hips) and natal males (e.g., large hands) can be modified through body changing behaviours (i.e., surgery or exercise). In light of the review’s findings and previous literature, it seems appropriate for clinicians to continue to monitor body dissatisfaction and utilise gender dysphoria treatments. At the same time, clinicians working with trans people should take a more holistic stance on body image. Rather than only focusing on improving satisfaction with sex-specific body parts through medical intervention, the psychological and social aspects of body image should be addressed (i.e., challenging negative thought processes about the body, positive re-framing of aspects that cannot be changed and challenging perceived negative reactions from society). For example, Cognitive Behavioural Therapy programmes targeted at US college women have been found to increase affective body image and decrease maladaptive body image cognitions (Butters & Cash, 1987). At the same time, future research would benefit from taking a more holistic approach when measuring body image, instead of focusing on satisfaction with sex-specific body parts.

This review found that trans people engage in disordered eating (e.g., Khoosal et al., 2009). Only one study by Álgars et al. (2012) explored why trans people may engage in this behaviour and found that trans people are motivated to engage in disordered eating to suppress features of their natal gender and accentuate features of their gender identity; thus
they are motivated by their body dissatisfaction. This is a finding that has been replicated within cisgender populations; Stice and Shaw (2002) suggested that body dissatisfaction is the main contributor towards the onset and maintenance of an eating disorder. Within cisgender populations there are thought to be several moderating factors that influence the relationship between body dissatisfaction and eating disorders. McLean, Paxton and Wetheim (2010), for example, found that women were more likely to suffer from an eating disorder if they had a higher body mass index, if they placed high importance on their appearance, and if they had lower cognitive reappraisal and self-care scores. More recently, Machado, Gonçalves, Martins, Hoek and Machado (2014) found perfectionism and a family history of an eating disorder to be prevalent in individuals who develop Anorexia Nervosa. Fortunately, the evidence from this current review suggests that disordered eating in trans people does not appear to be clinically significant (e.g., Witcomb et al., 2015). Perhaps in a trans population, body dissatisfaction does not manifest into an eating disorder since trans people are dissatisfied with aspects of their body (i.e., hands) that cannot be modified through diet restriction (Witcomb et al., 2015). It may also be that as body dissatisfaction improves with CHT and SRS (e.g., de Vries et al., 2014), disordered eating decreases, given that body dissatisfaction is thought to manifest disordered eating (Ålgars et al., 2012). In relation to clinical implications, clinicians working with trans people should be aware that disordered eating may be present. If this is the case, clinicians should work with the trans person to ascertain why the individual may be engaging in this disordered behaviour. This will help inform clinical choices regarding how best to address this disordered behaviour. Clinicians working in other areas should also be mindful that patients, both those identifying as trans and those yet to explore their gender identity, may present with disordered eating as a consequence of their gender dysphoria. In addition to this, more empirical research needs to explore why trans people may be at risk for disordered eating as there is currently only one study by Ålgars et al. (2012) that has explored potential explanations. Researchers should also explore body (dis)satisfaction with regard to body parts that cannot be modified through medical intervention (i.e., hands or feet). This in turn would enable a better understanding of body image in trans people which would inform clinical practice.

Despite these important findings, the review was limited by the methodological quality of studies considered within it. With regard to body dissatisfaction, numerous different measures were used to assess this construct. Even though interesting and varied findings have been produced from such studies, the lack of consistency means it is hard to make cross-
study comparisons. The content of the measures employed to explore body image, disordered eating and gender dysphoria was also varied and sometimes limited. For instance, BIS (the most commonly employed body image measure) only taps into the cognitive dimension of body image and fails to recognise the attitudinal, perceptual, or behavioural dimensions. Therefore, this measure is unlikely to provide a comprehensive understanding of body image. The field would benefit from consolidating the most useful components of existing measures to develop a comprehensive and validated measure that taps all dimensions of body image. While cross-sectional research has identified an association between gender dysphoria, body image (e.g., Kozee et al., 2012) and disordered eating (e.g., Algars et al., 2010), there is a lack of longitudinal research within the field. This is problematic as how body dissatisfaction and disordered eating change over time (i.e., during the treatment programme) is poorly understood. Studies also typically employed a small sample of trans people who did not always have a clinical diagnosis of Gender Dysphoria in accordance with the ICD or DSM. This prevents the generalisability of such findings to those who have an official diagnosis. In addition to the research areas’ methodological limitations, the current systematic review also has some limitations which should be considered. This review only considered papers as being eligible for inclusion if they were written in English, Spanish or Dutch and therefore papers that may have been relevant but were written in other languages were not reviewed. This review also excluded studies that explored body image and/or disordered eating in intersex people and therefore the findings of this review cannot be generalised to this population.

3.5.1. Conclusion

This systematic review has highlighted how body dissatisfaction is core to the distress of trans people which may put some people at risk for disordered eating. To enhance our understanding of body image and disordered eating in trans people, more methodologically robust research needs to be conducted (e.g., larger sample sizes, longitudinal designs). As a consequence, it is hoped that a more advanced empirical knowledgebase will be established, which in turn will inform clinical practice.
Chapter 4

Gaps within the literature

4.1. Introduction
Chapters 1 to 3 have highlighted that, due to experiencing gender incongruence and the distress associated with this, transgender people are particularly vulnerable to body dissatisfaction, eating disorder psychopathology, and poor mental health; all of which might be alleviated by physical activity and/or sport engagement. However, chapters 2 and 3 identified several gaps and limitations within the current physical activity and body image literature. The aim of chapter 4 is to highlight and discuss the gaps within: (i) the transgender physical activity and sport literature determined in chapter 2; and, (ii) the transgender body dissatisfaction and eating disorder literature identified in chapter 3. Chapter 4 will then outline how the studies reported on in the thesis intend to address the research gaps identified in chapters 2 and 3 by presenting the aims of the empirical chapters within this thesis. By addressing the gaps in the literature through the empirical studies within this thesis, it is hoped that a better understanding of physical (in)activity, experiences of body (dis)satisfaction and mental health within the transgender population will be obtained.

4.2. Physical activity and sport
Poor mental health and body dissatisfaction impose great challenges for the transgender population which need to be addressed (e.g., Dhejne, Van Vlerken, Heylens, & Arcelus, 2016; Witcomb et al., 2015). Based on the findings of research conducted with the cisgender population, physical activity and/or sport engagement may potentially be able to alleviate poor mental health and body dissatisfaction experienced by transgender people (e.g., Carter, Morres, Meade, & Callaghan, 2016; Cox, Ullrich-French, Howe, & Cole, 2017; Herring, Jacob, Suvey, & O’Conner, 2011; Kruger, Lee, Ainsworth, & Macera, 2008; Lantz, Hardy, & Ainsworth, 1997; McMahon et al., 2017; Rebar et al., 2016). However, chapter 2, which systematically reviewed the literature pertaining to physical activity and sport in the transgender population, concluded that despite a lack of literature it appears that the majority of transgender people have a negative experience when being (or attempting to be) physically active or participating in sport. This conclusion was based mainly on qualitative studies that were concerned with participation in competitive sport at an elite level. There is even less research that has considered transgender people’s experiences of participating in physical
activity and/or recreational sport for leisure or fitness. This is surprising as it would be expected that transgender people would be more likely to engage in physical activity and/or recreational sport rather than competitive sport at an elite level. In addition to this, none of the studies within the systematic review concerned with physical activity and recreational sport had considered the role of medically transitioning. Medically transitioning has been associated with an increase in mental well-being and a decrease in body dissatisfaction (i.e., increase in body satisfaction; e.g., Costa & Colizzi, 2016; Fisher et al., 2014; Gorin-Lazard et al., 2013; Heylens, Verroken, De Cock, T’Sjoen, & De Cuypere, 2014). Better mental well-being and lower body dissatisfaction (i.e., greater body satisfaction) have been associated with greater physical activity and/or sport engagement within the cisgender population (e.g., Carter et al., 2016; Cox et al., 2017; Kruger et al., 2008; McMahon et al., 2017). Therefore, given that there is limited research which has explored the experiences of treatment seeking and medically transitioning transgender people in physical activity and recreational sport, further exploratory qualitative research is needed. Such research will facilitate our understanding of the specific experiences of this population and, if necessary, start to reveal how physical activity and recreational sport can be made more accessible. This will help to determine whether physical activity and/or recreational sport (engaged in for leisure or fitness) would be a feasible mechanism to alleviate mental health problems and body dissatisfaction in transgender people.

Although qualitative research will be useful in obtaining an understanding of physical activity and recreational sport experiences within the transgender population, such findings cannot be generalised. In contrast, the findings from quantitative research conducted with larger, representative samples can be more widely generalised. The systematic review in chapter 2 identified that there is currently a lack of quantitative research that has considered the amount of, and factors associated with, physical activity and recreational sport participation within the transgender population. It is important that quantitative research in this area is increased so that the findings can be used to inform the development of interventions and initiatives which aim to increase the accessibility of physical activity and/or recreational sport within the transgender population. Such interventions may have important benefits in relation to mental health and body dissatisfaction.
4.3. Body dissatisfaction and disordered eating

Alleviating body dissatisfaction within the transgender population is paramount as the systematic review in chapter 3 concluded that body dissatisfaction appears to make this population vulnerable to disordered eating (Ålgars, Alanko, Santtila, & Sandnabba, 2012), although it was noted that only one study to date has explicitly studied the association between body dissatisfaction and eating disorder psychopathology. In addition to this, research conducted with the cisgender population has found disordered eating to be influenced by multiple factors and, consequently, to be highly complex (e.g., Mazzeo & Bulik, 2009). No research to date has explored whether factors, other than body dissatisfaction, are capable of explaining eating disorder psychopathology within the transgender population. This is significant as many factors that have been found to be associated with eating disorder psychopathology within the cisgender population are pertinent among transgender people. For instance, poor mental health (i.e., symptoms of anxiety and depression) has been associated with eating disorder psychopathology in cisgender people (e.g., Brechan & Kvalem, 2015; DeBoer & Smits, 2013). Due to their minority identity, transgender people are thought to be particularly vulnerable to poor mental health (e.g., Dhejne et al., 2016; Hendricks & Testa, 2012; Meyer, 2003). Understanding risk factors associated with eating disorder psychopathology within the transgender population will allow for specific prevention and alleviation strategies to be established. Therefore it is apparent from the systematic review of the literature presented in chapter 3 that there is a need for more research that explores why transgender people are vulnerable to disordered eating.

The systematic review in chapter 3 also highlighted how research has shown that gender affirming medical interventions are capable of alleviating body dissatisfaction (i.e., increasing body satisfaction; Kraemer, Delsignore, Schnyder, & Hepp, 2008; Smith, Van Goozen, Kuiper, & Cohen-Kettenis, 2005). As body dissatisfaction has been associated with eating disorder psychopathology within the transgender population (Ålgars et al., 2012), it would be expected that gender affirming medical interventions are also capable of alleviating eating disorder symptoms. Only one study within the systematic review in chapter 3 considered the role of gender affirming medical interventions on eating disorder symptoms, finding these symptoms to be alleviated following gender affirming surgery (Khoosal, Langham, Palmer, Terry, & Minajagi, 2009). However, this study only considered the role of gender affirming surgery and not the isolated role of cross-sex hormones. Khoosal et al.’s (2009) study was also limited by the fact that only a small sample (N=40) of transgender
females were recruited. Due to these limitations, conclusions about the role of gender affirming medical interventions on eating disorder symptoms cannot be made. In light of this, more research is needed in a large sample of treatment seeking transgender males and females. Such research is important because, if an association between gender affirming interventions and eating disorder symptoms is found, it may suggest that eating disorder symptoms are secondary to gender incongruence.

Research has suggested that transgender people may experience dissatisfaction with all of their body and not just parts of the body that are associated with their gender assigned at birth (e.g., Becker et al., 2016). Additionally, research has found some transgender people to continue to report high levels of body dissatisfaction after gender affirming medical interventions (van de Grift et al., 2017a). In light of the findings from previous literature, it would seem that interventions (other than gender affirming medical interventions) which are capable of alleviating body dissatisfaction are necessary. One potential intervention that may be able to alleviate body dissatisfaction in the transgender population is physical activity and/or sport engagement. However, the systematic review in chapter 2 revealed that there is very little known about the amount of physical activity and sport transgender people engage in or about the factors that are associated with being physically active. Therefore it is unknown whether physical activity and sport engagement would be an acceptable and effective intervention to transgender people. Preventing this knowledge from being obtained is also the lack of available tools that can assess important intervention outcomes, such as mental health and body dissatisfaction, within the transgender population.

4.4. Measurement issues in transgender health
To determine whether interventions that are aimed at improving mental health and body dissatisfaction within the transgender population have been effective, reliable measurement of these constructs is imperative. The systematic review in chapter 3 identified a lack of consistency in the tools used to assess body dissatisfaction within the transgender population. Measurement consistency is important in order to allow comparisons to be made easily across studies. The review also highlighted that tools which are used to assess body dissatisfaction within the transgender population tend to have been developed and validated with the cisgender population (e.g., the Body-Cathexis Scale; Secord & Jourard, 1953), or with populations known to experience high levels of body dissatisfaction, such as people with an eating disorder (e.g., Eating Disorder Inventory-2; Garner, 1991). While these measures have
undoubtedly been useful in starting to explore body dissatisfaction and eating psychopathology in transgender individuals, the systematic review in chapter 3 demonstrated how body dissatisfaction experienced by transgender people differs in many aspects from body dissatisfaction experienced by the cisgender population and by people with an eating disorder. For instance, weight and shape concerns are core to a diagnosis of anorexia and bulimia nervosa within the International Classification of Diseases (ICD-10; World Health Organization (WHO), 1992) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association (APA), 2013). In contrast, transgender people report primarily experiencing dissatisfaction with body parts that are a reminder of the gender they were assigned at birth (e.g., genitals; van de Grift et al., 2016a; 2016b). Transgender people are thought to engage in disordered eating to suppress body features associated with their gender assigned at birth and accentuate body features associated with their gender identity (Ålgars et al., 2012). In light of this, self-report measures employed within this group should assess body dissatisfaction in relation to gender incongruence (i.e., ‘I am dissatisfied with my body as it does not align with my gender identity’). This will allow for measurement of body dissatisfaction within the transgender population to be more accurate and meaningful. This issue is not isolated to the measurement of body dissatisfaction. Currently, mental health measures employed with the transgender population do not assess mental health in relation to gender incongruence and gender distress (dysphoria) (i.e., ‘I feel low in mood because the gender I was assigned at birth and my gender identity do not match’) (Dhejne et al., 2016). This is problematic as the full nature of this population’s experiences of mental health problems cannot be established which is likely to affect the conclusions drawn from research and, consequently, the successfulness of interventions which aim to alleviate mental health in this population. In response to this, there is a need for the development of a measure that has been designed with the transgender population in mind and is capable of assessing mental health and body dissatisfaction in relation to gender incongruence and gender distress. Such a measure will be beneficial for clinical purposes and will also extend past research by enhancing the accuracy and reliability of data collected on mental health and body dissatisfaction from the transgender population.

4.5. Empirical aims of the thesis

The overarching aim of this thesis was to further the current understanding around physical (in)activity, experiences of body (dis)satisfaction and mental health within the transgender population. In light of the gaps identified in chapters 2 and 3, the empirical research
presented in this thesis was concerned with exploring whether transgender people engage in physical activity and/or sport as well as the role that gender affirming medical interventions, mental health and body (dis)satisfaction play in being active. The research comprising this thesis also aimed to explore the role of mental health and body dissatisfaction in eating disorder psychopathology with the purpose of understanding why this population is vulnerable to eating disorder symptoms. Additionally, the research within this thesis was concerned with exploring the role of cross-sex hormones on eating disorder symptoms within the transgender population. Due to the issues surrounding measurement of mental health and body dissatisfaction, increasing the reliability of self-report measurement of these constructs within the transgender population was a further aim of the research presented in this thesis. The thesis has seven specific aims which are listed below, along with the relevant chapter number and corresponding empirical study. The main research questions and different areas of investigation to be explored in the thesis are displayed in Figure 4.1.

1. To qualitatively understand the experiences that treatment seeking transgender people have when engaging (or attempting to engage) in physical activity and/or recreational sport for leisure and fitness (chapter 6; study 1).
2. To establish the amount of physical activity that treatment seeking transgender people engage in (chapter 7; study 2).
3. To establish the role of cross-sex hormones on physical activity levels in treatment seeking transgender people (chapter 7; study 2).
4. To quantitatively identify factors that are associated with physical activity in treatment seeking transgender people (chapter 7; study 2).
5. To establish why transgender people are vulnerable to disordered eating by exploring which factors are associated with eating disorder symptoms in treatment seeking transgender people (chapter 8; study 3).
6. To better understand the alleviating effects that cross-sex hormones might have on eating disorder symptoms in treatment seeking transgender people (chapter 8; study 3).
7. To develop and validate a new transgender health outcome measure that is capable of assessing gender distress, gender congruence, associated mental well-being, and life satisfaction for use in research and clinical settings (chapter 9; study 4).
The seven research aims were addressed by conducting four empirical studies, as summarised below.

1. Study 1: A qualitative study to explore the experiences that treatment seeking transgender people have when engaging (or attempting to engage) in physical activity and/or recreational sport for leisure and fitness.

2. Study 2: A quantitative study to explore the levels, factors associated with, and role of cross-sex hormones on physical activity engagement among treatment seeking transgender people.

3. Study 3: A quantitative study to explore why treatment seeking transgender people are vulnerable to disordered eating as well as the role cross-sex hormones might have on eating disorder symptoms.

4. Study 4: A study to develop and validate a new transgender health outcomes measure.
Figure 4.1. Main research questions and factors to be explored within the thesis
Chapter 5: General methodology

5.1. Introduction
The aim of this chapter is to introduce the methodology employed within this thesis. The research design chosen for this thesis will be outlined, followed by a description of the participants involved and procedures conducted for the studies that comprise this thesis. This will be followed by details of the measures used within this thesis and an overview of the data analysis strategy employed. The specific methodology used within each study is discussed in detail within the method section of each chapter.

5.2. Research design
In this thesis, a critical realist perspective was adopted which has been described as transcending the polarised perspectives of positivism and relativism (Bhaskar, 1989). A critical realist believes that the research design should be dictated by the research questions (McEvoy & Richards, 2006). Therefore, based on the research aims of the thesis (see section 4.5.) an exploratory sequential mixed method research design (i.e., exploratory qualitative research followed by quantitative research) was deemed the most appropriate. Triangulating qualitative and quantitative research can provide complementary perspectives on a phenomenon (McEvoy & Richards, 2006). Given the paucity of research in this area (see chapters 2 and 3), a cross-sectional approach was chosen to enable initial inroads to be made in exploring physical activity, body (dis)satisfaction and mental health in transgender individuals. The cross-sectional research studies (chapters 6 to 9) highlight novel findings and suggest that longitudinal research is warranted with the transgender population, especially over the course of gender affirming medical interventions, to build on these findings.

5.3. Participants
Both transgender and cisgender participants were recruited for studies within this thesis to address the research questions stated within each chapter.
5.3.1. Transgender participants
For all of the empirical chapters in this thesis (chapters 6 to 9), people who self-identified as transgender were asked to take part in the research. In light of the issues surrounding diagnoses discussed in section 1.4., transgender participants were not required to have a formal diagnosis to take part in the studies within this thesis. However, for all of the studies in this thesis, a large proportion of the participants were recruited from a transgender health service within the United Kingdom (UK; Nottingham Centre for Transgender Health) and therefore it is acknowledged that the majority of transgender participants that contributed towards the research did have an official diagnosis (Transsexualism as per ICD-10 or Gender Dysphoria as DSM-5) to allow them to access the treatments offered at the transgender health service (see section 1.4.). It is also acknowledged that transgender participants recruited from the Nottingham Centre for Transgender Health might have taken part in more than one study reported on in this thesis, but it is not possible to identify specific instances given that individuals took part anonymously in all studies apart from study 1 (chapter 6).

To be eligible to participate in the empirical studies (chapters 6 to 9) that comprise this thesis, transgender people were required to be aged 17 years or over (when recruited from a transgender health service (as adult transgender health services in the UK receive referrals from people aged 17 and above)) and aged 18 years and over when recruited from the community (e.g., lesbian, gay, bisexual and transgender (LGBT) organisations).

5.3.2. Cisgender participants
Cisgender participants were recruited for studies 2 and 4 (chapters 7 and 9, respectively). To be eligible to participate, cisgender participants were required to not identify as transgender or to experience incongruence between the gender they were assigned at birth and gender identity. Cisgender participants were also required to be age 18 years or over.

5.3.3. All participants
For both the transgender and cisgender groups, participants were not excluded based on their reported levels of physical activity, body (dis)satisfaction and mental health. Participants were also not excluded based on any socio-demographic variables, such as age, gender, race, ethnicity or religion.
5.4. Recruitment of participants

The recruitment method for each study is discussed in turn, below.

5.4.1. Chapter 6: A qualitative study to explore the barriers and facilitator of physical activity/sport in the transgender population

Only transgender participants were invited to take part in study 1. For this study all participants who had undergone assessment and been accepted onto the treatment programme at the Nottingham Centre for Transgender Health were invited to take part (see section 1.5.). Clinicians working within the centre were asked to identify patients from their case load who would be suitable to take part in the research (i.e., they were not deemed as vulnerable or fragile by their clinician and were fluent in English). Suitable patients were informed about the study by their clinician who explained during a routine appointment that there was a research project taking place at the service that was interested in exploring the experiences that transgender people have regarding physical activity and sport. It was made clear to the patient that they were under no obligation to participate in the research and that their decision would have no impact on the treatment or services that they received. If the patient wanted to find out more about the study, then a meeting with the primary researcher (PhD candidate) was arranged at the centre.

5.4.2. Chapter 7: Study 2 – Determining the levels and predictors of physical activity in the transgender population

Both transgender and cisgender participants were invited to take part in this study.

5.4.2.1. Transgender participants

For this study, all participants that were accepted for assessment by the Nottingham Centre for Transgender Health and were awaiting initial assessment at the service were invited to take part in the research. When patients at this service were sent an appointment letter for their first assessment in the post, they also received an invitation to take part in the study. It was made clear to all participants that participation was voluntary and they did not have to take part in the research project if they did not wish. It was also made clear that if they did take part, their care at the service would not be affected. This study was part of a larger longitudinal study aiming to investigate the clinical correlates and outcomes for people treated at the Nottingham Centre for Transgender Health. A questionnaire on physical activity was included into the questionnaire pack for the sole purpose of this study and
therefore the data extracted from the Nottingham Centre for Transgender Health’s database for this study were all collected within the timeline of this PhD research.

5.4.2.2. Cisgender participants
This sample was invited to take part in the research by sharing an online link to the questionnaire (developed through Bristol Online Survey) using snowball sampling. This involved sharing the link with members of the community through social media sites such as Facebook and Twitter and via email. People who took part in the research were asked to pass information about the study onto anyone else who may be interested in taking part in the research.

5.4.3. Chapter 8: Study 3 – The role of cross-sex hormones on eating disorder symptoms in the transgender population
Only transgender participants were invited to take part in this study. As in study 2, transgender participants were invited to participate in the research while waiting for their initial assessment at the Nottingham Centre for Transgender Health. When the patients’ first appointment was sent out to them in the post, information regarding the study was included. All patients were invited to take part but it was clearly explained to them that they did not have to. If they decided to take part in the research it was made clear that this would not affect the care they received at the service. As in study 2, this study was part of a longitudinal study taking place at the Nottingham Centre for Transgender Health. Collection of data for this study began in 2012 and therefore some of the data used within this study were historical (i.e., were collected before the research for this PhD thesis commenced).

5.4.4. Chapter 9: Study 4 – Development and validation of a new transgender health outcome measure
Both transgender and cisgender participants were invited to take part in study 4.

5.4.4.1. Transgender participants
Participants for this study were invited from the Nottingham Centre for Transgender Health. Patients who were being assessed or were already in the treatment programme at the centre were invited to take part. Clinicians working at the centre were asked to identify potential participants from their case load (i.e., those who were not perceived to be vulnerable or fragile by their clinician and had a good understanding of written English). Once appropriate
patients had been identified, the clinician involved in their care provided written information about the study in an envelope. The questionnaire pack for this study was also included within the same envelope and patients were asked to complete the questionnaires if they were happy to take part. The research team’s contact details were included within the envelope and information on how the patient could seek independent advice about taking part in the study was also included within the pack.

Transgender participants were also invited from the community through LGBT support organisations and charities. Gatekeepers at these organisations and charities who agreed to facilitate recruitment were asked to share a brief outline of the research project on their websites, mailing lists and/or newsletters (whichever worked best for them). They were provided with an electronic flyer (see Appendix A) and a summary (see Appendix B) that described the study and could be used to advertise the study through the suggested mediums. Snowball sampling was also used. Charities, organisations and people who took part in the study were asked to pass on the study information to other potentially interested parties (i.e., other relevant charities or transgender people).

5.4.4.2. Cisgender participants

Cisgender people were invited to take part in the research through the community via snowball sampling. This involved sharing details of the research study with people through social networking sites (e.g., Facebook and Twitter) and email. In addition to this, people who took part in the research were asked to pass information about the study onto anyone else who may be interested in taking part in the research. Flyers advertising the study (see Appendix A) were also placed on noticeboards at Loughborough University.

5.5. Procedures

5.5.1. Chapter 6: Study 1 - A qualitative study to explore the barriers and facilitators of physical activity/sport in the transgender population

Patients who were interested in finding out more about study 1 were given an information sheet by the PhD candidate which they could read in their own time (see Appendix C). It was

1 Within this summary the scale is named the ‘Nottingham Gender and Body Dysphoria Scale’. Within chapter 9 this scale is named the ‘Gender Congruence and Life Satisfaction Scale’. The name of the scale was changed in chapter 9 after the validation process as it was felt to better represent the contents of the scale.
verbally explained to the participant that if they agreed to participate, they would be required to take part in a semi-structured interview. The patient was given 24 hours to decide whether or not they would like to take part in the study and after this time the PhD candidate telephoned the patient to determine the outcome of their decision. If the patient decided they would like to take part in the study, then a date and time for the interview was arranged during this telephone conversation. It was explained on the telephone that these interviews would last approximately 30 to 60 minutes and would be audio recorded with the participant’s permission. This time frame was determined from a pilot interview that was conducted prior to the main data collection phase. The pilot interview was conducted between the PhD candidate (interviewer) and another member of the research team (interviewee) to ensure an appropriate breath of topics were covered in the interview and that it was an appropriate length (i.e., not too long). The PhD candidate conducted all of the semi-structured interviews with the participants. The interviews were offered either face-to-face at the Nottingham Centre for Transgender Health or over the telephone, whichever the participant preferred. When the interview was conducted over the telephone, informed consent was provided through an online survey prior to the interview (see Appendix D). When the interview was being conducted face-to-face, participants provided written informed consent prior to interview (see Appendix E). The rationale for offering participants the choice of method of interview was for pragmatic reasons. Patients travel from all over England and Wales to access the Nottingham Centre for Transgender Health and usually only access this service once every three months. Despite travel expenses being offered to all participants, for some it would be impractical and inconvenient to travel to the centre for the interview alone if the interview could not be scheduled on the same date as the patient’s routine appointment.

5.5.2. Chapter 7: Study 2 - Determining the levels and predictors of physical activity in the transgender population

For this study, both transgender and cisgender people were invited to complete self-report measures.

5.5.2.1. Transgender participants

This study was part of a larger longitudinal study aiming to investigate the outcomes of people treated at the Nottingham Centre for Transgender Health and the clinical correlates. Before the first appointment at the centre, all patients were sent a questionnaire pack in the post and invited to take part. After reading the information sheet (see Appendix F) and
providing informed consent (see Appendix G), participants were asked to return the completed paper questionnaire pack to the Nottingham Centre for Transgender Health using the prepaid envelope provided. Alternatively, patients could bring their completed questionnaires to their first appointment at the Nottingham Centre for Transgender Health. The completion of these questionnaire packs took approximately 20 to 30 minutes.

5.5.2.2. Cisgender participants
The study was explained using an information sheet (see Appendix H) and informed consent was obtained prior to participants taking part (see Appendix I). Participants were invited to complete a short online survey (which took approximately 10 minutes) which only asked about their physical activity engagement.

5.5.3. Chapter 8: Study 3 - The role of cross-sex hormones on eating disorder symptoms in the transgender population
The procedures for study 3 are the same as those for the transgender participants in study 2 (see section 5.5.2.1.).

5.5.4. Chapter 9: Study 4 - Development and validation of a new transgender health outcome measure

5.5.4.1. Transgender participants
Patients who were interested in taking part in this study were given an envelope by their clinician which included the information sheet (see Appendix J) and questionnaires. Participants were asked to return the completed questionnaire either in the prepaid envelope provided or by bringing the questionnaire to their next appointment at the Nottingham Centre for Transgender Health. A pilot study determined that completion of the questionnaire pack took approximately 20 minutes.

Alternatively, patients from the transgender health service were directed to an online version of the questionnaire pack which had been set-up on Bristol Online Survey. This included the

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2 Within this information sheet the scale is named the ‘Nottingham Gender and Body Dysphoria Scale’. Within chapter 9 this scale is named the ‘Gender Congruence and Life Satisfaction Scale’. The name of the scale was changed in chapter 9 after the validation process as it was felt to better represent the content of the scale.
information sheet (see Appendix K\(^3\)), consent form (see Appendix L) and questionnaires. The same procedure was followed with transgender people who were invited from the community (i.e., via transgender support organisations). The questionnaires that community participants were invited to complete were the same as those administered to the transgender people recruited from the Nottingham Centre for Transgender Health. Participants completed these questions in their own time and submitted their responses online.

5.5.4.2. Cisgender participants
Participants were directed to the online questionnaire pack which had been compiled for this study (on Bristol Online Survey). They were invited to complete the survey in their own time and submit their responses online. The questionnaire pack was the same as that administered to the transgender participants except that this group were not asked to provide information about gender transition. These questions were filtered out in the online questionnaire when the participant indicated (by checking a box) that their gender assigned at birth and gender identity were the same.

5.6. Ethical considerations
When participants were recruited from the Nottingham Centre for Transgender Health (chapters 6 to 9; studies 1 to 4, respectively), ethical approval was sought and granted from the relevant NHS ethics committee and from the Research and Development Department of the Nottinghamshire Healthcare NHS Foundation Trust (see Appendix M). For the recruitment of transgender people from the community (LGBT charities and organisations) and of cisgender people (chapters 7 and 9; studies 2 and 4, respectively), ethical approval was obtained from Loughborough University’s ethical advisory committee (see Appendix M).

Following ethical approval, participants in each study were provided with an information sheet. After reading this, participants were given the opportunity to ask questions about the research. The PhD candidate’s contact details were always provided as well as the contact details of the supervisors. When participants were recruited from the Nottingham Centre for Transgender Health, they were offered the opportunity to obtain independent advice about

\(^3\) Within this information sheet the scale is named the ‘Nottingham Gender and Body Dysphoria Scale’. Within chapter 9 this scale is named the ‘Gender Congruence and Life Satisfaction Scale’. The name of the scale was changed in chapter 9 after the validation process as it was felt to better represent the content of the scale.
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taking part in the research from the Patient Advice Liaison Service (PALS) available within the NHS. Informed consent was obtained from all participants prior to them taking part in any research reported on in this thesis. When research was conducted face-to-face, or when paper questionnaires were completed, written informed consent was obtained. When research was conducted online, participants were asked to tick a box that indicated their consent to take part. Participants could not proceed with the survey unless this box had been checked. For study 4, when participants were recruited from the Nottingham Centre for Transgender Health, returning their completed questionnaire was evidence of informed consent. This procedure was recommended and approved by the NHS ethics committee and by the Research and Development Department of the Nottinghamshire Healthcare NHS Foundation Trust.

Taking part in the research reported on in this thesis was completely voluntary and no incentives were offered. Participants were made aware of their right to withdraw at any stage without giving reason. If participants were required to withdraw their responses before data analysis had begun, a date for this cut-off was always specified on information sheets. Transgender people who were recruited from the Nottingham Centre for Transgender Health were made aware that withdrawing from the study would not affect the care or treatment they received at the service. No participants requested that their data be withdrawn in any of the studies that comprise this thesis.

The information sheets for all studies stated that all data collected from participants would be confidential and anonymous. On completion of the study, participants were debriefed (either verbally or on paper/online) and directed to appropriate support organisation if necessary (e.g., Mind, Samaritans). Paper documentation (e.g., questionnaire packs, consent forms) was stored in a locked cabinet at the Nottingham Centre for Transgender Health for chapters 6 to 9 (studies 1 to 4). Data were then entered into a password protected computer at the Nottingham Centre for Transgender Health and transferred using an encrypted memory stick to Loughborough University for data analysis. Data collected online for chapters 7 and 9 (studies 2 and 4) were stored on a password protected computer at Loughborough University.
5.7. Measures

5.7.1. Interviews
As identified in chapter 2 (see section 2.5.1.), limited research has explored the experiences of transgender people regarding physical activity and recreational sport, and therefore a qualitative approach was deemed appropriate for study 1 (chapter 6). Individual semi-structured interviews were conducted with participants, which were guided by questions and prompts. This is in accordance with the critical realist approach which values interviews as a data collection tool (Smith & Elger, 2014). The questions and prompts were not prescriptive and did not follow a chronological order, although a question that was suitable to begin the interview was identified. A semi-structured interview schedule was seen as necessary to ensure that the interview maintained focus and relevance (e.g., Fossey, Harvey, McDermott, & Davidson, 2002), whilst allowing participants to shape the interview through discussion of their individual experiences. The interview schedule was developed after consulting the relevant academic literature and academic clinicians working within the area of transgender health (see Appendix N).

5.7.2. Questionnaires

5.7.2.1. Socio-demographic information
In all empirical chapters that comprise this thesis (including the qualitative chapter; study 1), participants were asked to report information about their age, gender assigned at birth, and gender identity (if relevant). Transgender participants were also asked to provide information about their social gender role and medical transition (e.g., hormone blockers, cross-sex hormone treatment, chest surgery (mastectomy and chest reconstructive surgery or breast augmentation), genital surgery). The information sought from participants about their social gender role and medical transition differed depending on the research question(s) of the particular study. See Appendix O for the socio-demographic questionnaires used in the empirical chapters that comprise this thesis.

5.7.2.2. Selection process for self-report questionnaire measures
Measures were selected in accordance with several criteria. First and foremost, it was vital that the measure was capable of appropriately assessing the construct in question. This was determined by exploring the face validity of the measure and also whether or not the measure was psychometrically sound and had undergone validity testing. Where possible, measures that had been validated with the transgender population, or had previously been used with the
transgender population and shown to have good reliability, were given priority. Considering participants in chapters 7 to 9 (studies 2 to 4) were asked to complete several different measures at one time, the length of the measure (i.e., the number of questions included) was also important. Respondent burden has been found to be great when participants are asked to complete numerous measures (e.g., Rolstad, Adler, & Ryden, 2011; Turner et al., 2007) which can adversely affect the quality of data collected (e.g., Diehr, Chen, Patrick, Feng, & Yasui, 2005; Snyder et al., 2007). Therefore, measures were selected which were valid, assessed the construct(s) of interest, had been used with transgender samples previously (wherever possible), and were not overly long. Copies of the measures used within the thesis and their scoring instructions are presented within the appendix (see Appendix P to X). Psychometric properties of the measures when used with the samples recruited for the research reported on in this thesis are presented in the relevant chapter (chapters 7 to 9).

**Transgender Congruence Scale (TCS; Kozee, Tylka, & Bauerband, 2012):** This self-report measure asks participants the degree to which they feel their gender identity is congruent with the gender they were assigned at birth (see Appendix P). It was designed specifically for use with the transgender population. There are 12 items in total and two subscales, one that assesses ‘appearance congruence’ (9-items; e.g., ‘My outwards appearance represents my gender identity’) and another that assesses ‘gender identity acceptance’ (3-items; e.g., ‘I have accepted my gender identity’). Participants are asked to rate their responses on a 5-point Likert scale from 1 = ‘strongly disagree’ to 5 = ‘strongly agree’. Three items are reverse scored (where 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1). A global score can also be calculated by calculating the mean score for all 12 items. A higher mean score indicates a higher level of transgender congruence. The measure has been validated with the transgender population and has demonstrated excellent reliability (Cronbach’s $\alpha=0.92$; Kozee, Tylka, & Bauerband, 2012).

**Experience of Transphobia Scale (Clements-Nolle, Marx, & Katz, 2006; Nuttbrock et al., 2010):** There is currently a lack of validated, self-report measures that assess transphobia (the experience of discrimination and prejudice on the basis of gender identity). In light of this, an item assessing verbal transphobia (‘Have you ever been verbally abused or harassed due to your gender identity or presentation?’) and an item assessing physical transphobia (‘Have you ever been physically abused or beaten due to your gender identity or presentation?’) were adapted from previous studies that have measured transphobia (Clements-Nolle et al., 2006; Nuttbrock et al., 2010; see Appendix Q). Participants were asked to rate, on a 4-point Likert
scale (from 0 = ‘never’ to 3 = ‘several times’), the frequency that they have experienced such behaviour. Responses from these two questions were analysed separately. A higher score indicates a more frequent experience of transphobia.

**Hamburg Body Drawing Scale (HBDS; Becker et al., 2016):** This self-report measure assesses (dis)satisfaction with different parts of the body. The measure was originally developed for use with individuals with different forms of psychoendocrinological disorders (Appelt & Strauss, 1988). It has since been adapted to include items specific to people assigned male and female at birth, it has gender-specific subscales, and it has been validated with the transgender population (Becker et al., 2016; see Appendix R). The measure assesses 27 body features that are gender neutral with respect to gender assigned at birth (e.g., arms, thighs). There are an additional five items that are specifically relevant to people assigned male at birth (e.g., Adam’s apple) and an additional six items that are specifically relevant to people assigned female at birth (e.g., breasts). Therefore the version concerned with people assigned male at birth includes 32 items in total and the version concerned with people assigned female at birth includes 33 items in total. When evaluation does not need to be specific in relation to gender, an item that assesses overall satisfaction with the body (‘Satisfaction with your overall appearance’) can be used. This was the only item used in this thesis. Participants are asked to rate their responses on a 5-point Likert scale (1 = ‘very dissatisfied’ to 5 = ‘very satisfied’). A high score indicates a low level of body dissatisfaction (i.e., body satisfaction). The measure was chosen as it has been validated among transgender people and been previously shown to be reliable (e.g., Cronbach’s $\alpha=.62-.91$; Becker et al., 2016; Davey, Arcelus, Meyer, & Bouman, 2016).

**Eating Disorder Inventory-2 (EDI-2; Garner, 1991):** This self-report measure assesses behaviours and psychological traits associated with eating disorder psychopathology (see Appendix S). In total, the EDI-2 comprises 11 subscales. Three of these subscales, drive for thinness, bulimia and body dissatisfaction, specifically assess eating-related symptoms (e.g., ‘I feel satisfied with the shape of my body’). The remaining eight subscales (ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears, asceticism, impulse regulation, and social insecurity) are associated with eating-related psychological disturbance (e.g., ‘I have extremely high goals’). These 11 subscales comprise 91 questions, however in this thesis only items related to the drive for thinness (n=7), bulimia (n=7), body dissatisfaction (n=9), perfectionism (n=6) and interpersonal distrust (n=7) subscales were
employed and therefore participants were asked to complete 36 items in total. Participants are asked to rate their responses on a 6-point Likert scale (3 = ‘always’, 2 = ‘usually’, 1 = ‘often’, 0 = ‘sometimes’, 0 = ‘rarely’, 0 = ‘never’), responses are summed and a higher score indicates a high levels of eating psychopathology. Eleven items are reverse scored (where 3 = 0, 2 = 0, 1 = 0, 0 = 1, 0 = 2, 0 = 3). While the EDI-2 is not a diagnostic tool, it has been extensively employed within the academic literature and clinical practice. It has been found to have good reliability among people with diagnosed eating disorders and the general population (e.g., Nevonen, Clinton, & Norring, 2006). The EDI-2 was employed within this thesis as it has previously been used with the transgender population and is capable of distinguishing between people with diagnosed eating disorders, transgender people and cisgender controls with no diagnosed eating disorder (see Khoosal, Langham, Palmer, Terry, & Minajagi, 2009; Witcomb et al., 2015).

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983): This self-report measure is widely used within different aspects of research to assess symptoms of anxiety and depression (see Appendix T). The measure comprises 14 items in total, seven which assess specifically anxiety (e.g., ‘I feel tense or wound up’; HADS-A) and seven which assess depression (e.g., ‘I have lost interest in my appearance’; HADS-D). A total score (sum) is calculated for each subscale. Participants are asked to rate their responses on a 4-point Likert Scale from 0 = ‘not at all’ to 3 = ‘most of the time’. Six items are reverse scored (where 3 = 0, 2 = 1, 1 = 2, 0 = 3). For each subscale, scores between 0-7 are considered ‘normal’, scores between 8-10 are considered ‘borderline clinical’, and scores of 11 and above are considered ‘clinically relevant’ (Snaith, 2003). However, the HADS is not a diagnostic tool. The highest score possible for each subscale is 21. The HADS has been shown to be a reliable measure within the general population and other specific populations (e.g., psychiatry, primary care; Bjelland, Dahl, Haug, & Neckelmann, 2002). Although the measure was developed with the cisgender population, there is currently no measure that assesses anxiety and depression that has been developed and validated with transgender people and so the HADS was used to assess these constructs within this thesis. The HADS has previously been used successfully with the transgender population (e.g., Bouman et al., 2016b; Hepp, Kraemer, Schnyder, Miller, & Delsignore, 2005).

Rosenberg Self-Esteem Scale (Rosenberg, 1965): This is a 10-item self-report measure that assesses participants’ feelings in relation to self-esteem using both positively and negatively
framed questions (see Appendix U). An example item is: ‘At times, I think I am no good at all’. Participants are asked to rate their responses on a 4-point Likert scale from $3 = ‘strongly agree’$ to $0 = ‘strongly disagree’$. Five items are reverse scored (where $3 = 0, 2 = 1, 1 = 2, 0 = 3$). Scores from the 10 individual items are summed to calculate the global score. The highest possible score is 30, which indicates very high self-esteem. This measure was chosen to assess self-esteem in this thesis given its brevity and because it has been shown to have reliability within the general population (e.g., Robins, Hendin, & Trzensniewski, 2001) and within specific populations, such as transgender people (Cronbach’s $\alpha=.92$; Davey et al., 2016).

**World Health Organisation Quality of Life-BREF (WHOQOL-BREF) (Harper, 1998):** The WHOQOL-BREF is a cross-culturally comparable quality of life measure (see Appendix V). This measure assesses quality of life with 26 items across four subscales: psychological (n=6; e.g., ‘How much do you enjoy life?’), physical (n=7; e.g., ‘Are you well able to get around?’), relationships (n=3; e.g., ‘How satisfied are you with your sex life?’), and environment (n=8; e.g., ‘How satisfied are you with your access to health services?’). There is also an item that assesses overall quality of life and another which assesses overall health. In this thesis, only the psychological and relationships subscales were used as well as the item that assesses overall quality of life. Participants are asked to rate their responses on a 5-point Likert scale (anchored from 1 to 5). Although the anchor remains the same throughout, the wording of the response scale differs for some questions (e.g., ‘very dissatisfied’ to ‘very satisfied’; ‘never’ to ‘always’; ‘very poor’ to ‘very good’). The four individual subscale scores are each generated by calculating the mean and multiplying this by four. The rationale for multiplying the mean score by four is to make the scores from the WHOQOL-BREF comparable to the WHOQOL-100 (Harper, 1998), which is the longer, original questionnaire. Three items are reverse scored (where $1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1$). A higher score indicates a higher quality of life. The WHOQOL-BREF has been found to have good reliability (e.g., psychological subscale Cronbach’s $\alpha=.81$, relationship subscale Cronbach’s $\alpha=.68$) and validity in the general population and in clinical populations (e.g., rehabilitation, primary care, mental health) across 23 countries (Skevington, Lofty, & O’Connell, 2004), hence it was felt to be an appropriate measure to assess quality of life within the thesis.

**Rapid Assessment of Physical Activity (Topolski et al., 2006):** This self-report measure was chosen as it quickly assesses physical activity engagement over the past week (see Appendix
W). The measure assesses the frequency and type of physical activity (e.g., ‘I do 30 minutes or more a day of moderate physical activities, 5 or more days a week’). The measure has nine statements in total, seven that relate to aerobic physical activity (items 1 to 7) and two items that relate to strength and flexibility physical activity (items 8 and 9). To determine levels of physical activity, participants are asked to indicate the degree to which the nine statements relate to them by ticking ‘Yes’ or ‘No’. There are no other response options available. The two subscales are scored separately. Total scores are calculated by choosing the highest item with an affirmative response and scoring accordingly. For example, if question three was the highest question which the participant scored ‘Yes’ to on the aerobic physical activity subscale, then they would be given a score of three. High levels of physical activity engagement are indicated by a higher score, and scores under six on the aerobic physical activity subscale are considered to indicate a suboptimal level of physical activity. The strength and flexibility subscale was not used within this thesis. This measure has good reliability with the general population as it has been found to have better specificity, sensitivity and predictive power than other self-report measures used to assess physical activity (Topolski et al., 2006).

Internet Gaming Disorder Scale-Short Form (IGDS9-SF; Pontes & Griffiths, 2015): This measure was developed in accordance with the nine criteria that define internet gaming disorder within the DSM-5 (APA, 2013). However, the IGDS9-SF is not a diagnostic tool. The IGDS9-SF aims to efficiently assess the severity of internet gaming disorder and any associated negative effects that it may have on a person’s life (e.g., ‘Do you systematically fail when trying to control or cease your gaming activity?’; see Appendix X). The IGDS9-SF assesses online and offline gaming activities over the past 12 months using just nine items. Participants are asked to rate their responses on a 5-point Likert scale (1 = ‘never’ to 5 = ‘very often’). No items are reversed scored. The global score is calculated by summing scores from the nine individual items and therefore scores can range from 9-45. A higher score indicates a higher level of problematic internet gaming behaviour. It is suggested by its developers that people who score 36 and above should be classified as ‘problematic gamers’. The measure has been found to be psychometrically sound and to have good reliability (Cronbach’s α=.87; Pontes & Griffiths, 2015). The measure has also been used within the transgender population and has been found to be reliable (Cronbach’s α=.92; Arcelus et al., 2016).
5.7.3. Summary of questionnaire measures used within this thesis

Table 5.1., below, outlines which questionnaire measures were used in each of the quantitative studies reported on in the thesis (studies 2 to 4; chapters 7 to 9).

<table>
<thead>
<tr>
<th>Questionnaire measures</th>
<th>Study 2</th>
<th>Study 3</th>
<th>Study 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transgender Congruence Scale</td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Experience of Transphobia</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamburg Body Drawing Scale</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Eating Disorder Inventory</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital Anxiety and Depression Scale</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Rosenberg Self-Esteem Scale</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>World Health Organisation Quality of Life-BREF</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Rapid Assessment of Physical Activity</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet Gaming Disorder Scale-Short Form</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

5.8. General data analysis strategy

5.8.1. Qualitative data analysis

5.8.1.1. Thematic analysis

To analyse the semi-structured interview data, thematic analysis was chosen as it provides a rich thematic description of the entire data set, which in turn highlights the most prominent and important themes (Braun & Clarke, 2006; Braun, Clarke, & Weate, 2016). Thematic analysis has consistently been used in qualitative psychological research due to its theoretical independence (Braun & Clarke, 2006; Braun et al., 2016). Thematic analysis is also valuable in research with participants whose perceptions on the topic have not been listened to before, such as in study 1 (chapter 6) (Braun & Clarke, 2006; Braun et al., 2016). Inductive thematic analysis was conducted, whereby themes were driven by the data as opposed to being theoretically driven by predefined themes. However, it is acknowledged that the researcher’s epistemological position will likely have affected and shaped the data analysis process to some degree, even when researchers attempt to distance themselves from the interview data (Braun & Clarke, 2006; Braun et al., 2016). This is in accordance with the critical realist approach that aims to develop deeper explanation and understanding of a particular
phenomenon whilst acknowledging that reality cannot be fully understood as our perceptions are shaped by theory and research interests (McEvoy & Richards, 2006).

All audio data were transcribed verbatim by the PhD candidate. To perform the thematic analysis, the steps outlined by Braun and Clarke (2006) and by Braun et al. (2016) were followed. To facilitate the analysis process, NVivo software was employed. NVivo is a qualitative software package that allows researchers to efficiently code data and identify connections. It is especially useful with large datasets, such as in the current study. First, the PhD candidate gained in-depth familiarisation with the data by reading and re-reading the interview transcripts, whilst making notes on potential codes. Next, codes were sought within each data transcript and noted down the left margin of the transcripts. In the right-hand margin, a description of how the interviewee discussed the topic was noted. Once all the interview transcripts had been coded, a second coder was asked to code a proportion of the transcripts (see section 5.8.1.2. for more details on this process). Codes from the first and second coder were then brought together to formulate themes and subthemes. These themes were critically reviewed by the whole research team to ensure they accurately represented the participants’ discussions and provided a sound narrative. Extracts to support each of the themes and subthemes were then identified; again, these themes and subthemes were consistently reviewed by the whole research team and were agreed upon before being finalised.

5.8.1.2. Ensuring validity

To ensure the findings from the qualitative study were valid and to increase trustworthiness, an independent researcher was sought to second code 20% of the transcripts (n=2). A discussion about the codes, and themes, was then held between the first (PhD candidate) and second coder. This process was undertaken to determine whether the coders were in agreement about the codes assigned to particular passages of text. On the whole, the first and second coders were in agreement. However, in a few instances, the second coder offered insight into how some passages of text could be assigned to more than one code. This feedback was incorporated into the themes and subthemes to ensure comprehensive analysis. In addition to this, critical discussions with the other members of the research team were held during the analysis process. These discussions allowed the PhD candidate to challenge interpretations and offered insight into how interpretations could be developed further. During these discussions, critical reflection on the development of themes and subthemes was
also encouraged. This process allowed the themes (and subthemes) to be refined in relation to both their content and labels.

5.8.2. Quantitative data analysis

5.8.2.1. Preliminary data analysis

Quantitative data analysis was conducted using IBM SPSS (Statistical Package for the Social Sciences) version 23 (IBM, 2015). Prior to the main analysis, preliminary checks were conducted to assess whether or not the datasets met parametric assumptions. To do this, the distributions of the datasets in each study were explored using histograms and by conducting a Kolmogorov-Smirnov normality test. Kolmogorov-Smirnov is suitable to use in samples greater than 50, however, the data were also interpreted in conjunction with histograms as the Kolmogorov-Smirnov test can be significant in large samples, even when scores are only slightly different from the normal distribution (Field, 2009).

In all quantitative chapters (studies 2 to 4), the data were shown to be non-normally distributed. Therefore, non-parametric tests were conducted when such an alternative was available (e.g., Mann-Whitney U test, Spearman’s Rho correlation). When a non-parametric equivalent test was not available, the data were transformed using log transformations and square-root transformations (as the data showed a positive skew; Field, 2009). In all cases, these transformations did not correct the distribution of the data to normal and therefore the relevant parametric test was conducted with the untransformed data.

Missing data were dealt with using the pairwise method as this is a more conservative method than the listwise exclusion method. The only exception to this was when Mann-Whitney U tests were conducted and missing data were excluded using the test-by-test method (i.e., a case is only removed when data are missing for the dependent variable).

5.8.2.2. Descriptive and inferential statistics

Prior to any hypothesis testing, descriptive statistics for each dataset were generated (e.g., mean age of participants, frequencies of gender identities) to allow the subsequent analysis to be interpreted accordingly.
5.8.2.3. Tests of association, regression and mediation analyses

In all three quantitative chapters (studies 2 to 4), one-tailed Spearman’s Rho correlations were conducted (as the data were non-normally distributed) to explore relationships between variables within the dataset. To control for Type 1 error, Bonferroni corrections were used in all correlational analysis (α = .05 ÷ number of comparisons). The correlational analyses also helped assess the assumption for multicollinearity by ensuring variables were not too highly correlated (e.g., above \( r = .90 \); Pallant, 2010). This assumption was never violated. In studies 2 and 3, all variables which significantly correlated with the outcome variable (either physical activity or eating disorder psychopathology) were entered into subsequent multiple linear regression models to determine whether these significantly correlated variables were capable of predicting the outcome in question (physical activity or eating disorder psychopathology). Only variables that significantly correlated with the outcome were entered into the multiple linear regression models to increase the robustness of these models. When categorical variables (e.g., gender) were being explored as potential predictor variables, dummy variables were created. In study 3, the multiple linear regression analysis was followed up with mediation analysis using the PROCESS software (Hayes, 2013). To conduct the mediation analysis, the bias-corrected bootstrap confidence interval approach was employed as this method has been found to have more power and better control for Type 1 errors in comparison to the causal steps method, popularised by Baron and Kenny (1986), and normal theory approaches of mediation (e.g., the Sobel test; Fritz & MacKinnon, 2007; Hayes, 2009; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). In contrast, the bootstrap confidence interval approach has been found to have very high power and is best for controlling for Type 1 errors (MacKinnon et al., 2002).

5.8.2.4. Tests of difference

Studies 2, 3 and 4 also employed Mann-Whitney U tests to explore differences in mean scores between groups of interest within the data sets (e.g., differences in physical activity behaviour based on cross-sex hormone use). Mann-Whitney U tests were conducted as the data were non-normally distributed. In all cases the Monte Carlo method was used as the sample size was large and in these circumstances this method is seen to be more accurate (Field, 2009). Study 3 also employed an ANCOVA to explore differences in eating disorder psychopathology mean scores between two groups (people who had and had not taken cross-sex hormones) whilst controlling for variables that had been shown to affect eating disorder.
psychopathology. These analyses were not followed up with post-hoc tests as no significant differences were found between the two groups.

5.8.2.5. Factor analysis (principal component analysis)

In study 4, principal component analysis was conducted to explore the factor structure of a newly developed scale. It was expected that the items on the developed scale would be related and so therefore oblique (direct oblimin criterion) rotation was employed.

5.8.2.6. Power analysis

Prior to participant recruitment commencing, power calculations were conducted for each study using guidelines provided by Cohen (1992). This calculation estimated the number of participants required for the study to be adequately powered to detect a medium effect size with power at 0.8 (\(p=.05\)); see Table 5.2. For study 4, a minimum of 300 participants was sought which is considered adequate for principal component analysis (Comrey & Lee, 1992; see Table 5.2.).

| Table 5.2. Summary of the main method of analysis used within each study, the number of people needed for power in the main analysis, and the number of people actually recruited |
|-----------------|----------------|----------------|
| **Main method of analysis used in the study** | **Number of people needed for main analysis** | **Number of people recruited for main analysis** |
| Study 1 | Thematic analysis | NA | 14 |
| Study 2 | Multiple linear regression | 91 | 360 |
| Study 3 | Multiple linear regression | 97 | 563 |
| Study 4 | Principal component analysis | 300 | 789 |

*Note: NA (not applicable); in study 2, 674 transgender and cisgender people were recruited in total but only the transgender participants were used in the main analysis (n=360)*
Chapter 6 (study 1): Experiences of physical activity and sport

Chapter 6 (study 1)

Barriers and facilitators of physical activity and sport participation among young transgender adults who are medically transitioning

This chapter has been published in the *International Journal of Transgenderism* as:


The content of chapter 6 (study 1) is largely the same as the published paper, however some small changes have been made to the formatting and presentation to ensure it is consistent with the rest of the chapters that comprise this thesis.

**Statement of authorship**

*Research conception and design:* BJ, JA & EH.

*Data collection:* BJ.

*Data analysis and interpretation:* BJ, JA & EH.

*Drafting of article:* BJ.

*Article editing and revisions:* BJ, JA, WB & EH.

The findings from chapter 6 (study 1) have also been presented at the following academic conferences:


6.1. Abstract

Transgender people (those who feel incongruence between the gender they were assigned at birth and their gender identity) engage in lower levels of physical activity compared to cisgender people (non-transgender). Several factors have been shown to affect physical activity engagement in the cisgender population however; the physical activity experiences of young transgender adults have not been explored. It was therefore the aim of the current study to understand what factors are associated with physical activity and sport engagement in young transgender adults who are medically transitioning. Semi-structured interviews were conducted with 14 young transgender adults (18-36 years) who had initiated their medical transition at a transgender health service in the United Kingdom. The data were analysed using thematic analysis. Two main themes were identified: (1) barriers and (2) facilitators to physical activity and sport. Overall, the young transgender adults were insufficiently active due to inadequate changing facilities, body dissatisfaction, fears surrounding ‘passing’ and not being accepted by others. At the same time, participants were motivated to engage in physical activity to increase their body satisfaction and gender congruence. However, participants felt there were a lack of safe and comfortable spaces to engage in physical activity and sport. In conclusion, young transgender adults who are medically transitioning experience several barriers to physical activity and sport, despite being motivated to be physically active. Initiatives to facilitate young transgender adults to be able to put their motivations into practice (i.e., to be more physically active) are needed.
6.2. Introduction
Physical activity can be defined as any activity engaged in (e.g., while working, playing, carrying out household chores, travelling, and recreational pursuits) that involves muscular-skeletal movement and energy expenditure and is vital for promoting physical and mental well-being (Lee et al., 2012; World Health Organisation (WHO), 2016). Across the world in 2010, 23% of adults (aged 18+) were not active enough, which is concerning considering that physical inactivity is the fourth leading risk factor for non-communicable diseases (e.g., cancer, diabetes, cardiovascular disease) (WHO, 2016). In 2008, non-communicable diseases accounted for approximately 5.3 million deaths around the world (Lee et al., 2012). It is therefore important to promote physical activity engagement, especially among groups that may be vulnerable to inactivity, such as transgender people (Jones et al., 2016a; see chapter 7).

‘Transgender’ is an umbrella term used to describe people who experience incongruence between the gender they were assigned at birth and their gender identity. Transgender males are people who were assigned female at birth but who later identify as male. Transgender females are people who were assigned male at birth but later identify as female. Cisgender people (non-transgender) do not experience incongruence between their assigned gender and gender identity. Some transgender people may choose to change their social gender role, but not necessarily undergo gender confirming medical treatments (e.g., cross-sex hormones, gender confirming surgery) (Beek, Kreukels, Cohen-Kettenis, & Steensma, 2015; Coleman et al., 2012; Wylie et al., 2014), but many do. Cross-sex hormone treatment (oestrogen or testosterone) induce the development of secondary sex characteristics, which align with experienced gender (e.g., breast growth for transgender females, increase in muscle mass and lowering of voice for transgender males). In addition, some transgender people will choose to undergo irreversible gender confirming surgeries to create a male or female chest and genitals.

People who attend transgender health services have reported (at the time of first contact with the service) high levels of mental health problems (specifically anxiety, depression and self-harm) in comparison to cisgender people (Arcelus, Claes, Witcomb, Marshall, & Bouman, 2016; Bouman, Davey, Meyer, Witcomb & Arcelus, 2016a; Bouman et al., 2017a; Davey, Arcelus, Meyer, & Bouman, 2016; Dhejne, Van Vlerken, Heylens, & Arcelus, 2016; Millet,
Longworth, & Arcelus, 2017). Although mental health difficulties do not prevent a transgender person accessing transgender healthcare, it may be necessary in some circumstances to manage these difficulties prior to gender confirming medical treatment (Coleman et al., 2012; Wylie et al., 2014).

Within cisgender populations, physical activity and sport have been found to alleviate symptoms of depression and anxiety (e.g., De Moor, Beem, Stubbe, Boomsma, & De Geus, 2006; Maltby & Day, 2001). In view of this, the National Health Service (NHS) in the United Kingdom (UK) recommends engaging in physical activity three times a week (at least 45 minutes each day) to alleviate mild to moderate depression (National Institute for Health and Care Excellence (NICE), 2016). Social support has also been found to be a product of physical activity and sport participation within the cisgender population (e.g., Armstrong & Oomen-Early, 2009). Based on these findings, engaging in frequent physical activity and/or sport may be particularly beneficial in relation to the mental well-being of transgender individuals. Furthermore, physical activity and sport participation can also contribute towards reaching the appropriate weight necessary to undergo some gender confirming surgeries. Kohl and Cook (2013) emphasise the importance of promoting physical activity to young people and providing them with ongoing opportunities to be active, as health-related behaviours (e.g., physical (in)activity) have been shown to track from childhood into adulthood.

Research that has explored levels of physical activity in transgender people has found that aerobic, strength and flexibility physical activity levels are low in comparison to cisgender people, when age and gender are controlled for (Jones et al., 2016a; see chapter 7). A recent systematic review concluded that transgender people on the whole have a negative experience when engaging in physical activity and competitive sport due to specific barriers relating to gender identity (e.g., changing facilities), transphobic behaviour (i.e., discrimination and violence relating to gender identity), lack of awareness about the needs of transgender people in physical activity and sport environments, and discriminatory policies for transgender people in competitive sport (see chapter 2; Jones, Arcelus, Bouman, & Haycraft, 2017a). However, this systematic review found that most studies were concerned with elite competitive sport, highlighting the dearth of research concerning recreational sport and physical activity that is engaged in for leisure and fitness. Such research is important
considering that most people who attend transgender health services will not be involved in elite competitive sport. Additionally, the studies reviewed did not consider the stage of transition of their participants (e.g., social transition, medical transition) and the implications this may have on physical activity levels.

A recent qualitative study has demonstrated how the stage of transition is significant when understanding physical activity and sport engagement in transgender people. Elling-Machartzki (2015) found that, post–transition, transgender people felt less ashamed of their bodies and therefore more comfortable when engaging in physical activity and sport than they did before transition. However, the mean age of the participants in Elling-Machartzki’s (2015) study was quite high (40.5 years, range 27-51) which may have affected the amount of physical activity participants engaged in as levels of physical activity have been found to decrease with age (e.g., British Heart Foundation, 2015). Therefore, when investigating physical activity among a specific population, age would be an important variable to consider. To date, no research has explored the experiences of young transgender adults (defined as people aged 18-39 years) in relation to engaging in physical activity and sport.

With the intention of addressing the limitations of previous literature, the current study was interested in understanding what factors are associated with physical activity and recreational sport engagement in young transgender adults who are medically transitioning. To adequately address the research aim, participants were purposefully recruited from a transgender health service in the UK once gender confirming medical treatment had been initiated. Given the lack of research with young transgender adults undergoing medical transition regarding their physical activity and sport participation, an inductive qualitative approach was seen as appropriate. One of the main advantages of this methodology is the rich and in-depth understanding of participant experience that it provides.

6.3. Method

6.3.1. Participants and recruitment

Participants were recruited through a national transgender health service within the UK. This service is part of the NHS and offers assessment and treatment for transgender people who wish to transition. During a routine appointment at the service, young adult patients who had begun treatment were invited to take part in the research. The study was approved by an NHS
ethics committee and also received University ethical approval from the first author’s institution (see Appendix M).

In total, 14 participants were recruited into the study from the transgender health service; nine transgender males and five transgender females. The gender difference seen is solely a reflection of people who agreed to participate in the study. The participants were recruited over eight months during 2015/2016. The mean age of participants was 22.71 years (range 18-36). The sample size of this study is in line with recommendations for thematic analysis (e.g., Guest, Bunce, & Johnson, 2006). Table 6.1. provides the demographic information of all participants in the study. Twelve out of the 14 participants currently engaged in physical activity or sport.
Table 6.1. Socio-demographic characteristics of participants included within the study

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age (years)</th>
<th>Gender identity</th>
<th>Stage of transition</th>
<th>Length of time on CHT when interviewed</th>
<th>Currently engaging in physical activity and/or sport?</th>
<th>Type of physical activity or sport currently engaged in</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>18</td>
<td>Male</td>
<td>CHT</td>
<td>1 month</td>
<td>Yes</td>
<td>Football, muscle strengthening exercises</td>
</tr>
<tr>
<td>02</td>
<td>18</td>
<td>Male</td>
<td>CHT</td>
<td>4 months</td>
<td>Yes</td>
<td>Tennis, muscle strengthening exercises</td>
</tr>
<tr>
<td>03</td>
<td>33</td>
<td>Male</td>
<td>CHT</td>
<td>4 months</td>
<td>Yes</td>
<td>Muscle strengthening exercises, cardio exercises</td>
</tr>
<tr>
<td>04</td>
<td>18</td>
<td>Male</td>
<td>CHT</td>
<td>4 months</td>
<td>Yes</td>
<td>Muscle strengthening exercises, cardio exercises</td>
</tr>
<tr>
<td>05</td>
<td>18</td>
<td>Male</td>
<td>CHT</td>
<td>11 months</td>
<td>Yes</td>
<td>Muscle strengthening exercises, cardio exercises</td>
</tr>
<tr>
<td>06</td>
<td>25</td>
<td>Male</td>
<td>CHT</td>
<td>7 months</td>
<td>Yes</td>
<td>Muscle strengthening exercises, cardio exercises</td>
</tr>
<tr>
<td>07</td>
<td>18</td>
<td>Female</td>
<td>CHT</td>
<td>6 months</td>
<td>No</td>
<td>NA</td>
</tr>
<tr>
<td>08</td>
<td>18</td>
<td>Male</td>
<td>CHT</td>
<td>4 months</td>
<td>Yes</td>
<td>Muscle strengthening exercises, cardio exercises</td>
</tr>
<tr>
<td>Participant</td>
<td>Age (years)</td>
<td>Gender identity</td>
<td>Stage of transition</td>
<td>Length of time on CHT when interviewed</td>
<td>Currently engaging in physical activity and/or sport?</td>
<td>Type of physical activity or sport currently engaged in</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>----------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>09</td>
<td>23</td>
<td>Male</td>
<td>CHT and double mastectomy</td>
<td>9 months</td>
<td>No</td>
<td>NA</td>
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<tr>
<td>10</td>
<td>18</td>
<td>Female</td>
<td>CHT and blockers</td>
<td>2 years</td>
<td>Yes</td>
<td>Cardio</td>
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<tr>
<td>11</td>
<td>29</td>
<td>Female</td>
<td>CHT</td>
<td>6 months</td>
<td>Yes</td>
<td>Squash, swimming</td>
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<tr>
<td>12</td>
<td>18</td>
<td>Female</td>
<td>CHT</td>
<td>6 months</td>
<td>Yes</td>
<td>Muscle strengthening exercises</td>
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<td>13</td>
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<td>Female</td>
<td>CHT and blockers</td>
<td>1 year</td>
<td>Yes</td>
<td>Cardio exercises</td>
</tr>
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<td>14</td>
<td>28</td>
<td>Male</td>
<td>CHT and double mastectomy</td>
<td>3 years</td>
<td>Yes</td>
<td>Rugby, muscle strengthening exercises</td>
</tr>
</tbody>
</table>

*Note: NA (not applicable), CHT (cross-sex hormone treatment)*
6.3.2. Interviews

Semi-structured interviews were conducted with all the participants in this study. The majority of interviews were conducted face-to-face at the transgender health service (n=11). For participants that could not travel to the NHS premises outside their scheduled appointment time, a telephone interview was conducted instead (n=3). All interviews were audio recorded, transcribed verbatim and lasted an average of 24 minutes (range 15 to 37 minutes).

To guide the interviews, a semi-structured interview schedule was developed by consulting the relevant academic literature as well as clinicians working with transgender individuals. The interview schedule included questions pertaining to transgender people’s experiences of physical activity and sport prior to, and across their transition.

6.3.3. Data analysis

Thematic analysis was employed to analyse the interviews and the guidelines outlined by Braun and Clarke (2006) were followed. Thematic analysis provides a rich thematic description of the entire data set, which in turn highlights the most prominent and important themes (Braun & Clarke, 2006). Five steps were followed. First, the first author read the interview transcripts whilst making notes on potential codes. Codes were then noted down the left margin, with a description of how the interviewee discussed the topic in the right hand margin. At this stage, an independent coder second coded approximately 20% (n=2) of the transcripts. Codes from both the first and second coder were then brought together to develop themes and subthemes, and relevant extracts to support these were identified. Themes and subthemes were then reviewed and refined by all the authors, creating a narrative and names for each theme/subtheme.

6.4. Results

Thematic analysis revealed two overarching themes: 1) barriers to engaging in physical activity and sport; 2) facilitators of physical activity and sport engagement. Within each of these overarching themes, two core themes were identified: i) internal (or personal) barriers/facilitators; ii) external (or environmental) barriers/facilitators. Within each theme, several subthemes were identified. See Table 6.2. for a summary of the themes and subthemes.
1) **Barriers to physical activity and sport**

This theme highlights the various barriers that participants experienced when engaging in (or attempting to engage in) physical activity and sport. Participants discussed their experiences in relation to both internal or personal barriers (e.g., body dissatisfaction) and external or environmental barriers (e.g., changing facilities).

1.1. **Internal and personal barriers**

Three main subthemes grouped under ‘internal and personal barriers’ were described by the interviewees. Although each subtheme is described separately, it is noted that one almost certainly has an effect on the other and complete separation of these factors is not possible.
1.1.1. Gender incongruence: For the majority of participants (n=10), the stage of transition and their gender incongruence were related to their physical inactivity. Some people who were previously physically active stopped such activity when socially transitioning:

“I stopped going [to the gym] when I socially transitioned” (Participant 09, transgender male)

“I was in a football team before everything [social transition] and I also did martial arts for five years” (Participant 08, transgender male)

Others who were hoping to enjoy the physical activity they used to enjoy, such as swimming (an activity where the body is highly visible), described no longer engaging in such activities as they had not yet seen the desired body changes expected from medical treatment (cross-sex hormones). The lack of body changes, and hence perceived lack of gender congruence, was mentioned by several participants as a reason why they had become physically inactive since they medically transitioned. The degree to which participants perceived they ‘passed’ as their gender identity (due to a lack of perceived gender congruence) was related to confidence levels:

“I haven’t been on hormones for that long so the breast growth hasn't developed properly. It is sort of just lacking confidence in that sort of respect and how I come across which is stopping me” (Participant 12, transgender female)

The gender incongruence that participants discussed appeared to be exacerbated in situations when the binary gender system was prominent. Changing rooms were mentioned numerous times by all interview participants and interlinked with several different themes and subthemes in this study, which magnifies the magnitude of this barrier. In the context of this subtheme, the participants perceived that their gender incongruence and an inability to ‘pass’ as their gender identity affected their use of changing rooms as they feared other users would judge them:
“I feel uncomfortable; I feel like people are looking at me going ‘why are they going into the male changing rooms’” (Participant 06, transgender male)

1.1.2. Body dissatisfaction: All participants discussed how the severe body dissatisfaction they experienced (i.e., negative evaluation about one’s appearance), defined by many participants as body dysphoria, was a barrier to engaging in physical activity and sport:

“When you feel so dysphoric with your body you can’t manage to go and do sports or go and do the gym and things like that” (Participant 09, transgender male)

“I haven’t been swimming but that is more of a confidence thing with body issues” (Participant 13, transgender female)

Engaging in physical activity appeared to heighten awareness of specific body parts that participants felt were not congruent with their gender identity when running or jumping, for example. For two participants, certain sportswear acted as a reminder of this incongruence due to the way it interacted with the body when being active:

“When you are running when the wind is blowing, your clothes sort of stick to you and that makes me feel quite dysphoric” (Participant 04, transgender male)

The discomfort that participants felt in relation to their bodies also prevented them using changing facilities in public leisure centres, gyms and sports clubs. This was evidently perceived as a highly distressing environment by participants:

“I would have to be comfortable in my body [to use changing facilities] and I don’t think that right now that is something I could do. I can’t even think about it. It would be too much right now” (Participant 07, transgender female)

1.1.3. Anxiety about others’ reactions: The majority (n=8) of the participants discussed how they were concerned about others negatively evaluating their gender expression. The example quotation below illustrates how this anxiety was significant enough, for the majority of participants, to prevent them from engaging in physical activity and sport in public spaces:
“That fear of what other people think. Like you’ve always got that thing in your mind as if someone would just be like ‘hold on, that's a girl’. That's why I don't like going to the gym” (Participant 08, transgender male)

Some (n=5) participants also discussed avoiding changing facilities during their social and medical transition as they anticipated or experienced overt transphobia (i.e., discrimination, abuse and stigma on the basis of gender identity):

“I don’t wanna be getting changed and y’know a cis guy comes in, he spots physical breasts and y’know beats me up” (Participant 03, transgender male)

“I actually have been into a changing room since I have changed to female and it didn't go very well. Someone complained to the head office at the reception and then they came in and told me that I wasn't allowed to be in there so that sort of put a downer on that and I haven't ever really done it since” (Participant 10, transgender female)

However, the actual experience of verbalised negative evaluation or transphobia from others was rare. The majority of discussions held by participants (n=13) indicated that this internal fear derived from beliefs of non-acceptance from others, perhaps due to previous negative experiences:

“[When I go to the gym] I feel like people are looking at me erm with knowledge that I am trans and I know that is impossible so I just ignore it just push it to the back of my mind” (Participant 06, transgender male)

“Nobody really ever said anything to me but it was just as you know there are a lot of big guys in the gym, and I mean like massive guys, so when somebody that they perceive to be a girl is in the gym like doing the same like in the same weight room as they are they kind of look at you a bit funny” (Participant 09, transgender male)
1.2. External or environmental barriers

Three subthemes were grouped under the core theme of ‘external or environmental barriers’. Once again, the separation between themes and subthemes is artificial as one will likely be affected by another. Most of the external barriers mentioned were linked to the fear of being abused, judged negatively, treated differently or laughed at. These fears appeared to be more prevalent when the participants felt vulnerable, such as in changing rooms.

1.2.1. Changing and showering facilities: All participants in this study discussed how changing facilities in leisure centres or sports clubs were one of the biggest barriers to their participation in physical activity and sport. From the participants’ discussions it was evident that the infrastructure of these facilities was the primary issue. When environments such as changing rooms are divided by the binary gender, people have to choose whether to enter one gendered facility or the other. All participants found changing facilities that were designed around the binary gender system uncomfortable:

“General like awkwardness around things that are categorised into male and female and it is like where do you fit sometimes cos for all intents and purposes now that I have had my top surgery I fit perfectly into a male changing room but in any situation where I might have to take off my trousers for something then it is quite obvious I don't have a penis” (Participant 09, transgender male)

Participants were also concerned about others seeing their incongruent chest or genitals when changing or showering. This concern arose due to the openness and lack of privacy of such facilities, which was evidently uncomfortable:

“To have cubicle changing rooms, that would be ideal. It would just cut away all that rubbish as far as having to deal with open changing rooms and I think it’s intimidating anyway” (Participant 03, transgender male)

“I use the private one [changing facility] just because I don't feel very comfortable changing out of my swim clothes in the women’s room because when they see me like that it is going to be a bit weird” (Participant 11, transgender female)
1.2.2. Sport-related clothing: Most participants (n=11) discussed how sport-related clothing, stereotypically worn by males and females, was uncomfortable to wear when in public and engaging in physical activity or sport. The discussions held by participants suggested that this was due to the revealing nature of some clothing:

“Well I would wear it [sports-related clothing] if I was on my own but I don’t like my body and the shape. I wouldn’t want to go and expose myself when exercising with other people” (Participant 07, transgender female)

“I am thinking along the lines of if I was wearing yoga pants and things like that and they were quite tight. So yes that would be an issue for me and that is probably why like whenever I go cycling I don't wear specific like cycling shorts I just wear like ordinary baggy shorts” (Participant 13, transgender female)

This was especially an issue in relation to swimwear which is highly revealing and can be an indication of one’s gender (e.g., swimming shorts are worn by men and a costume by women):

“I have to think what sort of swimwear will I use because obviously there is going to be some bulging in the area and then that might trigger like nasty responses” (Participant 11, transgender female)

Several participants (n=9) felt they could address this issue by wearing concealing sportswear (e.g., baggy t-shirts), however, to achieve this they had to compromise by deviating from clothing that is traditionally or stereotypically worn when engaging in that specific physical activity:

“I would wear like surf shorts that are a little like less revealing and a bit of a longer swimming top” (Participant 11, transgender female)

However, two participants clearly felt uncomfortable about having to adapt traditional and stereotypical sportswear as they felt it drew unwanted attention towards them:
“Every time I have gone [to the gym] I have never felt comfortable because you see all the lads wearing sort of really revealing tops like vests and things like that and I am having to wear a full covered top and it gets you get all hot and sweaty. You get people looking at you” (Participant 01, transgender male)

“The swimming pool is kind of a bit uncomfortable because I have to wear a t-shirt and it looks a bit weird” (Participant 04, transgender male)

Several participants (especially transgender males) also felt it was impossible prior to gender confirming surgery to both engage in physical activity or sport and conceal their breasts and genitals at the same time. All the transgender males within this study explained that to be physically comfortable during physical activity (e.g., unrestricted breathing), they could not wear a binder but to maintain a clear gender presentation and feel comfortable in public, they had to wear their binder:

“I can’t really run around because I have my binder on all the time [and] I get very, very uncomfortable and I can’t breathe. Pretty much that is the main reason why I don’t do sport that involves seeing other people” (Participant 02, transgender male)

“I will probably run a lot more because it is quite awkward running because obviously you can’t bind because it compresses your chest. But it is quite uncomfortable to have to not bind and you have to try and find somewhere to run where people are not going to see you” (Participant 04, transgender male)

What was significant here is how participants were more likely to engage in physical activity within the comfort of their homes as opposed to public spaces (e.g., gyms). Participants discussed how they did not feel it was necessary to maintain a clear gender expression or wear traditional sportswear when at home:

1 A binder is an item of clothing worn under a t-shirt or shirt by some transgender males (or non-binary people) before chest surgery (mastectomy). The binder minimises the chest area to give the appearance of a male chest.
“If I am doing training in my room I can I usually just do it in my lounge wear so I don’t have to worry about it. It’s a lot more comfortable [not wearing a binder].” (Participant 02, transgender male)

1.2.3. Team sports: Half of the participants (n=7) spoke about how they were part of a sports team (e.g., football) or sports club (e.g., taekwondo) prior to socially transitioning (i.e., in their gender assigned at birth). However, at their current stage of medical transition, being involved in team sport was rare as participants felt that there was not a team that aligned with their gender identity or a gendered team they would comfortably fit into:

“I don't really fit into a bracket where I could play for a team anymore so I tend not to bother” (Participant 08, transgender male)

“It is quite hard to be part of a sport team because obviously like with the transition and everything I would have had to change sport teams and that's quite difficult” (Participant 04, transgender male)

Transgender men in this study also compared their size and strength levels to cisgender males and therefore felt it was difficult or dangerous to play against cisgender males. They understandably felt playing on a female team was out of the question:

“It is too aggressive for me to play on the male football team I’d end up getting like. Basically I have a fear of getting like broken and female football obviously I can’t do that anymore” (Participant 08, transgender male)

The concern about their lack of strength appeared to be related to their low levels of testosterone before transition or during early medical transition:

“When I was on low levels of T [testosterone] and I was still kind of in a transitional state with it, it was difficult going to a man’s rugby team. I started playing when I was quite weedy and small in comparison to these big old you know 28 year old blokes who are big and muscly” (Participant 14, transgender male)
2) Facilitators of physical activity and sport
This theme was divided into two core themes (internal and external/environmental facilitators), as per the previous theme, each of which had further subthemes (see Table 6.2.).

2.1. Internal facilitators
In the general population, people are motivated to engage in physical activity and/or sport for health reasons, to change their appearance, and/or enjoyment (e.g., Salmon, Owen, Crawford, Bauman, & Sallis, 2003; Williams & Cash, 2001). For the young transgender adults interviewed in this study, this was not different. However, specific motivating factors related to their transgender identity and transitional process, were mentioned which will be discussed in the following sections. As with the previous theme, subthemes are discussed separately, but are evidently interconnected.

2.1.1. Body satisfaction as motivator to be physically active: Despite describing extreme distress in relation to their bodies, most participants (n=9) were motivated to use physical activity to increase body satisfaction and confidence:

“The dysphoria is a motivator to change it [the body]. It’s not necessarily particularly comfortable but it is a motivator to change it [the body] into something that’s more desirable” (Participant 03, transgender male)

“I suppose being more comfortable with my own body. I think that is probably the main motivation” (Participant 04, transgender male)

The two participants that had undergone chest reconstructive surgery felt they engaged in more physical activity, or were more likely to engage in physical activity, where the body was more visible (e.g., swimming) as they felt more comfortable with it:

“We stayed in a hotel and had a bit of a swim and a dip and that is the first time I have been topless since the chest surgery” (Participant 14, transgender male)

When the other twelve participants were asked about their future physical activity and sport participation following gender confirming surgery, they hypothesised that they would be
more likely to engage in physical activity and sport in public and mainstream spaces due to an increase in body satisfaction:

“I’m not a member of the gym or anything but once, you know, once the top surgery’s out of the way I will feel more confident using gym facilities. That’s the only thing that’s stopping me” (Participant 03, transgender male)

“I think that will be a real life changer [gender confirming surgery] because I will no longer be held back by situations like “oh what if that gym doesn't have cubicle showers” and “what if that changing room for swimming is all open”. Like it won’t be an issue anymore because nobody would see the difference so I think that will definitely help” (Participant 09, transgender male)

2.1.2. The accentuation of body changes as a motivator to be physically active: It was evident that most of the female and male participants interviewed (n=11) were striving to meet body ideals emphasized in Westernised culture (i.e., women are curvaceous but thin and men are a V-shape and muscular). All but one of the transgender males in this study engaged in weight training (see Table 6.1.). Building muscle for a young transgender man will likely improve their self-esteem and self-perception as their appearance becomes more congruous with what they perceive a stereotypical male physique to be:

“At the moment I am seeing a big progress. I am happy with like my arms they are starting to get bigger and I am starting to look more masculine. My shoulders are broader” (Participant 08, transgender male)

Several transgender males (n=8) discussed how it was easier to achieve their masculine body ideal once cross-sex hormones had commenced. It was evident that they were motivated to increase their gender congruence (which affects their ability to ‘pass’ as their gender identity) by combining physical activity and the masculinising effects of testosterone:

“Like muscle like on the shoulders and arms and stuff erm it helps you pass better if you have got more muscles” (Participant 04, transgender male)
“I think that when you have got more muscle and you feel more defined and more toned you feel better and it is more socially acceptable as well so people tend to accept you more how you want them to” (Participant 09, transgender male)

One transgender female in this study spoke about the positive effects that the combination of cross-sex hormone treatment and physical activity had on the body:

“I am now happier with how my workout mixes in with my medication. I have noticed changes happening to certain parts of my body which makes me more comfortable with it” (Participant 12, transgender female)

There were noticeable gender differences in the appearance that transgender males and transgender female were aiming to accentuate. Whilst transgender males were striving for muscularity, one transgender female spoke about how she was attempting to achieve “a toning and slimming” effect which she felt was more achievable once cross-sex hormones had been initiated.

2.1.3. Gender confirming surgery as a motivator: There were a few participants (n=4) in this study that discussed surgery as a motivator for engaging in physical activity. Participants recognised the importance of being in good physical health, and achieving a specific weight prior to gender confirming surgeries:

“I am motivated to go running just to keep healthy for future things like surgery” (Participant 10, transgender female)

“Yeah I guess that’s another one as well-being as fit and as healthy as I can for surgery as well” (Participant 03, transgender male)

Transgender males, before chest surgery, were especially aware of the benefits weight training would have in relation to surgical outcomes:
“I did a push-up app on my phone to try and get my shoulders and my chest just a bit muscly for surgery. It is better for your results if you do get a bit built before [surgery]” (Participant 09, transgender male)

2.2. External facilitators or environmental facilitators

Finally, participants discussed physical activity and sport environments that felt more welcoming and accessible to them, and hence facilitated engagement in physical activity or sport.

2.2.1. Trans only environments: Several participants (n=6) discussed the facilitating effect ‘safe spaces’ had on physical activity engagement. These ‘safe spaces’ were usually characterised by only including other transgender people and therefore participants perceived they would feel more comfortable, especially during their medical transition. Much of the discussion held by participants was hypothetical as these ‘safe spaces’ were not freely available. Several participants spoke about this in relation to ‘trans specific’ swimming groups:

“I think that would be a great idea because I’ve got friends that are trans as well that like swimming but won’t go. So I think it would be something nice to go to a swimming pool with other people that are just like us. No one judges you” (Participant 08, transgender male)

“Like if it is made for transgender people [swimming group] then there is nothing to worry about is there?” (Participant 10, transgender female)

While the majority of participants felt that ‘trans specific’ spaces would encourage physical activity at their current stage of transition, some (n=2) felt these spaces did not promote transgender inclusion in mainstream physical activity and sport:

“I know there are trans specific sort of swim sessions and I would not feel comfortable. I just rather integrate in and y’know not making it about a trans thing y’know. I’m just another guy going to the gym or going to the pool - do you know what I mean?” (Participant 03, transgender male)
6.5. Discussion

This study aimed to understand the factors which are associated with recreational physical activity and sport engagement among young transgender people who are undergoing medical transition. Overall, young transgender adults are insufficiently active due to inadequate changing facilities, body dissatisfaction, fears surrounding ‘passing’ and not being accepted. At the same time, participants appeared to be motivated to engage in physical activity to increase their body satisfaction and gender congruence. Despite this motivation, participants felt there was a lack of ‘safe’ public environments (e.g., gyms) in which to engage in physical activity and sport.

One of the most significant findings of this study was the challenge that changing facilities imposed for the young transgender adults; a finding that supports previous research with older transgender adults (e.g., Hargie, Mitchell, & Somerville, 2015). The binary infrastructure of changing rooms and the lack of privacy was core to this challenge. Leisure centres and sport clubs should consider non-binary changing rooms, with private changing and showering cubicles. This would help transgender people access public physical activity and sport environments. However, the challenges that changing facilities imposed appeared to be much more deep-seated than this as body dissatisfaction, fears about passing, and the fear of transphobia interlinked with this barrier.

Despite all the participants being on cross-sex hormones which have been found to increase body satisfaction (e.g., Becker et al., 2016; Fisher et al., 2014), body dissatisfaction was still a significant barrier to physical activity and sport participation in the current study which has previously been found with older transgender people (mean age 40.5 years, range 27-51; Elling-Machartzki, 2015). The young transgender adults in the current study discussed how their bodies had not yet started to change or changed a significant amount in accordance with their gender identity and, hence, dissatisfaction was still problematic in relation to physical activity and sport. In contrast to previous research (Elling-Machartzki, 2015), the current study established an understanding as to why the body is a barrier. Participants explained how their awareness of incongruent body parts became heightened during physical activity, sometimes due to the sports clothing worn as it acted as a reminder of these body parts because of the way it interacted with the body. In addition, sports clothing for some sports can be clearly gendered (e.g., swimming costumes are worn by women and trunks by men).
and revealing. Due to the high levels of dissatisfaction that participants in this study experienced with their bodies, they found such revealing clothing to be a barrier to their participation in physical activity and sport. In light of this, sports clothing brands should consider developing gender neutral and less revealing sportswear. This would be especially beneficial for sports such as swimming, gymnastics, athletics and cycling. Additionally, for the young transgender men in this study, concealing their chest and engaging in physical activity or sport in a safe and comfortable way was impossible. The development of effective (e.g., conceals chest) but more comfortable (e.g., less restrictive) and water-friendly chest binders would be a much welcomed product for this population.

The fear of being mis-gendered (i.e., not passing as the gender they identify with) was also core in explaining physical activity and sport disengagement in the current study. Concerns surrounding a lack of gender congruence were sometimes so significant that participants feared physical abuse from others. Previous research has found transgender people to avoid physical activity and sport due to transphobia (Hargie et al., 2015; Muchicko, Lepp, & Barkley 2014). However, in the current study it was found that for the majority of participant’s negative evaluation from others and transphobia was anticipated as opposed to experienced. It may therefore be beneficial to develop interventions that challenge these negative thought processes, with the aim of encouraging physical activity and sport in public spaces (e.g., gyms, swimming pools, exercise classes). An intervention that is based on Cognitive Behavioural Therapy and hence challenges negative thought process (e.g., you are not being judged, no one is going to hurt you) may be particularly beneficial in this context.

However, for the young transgender adults in this study, there was evidently the desire and motivation to engage in physical activity and/or sport to increase gender congruence and body satisfaction. Engagement in physical activity in the current study was common, with 12 out the 14 participants currently reporting to be active. This may be due to the fact that participants who were currently physically active felt motivated to take part in a study about physical activity and sport. This finding may also be explained by the participants’ age as young people have been found to be more physically active then older people (e.g., British Heart Foundation, 2015). However, it is important to emphasise that physical activity was very rarely done in public spaces (e.g., gyms) as participants preferred to engage in physical activity within the comfort of their own homes. Participation in team based sport was also
uncommon in those who took part in this study, which was also previously found by Hargie et al. (2015). The young transgender adults in our study commented on the difficulties of aligning with a gendered team (e.g., male or female) during their medical transition, a finding previously supported (Caudwell, 2012). However, in our study, transgender males were particularly concerned about the danger of playing with and against cisgender males as they felt their size and strength was not yet comparable. This is an important finding that needs to be addressed by sport organisations who need to make a conscious effort to increase sport participation and competition among the transgender population, especially given the psychosocial benefits team sport can have (e.g., Armstrong & Oomen-Early, 2009). The development of mixed gendered teams that remove the pressure of being a certain size and strength would be beneficial. When the size of competitors is a concern, the Canadian Centre for Ethics in Sport (2016) suggests developing size categories, such as in wrestling. A few participants in this study pointed out that it may be unhelpful to create an abundance of ‘trans only’ sports club as this may further promote the exclusion of transgender people in mainstream sport. Instead, it may be more useful to increase awareness and acceptance of gender diversity within the public domain. This could be achieved through public campaigns that increase awareness of transgender people.

The findings from the current study suggest that socially and medically transitioning is core to physical activity and sport disengagement and that, once medical transition is complete, the barriers (and facilitators) are likely to change. Comments made by participants in this study suggest that physical activity and sport engagement will increase after transition. Future research now needs to explore whether there are any differences in physical activity levels between transgender people who have undergone a transition and cisgender people, and if a difference is found, why.

This study is the first to explore the experiences of physical activity and sport in a young sample of treatment seeking transgender adults. Being specific in relation to the age and stage of transition of our participants will allow for specific interventions and initiatives (that promote physical activity) to be developed. However, there are some limitations to be taken into consideration. Three of the interviews were conducted via telephone and whilst the interviewer felt this method was as effective as the face-to-face interviews, telephone interviews have been criticised as important social cues cannot be responded to which can
affect the rapport between interviewer and interviewee (e.g., Cook, 2012; Novick, 2008). This may have consequently affected the depth of data that was collected from these interviews. Another limitation of the study was the fact that the number of male (n=9) and female (n=5) participants was not equal and, while not expected, gender differences were found especially in relation to males (e.g., the issue with binders, building muscle). Future research may therefore want to consider recruiting a larger transgender female population (assigned male at birth) to further explore these gender differences.

6.5.1. Conclusion
There are a range of positive and negative factors that affect physical activity and recreational sport engagement among young transgender adults who are medically transitioning. Internal (e.g., body dissatisfaction) and external (e.g., sport-related clothing) barriers prevent this population from engaging in physical activity and sport. Despite this, young transgender adults are motivated by body dissatisfaction and perceived gender incongruence to be physically active. However, due to the uncomfortable and unwelcoming environment that is sometimes experienced or anticipated in public physical activity and sport spaces (e.g., leisure centres), young transgender adults find it difficult to be physically active. Awareness of transgender people needs to be increased through public campaigns, and leisure centres and sports clubs need to consider ways in which they can make their spaces more accessible and welcoming for people with a variety of different gender identities (e.g., gender neutral changing facilities and showers).
In the previous chapter (chapter 6, study 1) it was established that young treatment seeking transgender people experience a range of internal and external barriers when engaging (or attempting to engage) in recreational physical activity and/or sport. Consequently it was hypothesised that these barriers would negatively affect the amount of physical activity that treatment seeking transgender people engage in. Therefore the aim of chapter 7 (study 2) was to explore this hypothesis by determining the amount of physical activity that treatment seeking transgender people engage in when compared to cisgender people (whilst controlling for age and gender). Building on the findings from the qualitative study presented in chapter 6, it was also the aim of study 2 to explore factors which statistically predict physical activity participation in the treatment seeking transgender population, given that quantitative findings have greater generalisability in comparison to qualitative findings.
Chapter 7 (study 2): Predictors of physical activity

The levels and predictors of physical activity engagement within the treatment seeking transgender population: A matched control study

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The content of chapter 7 (study 2) is largely the same as the published paper, however some small changes have been made to the formatting and presentation to ensure it is consistent with the rest of the chapters that comprise this thesis.

**Statement of authorship**

*Research conception and design:* BJ, EH & JA.

*Data collection:* BJ.

*Data analysis and interpretation:* BJ, EH & JA.

*Drafting of article:* BJ.

*Article editing and revisions:* BJ, EH, WB & JA.

The findings from chapter 7 (study 2) have also been presented at the following academic conferences:


7.1. Abstract

Physical activity has been found to alleviate mental health problems and could be beneficial for at-risk populations, such as transgender people. This study had three aims. First, to explore the amount of physical activity that treatment seeking transgender people engage in, and to compare this to matched cisgender people. Second, to determine whether there was a difference in physical activity depending on cross-sex hormone use. Third, to determine factors which predict physical activity among treatment seeking transgender people. Transgender (n=360) and cisgender people (n=314) were recruited from the UK. Participants were asked to complete questionnaires about physical activity, symptoms of anxiety and depression, self-esteem, body satisfaction and transphobia. Transgender people engaged in less physical activity than cisgender people. Transgender people who were on cross-sex hormones engaged in more physical activity than transgender people who were not. In transgender people on cross-sex hormones, high body satisfaction was the best statistical predictor of physical activity while high self-esteem was the best statistical predictor in people who were not. In conclusion, transgender people are less active than cisgender people. Cross-sex hormone treatment appears to be able to indirectly increase physical activity within this population, which may be beneficial for mental well-being.
7.2. Introduction

Physical activity is defined as any activity (e.g., while working, playing, carrying out household chores and recreational pursuits) that involves muscular-skeletal movement and energy expenditure (World Health Organization (WHO), 2016). In 2010, 23% of adults around the world were not active enough (WHO, 2016), highlighting that inactivity represents a global public health problem. Globally, engaging in insufficient physical activity is the fourth leading risk factor for non-communicable diseases (e.g., cancer, diabetes, cardiovascular disease) (WHO, 2016), which accounted for approximately 5.3 million deaths globally in 2008 (Lee et al., 2012). Physical activity has also been found to alleviate mental health problems, particularly depression and anxiety (Carter, Morres, Meade, & Callaghan, 2016; Herring, Jacob, Suveg, & O’Connor, 2011; McMahon et al., 2017; National Institute for Health and Care Excellence (NICE), 2016; Rebar et al., 2016). In light of this, physical activity may be beneficial for populations that are vulnerable to mental health problems.

One of these vulnerable populations is transgender people who experience incongruence between their sex assigned at birth and their gender identity. Transgender women are those assigned male at birth but who identify as female. Transgender men are those assigned female at birth but who identify as male. Some people may identify outside the binary gender system (e.g., gender neutral, non-gender, gender queer) or be more fluid in their gender identity (i.e., a person whose gender identity varies over time) (Arcelus & Bouman, 2017a). Cisgender people do not experience such gender incongruence (Arcelus & Bouman, 2017a). The majority of transgender people will choose to socially transition (i.e., present as their gender identity at work, with friends and family) and many will choose to undergo a medical transition. This may include cross-sex hormone treatment (oestrogen for transgender females/non-binary and testosterone for transgender males/non-binary), mastectomy (transgender males/non-binary), breast augmentation (transgender females/non-binary), and surgery to create male or female genitalia depending on gender identity. However, it is important to point out that not every transgender person will wish to undergo a medical transition and that some individuals may only wish to undergo a partial medical transition (i.e., cross-sex hormones and no surgery; Beek, Kreukels, Cohen-Kettenis, & Steensma, 2015).

Mental health problems such as depression, anxiety, and self-harm have been found to be particularly prevalent in transgender people (Arcelus, Claes, Witcomb, Marshall, & Bouman,
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2016; Bouman, Davey, Meyer, Witcomb, & Arcelus, 2016a; Bouman et al., 2016b; Bouman et al., 2017a; Claes et al., 2015; Dhejne, Van Vlerken, Heylens, & Arcelus, 2016; Marshall, Claes, Bouman, Witcomb, & Arcelus, 2016; Millet, Longworth, & Arcelus, 2017; Warren, Smalley, & Barefoot, 2016) and therefore physical activity may be a useful coping mechanism. In addition to this, engaging in frequent physical activity may help transgender people reach a suitable Body Mass Index required for gender affirming surgery (if this is what the person wishes). Although research is inconclusive, it has shown cross-sex hormone treatment may put transgender females at risk of cardiovascular disease and may make transgender males more susceptible to risk factors associated with cardiovascular disease (Unger, 2016). For this reason, frequent physical activity engagement is essential to maintain heart health. Transgender males have also discussed being motivated to increase muscle mass on the upper torso through engaging in frequent weight training to enhance surgical outcomes after mastectomy (see chapter 6; Jones, Arcelus, Bouman, & Haycraft, 2017b). However, there is a lack of research that has explored levels of physical activity among transgender people and therefore it is unknown as to whether engaging in physical activity would be feasible among this population.

A systematic review concluded that the majority of transgender people have a negative experience when engaging in physical activity (see chapter 2; Jones, Arcelus, Bouman, & Haycraft, 2017a). This is supported by a recent qualitative study (see chapter 6; Jones et al., 2017b) which found that a range of external factors, such as changing rooms, sport-related clothing and discrimination, stigmatisation and prejudice on the basis of gender identity (transphobia), all discouraged transgender people from engaging in physical activity. Gender incongruence and body dissatisfaction were also identified as barriers to physical activity engagement (see chapter 6; Jones et al., 2017b). Based on this knowledge, it is likely that levels of physical activity are low among the transgender population and therefore research should focus on identifying ways to increase activity levels in these individuals in light of the known mental health benefits (e.g., Carter et al., 2016).

The only quantitative study to explore the amount of physical activity transgender people engage in supports this suggestion, as transgender people were found to engage in less physical activity than cisgender people (Muchicko, Lepp, & Barkley, 2014). This study recruited 47 cisgender people and compared them with 33 (non-matched) transgender people. Although the study is of interest, the lack of matching between the two groups for age and
gender (variables known to affect levels of physical activity; British Heart Foundation (BHF), 2015; WHO, 2016) limits the impact of its findings. In addition, there was a lack of information regarding the transgender participants’ stage of medical transition (i.e., whether they were on cross-sex hormone treatment). Research has shown that cross-sex hormone treatment, which helps the person’s body to align with their gender identity (either by the development of breasts for transgender females or by an increase in muscle mass and lowering of voice for transgender males), increases mental well-being in the transgender population (e.g., Bouman et al., 2016b; Costa & Colizzi, 2016; Heylens, Verroken, De Cock, T’Sjoen, & De Cuypere, 2014; Fisher et al., 2014; Gorin-Lazard et al., 2013). This information is of significance when exploring physical activity within the transgender population as cisgender people with better mental health have been found to engage in more physical activity compared to people with poorer mental health (e.g., Kruger, Lee, Ainsworth, & Macera, 2008; McMahon et al., 2017; Noordstar, van der Net, Jak, Holders, & Jongmans 2016).

Although the studies discussed above have suggested that levels of physical activity are low among transgender people and have identified potential barriers to engaging in physical activity, they are limited by their qualitative nature, which means that findings cannot be generalised and interventions cannot be developed (see chapter 6; Jones et al., 2017b), or by the small number of participants, lack of matching and lack of information about stage of transition (Muchicko et al., 2014). Quantitatively understanding whether there is a physical activity inequality between cisgender and transgender people, as well as understanding factors that are associated with physical activity in the transgender population, is essential in order that specific initiatives to increase physical activity can be developed for this population.

Taking into consideration the limitations of previous studies, this study has three main aims. First, to explore the amount of physical activity that treatment seeking transgender people engage in, and to compare this to cisgender people matched for age and gender. Second, in light of the positive psychological benefits that cross-sex hormones can have on mental well-being in the transgender population (e.g., Costa & Colizzi, 2016) this study also aims to determine whether there is a difference in physical activity levels between people who are and are not on cross-sex hormone treatment as well as to determine whether levels of physical activity in people who are on cross-sex hormone treatment are comparable to
cisgender people, when age and gender are controlled for. Finally, this study aims to
determine factors which predict physical activity participation in transgender individuals. This will be explored for the whole group of transgender participants and also for people who are and are not on cross-sex hormone treatment, separately. Factors which have previously been found to predict physical activity in the cisgender population will be explored as potential statistical predictors, such as younger age and male gender (BHF, 2015; WHO, 2016) low anxiety and depression levels (Carter et al., 2016; McMahon et al., 2017), high body satisfaction (Kruger et al., 2008; Lantz, Hardy, & Ainsworth, 1997) and high self-esteem (Joseph, Royse, Benitez, & Pekmezi, 2014; Noordstar et al., 2016; Sonstroem & Morgan, 1989). Transphobia has been found to be a predisposing factor to high levels of anxiety, depression and low self-esteem (Hendricks & Testa, 2012; Meyer, 2003) and has been identified as a barrier to physical activity in the transgender population (see chapter 6; Jones et al., 2017b). Hence, transphobia will also be explored as a potential statistical predictor of physical activity.

First, it was hypothesised that treatment seeking transgender people would engage in less physical activity than cisgender people. Second, it was hypothesised that levels of physical activity would be greater in the group that were on cross-sex hormone treatment (compared to those who were not) and that this would be comparable to cisgender people’s physical activity levels. Finally, it was hypothesised that younger age, male gender identity, lower levels of anxiety, lower levels of depression, high body satisfaction, high self-esteem, and fewer experiences of transphobia would predict greater physical activity engagement.

7.3. Method

7.3.1. Participants and recruitment

Transgender participants aged 17 or over were recruited from a national transgender health service in the United Kingdom (UK) during a 12 month period in 2015/2016. Participants were recruited at the assessment stage. None of the participants had received gender affirming medical interventions from the service, but some were taking cross-sex hormones and blockers (medication used to inhibit puberty) prescribed from NHS providers (as their care was transferred from the child and adolescent service to the adult service), private providers or was self-prescribed via the internet.
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The cisgender participants were recruited from the community over four months in 2016 using a snowball sampling technique. Cisgender participants were required to not experience incongruence between the sex they were assigned at birth and their gender identity. All cisgender participants were age 18 or over.

The study was approved by an NHS research ethics committee and by the Research and Development Department of the Nottinghamshire Healthcare NHS Foundation Trust (see Appendix M). Ethical approval for recruitment of the cisgender participants was granted from the first author’s university research ethics committee (see Appendix M).

7.3.2. Procedure

After informed consent had been obtained from participants, the transgender sample was invited to complete the self-report questionnaires listed below. The completion of these questionnaires took approximately 20 to 30 minutes. Cisgender participants were invited to take part in a short survey (approximately 10 minutes) which only asked about their physical activity engagement.

7.3.3. Measures

Socio-demographic information: Information was collected about participants’ age, sex assigned at birth, and gender identity. For the transgender participants, information about whether they were taking cross-sex hormones was also collected.

Rapid Assessment of Physical Activity (Topolski et al., 2006): This measure has nine statements that rapidly assess the frequency of engagement in physical activity (e.g., I do 30 minutes or more a day of moderate physical activities, 5 or more days a week). Participants are asked to indicate whether the statement relates to them or not by ticking ‘Yes’ or ‘No’. There are no other response options. The scale has two subscales: 1) aerobic physical activity (7 items); and 2) strength and flexibility physical activity (2 items). In the current study, only the aerobic physical activity subscale was used. Total scores are calculated by choosing the highest item (1 to 7) with an affirmative response and scoring this accordingly. For example, if question 3 was the highest question that the participant responded ‘yes’ to, then they would be given a score of 3. High levels of physical activity engagement are indicated by a higher score. Scores under 6 are considered a suboptimal level of physical activity. Reliability
analysis was not conducted for the current sample due to the ‘yes’, ‘no’ response style but this measure has been shown to have good reliability previously (Topolski et al., 2006).

**Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983):** This measure has 14 items; seven assess anxiety and seven assess depression. Scores for each subscale (anxiety and depression) are calculated by summing the scores for each individual item. For each subscale, scores between 0-7 are considered ‘normal’, scores between 8-10 are considered ‘borderline clinical’, and scores of 11 and above are considered ‘clinically relevant’ (Snaith, 2003). The highest score possible is 21 for each subscale. The measure has previously been found to have good reliability (Bjelland, Dahl, Haug, & Neckelmann, 2002). In the current study, both the anxiety (α=.86) and depression (α=.75) subscales had good reliability.

**Hamburg Body Drawing Scale (HBDS) (Becker et al., 2016):** This measure was originally developed for use with individuals with different forms of psychoendocrinological disorder (Appelt & Strauß, 1988) and has since been adapted and validated with transgender people (Becker et al., 2016). In total, satisfaction with 33 body parts is assessed. To assess an individual’s overall satisfaction with their body, just one individual item is used (‘Satisfaction with your overall appearance’). In the current study, only the item that assesses overall appearance satisfaction was used. A 5-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied) is used and therefore a high score indicates a high level of body satisfaction. Reliability analysis was not conducted for the current sample as only one item of the HBDS was used but the scale has previously been found to have good reliability (Becker et al., 2016).

**Rosenberg Self-Esteem Scale (Rosenberg, 1965):** This is a 10-item self-report measure that assesses self-esteem. Responses are scored on a 4-point Likert scale (strongly agree (3) to strongly disagree (0)). The global score is calculated by summing the scores from the individual items. A high score indicates a higher self-esteem (highest possible score is 30). The measure has previously been shown to have good reliability (α=.88-.90) (Robins, Hendin, & Trzeniewski, 2001). In the current sample, the measure had excellent reliability (α=.91).

**Experience of Transphobia Scale (Clements-Nolle, Marx, & Katz, 2006; Nuttbrock et al., 2010):** An item assessing verbal transphobia (‘Have you ever been verbally abused or harassed due to your gender identity or presentation?’) and an item assessing physical
transphobia (‘Have you ever been physically abused or beaten due to your gender identity or presentation?’) were adapted from previous studies that measured transphobia (Clements-Nolle et al., 2006; Nuttbrock et al., 2010). Participants were asked to rate, on a 4-point Likert scale (from ‘never’ to ‘several times’), the frequency that they have experienced such behaviour. A higher score indicates a more frequent experience of verbal and/or physical transphobia.

7.3.4. Data analysis
Data were analysed using SPSS 23 (IBM, 2015). The data were not normally distributed and therefore non-parametric tests were conducted, where possible (Field, 2009). To address the first aim, each transgender individual was matched by age and experienced gender identity with a cisgender participant and a Mann-Whitney U test was conducted to explore differences in physical activity between these two groups. For the second aim, a Mann-Whitney U test was conducted between people who had and had not taken cross-sex hormones to determine whether there was a difference in physical activity. Each transgender individual who had taken cross-sex hormones was then matched, by age and gender identity, with a cisgender participant and a Mann-Whitney U test was conducted between these two groups to explore differences in physical activity. For all Mann-Whitney U analyses, an effect size was calculated ($z^2 / N-1$). For the final aim, one-tailed Spearman’s Rho correlations were conducted between physical activity and the potential statistical predictor variables (age, gender identity, anxiety, depression, overall body satisfaction, self-esteem and transphobia) for the whole group and also for those who were and were not on cross-sex hormone treatment, separately. Spearman’s Rho correlations were conducted in relation to the participants’ gender identity in accordance with recommendations made by Auer et al. (2013). As gender identity had more than two categories (e.g., neither male or female), six dummy variables were created to allow this variable to be entered into the Spearman’s Rho correlation analysis. Given the large number of Spearman’s Rho correlations being run (i.e., 26), a Bonferroni correction was applied to correct for multiple comparisons. An adjusted p-value of .002 was therefore used to indicate significance in the correlations (i.e., .05 [standard p-value] ÷ 26 [number of correlations] = .002 [adjusted p-value]). Only variables that significantly correlated with physical activity were entered into the subsequent analysis to increase its robustness. To determine which variable(s) was the best statistical predictor of physical activity, stepwise multiple linear regression analysis was conducted. The level of significance used was $p<.05$. 

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7.4. Results
During the data collection period, 383 people were accepted for assessment at the transgender health service. Of this sample, 360 participants (94%) provided informed consent to participate in the study. Three hundred and fourteen cisgender participants were recruited from the community and all provided informed consent.

7.4.1. Aim 1: Comparing levels of physical activity between transgender and cisgender people
From the pool of transgender (n=360) and cisgender (n=314) participants, 137 transgender and 137 cisgender participants were matched by age and gender identity. From the transgender sample, people with non-binary gender identities were removed from the matching process (n=30, 8.33%). A further 14 people (3.89%) were removed as they had not yet decided on their gender identity and a further three people (.83%) were excluded as they did not provide any information about their gender identity. The socio-demographic characteristics of the matched transgender (n=137) and cisgender (n=137) participants are displayed in Table 7.1. According to Topolski et al. (2006) both the transgender (mean=4.24) and cisgender (mean=5.12) participants engaged in insufficient levels of physical activity.
### Table 7.1. Socio-demographic information for the cisgender and transgender samples who are matched for age and gender identity

<table>
<thead>
<tr>
<th></th>
<th>Cisgender (n=137) (%)</th>
<th>Transgender (n=137) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>30.15 (11.87)</td>
<td>30.15 (11.87)</td>
</tr>
<tr>
<td>Sex assigned at birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42 (30.7)</td>
<td>95 (69.3)</td>
</tr>
<tr>
<td>Female</td>
<td>95 (69.3)</td>
<td>42 (30.7)</td>
</tr>
<tr>
<td>Gender identity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42 (30.7)</td>
<td>42 (30.7)</td>
</tr>
<tr>
<td>Female</td>
<td>95 (69.3)</td>
<td>95 (69.3)</td>
</tr>
<tr>
<td>Cross-sex hormone treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>prior to assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>NA</td>
<td>53 (38.7)</td>
</tr>
<tr>
<td>No</td>
<td>NA</td>
<td>82 (59.9)</td>
</tr>
<tr>
<td>No response</td>
<td>NA</td>
<td>2 (1.5)</td>
</tr>
</tbody>
</table>

**Note:** NA (not applicable)

Cisgender participants engaged in significantly more physical activity (mean=5.12, SD=1.80, median=6.00, IQR=3.00) in comparison to those in the transgender group (mean=4.24, SD=2.05, median=4.00, IQR=3.00; U=7108.00, z=-3.53, effect size=.05, p=.001). To further explore any differences in physical activity between transgender and cisgender participants, participants were split in relation to their gender identity. This analysis showed that cisgender males (n=42, mean=5.40, SD=1.79, median=6.00, IQR=3.00) engaged in significantly more physical activity in comparison to transgender males (n=42, mean=4.17, SD=2.05, median=4.00, IQR=4.00; U=583.50, z=-2.73, effect size=.05, p=.004). Cisgender females (n=95, mean=5.00, SD=1.80, median=5.00, IQR=3.00) also engaged in significantly more physical activity than transgender females (n=95, mean=4.27, SD=2.07, median=4.00, IQR=3.00; U=3614.50, z=-2.41, effect size=.04, p=.007). The participants were then split in relation to the gender they were assigned at birth. Two comparisons were conducted: cisgender males (n=42) vs. transgender females (assigned male at birth; n=95, mean=4.34, SD=2.06, median=4.00, IQR=3.00; U=1412.00, z=-2.77, effect size=.06, p=.002), and cisgender females (n=95) vs. transgender males (assigned female at birth; n=42, mean=4.02,
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SD=2.05, median=4.00, IQR=4.00; U=1451.50, z=-2.58, effect size=.05, p=.005). Both tests supported what was found when the analysis was conducted in relation to gender identity.

7.4.2. Aim 2: Comparing physical activity levels of people who were on cross-sex hormone treatment and those who were not

It was found that the transgender patients who were on cross-sex hormone treatment (n=102) engaged in significantly more physical activity (mean=4.65, SD=1.92, median=4.00, IQR=3.00) compared to the patients who were not (n=241; mean=4.07, SD=1.82, median=4.00, IQR=3.00; U=10027.00, z=-2.74, effect size=.02, p=.003).

To determine whether the level of physical activity engaged in by transgender people who were on cross-sex hormones was comparable to the cisgender population, these two groups were matched by age and gender identity. People were excluded if they had not provided information about their gender identity (n=3; 2.94%), or if they had a non-binary gender identity (n=8; 7.84%). Therefore, 91 transgender people were matched with 91 cisgender people. In these samples, 52 identified as female and 39 as male. The mean age was 31.84 (SD=13.55).

Cisgender people (mean=5.33, SD=1.92, median=6.00, IQR=3.00) were found to engage in significantly more physical activity than transgender people who were on cross-sex hormones (mean=4.73, SD=1.97, median=5.00, IQR=4.00; U=3356.50, z=-2.27, effect size=.03, p=.010). When people with a female gender identity were explored, there was no significant difference in physical activity levels between transgender females on cross-sex hormone treatment (mean=4.79, SD=2.01, median=5.00, IQR=4.00) and cisgender females (mean=5.33, SD=1.92, median=6.00, IQR=3.00; U=1133.00, z=-1.47, effect size=.02, p=.065). When people with a male gender identity were explored, cisgender males (mean=5.33, SD=1.94, median=6.00, IQR=3.00) engaged in significantly more physical activity than transgender males on cross-sex hormones (mean=4.64, SD=1.93, median=4.00, IQR=3.00; U=593.00, z=-1.73, effect size=.04, p=.041).

7.4.3. Aim 3: Statistical predictors of physical activity in transgender people

To satisfy the third aim, only transgender people were included (n=360). The socio-demographic variables of the transgender sample, presented for the whole sample, and
separately for people who were on cross-sex hormone treatment (n=102) and those who are not (n=241), are displayed in Table 7.2.

**Table 7.2.** Socio-demographic characteristics of the whole sample of transgender participants, participants on cross-sex hormone treatment and those not on cross-sex hormone treatment

<table>
<thead>
<tr>
<th></th>
<th>Whole sample (n=360)</th>
<th>No CHT group (n=241)</th>
<th>CHT group (n=102)</th>
<th>Sample size (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex assigned at birth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>151 (41.9)</td>
<td>98 (40.7)</td>
<td>44 (43.1)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>209 (58.1)</td>
<td>143 (59.3)</td>
<td>58 (56.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender identity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>166 (46.1)</td>
<td>107 (44.4)</td>
<td>52 (51.0)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>131 (36.4)</td>
<td>84 (34.9)</td>
<td>39 (38.2)</td>
<td></td>
</tr>
<tr>
<td>Partly male and female</td>
<td>14 (3.9)</td>
<td>9 (3.7)</td>
<td>4 (3.9)</td>
<td></td>
</tr>
<tr>
<td>Neither male or female</td>
<td>17 (4.7)</td>
<td>13 (5.4)</td>
<td>3 (2.9)</td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>18 (5.0)</td>
<td>18 (7.5)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>8 (2.3)</td>
<td>7 (2.9)</td>
<td>1 (1.0)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>6 (1.7)</td>
<td>3 (1.2)</td>
<td>3 (2.9)</td>
<td></td>
</tr>
<tr>
<td><strong>CHT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>102 (28.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>241 (66.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>17 (4.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CHT and blocker in combination</strong></td>
<td></td>
<td>35 (34.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CHT only</strong></td>
<td></td>
<td>67 (65.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Blockers only (no CHT)</strong></td>
<td></td>
<td>7 (2.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: CHT (cross-sex hormone treatment)*

**7.4.3.1. Statistical predictors of physical activity for the whole sample of transgender participants**

To examine the significant correlates of physical activity in the whole sample (n=360), one-tailed Spearman’s Rho correlations were conducted (see Table 7.3.). Age, depression, body
satisfaction, and self-esteem were all found to be significantly correlated with physical activity. Therefore, the four significantly correlated variables were entered into a stepwise regression to explore the best statistical predictor(s) of physical activity. Overall the model was significant \( (F(2,300)=12.34, p=.001) \) and explained 7.6% \( (R^2=.076) \) of the total variance of physical activity. Self-esteem \( (\beta=.20, p=.001) \) and body satisfaction \( (\beta=.12, p=.049) \) were the best statistical predictors of physical activity, both of which had a positive relationship with the outcome variable.

**Table 7.3.** One-tailed Spearman’s Rho correlations between physical activity and the study variables, presented for the whole sample and separately for those who were and were not on cross-sex hormone treatment prior to assessment

<table>
<thead>
<tr>
<th></th>
<th>Whole group (n=360)</th>
<th>No cross-sex hormone treatment group (n=241)</th>
<th>Cross-sex hormone treatment group (n=102)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.18***</td>
<td>.20***</td>
<td>.07</td>
</tr>
<tr>
<td>Male gender identity†</td>
<td>.03</td>
<td>.03</td>
<td>-.00</td>
</tr>
<tr>
<td>Female gender identity†</td>
<td>.05</td>
<td>.02</td>
<td>.09</td>
</tr>
<tr>
<td>Partly male and female</td>
<td>-.10</td>
<td>-.09</td>
<td>-.09</td>
</tr>
<tr>
<td>gender identity†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither male or female</td>
<td>-.04</td>
<td>.01</td>
<td>-.11</td>
</tr>
<tr>
<td>gender identity†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not sure of gender identity†</td>
<td>-.04</td>
<td>-.02</td>
<td>NA</td>
</tr>
<tr>
<td>Other gender identity†</td>
<td>-.02</td>
<td>-.03</td>
<td>.06</td>
</tr>
<tr>
<td>Verbal transphobia</td>
<td>.04</td>
<td>.08</td>
<td>-.08</td>
</tr>
<tr>
<td>Physical transphobia</td>
<td>.06</td>
<td>.08</td>
<td>-.02</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.27***</td>
<td>.23***</td>
<td>.29***</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-.12</td>
<td>-.07</td>
<td>-.14</td>
</tr>
<tr>
<td>Depression</td>
<td>-.22***</td>
<td>-.21***</td>
<td>-.15</td>
</tr>
<tr>
<td>Body satisfaction</td>
<td>.21***</td>
<td>.11</td>
<td>.38***</td>
</tr>
</tbody>
</table>

*Note: † (dummy coded variables); NA (not applicable)

*p<.05, **p<.01, ***p<.001 (corrected for multiple comparisons)*
7.4.3.2. Statistical predictors of physical activity in people who were and were not on cross-sex hormones

The socio-demographics of people who were and were not on cross-sex hormone treatment are presented in Table 7.2. Mann-Whitney U tests were also conducted to explore differences between these two groups on the study’s variables (see Table 7.4.). People who were on cross-sex hormones were significantly older, reported higher levels of self-esteem and body satisfaction, and experienced less anxiety and depression in comparison to participants who were not on cross-sex hormones (see Table 7.4.). There were no significant differences between the groups in relation to experiences of verbal and physical transphobia.
Table 7.4. Descriptive statistics and tests of difference between transgender people who were and were not on cross-sex hormone treatment for all predictor variables

<table>
<thead>
<tr>
<th></th>
<th>No cross-sex hormone treatment group (n=241)</th>
<th>Cross-sex hormone treatment group (n=102)</th>
<th>Mann-Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Median (IQR)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Age</td>
<td>26.91 (12.15)</td>
<td>22.00 (10.00)</td>
<td>32.81 (14.91)</td>
</tr>
<tr>
<td>Verbal transphobia</td>
<td>1.51 (1.16)</td>
<td>2.00 (2.00)</td>
<td>1.58 (1.14)</td>
</tr>
<tr>
<td>Physical transphobia</td>
<td>0.34 (0.78)</td>
<td>0.00 (0.00)</td>
<td>0.38 (0.87)</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>14.39 (5.92)</td>
<td>14.00 (9.00)</td>
<td>18.19 (6.39)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>10.20 (3.42)</td>
<td>9.00 (7.00)</td>
<td>9.09 (3.68)</td>
</tr>
<tr>
<td>Depression</td>
<td>5.90 (3.26)</td>
<td>7.00 (5.50)</td>
<td>4.71 (3.29)</td>
</tr>
<tr>
<td>Body satisfaction</td>
<td>1.86 (0.70)</td>
<td>2.00 (1.00)</td>
<td>2.17 (0.86)</td>
</tr>
</tbody>
</table>
In the group that was not on cross-sex hormones, age, depression and self-esteem were found to be significantly correlated with physical activity (see Table 7.3.) and these variables were therefore entered into a stepwise regression. Overall, the model was significant and explained 4.8% of the variance in physical activity engagement (see Table 7.5.). The only variable to have a significant relationship with physical activity engagement was self-esteem which was positively related (see Table 7.5.).

**Table 7.5.** Stepwise regression models reporting the unstandardized beta, standard error of beta, and the standardised beta (β) coefficients for (i) those who were not and (ii) those who were on cross-sex hormone treatment prior to assessment

<table>
<thead>
<tr>
<th></th>
<th>( F )</th>
<th>( R^2 )</th>
<th>beta</th>
<th>SE beta</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) No cross-sex hormone treatment group ((n=241))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>11.32**</td>
<td>.048</td>
<td>.07</td>
<td>.02</td>
<td>.22***</td>
</tr>
<tr>
<td>(ii) Cross-sex hormone treatment group ((n=102))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body satisfaction</td>
<td>11.16***</td>
<td>.124</td>
<td>.79</td>
<td>.24</td>
<td>.35***</td>
</tr>
</tbody>
</table>

\* \( p < .05 \), \** \( p < .01 \), \*** \( p < .001 \)

In the group that was on cross-sex hormones, body satisfaction and self-esteem were found to be significantly correlated with physical activity (see Table 7.3.) and were therefore entered into a stepwise regression. Overall, the model was significant and explained 12.4% of the total variance in physical activity (see Table 7.5.). The only variable that significantly predicted physical activity engagement was body satisfaction, which was positively related (see Table 7.5.).

**7.5. Discussion**

This study found that, overall, treatment seeking transgender people engaged in less physical activity compared to cisgender people. Cross-sex hormone treatment was found to have an important role in physical activity as transgender people who were taking cross-sex hormones engaged in significantly more physical activity compared to transgender people who did not; also, the best statistical predictors of physical activity in these two groups differed. While
greater body satisfaction (i.e., feeling less dissatisfied with one’s body) was found to be the best predictor of physical activity in transgender people who were taking cross-sex hormones, greater self-esteem was found to be the best statistical predictor in participants who were not taking cross-sex hormones. Transgender males (who were taking cross-sex hormones) engaged in less physical activity than cisgender males, however this study did not find a significant difference between transgender females who were on cross-sex hormone treatment and cisgender females. This highlights the importance of increasing the accessibility of cross-sex hormone treatment. Currently, people have to wait a significant amount of time before they are seen at transgender health services (Bouman & Richards, 2013; Kanamori & Cornelius, 2016; Kattari, Walls, Whitfield, & Langenderfer-Magruder, 2015) but our findings suggest that this delay could be adversely impacting their physical activity engagement, which could contribute to poorer mental well-being.

Both the transgender and cisgender people in the current study reported engaging in insufficient levels of physical activity (Topolski et al., 2006). However, it was found that, overall, treatment seeking transgender people were significantly less active in comparison to cisgender people who were matched on age and gender identity. This finding supports previous research (Muchicko et al., 2014) and, given the known mental and physical health benefits of physical activity (Carter et al., 2016; Herring et al., 2011; Lee et al., 2012; McMahon et al., 2017; Rebar et al., 2016; WHO, 2016) highlights the need to improve support for physical activity engagement of treatment seeking transgender people. Efforts should focus on factors that have been shown to predict physical activity within the transgender population.

Based on the amount of barriers that transgender people experience when engaging in physical activity and sport (see chapters 2 and 6; Jones et al., 2017a; 2017b), it is understandable that greater self-esteem was found to be the best statistical predictor of physical activity in this current study (for the whole group and for participants who had not taken cross-sex hormones). Although the mechanisms contributing to self-esteem levels are likely to differ in transgender and cisgender people, self-esteem has also been shown to affect physical activity engagement within the cisgender population (Joseph et al., 2014; Noordstar et al., 2016; Sonstroem & Morgan, 1989). Consequently, self-esteem interventions developed for the general population (e.g., behaviour change interventions that focus on self-esteem) may be useful in increasing physical activity within the transgender population (Fennel, 1996;
Staring et al., 2016). Furthermore, gender affirming medical treatment (e.g., cross-sex hormone treatment and gender affirming surgery) has been found to increase self-esteem in transgender people (e.g., Gorin-Lazard et al., 2013; Murad et al., 2010) and hence also appears to be crucial in indirectly increasing physical activity levels in transgender people who are treatment seeking.

This study found that once cross-sex hormone treatment had commenced, self-esteem was no longer the best statistical predictor of physical activity. In addition, transgender people who were taking cross-sex hormones engaged in significantly more physical activity than participants who were not. This finding further supports the notion that cross-sex hormone treatment is crucial in indirectly increasing physical activity engagement (in transgender people who are treatment seeking). Participants who were taking cross-sex hormones had greater self-esteem levels, were less anxious and less depressed, and had a higher body satisfaction (i.e., were less dissatisfied with their bodies). These are all psychological factors that have been positively associated with physical activity in the cisgender population (Kruger et al., 2008; McMahon et al., 2017; Noordstar et al., 2016) and therefore may explain why this group was more active in the current study compared to the group of people who was not taking cross-sex hormones.

In transgender people who were taking cross-sex hormones, a higher level of body satisfaction was found to be the best statistical predictor of physical activity. This finding is consistent with research that has found body satisfaction to increase once cross-sex hormone treatment has started (Fisher et al., 2014; van de Grift et al., 2017a) as well as research with cisgender people that has found that people who have higher levels of body satisfaction engage in more physical activity (Kruger et al., 2008; Lantz et al., 1997). Interestingly, this study found that levels of physical activity in transgender females on cross-sex hormones did not differ to levels in cisgender females. Cross-sex hormones appear to alleviate the physical activity inequality seen between cisgender and transgender females. Therefore, body satisfaction interventions aimed at cisgender women in an effort to increase their physical activity levels may also be applicable among transgender females on cross-sex hormone treatment, although the feasibility of this would need to be tested.

In comparison to transgender males on cross-sex hormone treatment, cisgender males were found to engage in significantly more physical activity. This difference might be explained by
Chapter 7 (study 2): Predictors of physical activity

the findings from a recent qualitative study where transgender males who were taking cross-sex hormones discussed how wearing a chest binder\(^1\) during physical activity was extremely uncomfortable (see chapter 6; Jones et al., 2017b). In addition, body satisfaction in transgender males has been found to significantly increase following chest reconstructive surgery (van de Grift et al., 2016c). In light of the current study’s findings and previous research, chest reconstructive surgery should be offered in a timely manner in accordance with the recommended Standards of Care, if this is what the person wishes (Coleman et al., 2012; Wylie et al., 2015). This may help to indirectly increase physical activity levels among transgender males (i.e., by increasing their levels of body satisfaction).

This is the first large scale study to compare physical activity levels of treatment seeking transgender people with a matched sample of cisgender people, and to quantitatively explore a range of factors which might predict physical activity. There are, however, some limitations. Transphobia was not significantly associated with physical activity, which was surprising given that 79% of survey respondents felt that transphobia was a barrier to participating in sport (Smith, Cuthbertson, & Gale, 2012). This lack of association in our study may be explained by the fact that some transgender people anticipate, as opposed to experience, transphobia (see chapter 6; Hargie, Mitchell, & Somerville, 2017; Jones et al., 2017b) and the measure in the current study only asked about the experience of transphobia. In addition, the percentage of physical activity explained by the regression models was low. This was despite age and depression being significantly correlated with physical activity. Future research should consider exploring why these factors were significantly associated with physical activity, but did not statistically predict the behaviour. In the current study, the physical activity measure used lacked specificity in relation to the type of physical activity engaged in. In this area of research, understanding the type of physical activity engaged in may highlight important nuances in relation to being active based on gender identity (i.e., to achieve a masculine or feminine body shape). Future research may also wish to extend the current study by exploring physical activity levels of non-binary people and determining how and why these may differ to transgender people who identify as female or male.

\(^{1}\)A chest binder is a garment of clothing worn by some transgender men to minimise breast tissue and increase the appearance of a male chest.
Chapter 7 (study 2): Predictors of physical activity

The findings of this research lead to several recommendations which could be useful for health professionals who are working with transgender individuals to implement in an effort to support physical activity engagement in this group. These include a need to develop or implement interventions to increase self-esteem and body satisfaction (and, in turn, physical activity). In addition to this, it is recommended that gender affirming medical interventions are offered in a timely manner, especially cross-sex hormone treatment and mastectomy, so as to facilitate transgender individuals’ engagement in physical activity.

7.5.1. Conclusion

In conclusion, there is an inequality in physical activity engagement between treatment seeking transgender people (especially those not on cross-sex hormones) and cisgender people. Cross-sex hormone treatment appears to be crucial in indirectly increasing physical activity engagement within the transgender population. Therefore the accessibility of cross-sex hormone treatment for transgender individuals needs to be increased.
Chapters 6 and 7 (studies 1 and 2, respectively) found body (dis)satisfaction to have an instrumental role in physical activity and sport (dis)engagement in transgender people. Research presented in chapter 3 also suggested that body dissatisfaction has a key role in the eating disorder symptoms experienced by many transgender people. The aim of chapter 8 (study 3) was therefore to explore the role that body (dis)satisfaction (alongside other factors) plays in eating disorder psychopathology in the treatment seeking transgender population.
Risk factors for eating disorder psychopathology within the treatment seeking transgender population: The role of cross-sex hormone treatment

This chapter has been published in the *European Eating Disorders Review* (impact factor: 3.39) as:


**Statement of authorship**

*Research conception and design:* BJ, EH & JA.

*Data collection:* BJ & NB.

*Data analysis and interpretation:* BJ, EH, LC & JA.

*Drafting of article:* BJ.

*Article editing and revisions:* BJ, EH, WB, LC, NB & JA.

The findings from chapter 8 (study 3) have been presented at an academic conference:

8.1. Abstract

Many transgender people experience high levels of body dissatisfaction, which is one of numerous factors known to increase vulnerability to eating disorder symptoms in the cisgender (non-trans) population. Cross-sex hormones can alleviate body dissatisfaction so might also alleviate eating disorder symptoms. This study aimed to explore risk factors for eating disorder symptoms in transgender people and the role of cross-sex hormones. Individuals assessed at a national transgender health service were invited to take part in this study (N=563). Transgender people not on cross-sex hormones reported higher levels of eating disorder psychopathology than people who were. High body dissatisfaction, perfectionism, anxiety symptoms and low self-esteem were risk factors for eating psychopathology but, after controlling for these, significant differences in eating psychopathology between people who were and were not on cross-sex hormones disappeared. Cross-sex hormones may indirectly alleviate eating disorder psychopathology. Given the high prevalence of transgender identities, clinicians at eating disorder services should assess for gender identity issues.
8.2. Introduction

Eating disorder psychopathology, which includes restrictive eating, binge eating and compensatory behaviours (e.g., self-induced vomiting, misuse of diet pills and laxatives), has been found to be more prevalent among adolescent girls and young adult women compared to men (e.g., Duncan, Ziobrowski, & Nicol, 2017; Fairburn & Harrison, 2003). Body dissatisfaction (i.e., the negative evaluation of one’s appearance; which is also more prevalent among adolescents and young people), has consistently been associated with eating disorder psychopathology in both females and males (e.g., Keel, Fulkerson, & Leon, 1997; Stice & Shaw, 2002; Wang, Lydecker, & Grilo, 2017). Body dissatisfaction is influenced by Western society’s view of beauty (e.g., Fitzsimmons-Craft, 2011). As a consequence, women who are dissatisfied with their bodies often strive to obtain a thin body, while men are more likely to strive to obtain a muscular physique (e.g., Grogan, 2016; McCready & Sasse, 2000). There are certain populations that have been found to be at increased risk of high levels of body dissatisfaction, such as the lesbian, gay, bisexual and transgender (LGBT) community (e.g., Calzo, Blashill, Brown, & Argenal, 2017; McClain & Peebles, 2016; Morgan & Arcelus, 2009). Within this group, transgender people are particularly vulnerable to body dissatisfaction due to the distress and incongruence they experience with their gender and body, yet this population is severely under researched in relation to eating disorder psychopathology (see chapter 3; Jones, Haycraft, Murjan, & Arcelus, 2016b; Witcomb et al., 2015).

Transgender people experience incongruence between their gender assigned at birth (determined from their sex characteristics (i.e., genitals)) and the gender they identify with. Transgender men are assigned female at birth but identify as male, while transgender women are assigned male at birth but identify as female (Arcelus & Bouman, 2017a; Bouman et al., 2017b). Cisgender people (non-transgender) do not experience such incongruence. Prior to undergoing gender affirming medical interventions (e.g., cross-sex hormone treatment (CHT), gender affirming surgery), many treatment seeking transgender people are dissatisfied with their body shape and/or weight, which may put them at risk of developing an eating disorder (Witcomb et al., 2015). It has been hypothesised that it is the body dissatisfaction (a common feature of eating disorder psychopathology), linked to the wish to achieve a masculine or feminine body ideal, which influences the development of eating disorder psychopathology, specifically drive for thinness and bulimia, among transgender people (Ålgars, Alanko, Santtila, & Sandnabba, 2012; Bouman & Arcelus, 2016; Khoosal,
Langham, Palmer, Terry, & Minajagi, 2009). In addition, it has also been hypothesised that the wish to stop menstruation and puberty, as well as not wanting to develop a feminine body shape (such as the development of breasts), can also play a role in the development of an eating disorder in transgender males (Bouman & Arcelus, 2016). This may explain why disordered eating has been found to be prevalent in transgender adolescents (Watson, Veale, & Saewyc, 2017). For example, Diemer, Grant, Munn-Chernoff, Patterson and Duncan (2015) found that transgender adolescents more frequently self-reported an eating disorder diagnosis in the past year (15.84%), and presented with eating disorder symptoms such as the use of diet pills (13.50%), self-induced vomiting and laxative abuse (15.61%), compared to cisgender adolescents.

As well as presenting to transgender health services with symptoms of an eating disorder, transgender people may initially present to eating disorder services. Case studies have reported on individuals who first present with eating disorder symptoms (e.g., food restriction, vomiting and body image distortion) without disclosing their transgender identity which, through exploration, has later been expressed as a desire to achieve a masculine or feminine body (different to the body associated with their gender assigned at birth) and, hence, identified as secondary to their gender identity (e.g., Couturier, Pindiprolu, Findlay, & Johnson, 2015; Winston, Acharya, Chaudhuri, & Fellowes, 2004). These findings are concerning considering that gender incongruence is not routinely assessed within eating disorder services given that the prevalence of transgender people is considered to be low. However, recently the prevalence of transgender people has increased and there has been a significant increase in demand for transgender health services across Europe and North America (Aitken et al., 2015; Arcelus et al., 2015; de Vries, Kreukels, T’Sjoen, Ålgars, & Mattila, 2015; House of Commons, 2016; Jones et al., 2017c). Therefore, gender incongruence may need to be considered by clinicians working at eating disorder services.

Within the cisgender population, several factors (such as body dissatisfaction (e.g., Keel et al., 1997; Stice & Shaw, 2002), high levels of perfectionism (e.g., Egan, Wade, & Shafran, 2011; Tchanturi, Larsson, & Adamson, 2016), the existence of interpersonal problems (e.g., Arcelus, Haslam, Farrow, & Meyer, 2013), low self-esteem (Dakanalis et al., 2016), and symptoms of anxiety and depression (e.g., Brechan & Kvalem, 2015; DeBoer & Smits, 2013; Fairburn, Cooper, & Shafran, 2003; Harrison, Sullivan, Tchanturia, & Treasure, 2009; Puccio et al., 2017)) have been identified as being associated with eating disorder psychopathology.
and found to increase the risk of developing an eating disorder. Body dissatisfaction has consistently been found to be associated with eating disorder psychopathology (e.g., Keel et al., 1997; Stice & Shaw, 2002). Dissatisfaction with one’s body has been described as a core feature, but not sufficient to completely explain the development of eating disorders (Polivy & Herman, 2002). The relationship between eating disorder psychopathology and body dissatisfaction has been found to be complex as cognitive-behavioural and emotion regulation theories of eating disorders have suggested that negative emotions, such as anxiety and depression, as well as self-esteem, mediate the relationship between body dissatisfaction and eating disorder psychopathology (e.g., Brechan & Kvalem, 2015; DeBoer & Smits, 2013; Fairburn et al., 2003; Harrison et al., 2009). Anxiety symptomatology has also been found to partially mediate the association between self-orientated perfectionism (a trait often associated with eating disorders; Egan et al., 2011) and eating disorder psychopathology (Egan et al., 2013), which suggests that anxiety plays a role in eating disorder development. Furthermore, interpersonal difficulties have also been linked to behaviours associated with eating disorders within the cisgender population (e.g., Arcelus et al., 2013).

Factors associated with, and found to mediate, eating disorder psychopathology in the cisgender population may be particularly pertinent among transgender people. This is because research has consistently shown treatment seeking transgender people to report high levels of mental health problems, such as anxiety and depression (e.g., Arcelus, Claes, Witcomb, Marshall, & Bouman, 2016; Bouman, Davey, Meyer, Witcomb, & Arcelus, 2016a; Bouman et al., 2017a; Dhejne, Van Vlerken, Heylens, & Arcelus, 2016; Millet, Longworth, & Arcelus, 2017), perfectionism (Khoosal et al., 2009), and interpersonal problems (Davey, Bouman, Meyer, & Arcelus, 2015) in comparison to cisgender people. Therefore these factors may be important when exploring risk factors for eating disorder psychopathology within the transgender population.

Once a medical transition has been initiated (e.g., CHT and gender affirming surgery), body dissatisfaction has been found to significantly improve in transgender adults (e.g., de Vries, Steensma, Doreleijers, & Cohen-Kettenis, 2011, de Vries et al., 2014; Fisher et al., 2014; van de Grift et al., 2016c, 2017a) and, therefore, these interventions may reduce the risk of developing an eating disorder or help to alleviate eating disorder symptoms. Although research is limited (one study to date), eating disorder symptoms have been found to reduce after gender affirming surgery (Khoosal et al., 2009). However, this study only considered
the role of surgery and not CHT. The study is also limited by the small sample size (N=40) and only recruiting transgender women. In light of this, the current study was concerned with exploring the role of CHT only and recruiting a larger sample comprising both transgender men and women. In addition to this, this study was concerned with exploring risk factors in transgender people yet to undergo a medical transition as this vulnerable population may first present to eating disorder services (without disclosing their transgender identity). As the cisgender literature suggests that eating disorders are complex and multifactorial this is also likely to be the case within the transgender population. Variables that can mediate between identified risk factors and eating disorder psychopathology will be explored. These analyses within the transgender population are important to determine through which mechanisms gender affirming medical interventions (e.g., CHT) are capable of alleviating eating disorder symptoms. Taking into consideration some of the limitations of previous research, the study had three specific aims:

1. To examine the role of CHT in eating disorder symptoms by determining whether there is a difference in eating disorder psychopathology (drive for thinness and bulimia) between a large sample of transgender people who are or who are not on CHT.

2. To explore risk factors (age, assigned gender, body dissatisfaction, perfectionism, interpersonal problems, self-esteem, anxiety, and depression) associated with eating disorder psychopathology in transgender people who are not on CHT.

3. To explore factors that mediate the relationship between identified risk factors and eating disorder psychopathology (drive for thinness and bulimia) in transgender people who are not on CHT.

Based on previous research it was first hypothesised that transgender people on CHT would have lower levels of eating disorder psychopathology compared to participants who are not on cross-sex hormones (e.g., Fisher et al., 2014; Khoosal et al., 2009). Second, it was hypothesised that younger age, identifying as female (because transgender people adopt and perform the social gender role (i.e., behaviours, attributes) associated with their experienced gender identity), higher levels of body dissatisfaction, anxiety, depression, perfectionism, interpersonal problems and lower levels of self-esteem would be risk factors for eating disorder psychopathology in transgender people who are not on CHT. Third, based on the centrality of body dissatisfaction to both gender incongruence (see chapter 3; Jones et al.,
2016b) and eating disorders (e.g., Stice & Shaw, 2002), it was hypothesised that if a significant relationship was found between body dissatisfaction and eating disorder psychopathology (addressed in aim 2), then the other identified risk factors would mediate this relationship in people who are not on CHT.

8.3. Method

8.3.1. Participants and recruitment

All patients offered an assessment at a national transgender health service in the United Kingdom (UK) between 2012 and 2015 were invited to take part in the study. This transgender health service offers assessment and gender affirming medical interventions to adults aged 17 and over who are considering, or wish to, medically transition.

8.3.2. Procedure

At initial assessment, participants were invited to complete socio-demographic questions and a range of self-report measures. This was part of a larger study for which ethical approval was obtained from the National Health Service (NHS) ethics committee and from the Research and Development Department from the Nottinghamshire Healthcare NHS Foundation Trust in accordance with Health Research Authority guidance (HRA, 2013; see Appendix M).

8.3.3. Measures

Socio-demographic information: Participants were asked to provide information about their age, gender assigned at birth, and stage of medical transition before assessment (e.g., whether or not they were on CHT). They were then invited to complete the following selection of self-report measures.

*Eating Disorder Inventory-2 (EDI-2; Garner, 1991)*: This questionnaire is commonly used to assess behaviours and psychological traits associated with eating disorder psychopathology. It has 11 subscales; three which assess eating-related symptoms (drive for thinness, bulimia, and body dissatisfaction) and eight which are associated with eating-related psychological features common in eating disorders (ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears, asceticism, impulse regulation, and social insecurity). In the current study, the drive for thinness and bulimia subscales were used to measure eating disorder psychopathology. The body dissatisfaction, perfectionism and
interpersonal distrust subscales were also used. Responses are rated on a 6-point Likert scale anchored from ‘never’ to ‘always’ and a higher score indicates a higher level of eating disorder psychopathology. All the subscales have previously been found to have good reliability among patients with an eating disorder and the general population (e.g., Nevonen, Clinton, & Norring, 2006). In the current study, the Cronbach’s alpha values were as follows: drive for thinness ($\alpha=.85$), bulimia ($\alpha=.83$), body dissatisfaction ($\alpha=.85$), perfectionism ($\alpha=.70$) and interpersonal distrust ($\alpha=.80$), showing that all had good reliability.

**Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965):** This is a 10-item self-report measure that assesses self-esteem using a 4-point Likert scale (‘strongly agree’ = 3 to ‘strongly disagree’ = 0). It produces a global score, which is calculated by summing the scores from the individual items. A high score indicates a higher self-esteem (highest possible score is 30). The measure has been validated and has excellent reliability ($\alpha=.88$–.90; Robins, Hendin, & Trzesniewski, 2001). In the current study, the reliability was also excellent ($\alpha=.92$).

**Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983):** This measure has 14 items in total, seven which relate to anxiety (HADS-A) and seven which relate to depression (HADS-D). The HADS-A and HADS-D subscale scores are calculated by summing scores from the individual items. Participants are asked to rate their responses on a 4-point Likert Scale (‘not at all’ = 1 to ‘most of the time’ = 3). For each subscale, scores between 0-7 are considered normal, scores between 8-10 are considered borderline clinical, and scores of 11 and above are considered clinically relevant (Snaith, 2003). The highest score possible is 21 for each subscale. The measure has good reliability in somatic, psychiatric and primary care patients as well as in the general population (Bjelland, Dahl, Haug, & Neckelmann, 2002). In the current study, both the anxiety ($\alpha=.84$) and depression ($\alpha=.77$) subscales had good reliability.

### 8.3.4. Data analysis

Data were analysed using SPSS 23 (IBM, 2015). The data were not normally distributed and therefore non-parametric tests were used when possible. Missing data were excluded using the pairwise method apart from in the Mann-Whitney U analysis where the test-by-test method was employed. Before the main analysis, descriptive analysis was conducted. For the first aim, a Mann-Whitney U test was conducted to determine whether there was a difference in eating disorder psychopathology between people who had taken CHT and those who had
not. For the second aim, preliminary one-tailed Spearman Rho correlations were conducted between the dependent variables (drive for thinness and bulimia) and independent variables (age, gender assigned at birth, anxiety, depression, self-esteem, body dissatisfaction, interpersonal distrust and perfectionism). As categorical variables cannot be entered into correlational analysis, a dummy variable was created for gender assigned at birth. The function of the Spearman’s Rho correlations was to determine which variables significantly correlated with the dependent variables and, consequently, to include only these variables in subsequent regression analysis to increase its robustness. Multicollinearity was not a cause for concern as no variable correlated at $r \geq .90$ with the outcome variables (Pallant, 2010). As multiple comparisons were conducted, Bonferroni corrections were used for the correlation analysis ($0.05 \div 16 = 0.003$). To determine which variables were able to explain the most variance in eating disorder psychopathology (drive for thinness and bulimia) in people who were yet to take CHT, stepwise multiple linear regression analysis was conducted. Once the risk factors had been established an ANCOVA was conducted to determine whether there was a significant difference in eating disorder symptoms between people who were and were not on CHT after controlling for the risk factors identified in the multiple linear regression analysis. For the third aim, mediation analysis was conducted to better understand the mechanisms that underlie the relationship between the independent variable (hypothesised to be body dissatisfaction) and eating disorder psychopathology (drive for thinness and bulimia). Mediation analysis was conducted using the PROCESS macro in SPSS (Hayes, 2013). Model 4, which uses the bias-corrected bootstrap confidence interval method, was employed. The level of significance used for all the analysis was $p<.05$.

### 8.4. Results

In total, 586 patients were invited for assessment during the study period and 563 (96%) agreed to participate. The mean age of participants was 29.49 years ($SD = 13.67$), slightly more participants were assigned male at birth ($n=352, 62.5\%$), and the majority were not on CHT prior to assessment at the transgender health service ($n=416, 73.9\%$; see Table 8.1.). While all participants were recruited at the point of assessment, some people had initiated CHT prior to assessment at this service ($n=139, 24.7\%$). Some participants may have initiated this intervention as their care was transferred from the child and adolescent gender identity development service and others might have obtained CHT through private health providers or via the Internet (Mepham, Bouman, Arcelus, Hayter, & Wylie, 2014). Table 8.1. also presents descriptive statistics separately for people who were and were not on CHT.
Table 8.1. Socio-demographic characteristics for the whole sample, for participants who have taken CHT, and for participants who have not taken CHT

<table>
<thead>
<tr>
<th></th>
<th>Total sample (N=563)</th>
<th>CHT (excluding blockers only†) (n=139)</th>
<th>No CHT (n=416)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender assigned at birth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>211 (37.5)</td>
<td>44 (31.7)</td>
<td>166 (39.9)</td>
</tr>
<tr>
<td>Male</td>
<td>352 (62.5)</td>
<td>95 (68.3)</td>
<td>250 (60.1)</td>
</tr>
<tr>
<td><strong>Cross-sex hormones</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (excluding blockers only)</td>
<td>139 (24.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>416 (73.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>8 (1.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: CHT (cross-sex hormone treatment); † (People who had only taken blockers (and not CHT) were excluded from the cross-sex hormones group as in contrast to CHT, hormone blockers do not affect secondary sex characteristics. Based on this, these people were included within the no cross-sex hormone group)

8.4.1. Aim 1: Differences in eating disorder psychopathology between people who were on CHT and those who were not

A Mann-Whitney U test was conducted to determine whether participants who were (n=139) and were not (n=416) on CHT differed in levels of drive for thinness and bulimia. The analysis demonstrated that transgender people who were not on CHT reported significantly higher levels of drive for thinness and bulimia compared to participants who were on CHT (see Table 8.2.).

Mann-Whitney U tests also showed that people who were not on CHT were significantly younger, had higher levels of body dissatisfaction and interpersonal distrust, more symptoms of anxiety and depression, and lower levels of self-esteem than participants who were on CHT (see Table 8.2.). There was no significant difference in levels of perfectionism between...
the two groups. A Pearson Chi-Squared test was conducted to explore differences in gender assigned at birth based on CHT use and this test was not significant ($\chi^2 (1) = 3.01$, $p = .083$) suggesting that gender assigned at birth is independent of CHT use.

Table 8.2. Means, standard deviations (SD) and Mann Whitney U tests of difference between people who have taken CHT and those who have not for all study variables

<table>
<thead>
<tr>
<th></th>
<th>No CHT (n=416) Mean (SD)</th>
<th>CHT (n=139) Mean (SD)</th>
<th>Mann-Whitney U</th>
<th>Z</th>
<th>Effect size</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>27.46 (12.15)</td>
<td>35.37 (16.02)</td>
<td>20126.50</td>
<td>-5.38</td>
<td>.23</td>
<td>.001</td>
</tr>
<tr>
<td>Drive for thinness</td>
<td>3.87 (4.95)</td>
<td>2.82 (4.07)</td>
<td>25207.50</td>
<td>-2.14</td>
<td>.09</td>
<td>.019</td>
</tr>
<tr>
<td>Bulimia</td>
<td>1.87 (3.54)</td>
<td>0.96 (2.32)</td>
<td>24178.00</td>
<td>-2.99</td>
<td>.13</td>
<td>.002</td>
</tr>
<tr>
<td>Body dissatisfaction</td>
<td>12.13 (6.96)</td>
<td>9.62 (6.83)</td>
<td>22368.00</td>
<td>-3.86</td>
<td>.16</td>
<td>.001</td>
</tr>
<tr>
<td>Interpersonal distrust</td>
<td>5.66 (4.60)</td>
<td>3.56 (3.86)</td>
<td>20609.50</td>
<td>-4.72</td>
<td>.36</td>
<td>.001</td>
</tr>
<tr>
<td>Anxiety</td>
<td>8.27 (4.31)</td>
<td>6.45 (4.00)</td>
<td>21021.50</td>
<td>-4.39</td>
<td>.19</td>
<td>.001</td>
</tr>
<tr>
<td>Depression</td>
<td>7.22 (3.88)</td>
<td>5.18 (3.48)</td>
<td>19270.50</td>
<td>-5.37</td>
<td>.23</td>
<td>.001</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>14.74 (6.52)</td>
<td>19.01 (6.49)</td>
<td>17849.00</td>
<td>-6.31</td>
<td>.27</td>
<td>.001</td>
</tr>
<tr>
<td>Perfectionism</td>
<td>5.10 (4.19)</td>
<td>4.88 (3.86)</td>
<td>27975.50</td>
<td>-0.28</td>
<td>.01</td>
<td>.410</td>
</tr>
</tbody>
</table>

Note: CHT (cross-sex hormone treatment)

8.4.2. Aim 2: Risk factors of eating disorder psychopathology in people who were not on CHT

Drive for thinness: Body dissatisfaction, high levels of perfectionism, the experience of interpersonal distrust, symptoms of anxiety and depression and low self-esteem were all significantly correlated with drive for thinness in people who were not on CHT (n=416; see Table 8.3.) and were therefore entered into the subsequent stepwise regression analysis.
Table 8.3. One-tailed Spearman’s Rho correlations between drive for thinness, bulimia and the study variables for people who have not taken CHT (n=416)

<table>
<thead>
<tr>
<th></th>
<th>Drive for thinness</th>
<th>Bulimia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.01</td>
<td>-.12</td>
</tr>
<tr>
<td>Male gender assigned at birth†</td>
<td>-.05</td>
<td>-.07</td>
</tr>
<tr>
<td>Female gender assigned at birth†</td>
<td>.05</td>
<td>.07</td>
</tr>
<tr>
<td>Body dissatisfaction</td>
<td>.48***</td>
<td>.31***</td>
</tr>
<tr>
<td>Perfectionism</td>
<td>.24***</td>
<td>.26***</td>
</tr>
<tr>
<td>Interpersonal distrust</td>
<td>.27***</td>
<td>.30***</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.35***</td>
<td>.36***</td>
</tr>
<tr>
<td>Depression</td>
<td>.30***</td>
<td>.28***</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>-.37***</td>
<td>-.48***</td>
</tr>
</tbody>
</table>

Note: CHT (cross-sex hormone treatment); † entered as dummy variables
*p<.05, **p<.01, ***p<.001 (corrected for multiple comparisons)

Overall, the stepwise regression model was significant and the significant variables explained 30% of the total variance of drive for thinness (see Table 8.4.). Higher levels of body dissatisfaction made the largest contribution to the variance followed by high levels of perfectionism and anxiety symptoms (see Table 8.4.). The average VIF (Variance Inflation Factor) for this model was 1.10 and the average tolerance was .91. The average VIF was not greater than 10 (Myers, 1990) and the average tolerance was not below .10 (Menard, 1995), which indicates that the assumptions of multicollinearity for this model were met and hence the variables were not too highly correlated.

Bulimia: Body dissatisfaction, high levels of perfectionism, the experience of interpersonal distrust, symptoms of anxiety and depression, and low self-esteem were all significantly correlated with bulimia in people who were not on CHT (n=416; see Table 8.3.). These six variables were therefore entered into a subsequent stepwise regression model. Overall, this model was significant and explained 25% of the total variance in bulimia (see Table 8.4.). Low self-esteem made the largest contribution to the variance, followed by high levels of perfectionism, body dissatisfaction and symptoms of anxiety (see Table 8.4.). The average VIF for this model was 1.38 and the average tolerance was .75 indicating that there is no multicollinearity within the model (Menard, 1995; Myers, 1990).
After determining the risk factors for eating disorder psychopathology in people yet to commence cross-sex hormones (n=416), an ANCOVA was conducted to determine whether there was a significant difference in eating disorder psychopathology between people who were (n=139) and were not (n=416) on CHT, after controlling for the identified risk factors. It was found that there was no longer a significant difference in drive for thinness between people who were and were not on CHT when body dissatisfaction, perfectionism and symptoms of anxiety were controlled for ($F(1, 538) = .35, p=.885$). It was also found that there was no longer a significant difference in levels of bulimia between people who were and were not on cross-sex hormones after self-esteem, perfectionism, body dissatisfaction and symptoms of anxiety were controlled for ($F(1, 529) = .03, p=.868$).

8.4.3. **Aim 3:** Exploring the mediators of the relationship between risk factors and eating disorder psychopathology in people who were not on CHT

In addressing aim 2, it was found that high levels of body dissatisfaction were a risk factor for both drive for thinness and bulimia. Due to the centrality of body dissatisfaction in both gender incongruence (see chapter 3; Jones et al., 2016b, van de Grift et al., 2016c, 2017a) and eating disorders (e.g., Stice & Shaw, 2002), mediators of the relationship between body dissatisfaction and eating disorder psychopathology were explored for people who had not
yet commenced CHT (n=416). The remaining risk factors identified in aim 2 were explored as mediators (perfectionism, symptoms of anxiety and self-esteem). Mediation occurs when the bootstrapped lower and upper confidence intervals do not include zero.

Perfectionism (model 1) and symptoms of anxiety (model 2) were explored separately as mediators of the relationship between body dissatisfaction and drive for thinness. Self-esteem (model 3), perfectionism (model 4) and anxiety (model 5) were explored separately as mediators of the relationship between body dissatisfaction and bulimia. Figure 8.1. demonstrates the five different models analysed through the direct and indirect effects. As can be seen by the unstandardized beta model coefficients (a, b, c) in Table 8.5., X (the independent variable; body dissatisfaction) always significantly predicted M (the mediator) depicted by pathway (a), and M always significantly predicted Y (the outcome variable; drives for thinness or bulimia) depicted by pathway (b), in all five models analysed. The direct effect (X-Y; depicted by pathway c) was also significant in all models (see Table 8.5.). For the indirect effect, a bias-corrected bootstrap confidence interval based on 5000 bootstrap sample was explored. As the bootstrapped lower and upper confidence intervals did not include zero it can be concluded that perfectionism (model 1) and symptoms of anxiety (model 2) each significantly mediated the relationship between body dissatisfaction and drive for thinness. This indicates that the relationship between body dissatisfaction and drive for thinness can be explained by the presence of perfectionism and anxiety symptoms. In addition, self-esteem (model 3), perfectionism (model 4) and symptoms of anxiety (model 5) each mediated the relationship between body dissatisfaction and bulimia (see Table 8.5.). This indicates that the relationship between body dissatisfaction and bulimia can be explained by the low self-esteem, perfectionism and anxiety symptoms.
Chapter 8 (study 3): Eating disorder psychopathology

**Figure 8.1.** Mediation analyses for perfectionism and anxiety as mediators between body dissatisfaction and drive for thinness and, for self-esteem, perfectionism and anxiety as mediators between body dissatisfaction and bulimia.
Table 8.5. Perfectionism, self-esteem and anxiety as potential mediators of the relationship between body dissatisfaction and eating disorder psychopathology (drive for thinness and bulimia) in people who have not taken CHT (n=416)

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Mediator in model</th>
<th>a (beta) (X-M)</th>
<th>b (beta) (M-Y)</th>
<th>c (beta) (X-Y; direct effect)</th>
<th>ab (beta) (indirect effect)</th>
<th>Bootstrap lower CI</th>
<th>Bootstrap upper CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive for thinness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1: Perfectionism</td>
<td>.09**</td>
<td>.23***</td>
<td>.33***</td>
<td>.02</td>
<td>.01</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Model 2: Anxiety</td>
<td></td>
<td>.15***</td>
<td>.23***</td>
<td>.31***</td>
<td>.03</td>
<td>.02</td>
<td>.06</td>
</tr>
<tr>
<td>Bulimia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 3: Self-esteem</td>
<td>-.39***</td>
<td>-.19***</td>
<td>.10**</td>
<td>.07</td>
<td>.05</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Model 4: Perfectionism</td>
<td>.09***</td>
<td>.29***</td>
<td>.14***</td>
<td>.02</td>
<td>.01</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Model 5: Anxiety</td>
<td></td>
<td>.15***</td>
<td>.25***</td>
<td>.12***</td>
<td>.04</td>
<td>.02</td>
<td>.06</td>
</tr>
</tbody>
</table>

Note: X-body dissatisfaction, M-mediator variable (perfectionism, self-esteem and anxiety), Y-outcome variable (drive for thinness or bulimia).

CHT (cross-sex hormone treatment)

*p<.05, **p<.01, ***p<.001
8.5. Discussion

This study aimed to understand the risk factors for eating disorder psychopathology within the transgender population, as well as the role of CHT in eating disorder psychopathology. The current study found that transgender people who were on CHT had significantly lower levels of eating disorder symptoms than transgender people who were not. When comparing this finding to previous literature, people within the current study who were on CHT presented with similar levels of eating disorder psychopathology compared to the general population (Witcomb et al., 2015). In contrast, transgender people in the current study who were not on CHT presented with higher levels of eating psychopathology than is found within the general population (Witcomb et al., 2015). When the current study’s finding and previous research are considered together, it suggests that CHT may be able to alleviate eating disorder psychopathology, which is in keeping with previous research (Fisher et al., 2014; Khoosal et al., 2009) and case studies (Couturier et al., 2015; Winston et al., 2004) that have supported the notion that eating disorder psychopathology in transgender people is secondary to gender incongruence.

This study is novel in that it aimed to understand why CHT might alleviate eating disorder symptoms by exploring risk factors in transgender people yet to undergo a medical transition. The current study found that high levels of body dissatisfaction, perfectionism, symptoms of anxiety, and low self-esteem were all risk factors for eating disorder psychopathology as reported in the cisgender literature (e.g., Brechan & Kvalem, 2013; Dakanalis et al., 2016; Egan et al., 2011; Fairburn et al., 2003; Keel et al., 1997; Puccio et al., 2017; Tchanturia et al., 2016). Once the identified risk factors for eating disorder psychopathology were controlled for, there was no longer a significant difference in eating disorder symptoms between people who were and were not on CHT. This finding suggests that CHT alleviates eating disorder symptoms as it reduces levels of body dissatisfaction, perfectionism, symptoms of anxiety and increases self-esteem.

Within the cisgender literature, body dissatisfaction has been described as a core feature of - though not sufficient to adequately explain - eating disorder symptoms (Polivy & Herman, 2002) and, consequently, other factors have been found to mediate the relationship between body dissatisfaction and eating disorder psychopathology (e.g., Brechan & Kvalem, 2015; DeBoer & Smits, 2013; Fairburn et al., 2003; Harrison et al., 2009). This also appears to be the case within the transgender population as the current study found high levels of
perfectionism and symptoms of anxiety to mediate the relationship between body dissatisfaction and drive for thinness. Additionally, low self-esteem, high levels of perfectionism and symptoms of anxiety were found to mediate the relationship between body dissatisfaction and bulimia in transgender individuals. These findings help to clarify the mechanisms through which CHT might be able to alleviate eating disorder symptoms. They suggest that CHT primarily alleviates high body dissatisfaction, which in turn reduces levels of perfectionism and symptoms of anxiety, and increases self-esteem. In combination, these factors then appear to alleviate eating disorder symptoms. This is the first study with transgender people that has been able to indicate how cross-sex hormones alleviate eating disorder symptoms, although this finding needs to be replicated with longitudinal research.

Clinicians working in eating disorder services should routinely assess gender identity issues as this is where transgender people may first present due to experiencing high levels of body dissatisfaction and eating disorder symptoms that are secondary to gender incongruence. Such patients should be referred to transgender health services as this study has shown the positive role that CHT plays in eating disorder symptoms. CHT is likely to be more effective than interventions offered at eating disorder services in these circumstances (Ewan, Middleman, & Feldmann, 2014).

When patients are referred to transgender health services with symptoms of an eating disorder, clinicians might be reluctant to accept such patients onto the treatment programme until these issues are resolved. The findings of the current study indicate that for patients presenting with high levels of eating disorder symptoms (that are secondary to gender identity issues), timely initiation of CHT may reduce these symptoms, as well as gender incongruence. Given the existence of barriers to accessing transgender healthcare (Bouman & Richards, 2013; Jones et al., 2017c; Kanamori & Cornelius-White, 2016; Scheim, Zong, Giblon, & Bauer, 2017), it is imperative that access to these services is increased to minimise the risk of eating disorder psychopathology. In addition, although gender affirming medical interventions alleviate body dissatisfaction (a core feature of eating disorder psychopathology) for many people, patients who report very high body dissatisfaction before gender affirming medical interventions have been found to continue to do so after gender affirming medical interventions (van de Grift et al., 2017a). Clinicians at transgender health services must consider that these patients (who continue to report high body dissatisfaction after gender affirming interventions) may be vulnerable to eating disorder psychopathology.
Within the current study, neither age or gender (assigned at birth) were found to be risk factors for eating disorder psychopathology within treatment seeking transgender people who were yet to commence CHT. This contrasts with research within the cisgender population which has found adolescents and young adult females to be at greater risk than males and older people (e.g., Fairburn & Harrison, 2003; Zeiler et al., 2016) and was despite the current study finding that people who were yet to commence CHT were significantly younger (and reported more eating disorder symptoms) than people who had initiated CHT. Previous research with transgender people has found transgender men (assigned female at birth) to report very high levels of body dissatisfaction (a common feature of eating disorder psychopathology) that were comparable to cisgender men with an eating disorder (Witcomb et al., 2015). This finding was not replicated when transgender women were compared to cisgender women with an eating disorder (Witcomb et al., 2015). Therefore, although gender may not be a risk factor for eating disorder symptoms within the transgender population, clinicians at both eating disorder and transgender health services should be mindful that people assigned female at birth may report a higher prevalence of eating disorder symptoms than people assigned male at birth.

For the first time, the current study has identified multiple risk factors for eating disorder psychopathology within a large sample of treatment seeking transgender people. In addition to this, the alleviating role that CHT plays in eating disorder symptoms has been recognised. This is in contrast to previous research, which has found levels of eating disorder symptoms in the transgender population to be higher than in the general population without understanding why (Witcomb et al., 2015). However, the following limitations should be considered. First, this study is cross-sectional and therefore causality cannot be determined. Risk factors need to be explored with further longitudinal research. Second, the group sizes within the comparative analysis were different which might have impacted on the findings. Finally, analysis was conducted in relation to gender assigned at birth. The majority of transgender people will transition within the binary gender system (i.e., man or woman) but there are increasing numbers of transgender people who identify outside the binary gender system (i.e., gender neutral, non-gender, bigender) or are fluid with their gender identity (Arcelus & Bouman, 2017a). Therefore, future research should be concerned with transgender people who identify as a woman, a man, and outside the binary gender system.
8.5.1. Conclusion

In conclusion, transgender people who were not on CHT reported more eating disorder symptoms than transgender people who were on CHT. The findings suggest that CHT may be able to alleviate eating disorder symptoms primarily through positively impacting on body dissatisfaction (i.e., increasing body satisfaction) which, in turn, reduces levels of perfectionism and symptoms of anxiety and increases self-esteem. Clinicians working at eating disorder services should incorporate the assessment of gender identity issues within their clinical practice and refer patients with such issues to transgender health services so that they can be evaluated for CHT.
Previous literature and the findings from the research presented in this thesis so far have established that treatment seeking transgender people are vulnerable to poor mental health and body dissatisfaction in comparison to cisgender people, especially when a medical transition has not yet been initiated. However, this knowledge has been established through the use of self-report measures that have not been developed or validated with the transgender population and therefore such measures lack specificity. In light of this, the aim of chapter 9 (study 4) was to develop and validate a new transgender health outcome measure with the transgender population.
Chapter 9 (study 4): Gender Congruence and Life Satisfaction Scale

The Gender Congruence and Life Satisfaction Scale (GCLS): Development and validation of a scale to measure outcomes from transgender health services

This chapter is under review with the Archives of Sexual Behavior (impact factor: 2.72) as: 


**Statement of authorship**

*Research conception and design:* BJ, WB, EH, JA.

*Data collection:* BJ.

*Data analysis and interpretation:* BJ, EH & JA.

*Drafting of article:* BJ.

*Article editing and revisions:* BJ, WB, EH, JA.

The findings from chapter 9 (study 4) have also been presented at an academic conference:

9.1. Abstract

It is vital that the treatment offered at transgender health services can be evaluated to ensure a high quality of care. However, there are currently no tools that are capable of assessing improvements in patients’ experiences of gender distress, gender incongruence, associated mental well-being, and general life satisfaction, simultaneously. This study therefore aimed to develop and validate such a tool. The Gender Congruence and Life Satisfaction Scale (GCLS) was developed through reviewing the literature, conducting interviews with transgender people, and holding discussions with experts working in transgender healthcare. An initial pool of items was developed and feedback on these was obtained. A total of 789 participants (451 transgender (171 transgender females, 147 transgender males, 133 non-binary individuals), and 338 cisgender (254 females, 84 males)) were recruited from the UK to test the factor structure and validity of the GCLS. Exploratory factor analysis retained 38 items which formed seven subscales (psychological functioning; genitalia; social gender role recognition; physical and emotional intimacy; chest; other secondary sex characteristics; and, life satisfaction). These seven subscales were found to have good internal consistency and convergent validity. The GCLS was also found to be capable of discriminating between groups (e.g., people who have and have not undergone gender affirming medical interventions). Transgender and cisgender subscale norms are provided for the GCLS. It can therefore be concluded that the GCLS is a suitable tool to use with the transgender population to measure health-related outcomes for both clinical and research purposes.
9.2. Introduction

Transgender people are those who experience a discrepancy between the gender they were assigned at birth and their gender identity. Transgender males are people who were assigned female at birth, on the basis of their sexual characteristics, but identify as male. Transgender females are people who were assigned male at birth, on the basis of their sexual characteristics, but identify as female. Some transgender people may also identify between or outside the binary gender spectrum. These people may choose to identify as gender neutral (feeling that one is neither male nor female), non-gender (having no gender in relation to presentation), or gender queer (identifying and presenting in a way that is outside the gender dichotomy of male and female) (Arcelus & Bouman 2017; Richards et al., 2016). Some people may also be more fluid with their gender identity whereby they do not have a fixed gender and it can therefore vary over time. Cisgender people do not experience such discrepancy (Arcelus & Bouman, 2017a; Bouman et al., 2017b). Many transgender people experience high levels of distress due to the discrepancy between their birth-assigned gender and gender identity (e.g., Beek, Kreukels, Cohen-Kettenis, & Steensma, 2015). To alleviate this distress, many transgender people will approach transgender health services in order to access gender affirming medical interventions to help them transition to the gender they identify with. Health professionals working at transgender health services may start their patients on cross-sex hormone treatment to induce either masculinisation (with testosterone) or feminisation (with oestrogen and often with testosterone-blocking medication), depending on the patient’s gender identity (Coleman et al., 2012; Wylie et al., 2014). After living as their experienced gender, transgender people, if they wish to do so, can be referred for gender affirming surgery (Coleman et al., 2012; Wylie et al., 2014).

Transgender health services throughout Europe and North America have seen a substantial increase in the number of referrals in recent years. This has put a strain on these services, especially in relation to waiting times for assessment and treatment (Aitken et al., 2015; de Vries, Kreukels, T'Sjoen, Älgars, & Mattila, 2015). In the United Kingdom (UK) patients can expect to wait more than one year before their first appointment at a transgender health service (Bouman & Richards, 2013; UK Trans Info, 2016). In light of this, evaluating the care and treatment received at these services is important. This will allow for the quality of care to be improved and will also facilitate the identification of service and personal factors associated with positive and negative outcomes (e.g., Dawson, Doll, Fitzpatrick, Jenkinson, & Carr, 2010). If factors associated with positive and negative outcomes of transgender
health services can be identified, patient-centred services can be created which provide extra support for patients who are vulnerable to poorer outcomes. Identification of these factors may also help to make the treatment process timely and more efficient for patients who are deemed not to be vulnerable. Patient-centred services are crucial in improving patient outcomes (e.g., Lauver et al., 2002). In addition, within nationalised social healthcare systems which are present in most European countries, access to care, including transgender healthcare, is free at the point of access for all citizens. However, these healthcare systems have limited resources and, at some point, rationing decisions may have to be made. Tools that predict which interventions are associated with good outcomes are vital to assist with making decisions regarding the allocation of healthcare resources and to explore how to improve overall patient outcomes.

In the literature, there are few studies that have explored patient treatment outcomes after gender affirming interventions, such as cross-sex hormones and gender affirming genital surgery. On the whole, these studies have demonstrated that mental health and quality of life improve following gender affirming medical interventions (Davis & Meier 2014; De Cuypere, Elaut, Heylens, & Monstrey, 2006; Fisher et al., 2014; Gorin-Lazard et al., 2012; Heylens, Verroken, De Cock, T’Sjoen, & De Cuypere, 2014; Jones, Haycraft, Murjan, & Arcelus, 2016b; Lindqvist et al., 2016; Murad et al., 2010; Ruppin & Pfäfflin 2015; van de Grift et al., 2016c). The main focus of outcome evaluations at transgender health services has often been based around mental health symptoms (e.g., anxiety, depression) (e.g., Heylens et al., 2014; Murad et al., 2010). While mental health is evidently an important aspect to include within any outcome assessment of gender affirming medical interventions, given the high prevalence of mental health problems transgender people often experience before gender affirming medical interventions (Dhejne, Van Vlerken, Heylens, & Arcelus, 2016), it should not be the sole focus. Researchers have argued that improvements in mental health should not be the only focus of transgender health service evaluations, as mental health interventions are generally not provided by transgender health services (Arkelus & Bouman, 2015; Dhejne et al., 2016). Patient outcomes will also be biased by levels of mental health problems experienced before treatment. Moreover, the treatment pathways for transgender people consist of multidisciplinary treatment options, which further complicates the evaluation of these interventions.
One of the most important outcomes that should be measured after gender affirming medical interventions is a change in the distress and unhappiness a person experiences with their experienced gender and body as a result of their gender identity being at odds with their assigned gender (i.e., gender incongruence). Measurement of this outcome is often neglected due to the lack of available measures that have been developed with the transgender population and are capable of assessing a change in distress and unhappiness a person experiences with their gender and body. The few measures that are available to assess gender distress (such as the Utrecht Gender Dysphoria Scale; Cohen-Kettenis & van Goozen, 1997) and body dissatisfaction (such as the Hamburg Body Drawing Scale; Becker et al., 2016), although useful, are limited. These measures have been developed with the binary gender system in mind (i.e., male or female) which is problematic in light of an increasing number of people identifying as non-binary or outside the gender binary (Beek et al, 2015; Richards et al., 2016); also, participants are asked to complete different versions depending on the gender they were assigned at birth. Measures developed to assess treatment outcomes within the transgender population therefore need to ensure they encapsulate people with non-binary gender identities and be gender neutral (i.e., applicable to all genders). A gender neutral measure also allows clinicians to assess outcomes using the same tool throughout the medical transition.

In addition, for outcome evaluations to be meaningful, the measures employed must have been developed for, and validated with, the population in question (Dawson et al., 2010). Currently, mental health and quality of life measures that are used to assess patient outcomes at transgender health services have often been developed for use with other specific (and dissimilar) populations (e.g., Eating Disorder Inventory-2; Garner, 1991) or the general population (e.g., Hospital Anxiety and Depression Scale; Zigmond & Snaith, 1983). Therefore, these measures are unlikely to be specific enough (i.e., unlikely to ask about mental health problems in relation to gender distress) to be used with the transgender population for meaningful evaluations. Due to the lack of a suitable, validated mental health and quality of life measure, transgender health services usually invite patients to complete a series of measures that assess different constructs relating to mental health and quality of life to ensure evaluations are comprehensive. Research has found respondent burden to be great when patients are asked to complete multiple questionnaires, especially when these questionnaires assess similar constructs (Rolstad, Adler, & Ryden, 2011; Turner et al., 2007). Respondent burden can affect the quality of data gathered and may reduce response rates.
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(Diehr, Chen, Patrick, Feng, & Yasui, 2005; Snyder et al., 2007). In light of this, treatment evaluations collected at transgender health services are likely to be of a poor quality as they might have been affected by respondent burden.

9.2.1. Aims
The objective of this study was to develop a self-report tool that was capable of assessing gender distress, gender congruence, associated mental well-being, and life satisfaction. Such a tool is imperative to ensure evaluations are mapped onto the most important aims of gender affirming medical treatment and to allow meaningful and efficient evaluations to take place at transgender health services. The tool that was developed in the current study has been named the Gender Congruence and Life Satisfaction Scale (GCLS). Details of the development of the GCLS will be provided in the method. Once the tool had been developed, the first aim of this study was to explore the factor structure of the GCLS. The second aim was to explore the convergent and discriminant validity of the GCLS (types of construct validity). The final aim was to determine whether the GCLS can distinguish between subgroups (i.e., transgender and cisgender people) and be sensitive to changes in gender distress, gender incongruence, associated mental well-being, and life satisfaction throughout the treatment process (known-groups validity; a further type of construct validity). The final aim therefore also provides an opportunity to pilot the GCLS with transgender people and provide subscale norms.

9.3. Method
9.3.1. Participants and recruitment
Two different groups of participants were involved in this study: transgender people and cisgender (non-trans) people.

Part of the study sample comprised transgender people who were invited from a national transgender health service within the UK. This is a National Health Service (NHS) funded centre, which offers assessment and treatment to transgender people who are pursuing, or are considering, medical transition. The centre is one of the largest in Europe and receives around 1000 referrals a year from England and Wales. This service accepts referrals from people aged 17 and over. Clinicians at the service informed participants of the existence of the study and provided them with the information sheet and details about how to participate.
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Some transgender people and all of the cisgender participants were recruited through the community via snowball sampling. All transgender and cisgender people recruited through the community were required to be aged 18 or over. This was achieved by sharing an online link to the study with transgender support organisations (for transgender people only), via social media websites, and by email. The content of this advertisement was the same for transgender and cisgender people recruited through the community. Participants that took part in the online survey were then asked to pass the link on to others in their network.

Recruitment took place over four months during 2016. A total of 458 transgender participants were invited. However from this sample, seven people were removed as they either had provided no information about their gender assigned at birth and gender identity (n=3) or had not indicated whether or not their gender assigned at birth and gender identity were the same (n=4). The final sample consisted of 451 transgender people. In addition, a total of 375 cisgender participants were invited. Of these participants, 37 were removed as they reported a gender identity that was different from the gender they were assigned at birth. The final cisgender sample therefore consisted of 338 participants. The final sample size therefore included 789 participants (338 identified as cisgender (42.8%) and 451 as transgender (57.2%)).

9.3.2. Procedure

After participants had read through the information sheet and decided whether or not they would like to take part, they were invited to complete the first iteration of the newly developed tool (GCLS). Participants recruited from the transgender health service were either asked to complete a paper questionnaire pack in their own time and return this to the service in a prepaid envelope, or complete the online survey. Community participants were asked to complete the survey online. No paper alternative was offered. Informed consent was obtained from all participants prior to taking part in the study.

The study was approved by an NHS research ethics committee and by the Research and Development Department of Nottinghamshire Healthcare NHS Foundation Trust (16/EM/0183) in line with Health Research Authority guidance (HRA, 2013), as well as Loughborough University Research Ethics Committee (see Appendix M).
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9.3.3. Development of the Gender Congruence and Life Satisfaction Scale
Several processes were undertaken to complete the development of the GCLS. First, systematic reviews of the available literature on treatment outcomes, including body dissatisfaction (see chapter 3; Jones et al., 2016b) and mental health were conducted (see Dhejne et al., 2016). This was followed by a review of existing body dissatisfaction measures that are currently used to assess patient outcomes at transgender health services (Jones et al., 2016b). Next, in-depth interviews with 14 transgender people attending a national transgender health service in the UK were undertaken as part of a larger study (see chapter 6; Jones, Arcelus, Bouman, & Haycraft, 2017b). These interviews highlighted how distress and dissatisfaction with gender, associated mental well-being, and life satisfaction improved over the treatment process. The study provided valuable information regarding the most important objectives of transgender health services from the patients’ point of view. Following this, several discussions took place with clinicians from different transgender health services in the UK, Sweden and Belgium. All of the outlined processes and studies mentioned above informed the first draft of the GCLS. The items within this first draft were developed as a result of the authors reviewing other self-report measures relating to gender incongruence, gender distress, mental well-being (including body dissatisfaction), and life satisfaction used with the transgender and cisgender population. This promoted a discussion among the research team about some of the limitations of these measures (e.g., not transgender specific, developed within the binary gender system). Some of the limitations were identified through earlier phases of development (i.e., the review of existing measure used to assess body dissatisfaction). The team then worked together to develop a list of items whilst taking into consideration some of the limitations identified in the previous phase. To be a valid item it had to: 1) be related to gender incongruence, gender distress, mental well-being or life satisfaction; 2) assess this construct in relation to gender incongruence and/or gender distress (i.e., I have felt extremely distressed when looking at my genitals); 3) be gender neutral. This process resulted in 85 items being developed.

The first draft of the GCLS was then discussed with the Nottingham Centre for Transgender Health Patient and Public Involvement (PPI) group. This PPI group consisted of 21 people who were attending, or had attended, the service and agreed to provide feedback for research projects taking place at the service. This consultation resulted in a revised draft of the GCLS. The authors also worked in consultation with transgender people in the community who were recruited through charities and support organisations for transgender and LGBT people.
within the UK. This included asking people to comment on the tool and the items that comprised it. Feedback was collected which allowed the development of the next draft of the scale, which was shared with several clinicians and academics in the field, including clinical academics from outside the UK (Sweden and Belgium). Following feedback, several drafts were developed which were discussed with the above groups until a tool that satisfied everyone was created. This process resulted in a tool with 42 items initially being created.

9.3.4. Measures
Socio-demographic questions: Information about participants’ age, their gender assigned at birth and gender identity was collected. Participants were invited to provide information (if applicable) about their gender transition, including the amount of time they spend living in their experienced gender in their daily lives (less than 50%, more than 50%, or 100% of the time). They were also asked whether they were using cross-sex hormones and/or blockers (if relevant) and whether they had undergone any gender affirming surgery (‘Yes’ or ‘No’ response style). On the online survey, these questions were only visible to individuals who indicated incongruence between their birth and experienced gender (i.e., these questions were not visible to cisgender participants).

Gender Congruence and Life Satisfaction Scale (GCLS; Jones, Bouman, Haycraft, & Arcelus, 2017): This 38-item scale aims to assess change and measure improvements in gender (in)congruence, related mental well-being, and life satisfaction throughout the process of undergoing gender affirming medical interventions. The scale is independent of gender assigned at birth and was developed to be relevant to people who identify as male, female, as well as those who identify outside the binary gender system (e.g., non-binary). The GCLS asks respondents to think about how they have felt over the last 6 months and to rate their responses on a 5-point Likert scale (always=1; never=5). In the final (38 item) version of the scale, 11 items were reverse coded (i.e., never = 1; always = 5). A higher score indicates a greater gender congruence, greater gender-related well-being, and greater life satisfaction. In contrast, a lower score indicates lower gender congruence, poorer gender-related well-being, and poorer general life satisfaction.

Hamburg Body Drawing Scale (HBDS; Becker et al., 2016): This scale was originally developed by Appelt and Strauss (1988) for use with individuals with different forms of psychoendocrinological disorders and assesses satisfaction with 33 different body parts.
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Becker et al. (2016) recently validated the scale with the transgender population and adapted it to include male and female specific subscales (Becker et al., 2016). There is also an item that assesses overall satisfaction with appearance. This was the only item used in the current study and the reason for including it was to assess the convergent validity of the GCLS (i.e., to determine whether two measures that theoretically should be related, are related). The male and female subscales were not used within the current study as they are not appropriate to use with non-binary transgender people. Participants are asked to rate their responses on a 5-point Likert scale (1 = very dissatisfied; 5 = very satisfied) and therefore a higher score indicates a higher level of body satisfaction. Becker et al. (2016) found the HBDS subscales to have good reliability ($\alpha=.62-.91$). As it is not possible to conduct reliability analysis with just one item, this was not calculated in the current study.

Transgender Congruence Scale (TCS; Kozee, Tylka, & Baurband, 2012): This measure has 12 questions, of which nine correspond with ‘appearance congruence’ (e.g., ‘I do not feel that my appearance reflects my gender identity’; ‘I am generally comfortable with how others perceive my gender identity when they look at me’) and three relating to ‘gender identity acceptance’ (e.g., ‘I am not proud of my gender identity’). Mean scores are calculated for each subscale. A global score can also be calculated by finding the mean of all responses. In the current study, only the 9-item appearance congruence subscale was used to assess convergent validity. Responses are rated on a 5-point scale from 1 = strongly disagree to 5 = strongly agree. A higher score indicates a higher level of transgender congruence. This measure has been found to have good reliability ($\alpha=.93$; Kozee et al., 2012) and in the current sample, the appearance congruence subscale had excellent reliability ($\alpha=.96$).

World Health Organisation Quality of Life-BREF (WHOQOL-BREF; Harper, 1998): The WHOQOL-BREF has 26 items which measures four domains: psychological, physical, relationships, and environment. There are also two items which are assessed separately that ask about overall quality of life and overall health. In the current study the psychological and relationships subscales were used as well as the item that assessed overall quality of life, so as to assess convergent validity. The questions are rated on a 5-point Likert scale (1 = very dissatisfied; 5 = very satisfied) and a higher score indicates a higher quality of life. The subscale scores are calculated using the mean and then multiplied by four. This is to make the scores from the WHOQOL-BREF comparable to the WHOQOL-100 (Harper, 1998), which is the longer original questionnaire. The WHOQOL-BREF has been found to have good to
excellent reliability and validity in the general population and in clinical populations (e.g., rehabilitation, primary care, mental health) across 23 countries (Skevington, Lofty, & O’Connell, 2004). In this study, the psychological ($\alpha=.89$) and relationships ($\alpha=.76$) subscales had very good reliability.

**Internet Gaming Disorder Scale-Short Form (IGDS; Pontes & Griffiths, 2015):** This measure is a brief 9-item questionnaire that assesses internet gaming behaviour (e.g., ‘Do you systematically fail when trying to control or cease your gaming activity?’). Participants are asked to rate their responses on a 5-point Likert scale (1 = never; 5 = very often). Scores range from 9-45 and are calculated by summing all responses. A higher score indicates more problematic gaming behaviour. The measure has good reliability ($\alpha=.87$) (Pontes & Griffiths, 2015) and in this study had excellent reliability ($\alpha=.92$). This measure was included within the current study to assess discriminant validity (i.e., to determine whether two measures are not related, as would theoretically be expected).

### 9.3.5. Data analysis

For the first aim of the study, principal component analysis was conducted with data from the transgender participants only to determine the factor structure of GCLS. For factor analysis, Comrey and Lee (1992) suggested that 300 participants is a good sample size and therefore the number of transgender participants (n=451) is considered adequate. For the second aim, convergent and discriminant validity testing was conducted. To assess convergent and discriminant validity, one-tailed Spearman’s Rho correlations (as the data were non-normally distributed) were conducted between the GCLS and the WHOQOL, HBDS, TCS and IGDS with the transgender participants only (n=451). As multiple comparisons were conducted, Bonferroni corrections were used ($p.05 \div 13 = p.004$). For the final aim, known-groups validity testing (another form of construct validity) was conducted. This analysis determines whether known-groups within the dataset, in this circumstance transgender people at different stages of their transition (i.e., cross-sex hormones vs. no cross-sex hormones) and cisgender people score in a theoretically expected way on the GCLS (e.g., transgender people score lower than cisgender people indicating a poorer outcome). Norm values were also generated for the GCLS subscales, global scale and clusters explored among the different groups. One-tailed Mann-Whitney U tests were conducted for this aim as the data were non-normally distributed. The significance level was set at $p<.05$. 

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9.4. Results
Descriptive statistics relating to the gender identities of the transgender people are displayed in Table 9.1. The mean age of all transgender participants was 36.94 \((SD=15.46)\) and ranged from 17 to 77 years. Of the 451 transgender people, 189 (41.9%) had not undergone any gender affirming medical intervention, 145 (32.2%) had taken cross-sex hormone treatment only, 22 (4.9%) had taken cross-sex hormones and undergone mastectomy only, 92 (20.4%) had taken cross-sex hormone treatment and undergone genital surgery (+/- mastectomy) and 3 (.7) had undergone genital surgery but were not taking cross-sex hormone treatment. The gender identities of these groups are displayed in Table 9.1. In the cisgender sample, 84 (24.9%) were male and 254 female (75.1%). The mean age of the cisgender sample was 36.52 \((SD=12.23)\) and ranged from 19 to 70 years.

Table 9.1. Gender identities of the transgender sample by stage of medical transition

<table>
<thead>
<tr>
<th></th>
<th>Transgender female</th>
<th>Transgender male</th>
<th>Non-binary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole transgender sample (n=451) (%)</td>
<td>171 (37.9)</td>
<td>147 (32.6)</td>
<td>133 (29.5)</td>
</tr>
<tr>
<td>No GAMI group (n=189) (%)</td>
<td>45 (23.8)</td>
<td>46 (24.4)</td>
<td>98 (51.8)</td>
</tr>
<tr>
<td>CHT only (n=145) (%)</td>
<td>78 (53.8)</td>
<td>50 (34.5)</td>
<td>17 (11.7)</td>
</tr>
<tr>
<td>CHT and mastectomy only (n=22) (%)</td>
<td>0</td>
<td>17 (77.4)</td>
<td>5 (22.6)</td>
</tr>
<tr>
<td>CHT and genital surgery (+/- mastectomy) (n=92) (%)</td>
<td>47 (51.1)</td>
<td>33 (35.8)</td>
<td>12 (13.1)</td>
</tr>
<tr>
<td>Genital surgery but no CHT (n=3) (%)</td>
<td>1 (33.3)</td>
<td>1 (33.3)</td>
<td>1 (33.3)</td>
</tr>
</tbody>
</table>

Note: CHT (cross-sex hormone treatment; GAMI (gender affirming medical interventions)

9.4.1. Aim 1: Factor structure of GCLS

9.4.1.1. Preliminary analyses
To explore the factor structure of the GCLS, principal component analysis was conducted. It was expected that the items on the GCLS would be related and so therefore oblique (direct oblimin criterion) rotation was employed. As preliminary analysis, multicollinearity and singularity were assessed. The determinant was above .00001 and therefore multicollinearity and singularity were not a cause for concern. Bartlett’s Test of Sphericity was also significant \((p<.001)\) suggesting that correlations between variables were significantly different from zero.
and therefore it was concluded that variables were adequately related to find clusters within the dataset.

9.4.1.2. Exploratory factor analysis and item elimination

Analysis to determine the number of factors to retain was conducted. Kaiser (1960) suggested that factors with an eigenvalue greater than one should be retained. Kaiser’s criteria is seen to be accurate when the sample size exceeds 250 (current sample n=451) and the average communality is equal or greater than .6 (.67 in the current study; Field, 2009). Seven factors with an eigenvalue greater than one were identified which explained 67.30% of the total variance. In contrast, the scree plot suggested five factors should be extracted (Cattell, 1966). Courtney and Gordon (2013) recommended that other statistical techniques (other than the eigenvalue and scree plot) should also be used to establish the number of factors to extract. Additional analysis was therefore conducted and Ruscio and Roche’s (2012) comparative data technique suggested seven factors should be retained, as did Velicer’s (1976) minimum average partial (MAP) test. Courtney and Gordon (2013) found Ruscio and Roche’s (2012) comparative data technique to have 87.14% accuracy and Velicer’s (1976) MAP test to have 59.60% accuracy in determining the number of factors to retain. Based on these analyses, seven factors were explored.

Item retention and elimination were subsequently considered in accordance with several criteria. Stevens (2002) suggested that for a sample size greater than 300 (current sample n=451), item loadings should be greater than .30 to be retained within a factor. All item loadings in the current study were above .30 and therefore all 42 items were retained at this stage. Next, the interpretability of items was explored by an expert panel working in the area of transgender health (n=8) and any items which were not found to theoretically or conceptually fit within the factor they had been placed were excluded. Based on this review, items 21, 27, 28 and 30 were excluded. When items cross-loaded simultaneously onto two (or more) factors with a difference of less than .10, the face validity of the item was considered. This applied to items 10, 19, 26 and 41. Items 10 (-.39), 26 (.42) and 41 (-.39) and were felt to conceptually fit better within the factors that they loaded highest with and therefore were retained within these factors. It was felt that item 19 did not conceptually fit within factor 1 (the factor which the item loaded the highest, .41), however it also loaded highly onto factor 3 (.38) and was felt to conceptually fit better within this factor (in comparison to factor 1).
Therefore item 19 was retained within factor 3. In total, four items were removed which resulted in the revised version of the GCLS comprising 38 items.

### 9.4.1.3. Analysis of the remaining 38 items

The remaining 38 items were then subjected to a second principle components analysis with oblique (direct oblimin criterion) rotation. Seven factors had an eigenvalue greater than one, which explained a large proportion of the overall variance (68.01%; see Table 9.2.). All item loadings were greater than .30 and all items conceptually and theoretically fitted within the factor that they had been placed. The only exception to this rule was item 19, which loaded highly onto factor 1 and factor 3 and was moved from factor 1 to 3 as it was felt to better conceptually fit within factor 3. Therefore 38 items were retained to comprise the final version of the GCLS.

The first factor (10 items) included items that related to psychological functioning associated with gender (in)congruence and was labelled ‘psychological functioning’. The second factor (6 items) included questions that pertained to distress and incongruence relating to the genitals and therefore was named ‘genitalia’. The third factor (4 items) included questions that asked about the degree to which participants were satisfied with how others perceived their gender role and therefore these items were categorised as ‘social gender role recognition’. The fourth factor (4 items) asked participants about satisfaction with their physical and emotional relationships and therefore was named ‘physical and emotional intimacy’. The fifth factor (4 items) was labelled ‘chest’ as it included questions that asked about distress and incongruence with the chest. The sixth factor (3 items) included questions that were related to distress and incongruence experienced in relation to non-genital secondary sex characteristics (e.g., hair, voice) and therefore these questions were categorised as ‘other secondary sex characteristics’. The seventh factor (7 items) included questions that assessed general life satisfaction (not related to gender incongruence) and therefore was labelled ‘life satisfaction’. From reviewing these subscales, they appear to conceptually cluster into two overarching themes; one that directly assesses the degree of gender congruence (factors 2, 3, 5 and 6) and another that assesses gender-related mental well-being and general life satisfaction (factors 1, 4 and 7). The clusters can be used by calculating the mean scores for the involved items.
9.4.1.4. Internal consistency

Internal consistency for each of the GCLS subscales and the global score (comprising all 38 items) was calculated. All seven subscales were found to have good (>0.7) internal consistency (Nunnally, 1978; see Table 9.2.) and the internal consistency for the global score was excellent (α=0.95).
### Table 9.2. Factor loadings, eigenvalues and percentage of variance each factor explains for the final 38 items of the GCLS (n=451)

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 - Psychological Functioning</strong>&lt;br&gt; (2) I have <strong>not</strong> gone to school/college/work</td>
<td>0.79</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
<td>-0.04</td>
<td>-0.05</td>
<td>0.09</td>
</tr>
<tr>
<td>(6) I have been unable to leave the house</td>
<td>0.75</td>
<td>-0.01</td>
<td>-0.02</td>
<td>0.02</td>
<td>0.07</td>
<td>-0.10</td>
<td>-0.04</td>
</tr>
<tr>
<td>(1) I have avoided social situations and/or social interactions</td>
<td>0.59</td>
<td>-0.03</td>
<td>0.02</td>
<td>0.17</td>
<td>0.13</td>
<td>-0.15</td>
<td>-0.05</td>
</tr>
<tr>
<td>(4) I have suffered from anxiety</td>
<td>0.58</td>
<td>-0.11</td>
<td>0.16</td>
<td>0.02</td>
<td>0.12</td>
<td>-0.04</td>
<td>-0.14</td>
</tr>
<tr>
<td>(13) I have thought about hurting myself or taking my own life</td>
<td>0.56</td>
<td>-0.21</td>
<td>0.04</td>
<td>-0.01</td>
<td>0.05</td>
<td>0.01</td>
<td>-0.26</td>
</tr>
<tr>
<td>(11) I have <strong>not</strong> engaged in leisure activities</td>
<td>0.51</td>
<td>-0.05</td>
<td>-0.07</td>
<td>0.19</td>
<td>0.29</td>
<td>0.00</td>
<td>-0.15</td>
</tr>
<tr>
<td>(8) I have thought about cutting or hurting my chest, genitals and/or surrounding areas</td>
<td>0.49</td>
<td>-0.35</td>
<td>0.06</td>
<td>-0.07</td>
<td>0.11</td>
<td>0.07</td>
<td>-0.08</td>
</tr>
<tr>
<td>(9) I have felt that life is meaningless</td>
<td>0.47</td>
<td>-0.17</td>
<td>0.03</td>
<td>0.12</td>
<td>0.07</td>
<td>0.01</td>
<td>-0.37</td>
</tr>
<tr>
<td>(12) I have suffered from low mood</td>
<td>0.46</td>
<td>-0.12</td>
<td>0.16</td>
<td>0.08</td>
<td>0.18</td>
<td>-0.01</td>
<td>-0.27</td>
</tr>
<tr>
<td>(7) I have found it difficult to make friends</td>
<td>0.45</td>
<td>0.03</td>
<td>-0.02</td>
<td>0.23</td>
<td>0.02</td>
<td>-0.14</td>
<td>-0.32</td>
</tr>
<tr>
<td><strong>Factor 2 - Genitalia</strong>&lt;br&gt; (29) I have felt that genital surgery will address the unhappiness I experience in relation to my gender</td>
<td>0.06</td>
<td>-0.83</td>
<td>-1.00</td>
<td>0.18</td>
<td>-0.04</td>
<td>-0.06</td>
<td>0.16</td>
</tr>
<tr>
<td>(22) I have felt unhappy about my genitalia since they do <strong>not</strong> match my gender identity</td>
<td>-0.04</td>
<td>-0.82</td>
<td>0.06</td>
<td>0.07</td>
<td>0.12</td>
<td>-0.10</td>
<td>0.03</td>
</tr>
<tr>
<td>(33) I have felt extremely distressed when looking at my genitals</td>
<td>0.05</td>
<td>-0.81</td>
<td>0.03</td>
<td>0.08</td>
<td>0.16</td>
<td>-0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>(14) I have felt distressed when touching my genitals as they do <strong>not</strong> match my gender identity</td>
<td>0.11</td>
<td>-0.78</td>
<td>0.09</td>
<td>0.07</td>
<td>0.12</td>
<td>-0.01</td>
<td>0.10</td>
</tr>
<tr>
<td>(31) I have been unable to have a fulfilling life because of the distress relating to my genitalia</td>
<td>0.08</td>
<td>-0.69</td>
<td>0.06</td>
<td>0.20</td>
<td>0.12</td>
<td>-0.02</td>
<td>-0.06</td>
</tr>
<tr>
<td>(26) I have felt that my genitals do match with my gender identity</td>
<td>0.18</td>
<td>0.42</td>
<td>0.10</td>
<td>0.27</td>
<td>0.06</td>
<td>0.29</td>
<td>0.34</td>
</tr>
<tr>
<td><strong>Factor 3 - Social Gender Role Recognition</strong>&lt;br&gt; (23) I have felt comfortable with how other people perceive my gender based on my physical appearance</td>
<td>-0.11</td>
<td>-0.04</td>
<td>0.82</td>
<td>-0.03</td>
<td>0.10</td>
<td>0.07</td>
<td>-0.04</td>
</tr>
<tr>
<td>(16) I have felt comfortable with how others have perceived my gender</td>
<td>-0.02</td>
<td>-0.03</td>
<td>0.79</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.06</td>
<td>-0.04</td>
</tr>
<tr>
<td>(20) I have felt satisfied with the pronouns that others use when talking about me</td>
<td>0.02</td>
<td>0.05</td>
<td>0.79</td>
<td>0.01</td>
<td>-0.09</td>
<td>-0.20</td>
<td>0.08</td>
</tr>
</tbody>
</table>
## Chapter 9 (study 4): Gender Congruence and Life Satisfaction Scale

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>(19) I have found it distressing that others do not address me according to my gender identity†</td>
<td>.41</td>
<td>.04</td>
<td>.39</td>
<td>-.09</td>
<td>.18</td>
<td>-.33</td>
<td>.21</td>
</tr>
<tr>
<td><strong>Factor 4-physical and emotional intimacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(37) I have felt satisfied with my sex life#</td>
<td>-.19</td>
<td>-.25</td>
<td>.14</td>
<td>.76</td>
<td>-.02</td>
<td>-.08</td>
<td>.03</td>
</tr>
<tr>
<td>(36) I have felt satisfied with my emotional relationship(s)#</td>
<td>-.05</td>
<td>-.02</td>
<td>.03</td>
<td>.75</td>
<td>.00</td>
<td>-.06</td>
<td>-.26</td>
</tr>
<tr>
<td>(5) I have not been able to be physically intimate with other people</td>
<td>.15</td>
<td>-.26</td>
<td>-.08</td>
<td>.70</td>
<td>.07</td>
<td>-.01</td>
<td>.11</td>
</tr>
<tr>
<td>(3) I have not been able to have emotional relationships with other people</td>
<td>.32</td>
<td>-.01</td>
<td>-.07</td>
<td>.63</td>
<td>.08</td>
<td>-.07</td>
<td>-.06</td>
</tr>
<tr>
<td><strong>Factor 5-chest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(34) I have felt satisfied with my chest#</td>
<td>-.16</td>
<td>.08</td>
<td>.02</td>
<td>.05</td>
<td>.94</td>
<td>-.08</td>
<td>-.01</td>
</tr>
<tr>
<td>(18) I have felt like my chest does not match my gender identity</td>
<td>-.12</td>
<td>.01</td>
<td>.07</td>
<td>-.03</td>
<td>.92</td>
<td>-.11</td>
<td>.03</td>
</tr>
<tr>
<td>(32) I have felt extremely distressed when looking at my chest</td>
<td>.10</td>
<td>-.19</td>
<td>.01</td>
<td>-.06</td>
<td>.81</td>
<td>-.01</td>
<td>-.01</td>
</tr>
<tr>
<td>(15) I have felt so distressed about my chest that I have not been able to have a fulfilling life</td>
<td>.22</td>
<td>-.14</td>
<td>-.05</td>
<td>-.07</td>
<td>.76</td>
<td>.08</td>
<td>-.01</td>
</tr>
<tr>
<td><strong>Factor 6-other secondary sex characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(17) I have felt that my body hair conflicts with my gender identity, either because I have it and do not like it or because I would like to have it</td>
<td>.01</td>
<td>-.03</td>
<td>.02</td>
<td>.09</td>
<td>.07</td>
<td>-.80</td>
<td>-.03</td>
</tr>
<tr>
<td>(25) I have felt that my facial hair conflicts with my gender identity, either because I have it and do not like it or because I would like to have it</td>
<td>.04</td>
<td>-.12</td>
<td>-.01</td>
<td>.01</td>
<td>.12</td>
<td>-.78</td>
<td>-.02</td>
</tr>
<tr>
<td>(24) I have felt that my voice has affected the way other people have perceived my gender identity which has been distressing for me</td>
<td>.28</td>
<td>-.01</td>
<td>.16</td>
<td>.06</td>
<td>.14</td>
<td>-.53</td>
<td>.19</td>
</tr>
<tr>
<td><strong>Factor 7-life satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(39) I have not felt satisfied with my friends</td>
<td>.11</td>
<td>.15</td>
<td>-.04</td>
<td>.07</td>
<td>.10</td>
<td>-.03</td>
<td>-.65</td>
</tr>
<tr>
<td>(40) I have felt satisfied with the support I have received from other significant people#</td>
<td>-.04</td>
<td>.20</td>
<td>.15</td>
<td>.31</td>
<td>.01</td>
<td>-.22</td>
<td>-.48</td>
</tr>
<tr>
<td>(42) I have felt satisfied with life in general#</td>
<td>.07</td>
<td>-.09</td>
<td>.30</td>
<td>.16</td>
<td>.09</td>
<td>.04</td>
<td>-.48</td>
</tr>
<tr>
<td>(38) I have felt satisfied in my leisure activities and hobbies#</td>
<td>.14</td>
<td>-.03</td>
<td>.14</td>
<td>.22</td>
<td>.21</td>
<td>.08</td>
<td>-.45</td>
</tr>
<tr>
<td>(35) I have felt satisfied at school/college/work#</td>
<td>.21</td>
<td>-.05</td>
<td>.24</td>
<td>.13</td>
<td>-.05</td>
<td>-.01</td>
<td>-.39</td>
</tr>
<tr>
<td>(41) I have not felt satisfied with my health</td>
<td>.30</td>
<td>.01</td>
<td>.14</td>
<td>-.12</td>
<td>.03</td>
<td>.05</td>
<td>-.39</td>
</tr>
</tbody>
</table>
### Chapter 9 (study 4): Gender Congruence and Life Satisfaction Scale

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10) I have not enjoyed life</td>
<td>.38</td>
<td>-.18</td>
<td>.15</td>
<td>.19</td>
<td>.08</td>
<td>.02</td>
<td>-.39</td>
</tr>
<tr>
<td><strong>Items removed for conceptual reasons</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(21) I have felt depressed when looking in the mirror as the body I have does not match my gender identity</td>
<td>.10</td>
<td>-.37</td>
<td>.06</td>
<td>-.01</td>
<td>.03</td>
<td>.54</td>
<td>-.11</td>
</tr>
<tr>
<td>(27) I have felt that the way my body looks naked does not represent my gender identity</td>
<td>-.06</td>
<td>-.46</td>
<td>.07</td>
<td>.05</td>
<td>.07</td>
<td>.50</td>
<td>-.03</td>
</tr>
<tr>
<td>(28) I have felt distressed about my gender as my body does not match my gender identity</td>
<td>.11</td>
<td>-.49</td>
<td>.10</td>
<td>-.03</td>
<td>.12</td>
<td>.40</td>
<td>-.01</td>
</tr>
<tr>
<td>(30) I have felt that I do not need sex hormones to make me feel happy about my gender</td>
<td>.10</td>
<td>-.26</td>
<td>-.43</td>
<td>.20</td>
<td>.26</td>
<td>.04</td>
<td>.05</td>
</tr>
<tr>
<td><strong>Eigenvalue</strong></td>
<td>14.83</td>
<td>3.35</td>
<td>2.30</td>
<td>1.84</td>
<td>1.24</td>
<td>1.21</td>
<td>1.07</td>
</tr>
<tr>
<td><strong>Variance explained (%)</strong></td>
<td>39.03</td>
<td>8.82</td>
<td>6.04</td>
<td>4.85</td>
<td>3.25</td>
<td>3.20</td>
<td>2.82</td>
</tr>
<tr>
<td><strong>Cronbach’s alpha</strong></td>
<td>.93</td>
<td>.79</td>
<td>.77</td>
<td>.85</td>
<td>.92</td>
<td>.81</td>
<td>.83</td>
</tr>
</tbody>
</table>

**Notes:** GCLS (Gender Congruence and Life Satisfaction Scale); # indicates reverse scored items (n=11); † item 19 was retained within factor 3 (rather than factor 1) for conceptual reasons.
9.4.2. Aim 2: Convergent and discriminant validity

In order to test the construct validity of the GCLS (i.e., the degree to which the GCLS measures what it claims to), Spearman’s Rho correlations were conducted between the GCLS and the WHOQOL, HBDS, TCS and IGDS with the transgender participants only (n=451). Construct validity comprises convergent and discriminant validity. For the GCLS to show convergent validity (i.e., to determine whether two measures that theoretically should be related, are related), it would be expected to have a moderate to high correlation with the WHOQOL, HBDS and TCS (Evans, 1996). As might be expected, the GCLS physical and emotional intimacy subscale had a strong significant association with the WHOQOL relationships subscale, as did the GCLS psychological subscale and the WHOQOL psychological subscale. Additionally, the GCLS chest, GCLS genitalia and GCLS other secondary sex characteristics subscales had a moderate to strong association with the HBDS overall satisfaction scale. The GCLS social gender role recognition, GCLS other secondary sex characteristics, GCLS chest and GCLS genitalia subscales also all had a moderate to strong significant association with the TCS appearance congruence subscale. The strongest significant association was found between the GCLS life satisfaction and the WHOQOL overall quality of life subscale. These results confirm the convergent validity of the GCLS (see Table 9.3.).

Next, correlations were run to determine discriminant validity; that is, to test whether the GCLS and IGDS are unrelated (i.e., a weak correlation) as would theoretically be expected. Table 9.4. shows that the GCLS subscales and the IGDS are unrelated as the two measures are weakly associated with one another (e.g., below $r=.39$; Evans, 1996). This suggests that the GCLS has discriminant validity. It is likely that some of these correlations will have reached statistical significance due to the large sample size of the current study (Field, 2009).
**Table 9.3.** Spearman’s Rho correlation matrix between GCLS, HBDS, TCS and WHOQOL assessing convergent validity (n=451; transgender participants only)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>GCLS: psychological functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>GCLS: genitalia</td>
<td>.52***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>GCLS: social gender role recognition</td>
<td>.51***</td>
<td>.26***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>GCLS: physical and emotional intimacy</td>
<td>.60***</td>
<td>.50***</td>
<td>.30***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>GCLS: chest</td>
<td>.61***</td>
<td>.55***</td>
<td>.49***</td>
<td>.41***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>GCLS: other secondary sex characteristics</td>
<td>.50***</td>
<td>.48***</td>
<td>.48***</td>
<td>.42***</td>
<td>.54***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>GCLS: life satisfaction</td>
<td>.76***</td>
<td>.34***</td>
<td>.52***</td>
<td>.56***</td>
<td>.47***</td>
<td>.40***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>GCLS: global</td>
<td>.90***</td>
<td>.70***</td>
<td>.63***</td>
<td>.70***</td>
<td>.78***</td>
<td>.69***</td>
<td>.80***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>TCS: appearance congruence</td>
<td>.46***</td>
<td>.43***</td>
<td>.63***</td>
<td>.36***</td>
<td>.56***</td>
<td>.50***</td>
<td>.51***</td>
<td>.62***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>HBDS: overall satisfaction</td>
<td>.58***</td>
<td>.42***</td>
<td>.46***</td>
<td>.44***</td>
<td>.56***</td>
<td>.54***</td>
<td>.56***</td>
<td>.67***</td>
<td>.62***</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>WHOQOL: overall</td>
<td>.62***</td>
<td>.27***</td>
<td>.42***</td>
<td>.46***</td>
<td>.41***</td>
<td>.35***</td>
<td>.74***</td>
<td>.62***</td>
<td>.45***</td>
<td>.51***</td>
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<td>12</td>
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<td>WHOQOL: psychological</td>
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<td>.41***</td>
<td>.44***</td>
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<td>.51***</td>
<td>.41***</td>
<td>.74***</td>
<td>.71***</td>
<td>.54***</td>
<td>.63***</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>WHOQOL: relationships</td>
<td>.44***</td>
<td>.34***</td>
<td>.23***</td>
<td>.73***</td>
<td>.27***</td>
<td>.34***</td>
<td>.58***</td>
<td>.54***</td>
<td>.32***</td>
<td>.39***</td>
</tr>
</tbody>
</table>

*Note: GCLS (Gender Congruence and Life Satisfaction Scale); TCS (Transgender Congruence Scale); WHOQOL-BREF (WHO Quality of Life-BREF); HBDS (Hamburg Body Drawing Scale); *p < .05, **p < .01, ***p < .001 (corrected for multiple comparisons)*
Table 9.4. One-tailed Spearman’s Rho correlations between the GCLS and the IGDS to assess discriminant validity (n=451; transgender participants only)

<table>
<thead>
<tr>
<th>GCLS subscales</th>
<th>IGDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological functioning</td>
<td>-.27***</td>
</tr>
<tr>
<td>Genitalia</td>
<td>-.10**</td>
</tr>
<tr>
<td>Social gender role recognition</td>
<td>-.19***</td>
</tr>
<tr>
<td>Physical and emotional intimacy</td>
<td>-.16***</td>
</tr>
<tr>
<td>Chest</td>
<td>-.14***</td>
</tr>
<tr>
<td>Other secondary sex characteristics</td>
<td>-.08</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>-.28***</td>
</tr>
<tr>
<td>Global</td>
<td>-.24***</td>
</tr>
</tbody>
</table>

*Note: GCLS (Gender Congruence and Life Satisfaction Scale); IGDS (Internet Gaming Disorder Scale)

*p <.05, **p <.01, ***p <.001

9.4.3. Aim 3: Known-groups’ validity

To determine whether the GCLS is capable of distinguishing between subgroups (e.g., cisgender people and transgender people who have had no gender affirming medical intervention) and to determine whether groups score in a theoretically expected way (e.g., people who have undergone gender affirming medical treatments will be expected to score higher than people who have not undergone gender affirming medical treatments on all subscales of the GCLS) known-groups validity (a further type of construct validity) was conducted using Mann-Whitney U tests (Hattie & Cooksey, 1984). Known-groups testing has previously been used to assess the construct validity of self-report measures (e.g., Alvarenga, Scaglusi, & Philippi, 2010). In the current study, some of these analyses were conducted between known-groups within the transgender sample, and some between transgender and cisgender participants. These analyses are not exhaustive but provide subscale and cluster norms for the different groups explored.

Initially, responses on the GCLS for transgender participants who had not undergone any gender affirming medical treatment (n=189) and cisgender people (n=338) were compared. It was found that the cisgender participants scored significantly higher (indicating a more positive outcome) on all GCLS subscales and the global scale than transgender people who
had not undergone any gender affirming medical interventions (see Table 9.5.). Responses between the two groups were also compared on the GCLS clusters previously identified. It was found that cisgender people scored significantly higher (indicative of a more positive outcome) than transgender people who were yet to undergo gender affirming medical interventions on the gender congruence cluster and the gender-related mental well-being and life satisfaction cluster (see Table 9.5.). All effect sizes for the comparative analysis were large (Field, 2009).

**Table 9.5.** Mean, standard deviation and Mann-Whitney U test scores for transgender people who have undergone no GAMI (n=189) vs. cisgender people (n=338) on the GCLS

<table>
<thead>
<tr>
<th></th>
<th>No GAMI group</th>
<th>Cisgender group</th>
<th>Mann-Whitney U</th>
<th>z</th>
<th>Effect size</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean(SD)</td>
<td>Mean(SD)</td>
<td>U</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological functioning</td>
<td>3.36 (1.01)</td>
<td>4.84 (.41)</td>
<td>3830.50</td>
<td>-17.96</td>
<td>.78</td>
<td>.001</td>
</tr>
<tr>
<td>Genitalia</td>
<td>3.22 (1.04)</td>
<td>4.54 (.33)</td>
<td>7063.50</td>
<td>-15.56</td>
<td>.68</td>
<td>.001</td>
</tr>
<tr>
<td>Social gender role recognition</td>
<td>2.73 (.83)</td>
<td>4.03 (1.07)</td>
<td>11650.00</td>
<td>-12.21</td>
<td>.53</td>
<td>.001</td>
</tr>
<tr>
<td>Physical and emotional intimacy</td>
<td>2.98 (1.07)</td>
<td>4.26 (.61)</td>
<td>10492.00</td>
<td>-12.85</td>
<td>.56</td>
<td>.001</td>
</tr>
<tr>
<td>Chest</td>
<td>2.57 (1.17)</td>
<td>4.60 (.50)</td>
<td>3835.00</td>
<td>-16.99</td>
<td>.74</td>
<td>.001</td>
</tr>
<tr>
<td>Other secondary sex characteristics</td>
<td>2.55 (1.25)</td>
<td>4.79 (.47)</td>
<td>3811.00</td>
<td>-18.03</td>
<td>.79</td>
<td>.001</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>3.06 (.77)</td>
<td>3.90 (.61)</td>
<td>12609.50</td>
<td>-11.55</td>
<td>.50</td>
<td>.001</td>
</tr>
<tr>
<td>Global GCLS</td>
<td>3.03 (.78)</td>
<td>4.45 (.31)</td>
<td>2398.50</td>
<td>-17.62</td>
<td>.77</td>
<td>.001</td>
</tr>
<tr>
<td>Cluster 1: gender congruence</td>
<td>2.83 (.84)</td>
<td>4.48 (.37)</td>
<td>2228.00</td>
<td>-17.74</td>
<td>.77</td>
<td>.001</td>
</tr>
<tr>
<td>Cluster 2: gender-related mental well-being and life satisfaction</td>
<td>3.18 (.84)</td>
<td>4.41 (.40)</td>
<td>5850.50</td>
<td>-15.57</td>
<td>.68</td>
<td>.001</td>
</tr>
</tbody>
</table>

*Note:* GCLS (Gender Congruence and Life Satisfaction Scale); GAMI (gender affirming medical intervention)
Next, a Mann-Whitney U test was conducted to compare responses on the GCLS between transgender males who had not undergone any gender affirming medical intervention (n=46) and transgender males who had taken cross-sex hormone treatment and undergone mastectomy (but not genital surgery; n=17). Within the UK (which is where these data were collected) mastectomy is funded by the NHS. However, breast augmentation is not, hence these analyses were only conducted in relation to transgender males. The analyses demonstrated that transgender males who had taken cross-sex hormones and undergone a mastectomy scored significantly higher (more positive outcome) on the psychological functioning, social gender role recognition, chest, other secondary sex characteristics, and life satisfaction subscales of the GCLS as well as the global scale, than transgender males who had not undergone any gender affirming medical intervention (see Table 9.6.). No significant differences were found between the two groups on the genitalia and physical and emotional intimacy subscales of the GCLS. The two groups were also compared on the GCLS clusters and it was found that transgender males who had taken cross-sex hormones and undergone a mastectomy scored significantly higher (more positive outcome) on the gender congruence cluster and the gender-related mental well-being and life satisfaction cluster than transgender males who had not undergone any gender affirming medical interventions (see Table 9.6.). Effect sizes for the comparative analysis were large (social gender role recognition; chest; other secondary sex characteristics; global scale; and cluster one), medium (psychological functioning; cluster two) and small (genitalia; physical and emotional intimacy; life satisfaction) (Field, 2009).
Table 9.6. Mean, standard deviation and Mann-Whitney U test scores for transgender males who have undergone no GAMI (n=46) vs. transgender males who are taking CHT and have undergone mastectomy (n=17) on the GCLS

<table>
<thead>
<tr>
<th>Transgender males: no GAMI</th>
<th>Transgender males: CHT and mastectomy</th>
<th>Mann-Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean(SD)</td>
</tr>
<tr>
<td>Psychological functioning</td>
<td>2.82 (.79)</td>
<td>3.64 (.70)</td>
</tr>
<tr>
<td>Genitalia</td>
<td>2.49 (.93)</td>
<td>2.79 (.95)</td>
</tr>
<tr>
<td>Social gender role recognition</td>
<td>2.63 (.76)</td>
<td>3.76 (1.01)</td>
</tr>
<tr>
<td>Physical and emotional intimacy</td>
<td>2.64 (1.04)</td>
<td>3.08 (1.02)</td>
</tr>
<tr>
<td>Chest</td>
<td>1.54 (.66)</td>
<td>4.24 (1.14)</td>
</tr>
<tr>
<td>Other secondary sex characteristics</td>
<td>1.91 (.91)</td>
<td>3.63 (1.29)</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>2.90 (.64)</td>
<td>3.39 (.71)</td>
</tr>
<tr>
<td>Global GCLS</td>
<td>2.54 (.57)</td>
<td>3.48 (.60)</td>
</tr>
<tr>
<td>Cluster 1: gender congruence</td>
<td>2.20 (.55)</td>
<td>3.51 (.76)</td>
</tr>
<tr>
<td>Cluster 2: gender-related mental well-being and life satisfaction</td>
<td>2.81 (.68)</td>
<td>3.45 (.66)</td>
</tr>
</tbody>
</table>

Note: GCLS (Gender Congruence and Life Satisfaction Scale); CHT (cross-sex hormone treatment); GAMI (gender affirming medical intervention)

Finally, a Mann-Whitney U test was conducted between responses on the GCLS for transgender participants who were yet to undergo any gender affirming medical intervention (n=189) and people who had taken cross-sex hormone treatment and undergone genital surgery (+/- mastectomy; n=92). People who had taken cross-sex hormone treatment and
undergone genital surgery (+/- mastectomy) scored significantly higher (more positive outcome) on all GCLS subscales and the global scale compared to people who had not undergone any gender affirming medical interventions (see Table 9.7.). The groups were also compared on the two clusters and it was found that transgender people who had taken cross-sex hormone treatment and undergone genital surgery (+/- mastectomy) scored significantly higher (more positive outcome) on the gender congruence cluster and the gender-related mental well-being and life satisfaction cluster than people who had not undergone any gender affirming medical intervention (see Table 9.7.). Effect sizes for the comparative analysis were large (social gender role recognition; chest; cluster one), medium (psychological functioning; other secondary sex characteristics; life satisfaction; global scale; cluster two) and small (genitalia; physical and emotional intimacy) (Field, 2009).
**Table 9.7.** Mean, standard deviation and Mann-Whitney U test scores for transgender people who have not undergone any GAMI (n=189) vs. transgender people who have taken CHT and undergone genital surgery (+/- mastectomy; n=92) on the GCLS

<table>
<thead>
<tr>
<th></th>
<th>No GAMI group</th>
<th>CHT and genital surgery (+/- mastectomy)</th>
<th>Mann-Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>U</td>
</tr>
<tr>
<td>Psychological</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>functioning</td>
<td>3.36 (1.01)</td>
<td>4.15 (.72)</td>
<td>4687.50</td>
</tr>
<tr>
<td>Genitalia</td>
<td>3.22 (1.04)</td>
<td>3.81 (.92)</td>
<td>5858.00</td>
</tr>
<tr>
<td>Social gender role</td>
<td>2.73 (.83)</td>
<td>3.93 (.73)</td>
<td>2523.50</td>
</tr>
<tr>
<td>recognition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical and</td>
<td>2.98 (1.07)</td>
<td>3.36 (1.14)</td>
<td>6923.50</td>
</tr>
<tr>
<td>emotional intimacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest</td>
<td>2.57 (1.17)</td>
<td>4.27 (.89)</td>
<td>2174.50</td>
</tr>
<tr>
<td>Other secondary sex</td>
<td>2.55 (1.25)</td>
<td>3.65 (1.10)</td>
<td>4484.00</td>
</tr>
<tr>
<td>characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>3.06 (.77)</td>
<td>3.72 (.72)</td>
<td>4537.00</td>
</tr>
<tr>
<td>Global GCLS</td>
<td>3.03 (.78)</td>
<td>3.88 (.60)</td>
<td>3461.50</td>
</tr>
<tr>
<td>Cluster 1: gender</td>
<td>2.83 (.84)</td>
<td>3.92 (.61)</td>
<td>2761.00</td>
</tr>
<tr>
<td>congruence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster 2: gender-</td>
<td>3.18 (.84)</td>
<td>3.86 (.70)</td>
<td>4755.00</td>
</tr>
<tr>
<td>related mental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>well-being and life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* GCLS (Gender Congruence and Life Satisfaction Scale); CHT (cross-sex hormone treatment); GAMI (gender affirming medical intervention)
9.4.4. Summary of analysis

Factor analysis on items of the GCLS supported a 7-factor solution with 38 items retained in total. The seven subscales are: psychological functioning; genitalia; social gender role recognition; physical and emotional intimacy; chest; other secondary sex characteristics; and life satisfaction. The subscales can be categorised into two clusters; 1) gender congruence (genitalia, chest, other secondary sex characteristics and social gender role recognition), and 2) gender-related mental well-being and general life satisfaction (physical and emotional intimacy, psychological functioning and life satisfaction). A higher score indicates a greater gender congruence, greater gender-related well-being, and greater life satisfaction. The GCLS subscales and the global scale have undergone vigorous testing and have demonstrated good reliability and validity. Subscale, global scale and cluster norms for transgender people at different stages of medical transition, as well as cisgender people have been generated. The known-groups’ analysis also demonstrated that the measure is capable of discriminating between groups of interest (e.g., people who have and have not undergone gender affirming medical interventions) and highlights how gender incongruence, gender-related mental well-being and general life satisfaction improve over the course of the medical transition. It can therefore be concluded that the GCLS is a suitable tool to use with the transgender population to measure gender congruence and life satisfaction, and - in particular - improvements in these that are likely to occur during the treatment process.

9.5. Discussion

The main aim of this study was to develop and evaluate a new transgender health outcome measure: the Gender Congruence and Life Satisfaction Scale (GCLS) which is capable of measuring changes in gender congruence and life satisfaction over the course of gender affirming medical interventions. The GCLS is the first transgender health outcome measure that can simultaneously assess gender congruence, gender distress, associated mental well-being and general life satisfaction, and can do so independently of gender assigned at birth and gender identity. This study confirmed that the GCLS is a valid and reliable measure to use with the transgender population and is capable of producing high quality outcome data for clinical and research purposes.

Having a brief, self-report questionnaire that is capable of assessing transgender health outcomes is important in order to measure the quality of care that is offered at transgender health services (Dawson et al., 2010), to enable transgender patients to be followed-up over
time (both before and after gender affirming medical interventions), and to determine what transgender healthcare needs people require. The latter may help with financial planning and future workforce and service development in the field of transgender healthcare.

The GCLS was developed in collaboration with the transgender population and healthcare professionals working in the field of transgender health. This has ensured that the GCLS is a meaningful and relevant measure for people attending transgender health services. Factor analysis suggested the retention of 38 items, which comprise seven subscales (psychological functioning, genitalia, social gender role recognition, physical and emotional intimacy, chest, other secondary sex characteristics, and life satisfaction) that are clustered into two themes: 1) gender congruence, 2) gender-related mental well-being and general life satisfaction. The two clusters have clinical relevance and applicability as some transgender people may or may not experience mental health problems in association with the distress and unhappiness they experience with their gender (e.g., Dhejne et al., 2016). The existence of two separate clusters therefore allows these factors to be considered separately. In addition, the outcome of transgender health services can be divided into short term and long term outcomes. Short-term outcomes refer to changes in the symptomatology that the individual presents to the service with (i.e., gender incongruence and gender dysphoria) and may be achieved in a relatively short time (e.g., chest incongruence decreases following mastectomy). Long-term outcomes relate to improvements in life satisfaction, quality of life and psychological well-being. Long-term outcomes may take significantly longer to achieve. This two-cluster based tool (GCLS) allows for the measurement of short term and long term outcomes to be assessed separately. Being able to review the scores on these two clusters will allow clinicians and healthcare professionals to deliver a patient-centred service. The delivery of patient-centred interventions is crucial to improve patient outcomes (e.g., Lauver et al., 2002). The mean scores given for each subscale, the global score and cluster of the GCLS for transgender people at different stages of medical transition within the current study can be used as norms. Subscale and cluster norms have also been provided for cisgender people; a sample who may provide a useful reference point for both future clinical and research purposes.

It is expected that the GCLS will not only be a useful clinical tool but will also aid research in the field of transgender health. As part of the validation process, the GCLS has already demonstrated that it can distinguish between subgroups of transgender individuals who are at different stages of medical transition, which makes it a suitable research tool. The current
study found that transgender people who had not undergone any gender affirming medical interventions reported worse outcomes on all GCLS subscales, the global scale and two clusters than both cisgender people and transgender people who had taken cross-sex hormone treatment and undergone genital surgery (+/- mastectomy). These findings support previous research that has shown patients to report less distress with their gender, lower levels of body dissatisfaction, better mental well-being, and greater life satisfaction after they had undergone gender affirming surgery (De Cuypere et al., 2005; De Cuypere et al., 2006; Lindqvist et al., 2016; Ruppin & Pfäfflin, 2015; van de Grift, Elaut, Cerwenka, Cohen-Kettenis, & Kreukels, 2017b).

This study also found that transgender males who had not undergone any gender affirming medical intervention reported worse outcomes on the chest, other secondary sex characteristics, social gender role recognition, psychological functioning, and life satisfaction subscales of the GCLS, as well as the global scale and the two clusters, than transgender males who had taken cross-sex hormone treatment and undergone mastectomy. There was no significant difference between the two groups on the genitalia and physical and emotional intimacy subscales of the GCLS. This finding supports previous research which has found dissatisfaction and distress with the genitalia to be increasingly prevalent after mastectomy in treatment-seeking transgender men (van de Grift et al., 2016c). Research with cisgender populations has found body dissatisfaction (Woertman & van den Brink, 2012), as well as specific genital dissatisfaction (Schick, Calabrese, Rima, & Zucker, 2010), to affect sexual satisfaction and therefore the high levels of dissatisfaction and distress experienced in relation to the genitalia in transgender men in the current study (before genital surgery) is likely to impact on their physical relationships.

The analysis we conducted with known-groups demonstrates the sensitivity of the GCLS and its ability to distinguish between outcomes at different stages of medical transition (i.e., chest distress dissipates after mastectomy). Having a validated tool that is capable of having this level of sensitivity will be extremely useful in advancing research in transgender health. For instance, when the length of time a person has been on cross-sex hormone treatment is known, longitudinal research may be able to identify a time frame in which long term outcomes, such as psychological functioning and life satisfaction, improve. Establishing this in different subgroups (e.g., non-binary people) is also important. The GCLS has been developed independent of gender assigned at birth and gender identity and therefore would be
an appropriate measure to use with non-binary transgender people. Research with this population is in its infancy, but suggests poorer mental health than binary transgender people (Rimes, Goodship, Ussher, Baker, & West, 2017; Warren, Smalley, & Barefoot, 2016). Some of the subscales from the GCLS can also be used to advance knowledge concerning factors that predict good outcomes in transgender people, for example, factors that predict life satisfaction. Establishing factors that predict a good outcome among non-binary transgender people is also essential as the factors are likely to differ to what is seen among transgender people who identify within the binary gender system.

The GCLS is the first transgender health outcome measure to be developed and validated with the transgender population and is capable of assessing important treatment outcomes. However, there are some limitations. First, the GCLS is only validated in an English speaking adult population. Future research should focus on validating the GCLS in other languages and other age groups (e.g., children and adolescents). Second, although gender incongruence, related mental well-being, and life satisfaction were all found to improve over the course of gender affirming medical interventions in the current study, it must be considered that these conclusions are based on cross-sectional data. In addition to this, data were not collected in relation to whether or not participants were accessing transgender health services (i.e., were treatment seeking) or the length of time on cross-sex hormone treatment. To further explore the short and long term outcomes of gender affirming medical interventions, longitudinal research that uses the GCLS in treatment seeking transgender people needs to be conducted. As this study provided no statistical evidence to support the two clusters (which represent short and long term outcomes), future longitudinal research employing the GCLS should determine (statistically) whether distinct patterns of change are present to support these clusters. The gender of the cisgender participants within this study was also skewed (i.e., the majority were female). Future research should look to employ the GCLS with a larger sample of cisgender males to compare scores with transgender males. Contrary to expectations, some subscales of the GCLS significantly correlated with the IGDS. This is likely to be due to the large sample size in the current study (Field, 2009) however, this finding may warrant further research into gaming behaviour of transgender people.

9.5.1. Conclusion

In conclusion, the findings from this study suggest that the GCLS is a suitable and robust measure to assess treatment outcomes in relation to gender congruence, related mental well-
being, and life satisfaction within the transgender population in both a clinical and research capacity. Having a measure that is capable of assessing these outcomes will allow for the quality of gender affirming medical interventions to be improved within transgender health services, and thus will improve the quality of life of transgender people and their families.
Chapter 10: General discussion

General discussion

10.1. Introduction
In this closing chapter, the initial aims of the thesis and the gaps identified by the systematic reviews (chapters 2 and 3) will be recapped. The empirical aims of this thesis will then be restated followed by a summary of the findings from these chapters (chapters 6 to 9). The implications that the findings of the research within this thesis have in relation to understanding physical (in)activity, body (dis)satisfaction and mental health within the transgender population will then be considered. This will be followed by a discussion of the implications, strengths, limitations and future directions for research. The chapter will close with a conclusion of the findings from this research reported on in this thesis.

10.2. Recap of the aims of the thesis
10.2.1. Initial aims and gaps within the literature
The overarching aim of this thesis was to further our understanding around physical (in)activity, experiences of body (dis)satisfaction and mental health in transgender people. An increasing number of transgender people are presenting to transgender health services across Europe and North America (Aitken et al., 2015; Arcelus, Bouman, Witcomb, Van De Noortgare, Claes, & Fernandez-Aranda, 2015; de Vries, Kreukels, T’Sjoen, Ålgars, & Mattila, 2015) or self-identifying as transgender without necessarily presenting to transgender health services (Kuyper & Wijsen, 2014). As the prevalence of transgender people increases, the challenges that this population face regarding physical (in)activity, body dissatisfaction (and associated vulnerability to eating disorder psychopathology), and poor mental health will undoubtedly become more pronounced within society. This is concerning as research has identified that transgender people have difficulties accessing healthcare, whether this be related to gender incongruence or general health (Winter et al., 2016). Consequently, there is a real need to understand how to improve the well-being of transgender people. A recent systematic review on mental health within the transgender population identified that when first assessed at a transgender health service, transgender people have poorer mental health than cisgender people (Dhejne, Vlerken, Heylens, & Arcelus, 2016). Following gender affirming medical interventions, poor mental health was found to dissipate to levels found within the cisgender population (Dhejne et al., 2016). However, there had been no systematic
reviews that had investigated physical activity and sport or body dissatisfaction and eating disorder symptoms. To address this gap, the initial aim of this thesis was to conduct two systematic reviews with the goal of synthesising the literature concerned with physical activity and sport in the transgender population (chapter 2), and the literature concerned with body dissatisfaction and disordered eating within the transgender population (chapter 3).

10.2.2. Summary of the findings from chapter 2

Chapter 2 concluded that many transgender people have a negative experience when engaging (or attempting to engage) in physical activity and sport (Jones, Arcelus, Bouman, & Haycraft, 2017a). This is problematic as physical activity and sport engagement within the cisgender population has been associated with a decrease in body dissatisfaction (i.e., an increase in body satisfaction) and with better mental health (e.g., Carter, Morres, Meade, & Callaghan, 2016; Cox, Ullrich-French, Howe, & Cole, 2017; Herring, Jacob, Suvey, & O’Conner, 2011; Kruger, Lee, Ainsworth, & Macera, 2008; Lantz, Hardy, & Ainsworth, 1997; McMahon et al., 2017; Rebar et al., 2016). This might therefore also be the case within the transgender population. However, chapter 2 found there to be a lack of qualitative research that has explored the experiences that transgender people have in relation to physical activity and recreational sport participation or engagement for leisure and fitness (Jones et al., 2017a). This is a significant omission as the majority of transgender people will not engage in sport at an elite level (i.e., they will not be professional athletes) and so these recreational sport/activity experiences are particularly worthy of study. In addition, previous research has not considered the role of gender affirming medical interventions in physical activity and sport engagement. This is important as medically transitioning has been associated with body satisfaction and, consequently, better mental health (e.g., Costa & Colizzi, 2016; Fisher et al., 2014; Gorin-Lazard et al., 2013; Heylens, Verroken, De Cock, T'Sjoen, & De Cuypere, 2014). Greater body satisfaction and mental well-being within the cisgender population have been associated with greater physical activity and sport engagement (e.g., Carter et al., 2016; Cox et al., 2017; Kruger et al., 2008; McMahon et al., 2017). The systematic review in chapter 2 also identified a lack of quantitative (and therefore more easily generalisable) research which has considered the amount of physical activity and sport that transgender people engage in, or the predictive factors associated with (in)activity (Jones et al., 2017a). There is also a lack of research that has considered the physical activity levels of transgender people compared to the cisgender population. This is important in order to determine whether there is an inequality in accessing physical activity and sport between transgender and
cisgender people. The gaps identified in chapter 2 informed the empirical research reported on in this thesis as such research is likely to be important for the development of initiatives that aim to increase physical activity and sport engagement and which might benefit the well-being of the transgender population.

10.2.3. Summary of the findings from chapter 3

From the evidence synthesised and presented in chapter 3, it was clear that there is a need to alleviate body dissatisfaction experienced by transgender people as body dissatisfaction makes this population vulnerable to eating disorder psychopathology (Jones, Haycraft, Murjan, & Arcelus, 2016b). Research within the cisgender population has found eating disorder psychopathology to be multifactorial (e.g., Polivy & Herman, 2002) yet there was no research that had explored whether this is the case within the transgender population. Factors such as body dissatisfaction (e.g., Keel, Fulkerson, & Leon, 1997; Stice & Shaw, 2002), high levels of perfectionism (e.g., Egan, Wade, & Shafran, 2011; Tchanturia, Larsson, & Adamson, 2016), the existence of interpersonal problems (e.g., Arcelus, Haslam, Farrow, & Meyer, 2013), low self-esteem (Dakanalis et al., 2016), and symptoms of anxiety and depression (e.g., Brechan & Kvalem, 2015; DeBoer & Smits, 2013; Fairburn, Cooper, & Shafran, 2003; Harrison, Sullivan, Tchanturia, & Treasure, 2009; Puccio et al., 2017) have all been associated with eating disorder psychopathology within the cisgender population. Many of the psychological factors found to be associated with eating disorder psychopathology within the cisgender population are also prominent among transgender people and therefore may be able to explain eating disorder symptoms within this population. Experiencing body dissatisfaction, symptoms of anxiety and depression, high levels of perfectionism and experiencing interpersonal problems have all been found to be prominent among transgender people (e.g., Davey, Bouman, Meyer, & Arcelus, 2015; Dhejne et al., 2016; Khoosal, Langham, Palmer, Terry, & Minajagi, 2009). In addition to this, and unique to the transgender population, is the role of gender affirming medical interventions in eating disorder symptoms. One study found gender affirming surgery to alleviate eating disorder symptoms (Khoosal et al., 2009). However, this study had a very small sample size and was only concerned with transgender females (Khoosal et al., 2009). Additionally, chapter 3 identified that there is currently no research that has explored the potential role of cross-sex hormones in eating disorder symptoms. Cross-sex hormones have been found to alleviate body dissatisfaction (i.e., improve body satisfaction; e.g., Fisher et al., 2014). Therefore it
was hypothesised that cross-sex hormones may potentially be capable of alleviating eating disorder symptoms in the transgender population.

To understand whether gender affirming medical interventions (i.e., cross-sex hormones and gender affirming surgery) aimed at improving the well-being of transgender people (including body dissatisfaction) have been beneficial, they need to be evaluated. Chapter 3 identified that there was currently a lack of appropriate tools to complete reliable evaluations of gender affirming medical interventions; hence the lack of research that has explored body dissatisfaction and eating disorder psychopathology as outcomes. In addition to this, Dhejne et al. (2016) identified that there had been a variety of different measures used to assess mental well-being and called for the development of a more robust measure that is capable of assessing mental well-being in relation to gender incongruence. These identified gaps in the literature informed the empirical aims of the thesis.

10.2.4. Empirical aims of the thesis

Following on from the systematic reviews and gaps highlighted in the literature, seven specific empirical aims of this thesis were identified. These were initially presented in section 4.5. and are outlined again, below.

1. To qualitatively understand the experiences that treatment seeking transgender people have when engaging (or attempting to engage) in physical activity and/or recreational sport for leisure and fitness (chapter 6; study 1).
2. To establish the amount of physical activity that treatment seeking transgender people engage in (chapter 7; study 2).
3. To establish the role of cross-sex hormones on physical activity levels in treatment seeking transgender people (chapter 7; study 2).
4. To quantitatively identify factors that are associated with physical activity in treatment seeking transgender people (chapter 7; study 2).
5. To establish why transgender people are vulnerable to disordered eating by exploring which factors are associated with eating disorder symptoms in treatment seeking transgender people (chapter 8; study 3).
6. To better understand the alleviating effects that cross-sex hormones might have on eating disorder symptoms in treatment seeking transgender people (chapter 8; study 3).
7. To develop and validate a new transgender health outcome measure that is capable of assessing gender distress, gender congruence, associated mental well-being, and life satisfaction for use in research and clinical settings (chapter 9; study 4).

10.3. Summary of the findings from the empirical studies

A summary of the findings of the research presented in this thesis will be presented below, chapter by chapter. Figure 10.1. presents an overview of the main research questions, different factors explored, and the key research findings.
Chapter 10: General discussion

Gender Incongruence & Distress

Poor mental health

Benefits of physical activity and sport

Are physical activity & sport engaged in by transgender people?

Factors associated with physical activity and sport (studies 1 & 2)

The amount of physical activity and sport (study 2)

The role of cross-sex hormones in eating disorder psychopathology (study 3)

Taking cross-sex hormones alleviates factors associated with eating disorder psychopathology

Taking cross-sex hormones reduces eating disorder psychopathology

Taking cross-sex hormones increases physical activity

Body dissatisfaction, perfectionism, self-esteem and anxiety are all risk factors for eating disorder psychopathology

Taking cross-sex hormones increases physical activity

Motivated to be physically active

Variety of external and internal barriers experienced

Body dissatisfaction

Eating disorder psychopathology

Why are transgender people vulnerable to eating disorder psychopathology?

Explore factors associated with eating disorder psychopathology (stddy 3)

The role of gender confirming medical interventions in physical activity (studies 1 & 2)

The role of cross-sex hormones in eating disorder psychopathology (stddy 3)

Exploring factors associated with physical activity and sport (studies 1 & 2)

Can the specificity of self-report measures be increased?

To develop a new measure (study 4)

GCLS is a reliable and valid self-report measure to use in a clinical and research capacity

To validate a new measure (study 4)

Poor specificity

Benefits of physical activity and sport

Benefits of physical activity and sport engaged in by transgender people?

Factors associated with physical activity and sport (studies 1 & 2)

The amount of physical activity and sport (study 2)

Taking cross-sex hormones alleviates factors associated with eating disorder psychopathology

Taking cross-sex hormones reduces eating disorder psychopathology

Taking cross-sex hormones increases physical activity

Motivated to be physically active

Variety of external and internal barriers experienced

Body dissatisfaction, perfectionism, self-esteem and anxiety are all risk factors for eating disorder psychopathology

Taking cross-sex hormones increases physical activity

Motivated to be physically active

Variety of external and internal barriers experienced

Body dissatisfaction, perfectionism, self-esteem and anxiety are all risk factors for eating disorder psychopathology

GCLS is a reliable and valid self-report measure to use in a clinical and research capacity

Figure 10.1. Main research questions, factors investigated, and findings of the thesis

GCLS: Gender Congruence and Life Satisfaction Scale
10.3.1. Chapter 6 (study 1): Barriers and facilitators of physical activity and sport participation among young transgender adults who are medically transitioning

There is a dearth of qualitative research that has considered the experiences that treatment seeking transgender people have when engaging in physical activity and recreational sport (see sections 1.7.5.2. and 10.2.2.). Therefore, study 1 aimed to explore the experiences that young treatment seeking transgender adults have when engaging in physical activity and recreational sport. This study was concerned with exploring the experiences of young treatment seeking transgender people because research with the cisgender population has shown older people to engage in less physical activity and sport compared to younger people (e.g., British Heart Foundation, 2015).

Overall, the findings of study 1 support and extend previous research that has found transgender people to have a negative experience when engaging in physical activity and sport (e.g., Hargie, Mitchell, & Somerville, 2017; Jones et al., 2017a; see chapter 2). The young people in this study reported both internal (e.g., body dissatisfaction) and external (e.g., changing facilities) barriers to physical activity and recreational sport. Despite all the young people in this study being on cross-sex hormones (which initiate the development of secondary sex characteristics), experiencing body dissatisfaction was still described as a barrier to physical activity and sport, as was previously found in an older sample of transgender people (Elling-Machartzki, 2015). The findings of study 1 built on previous research as the young people explained that although the cross-sex hormones had started to change their bodies in a positive way (i.e., bring their bodies in line with their gender identity), these changes were not significant enough for body dissatisfaction to be alleviated to a level which they felt allowed them to engage in physical activity and sport in a comfortable way. In addition to this, and in support of previous research (Hargie et al., 2017; Muchiock et al., 2014), transphobia was found to be a barrier to physical activity and sport engagement. However, study 1 extended previous findings as it found that for the majority of participants, transphobia was anticipated as opposed to experienced.

The young people in this study also reported factors which they felt could facilitate physical activity and sport engagement. This is the first time that positive determinants of physical activity and/or sport within the transgender population have been reported in-depth within the literature. The majority of the participants in study 1 were physically active, although they reported rarely engaging in physical activity or sport in public spaces (e.g., gyms, leisure
centres). It was evident from this study that the young people were motivated to engage in physical activity and sport. They were motivated to change their bodily appearance and increase perceived gender congruence, to enhance surgical outcomes of gender affirming surgery (transgender males only), and to ensure they were in good physical health to undergo these major surgeries. However, due to the barriers they experienced, participants could not always act on this motivation, especially when attempting to engage in physical activity and/or sport in a public space.

In summary, the findings of this study suggest that young transgender people have difficulties accessing physical activity and recreational sport. The young transgender adults in study 1 were motivated to be active; however, they reported experiencing numerous barriers which prevent many of this population from engaging in physical activity and/or recreational sport. In many cases, this means that access to physical activity or sport, and the positive health benefits that it could bring, is prevented by the existence of these barriers. Many of these barriers appeared to be directly or indirectly related to body (dis)satisfaction. Some of these barriers also appeared to be related to the uncomfortable and unwelcoming environment that is sometimes experienced in physical activity and/or recreational sport spaces by this population. As a consequence of these barriers, it was hypothesised that the amount of physical activity that the transgender population engages in would be low in comparison to the cisgender population.

10.3.2. Chapter 7 (study 2): The levels and predictors of physical activity engagement within the treatment seeking transgender population: A matched control study

Study 2 was interested in exploring the hypothesis that physical activity engagement would be low in transgender people in comparison to cisgender people in order to determine whether there is inequality in physical activity and sport engagement between these two groups. It is essential that physical activity is accessible to transgender people so that they can benefit from the potential benefits in terms of alleviating mental health and body dissatisfaction which may be particularly relevant for this vulnerable population (e.g., Carter et al., 2016; Cox et al., 2017; Herring et al., 2011; Kruger et al., 2008; Lantz et al., 1997; McMahon et al., 2016; Rebar et al., 2016). In order to build on and complement the findings from study 1, study 2 was concerned with quantitatively exploring factors that might be associated with physical (in)activity. Adopting a quantitative approach facilitates generalisation of the findings (which is not possible with qualitative research) which can be
used to inform the development of specific interventions and initiatives to increase physical activity within the transgender population.

Study 2 found that transgender people engaged in significantly less physical activity than cisgender people after controlling for age and gender identity. This relationship was then broken down by exploring differences in physical activity depending on cross-sex hormone use and gender identity. It was found that transgender people who had not taken cross-sex hormone treatment engaged in significantly less physical activity than people who had taken cross-sex hormones. When transgender females who had taken cross-sex hormones were compared to cisgender females, no significant difference was found between their physical activity levels, even after controlling for age. For transgender females, body dissatisfaction may have been alleviated to a level sufficient to enable these individuals to engage in physical activity comfortably, as supported by the findings from study 1 (see chapter 6; Jones, Arcelus, Bouman, & Haycraft, 2017b). However, transgender males on cross-sex hormones were found to engage in significantly less physical activity than cisgender males, after controlling for age. This finding may be explained by the fact that many treatment seeking transgender men choose to wear a chest binder before mastectomy and chest reconstructive surgery. Wearing a chest binder has been described as a significant barrier to physical activity and sport engagement due to the discomfort of wearing the garment (see chapter 6; Jones et al., 2017b). After mastectomy and chest reconstructive surgery, dissatisfaction with the chest has been found to significantly diminish among transgender men (van de Grift et al., 2016c) and so not having to wear a binder is likely to have a positive effect on physical activity engagement.

In the participants who were yet to take cross-sex hormones, high self-esteem was found to be the best statistical predictor of physical activity, which supports research within the cisgender population (e.g., Joseph, Royse, Benitez, & Pekmezi, 2014; Noordstar, van der Net, Jak, Holders, & Jongmans, 2016; Sonstroem & Morgan, 1989). In people who were taking cross-sex hormones, greater body satisfaction was found to be the best statistical predictor of physical activity engagement, which is also consistent with findings from the cisgender population (e.g., Cox et al., 2017; Goodwin, Haycraft, & Meyer, 2016; Kruger et al., 2008; 1

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1 A chest binder is a garment of clothing worn by some transgender men to minimise breast tissue and increase the appearance of a male chest.
Lantz et al., 1997; Marquez & McAuley, 2001; Williams & Cash, 2001). In addition to this, people who had taken cross-sex hormones in study 2 (compared to participants that had not) reported higher self-esteem, fewer symptoms of anxiety and depression, and higher body satisfaction; all of which are factors that have been positively associated with physical activity engagement within the cisgender population (e.g., Kruger et al., 2008; McMahon et al., 2017). This finding suggests that cross-sex hormones are capable of increasing physical activity in treatment seeking transgender people indirectly through increasing mental well-being, self-esteem and decreasing body dissatisfaction (i.e., increasing body satisfaction).

In conclusion, the findings from study 2 provide important information about factors that can statistically predict physical activity engagement in treatment seeking transgender people who have and have not taken cross-sex hormones. Cross-sex hormone treatment appears to be crucial in indirectly alleviating the inequality in physical activity participation that is seen between treatment seeking transgender people and cisgender people, especially in treatment seeking transgender females. Mastectomy and chest reconstructive surgery may also play a positive role in physical activity engagement among transgender males. This study has further demonstrated how body (dis)satisfaction plays a key role in the amount of, and factors associated with, physical activity engagement in treatment seeking transgender people. Body dissatisfaction has also been found to be central to other mental health problems that can affect the well-being of transgender people, such as eating disorder psychopathology.

10.3.3. Chapter 8 (study 3): Risk factors for eating disorder psychopathology within the treatment seeking transgender population: The role of cross-sex hormone treatment

Study 3 was concerned with understanding other ways in which body dissatisfaction might make transgender people vulnerable. The systematic review presented in chapter 3 concluded that body dissatisfaction might make transgender people vulnerable to eating disorder psychopathology (e.g., Ålgars, Alanko, Santtila, & Sandnabba, 2012; Bouman & Arcelus, 2016; Jones et al., 2016b; Khoosal et al., 2009). However, what was evident from this review was that no research had explored other factors associated with eating disorder symptoms. This is important as eating disorder symptoms are likely to be multifactorial in transgender people (see sections 3.5., 4.3. and 10.2.3.). The review also highlighted the lack of research exploring the role of cross-sex hormones (see sections 4.3. and 10.2.3.). Cross-sex hormone treatment has been found to alleviate body dissatisfaction (e.g., de Vries, Steensma, Doreleijers, & Cohen-Kettenis, 2011; de Vries et al., 2014; Fisher et al., 2014; van de Grift et
al., 2017a) and is therefore also likely to alleviate eating disorder symptoms. In light of these gaps, study 3 aimed to determine factors associated with eating disorder symptoms in a large sample of transgender people and to explore the potential role of cross-sex hormone treatment on these symptoms.

Study 3 found that treatment seeking transgender people who were yet to initiate cross-sex hormone treatment had higher levels of eating disorder psychopathology compared to treatment seeking transgender people who had initiated cross-sex hormone treatment. When the levels of eating disorder symptoms of the transgender people in study 3 who had taken cross-sex hormones were compared to levels previously found within the cisgender population (Witcomb et al., 2015), no significant difference was found. In contrast, transgender people who had not taken cross-sex hormones reported much higher levels of eating disorder psychopathology than had previously been found within the cisgender population (Witcomb et al., 2015). When taken together, these findings suggest that cross-sex hormone treatment may be capable of alleviating eating disorder symptoms in treatment seeking transgender people.

Study 3 built on previous research by attempting to establish why and how cross-sex hormones are able to alleviate eating disorder symptoms. This study found that high levels of body dissatisfaction, perfectionism, symptoms of anxiety, and low self-esteem were all risk factors for eating disorder psychopathology in treatment seeking transgender people who were yet to initiate a medical transition. In addition to this, there was no longer a significant difference in eating disorder psychopathology between people who had and had not taken cross-sex hormones after the identified risk factors were controlled for. Therefore, it was concluded that cross-sex hormones are potentially capable of alleviating eating disorder symptoms by reducing levels of body dissatisfaction, high perfectionism, and symptoms of anxiety, and by increasing self-esteem. This study further highlighted the potential mechanisms through which this was possible. Mediation analysis suggested that cross-sex hormones primarily alleviate body dissatisfaction which in turn reduces high levels of perfectionism and symptoms of anxiety and increases self-esteem.

In conclusion, treatment seeking transgender people who are yet to initiate a medical transition report more eating disorder symptoms than transgender people who have initiated a
medical transition. The findings of this study suggest that cross-sex hormones may potentially be able to alleviate eating disorder symptoms in the treatment seeking transgender population by reducing some of the identified risk factors.

10.3.4. Chapter 9 (study 4): The Gender Congruence and Life Satisfaction Scale (GCLS): Development and validation of a scale to measure outcomes from transgender health services

The previous three studies (studies 1, 2 and 3) emphasised the importance of increasing transgender people’s well-being. The findings of the research in this thesis suggest that this may be possible through gender affirming medical interventions. To determine the effectiveness of these interventions, treatment outcomes need to be evaluated. This can be achieved through self-report measures; however, the majority of self-report measures used with this population have several limitations (see sections 1.7.5.1., 3.5., 4.4. and 10.2.3.). Self-report measures used with transgender people to assess intervention outcomes, which may include the measurement of body (dis)satisfaction and mental well-being, have been developed and validated with the cisgender population (e.g., Hospital Anxiety and Depression Scale; Zigmond & Snaith, 1983), or with other specific populations, such as people with eating disorders (e.g., Eating Disorder Inventory-2; Garner, 1991). This is problematic as these measures are unlikely to be specific enough to be used with the transgender population (i.e., because they do not assess body dissatisfaction and mental health in relation to gender identity issues). This therefore means that evaluations of body (dis)satisfaction and mental well-being are susceptible to unreliability. Given the importance of reliably assessing these constructs from both a research and clinical point of view, study 4 aimed to develop a measure that is capable of assessing treatment outcomes. Prior to the development of this tool, the most important intervention outcomes were identified. These were gender incongruence, gender distress, mental well-being (including body (dis)satisfaction), and life satisfaction. This measure was developed with members of the transgender population and experts working within the area of transgender healthcare in the United Kingdom (UK), Sweden and Belgium. It was named the Gender Congruence and Life Satisfaction Scale (GCLS). After developing the GCLS, study 4 aimed to validate the measure.

Assessment of the factor structure of the GCLS revealed seven subscales (genitalia, chest, other secondary sex characteristics, social gender role recognition, physical and emotional
intimacy, psychological functioning, and life satisfaction). The first four subscales were categorised into the *gender congruence* cluster and the latter three subscales were categorised into the *gender-related mental well-being and general life satisfaction* cluster. These clusters were developed to facilitate clinicians’ assessments of important short term and long term outcomes from gender affirming medical interventions. In the short term, clinicians aim to alleviate gender incongruence and distress. In the long term, clinicians will be looking for improvements in psychological well-being and life satisfaction.

Study 4 also demonstrated that the GCLS is a valid and reliable measure to use with the transgender population. As part of these analyses, the GCLS was found to be capable of distinguishing between known-groups at different stages of social gender role and medical transition. For instance, transgender people who had not undergone any gender affirming medical interventions reported poorer outcomes on all the GCLS subscales compared to cisgender people as well as transgender people who had taken cross-sex hormone treatment and undergone genital surgery (+/- mastectomy and chest reconstructive surgery). This finding is consistent with research that has reported on the positive effects of gender affirming medical interventions on gender incongruence, body dissatisfaction, mental well-being and life satisfaction (De Cuypere et al., 2005; De Cuypere, Elaut, Heylens, & Monstrey, 2006; Lindqvist et al., 2017; Ruppin & Pfäfflin, 2015; van de Grift et al., 2017a), but builds on past research by providing a transgender-specific tool through which to measure these changes. This demonstrates that the GCLS is a suitable tool to use within a research capacity.

In conclusion, study 4 developed and validated a new self-report measure (the GCLS) capable of assessing short and long term outcomes in transgender people at different stages of transition. The GCLS is likely to have clinical and research implications which will be discussed in sections 10.5.3. and 10.7.2., respectively.

### 10.4. Contribution of findings to understanding physical (in)activity, body (dis)satisfaction and mental health in transgender people

This thesis presents research which furthers our understanding of physical (in)activity, experiences of body (dis)satisfaction and mental health in the transgender people and has made significant advances to extend knowledge. However, what is apparent is that body (dis)satisfaction is core to explaining many of the findings of this thesis. This is not surprising
as body dissatisfaction has been described as core to the distress and unhappiness that transgender people experience (see chapter 3; Jones et al., 2016b; Witcomb et al., 2015).

10.4.1. Body image

Body image is the mental representation that people create of their physical selves. This mental representation can be affected by different external (e.g., the media) and internal (e.g., self-esteem) factors. People may experience satisfaction with their body image, however, it is increasingly common for people to experience dissatisfaction with their body and/or the image that a person has about their body and this is referred to as body dissatisfaction (Levine, Smolak, Moodey, Shurman, & Hessen, 2006). Body ideal internalisation (i.e., an individual’s acceptance of societal beliefs, attitudes and standards of body image) is thought to be a major risk factor for body dissatisfaction within the cisgender population (e.g., Fitzsimmons-Craft, 2011; Grogan, 2016; Thompson & Stice, 2001). These body ideals are most commonly emphasised through sociocultural messages within the media, from friends and family (Grabe, Ward, & Hyde, 2008; Leit, Gray, & Pope, 2002; Stice & Shaw, 2002; Yamamiya, Cash, Melnyk, Posavac, & Posavac, 2005). Standards of beauty have changed over time but feminine body ideals in the twenty-first century place emphasis on being thin with good muscle tone (i.e., looking firm) and large breasts (Grogan, 2016). Masculine body ideals in the twenty-first century emphasise being muscular and thin, sometimes defined as the V-body shape (Grogan, 2016; McCreary & Sasse, 2000). Body ideals for most women and men are unattainable (e.g., Fitzsimmons-Craft, 2011; Thompson & Stice, 2001).

10.4.2. Body dissatisfaction in transgender people

Transgender people also experience dissatisfaction with their bodies because their body image and body ideal (e.g., a body of a women or man) do not match (see chapter 3; Jones et al., 2016b; Kozee, Tylka, & Bauerband, 2012) even following gender affirming medical treatment. Much of the research in this area has focused on sex-specific characteristics which chapter 3 concluded transgender people are often highly dissatisfied with (Becker et al., 2016; Jones et al., 2016b). Following gender affirming medical interventions (if this is what a person wishes), dissatisfaction with sex-specific body parts has been found to alleviate (i.e., body satisfaction increases; e.g., Bandini et al., 2013; de Vries et al., 2011, 2014; Fisher et al., 2014; van de Grift et al., 2017a). As gender affirming medical interventions are capable of alleviating body dissatisfaction within the transgender population, it has been suggested that
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body dissatisfaction is at least partly driven by gender incongruence (e.g., Kozee et al., 2012). This is supported by a study which found that prior to gender affirming medical interventions, gender incongruence was positively associated with genital dissatisfaction (i.e., the higher the level of gender incongruence, the higher genital dissatisfaction; van de Griff et al., 2017a). However, the same study also found that overall body dissatisfaction and gender incongruence were not significantly associated prior to gender affirming medical interventions (van de Griff et al., 2017a). Such research suggests that not all body dissatisfaction experienced by transgender people is associated with gender incongruence. As with cisgender people, transgender people may also be dissatisfied with their weight and shape (Witcomb et al., 2015). In support of this, chapter 3 found evidence of transgender women striving for thinness (through diet restriction) so as to appear more feminine (Ålgars et al., 2012; Jones et al., 2016b). Additionally, the transgender males in chapter 6 (study 1) reported engaging in weight training to gain more muscle on their upper torso (Jones et al., 2017b). When taken together, the findings of this thesis and previous research suggest that while transgender people experience body dissatisfaction with sex-specific characteristics, transgender people are also susceptible to body ideals emphasised in Western society through sociocultural messages.

10.4.3. Body dissatisfaction and mental health in transgender people

Within the cisgender population, research has found poor body image to impact several aspects of a person’s life. Body dissatisfaction has been found to be a predictive factor for depression and low self-esteem (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006; Stice, Hayward, Cameron, Killen, & Taylor, 2000). One study unpacked these findings and found body dissatisfaction to lower self-esteem which in turn increases symptoms of anxiety and depression (Duchesne et al., 2017). Experiencing mental health problems can be stigmatising as can having a minority identity, such as being transgender (Hendricks & Testa, 2012; Meyer, 2003). Therefore, some transgender people have been described as being vulnerable to a double stigma (Mizock, 2012). Stigmatisation has also been associated with social isolation and a fear of entering close relationships (Hatzenbuhler, Phelan, & Link, 2013). The development of and effects of having poor body image for transgender people are therefore complex and widespread.
10.4.4. Body dissatisfaction, physical activity and sport participation

Body dissatisfaction has also been associated with social physique anxiety within the cisgender population (Lantz et al., 1997). Social physique anxiety is defined as the anxiety experienced by individuals who perceive that their physique (i.e., the shape and size of their body) will be negatively evaluated by others, affecting the way they see their body themselves (Hart, Leary, & Rejeski, 1989). Social physique anxiety has been found to be negatively associated with physical activity motivation (e.g., Hausenblas & Fallen, 2002; Kruger et al., 2008; Tiggemann & Williamson, 2000) and participation (e.g., Lantz et al., 1997). This may explain why study 1 (chapter 6) found body dissatisfaction to be one of the biggest barriers faced by young transgender adults when attempting to engage in physical activity and sport (Jones et al., 2017b). Additionally, study 2 (chapter 7) found physical activity engagement to be low among treatment seeking transgender people (who often experience very high levels of body dissatisfaction) when compared to cisgender people (Jones, Haycraft, Bouman, & Arcelus, 2018). In combination, findings from this thesis and from previous research are concerning given the evidence which suggests that engaging in frequent physical activity and sport is likely to have a number of physical and mental health benefits for the transgender population.

10.4.5. Body dissatisfaction and eating disorder symptoms in transgender people

Body dissatisfaction has been found to make transgender people vulnerable to eating disorder symptoms (see chapter 3; Ålgars et al., 2012; Bouman & Arcelus, 2016; Jones et al., 2016b; Khoosal et al., 2009). Study 3 (chapter 8) found the relationship between eating disorder psychopathology and body dissatisfaction to be complex. Self-esteem, anxiety and perfectionism were each found to significantly mediate the relationship between body dissatisfaction and drive for thinness, as well as the relationship between body dissatisfaction and bulimia, in people who had not taken cross-sex hormones. These findings support cognitive-behavioural and emotion regulation theories of eating disorders and previous research that has described the mediating role of symptoms of anxiety and self-esteem (e.g., Brechan & Kvalem, 2015; DeBoer & Smits, 2013; Fairburn et al., 2003; Harrison et al., 2009). Low self-esteem and high levels of anxiety within the transgender population are thought to be connected, and at least partly caused by the discrimination, stigmatisation and prejudice (transphobia) that (some) transgender people experience (Hendricks & Testa, 2012; Meyer, 2003). Interestingly, experiencing stigmatisation (due to minority gender identity) has
been linked to higher levels of disordered eating among transgender youth (Watson, Veale, & Saewyc, 2017). Experiencing transphobia is likely to cause a negative emotional state which some transgender people may find difficult to regulate and so, consequently, coping mechanisms are sought. These mechanisms may be healthy, such as physical activity and/or sport engagement. However, the findings reported in this thesis indicate that transgender people have difficulty accessing physical activity and/or sport (see chapter 6; Jones et al., 2017b). Therefore, transgender people may be susceptible to adopting unhealthy coping mechanisms. When considered in light of previous research with the cisgender population, the findings of study 3 suggest that transgender people may binge, self-induce vomiting and/or restrict their food to regulate negative emotions.

Within study 3, high levels of perfectionism also predicted both drive for thinness and bulimia, which supports cisgender research (e.g., Egan et al., 2011; Tchanturia et al., 2016). Slade (1982) proposed that high levels of perfectionism, when coupled with dissatisfaction with life and self (i.e., low self-esteem), leaves people wanting complete control in their life. Gaining complete control in many aspects of life is often unattainable and therefore controlling body shape, weight and food intake can become the focus (Slade, 1982). This explanation may be particularly pertinent among treatment seeking transgender people who are yet to take cross-sex hormones as they may especially feel a lack of control over their medical transition. Currently, long waiting times for assessment and treatment are experienced in transgender health services across the UK and Europe (Bouman & Richards, 2013; Kanamori & Cornelius-White, 2016). In this sense, self-reported perfectionism within the transgender population may be a proxy for feeling a lack of control which is likely to be caused by temporary uncertainty surrounding their medical transition. Therefore, in this context, it is possible that perfectionism appears to be a state (i.e., striving for things to be perfect in response to feeling a lack of control during medical transition) as opposed to being a stable personality trait. Therefore, treatment seeking transgender people who are yet to take cross-sex hormones may seek to gain control through temporarily engaging in disordered eating behaviours.

Research presented within this thesis has also supported that cross-sex hormones may be able to alleviate eating disorder symptoms within the treatment seeking transgender population (see chapter 8; study 3). Previous research has also found undergoing gender affirming
surgery in transgender females to alleviate eating disorder psychopathology (Khoosal et al., 2009). When these findings and previous research are considered in combination, they may suggest that eating disorder symptoms experienced by the treatment seeking transgender population are secondary to gender incongruence (i.e., that eating disorder symptoms are caused by gender incongruence) due to the positive effects of gender affirming medical interventions.

10.4.6. Evaluating the impact of gender affirming medical interventions on body dissatisfaction

Due to the widespread impact that body dissatisfaction appears to have for the transgender population, it is imperative to evaluate the gender affirming medical interventions offered at transgender health services which aim to increase gender-related body satisfaction. The majority of the research within this area has been concerned with mental health outcomes, such as anxiety and depression (e.g., Davis & Meier 2014; De Cuypere et al., 2006; Gorin-Lazard et al., 2012; 2013; Heylens et al., 2014; Lindqvist et al., 2016; Murad et al., 2010; Ruppin & Pfäfflin 2015). This is evidently an important outcome to assess as transgender people often report poor mental well-being (e.g., Dhejne et al., 2016). However, the primary aim of interventions offered at transgender health services is to alleviate gender incongruence (and associated body dissatisfaction). This outcome is frequently neglected. The majority of research that has been concerned with assessing outcomes from interventions offered at transgender health services also has methodological limitations. For instance, the majority of research is cross-sectional and therefore true cause and effect cannot be determined. To date there has been little research that has explored the longitudinal outcomes of gender affirming medical interventions offered to transgender people. This research is important in order to reliably determine the effects of gender affirming medical interventions. There is also very limited research that has explored factors which are associated with positive and negative outcomes. Therefore patients who are vulnerable to a poorer outcome cannot be identified nor can preventative support be provided. Identifying interventions that are associated with positive outcomes is important for the allocation of healthcare resources. Conducting longitudinal outcome research has been hampered by the lack of an appropriate tool to do so (see study 4; chapter 9). Section 10.7.2. will consider specific ways in which the tool developed within this thesis (the Gender Congruence and Life Satisfaction Scale; GCLS) may be able address these gaps within the literature and ultimately improve transgender healthcare.
10.5. Implications of this thesis

The research presented within this thesis has highlighted several notable practical implications. These relate to a need to improve transgender people’s access to, and engagement in, physical activity and sport. Additionally there is a need to alleviate body dissatisfaction as well as a need to improve access to, and treatment offered by, transgender health services.

10.5.1. Facilitating physical activity and sport participation within the transgender population

Physical activity and sport engagement is likely to have a number of benefits for mental health and body dissatisfaction within the transgender population (e.g., Carter et al., 2016; Herring et al., 2011; McMahon et al., 2016; Rebar et al., 2016). However, the research in this thesis (see chapter 6; Jones et al., 2017b) found that many treatment seeking transgender people avoid participating in physical activity or recreational sport. The following two sections make specific recommendations which may facilitate increased physical activity in the transgender population.

10.5.1.1. Recommendations for physical activity and sport organisations

Study 1 (chapter 6) identified that some young transgender people are avoidant of physical activity and sport due to a fear of transphobia (Jones et al., 2017b). Anticipating transphobia and consequently avoiding intolerant environments may be seen as a useful coping mechanism by many transgender people. However, avoiding physical activity and sport is problematic for this population due to the known health benefits. There are activity groups and sporting clubs that are open to transgender people only and these might be more acceptable for some transgender people. However, the research within this thesis identified that there is a lack of these groups available for transgender people (see chapter 6; Jones et al., 2017b). Therefore sports organisations, leisure centres and gyms should work to increase the number of transgender only physical activity and sport groups/sessions. For some transgender people, these groups will not be acceptable as they may be seen to promote transgender exclusion from mainstream physical activity and sport (see chapter 6; Jones et al., 2017b). Consequently, it is important that physical activity spaces and sports clubs are made to be inclusive of transgender people. One potential way to do this is to introduce more mixed-gendered sports teams that reduce the pressure of being a certain size or strength, especially
when sport is being engaged in at a recreational level. This will better support transgender people at varying stages of social and medical transition to be able to participate in team sport without having to align themselves with a male or female team. Mixed gendered sports teams will also help non-binary and gender neutral transgender people to be able to access sport. If sports organisations are concerned about transgender people having an athletic advantage they could consider developing gender neutral (i.e., not divided by the binary gender system) size categories. Any sports organisation wanting to exclude transgender people from their sport will have difficulty justifying their decision given the findings of empirical research. There is currently no consistent or direct physiological research that has found transgender people to have an unfair athletic advantage (see chapter 2; Jones et al., 2017a). After considering the limited physiological evidence, chapter 2 concluded that it is only transgender females who are potentially seen to have an athletic advantage due to androgenic hormones (i.e., testosterone) (Jones et al., 2017a). However, it is still debated within the literature as to whether or not androgenic hormones are a useful marker of athletic advantage (Karkazis, Jordan-Young, Davis, & Camporesi, 2012).

While awareness of gender diversity has increased significantly over the past few years, more still needs to be done. The findings from this thesis suggest that increasing awareness of the barriers that transgender people face when engaging (or attempting to engage) in physical activity and sport will increase the accessibility of mainstream physical activity and sport for this population. Awareness training should be made available and delivered to people concerned with the implementation of physical activity and sport, such as sports team managers and staff working at leisure centres and gyms. People working within these arenas need to ensure that changing facilities are inclusive for this population. Study 1 (chapter 6) identified how changing facilities were one of the biggest barriers to transgender people attempting to be active which is concerning considering that changing facilities are instrumental to physical activity and sport engagement (Jones et al., 2017b). In light of this, it is recommended that more gender neutral (i.e., not divided by the binary gender system) changing facilities are introduced into leisure centres, gyms, swimming baths and sports clubs. Within these facilities, separate and private cubicles should be available. However, it is acknowledged that in some countries, the implementation of gender neutral changing facilities will be a challenge. For instance, Donald Trump has recently revoked guidance in the USA to allow transgender school students to use the gendered toilet which matches their
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gender identity (BBC News, 2017) so it is acknowledged that, unfortunately, this recommendation will not be straightforward to roll-out globally.

10.5.1.2. Recommendations regarding sport-related clothing

Study 1 (chapter 6) also found that the clothing that people wear to engage in physical activity and sport can be problematic for transgender people (Jones et al., 2017b). Such clothing is often very revealing and an indication of one’s gender. Therefore sports clothing brands should consider developing more gender neutral and less revealing sports clothing, especially for activities such as swimming, gymnastics, athletics and cycling where clothing is often highly revealing. For recreational engagement in physical activity and sport, the performance-enhancing benefits of certain clothes would be less important to the transgender population, meaning that making some sport clothing less revealing should not significant impact the majority of transgender sport participants. Some transgender people also have concerns about effectively concealing their chest and/or genitals in sports clothing, especially transgender males (see chapter 6; Jones et al., 2017b). The transgender males in study 1 spoke at length in relation to the issues they had (before mastectomy and chest reconstructive surgery) with binding their chest and engaging in physical activity and sport in a safe and comfortable way (Jones et al., 2017b). In response to this, sports clothing brands should consider developing a chest binder that is effective (i.e., conceals the chest) but also comfortable (i.e., is not restricting).

10.5.2. Recommendations to alleviate body dissatisfaction and eating disorder symptoms

In section 10.4., it was evident that there is a need to alleviate experiences of body dissatisfaction within the transgender population due to the widespread implications that this can have on a person’s life. Study 3 (chapter 8) also identified how body dissatisfaction may make some treatment seeking transgender people vulnerable to eating disorder symptoms. In support of previous research, study 4 (chapter 9) demonstrated that cross-sex hormones and gender affirming surgery are associated with a decrease in body dissatisfaction (i.e., increase in body satisfaction) (e.g., e.g., Bandini et al., 2013; de Vries et al., 2011, 2014; Fisher et al., 2014; van de Grift et al., 2017a). Study 4 found that gender affirming medical interventions directly increase satisfaction with parts of the body that are responsive to the concerned intervention. For example, transgender males who had undergone mastectomy and chest reconstructive surgery reported significantly more satisfaction with their chest compared to
transgender males who hadn’t undergone this intervention (see section 9.4.3.). Research has also found this increase in body satisfaction to be reported in relation to body parts that are unresponsive to gender affirming medical interventions (van de Grift et al., 2017a). However, van de Grift et al. (2017a) found that overall body dissatisfaction before gender affirming medical interventions is associated with higher overall body dissatisfaction after gender affirming medical interventions. As overall body dissatisfaction is not thought to be associated with levels of gender incongruence (van de Grift et al., 2017a), transgender people who continue to report body dissatisfaction after gender affirming interventions may benefit from holistic body image interventions.

Although transgender people experience a variety of different barriers to physical activity and sport (see chapters 2 and 6; Jones et al., 2017a; 2017b), the young transgender people in study 1 (chapter 6) discussed how they felt they would be able to be more active following their medical transition due to an increase in gender congruence (Jones et al., 2017b). In light of this, physical activity and sport engagement may be an effective intervention for transgender people who continue to report high levels of body dissatisfaction after a medical transition. Research with the cisgender population has found physical activity and sport engagement to have positive effects on body image (e.g., Cox et al., 2017; Goodwin et al., 2016; Kruger et al., 2008; Lantz et al., 1997; Marquez & McAuley, 2001; Williams & Cash, 2001). A meta-analysis found that physical activity interventions are most effective (i.e., they reduce body dissatisfaction the greatest) when physical activity is engaged in more frequently and is the sole component of the intervention (i.e., a healthy diet isn’t also incorporate) (Campbell & Hausenblas, 2009). Interestingly, the duration, intensity, mode or length of physical activity was not associated with the successfulness of the intervention (Campbell & Hausenblas, 2009). With this in mind, physical activity can be seen as a flexible (in relate to duration, intensity, mode and length) intervention to alleviate body dissatisfaction. In comparison to other interventions that may be offered to alleviate body dissatisfaction, physical activity may be seen as cost-effective. Physical activity can be engaged in at home or in public spaces. Having an intervention that is cost-effective is of great importance given the immense financial pressure that the UK’s National Health Service (NHS) is currently under (National Health Service England, 2017). Such interventions will also be beneficial for transgender people who have to pay for their own healthcare, such as in the USA. Recommending physical activity and sport engagement to alleviate body dissatisfaction
within the transgender population (especially among those who have undergone a medical transition) may also be an acceptable intervention as the young transgender adults in study 1 (chapter 6) explained that they were motivated to engage in physical activity and sport to change their bodily appearance (Jones et al., 2017b).

The findings reported in this thesis have supported the notion that transgender people may be susceptible to body ideals emphasised within Western society (e.g., Grabe et al., 2008; Leit et al., 2002; Stice & Shaw, 2002; Yamamiya et al., 2005). Achieving these body ideals may be even more unrealistic among the transgender population, when compared to the cisgender population especially when a medical transition is initiated after puberty has finished. Testosterone therapy will increase muscle mass in a male pattern and decrease body fat, especially around the hips and buttocks (Meyer et al., 1986). However, the size and shape of the pelvis (which gives a feminine hourglass shape) cannot be altered through medical or physical (i.e., weight training) intervention. Oestrogen therapy will reduce muscle mass in a male pattern and increase body fat by an average of 3.8 kg mainly around the hips and buttocks (Elbers et al., 2003). However, there is no medical or physical intervention that can change the shape of the pelvis (to give a feminine hourglass shape) or decrease broad shoulders (although oestrogen therapy will reduce muscle around the shoulders).

Interventions used with cisgender people that aim to alleviate susceptibility to the internalisation of body ideals may therefore be particularly beneficial with the transgender population. Research has found that media literacy interventions, which aim to increase the ability to critically analyse and evaluate media content, have been shown to be favourable in relation to decreasing body dissatisfaction and the internalisation of body ideals (Coughlin & Kalodner, 2006; McLean, Paxton, & Wertheim, 2016; Yamamiya et al., 2005). For instance, a study with college women found that the group that received media literacy training reported greater body satisfaction and lower internalisation of the thin-ideal than the group that received no intervention (Coughlin & Kalodner, 2006). Within this study, the media literacy intervention included two sessions which aimed to educate the college women about body image and techniques that the media use to create ‘body ideals’. The women were also taught cognitive strategies to challenge the messages they are exposed to in the media (Coughlin & Kalodner, 2006). In light of the effectiveness of media literacy interventions within the cisgender population, these interventions may be beneficial to transgender people who are susceptible to sociocultural messages of beauty.
Chapter 10: General discussion

As suggested previously, body dissatisfaction may be a risk factor for eating disorder symptoms in treatment seeking transgender people although for most people these symptoms do not appear to typically manifest into a clinical eating disorder (see chapter 8). The sustained body dissatisfaction experienced by some transgender people following gender affirming medical interventions (van de Grift et al., 2017a) may continue to put some people at risk for eating disorder symptoms. The research within this thesis suggested that treatment seeking transgender people may use disordered eating behaviour to regulate their emotions (see chapter 8 and section 10.4.5.). Therefore, clinicians working with transgender people need to support the individual to identify functional strategies to manage emotions. Additionally, clinicians may need to work with individuals to address particularly difficult negative emotions. In light of this, Dialectical Behaviour Therapy (DBT), which is based on Cognitive Behavioural Therapy but also looks to change unhelpful behaviours, may be useful among transgender people who are using disordered eating behaviours to regulate their emotions. Within the cisgender population, a low-intensity DBT intervention (which included a self-help manual and support phone calls) has been shown to reduce eating disorder psychopathology and increase quality of life compared to a wait-list group (Masson, von Ranson, Wallace, & Safer, 2013). Low-intensity interventions are likely to be cost-effective which is imperative in light of the NHS’s financial situation (National Health Service England, 2017).

10.5.3. Implications for transgender health services

One of the most significant implications of the findings from this thesis is the need to increase transgender individuals’ access to gender affirming medical interventions. The studies within this thesis suggested that gender affirming medical interventions that are offered at transgender health services may be capable of increasing physical activity (studies 1 and 2), and alleviating body dissatisfaction (studies 2, 3 and 4) (and associated eating disorder psychopathology; study 3), mental well-being (studies 2, 3 and 4) and gender incongruence and distress (study 4). One key way that accessibility to transgender health services can be achieved is by decreasing waiting times. Currently, transgender people in the UK have to wait approximately 12-24 months before they are seen at a NHS transgender health service (Bouman & Richards, 2013; UK Trans Info, 2016). However, although reducing waiting times would greatly improve the lives of transgender people it is
acknowledged that reducing waiting times in NHS transgender health services would require additional staffing, resources and funding.

Long waiting times for assessment at transgender health services prolongs the amount of time that transgender people are inactive or insufficiently active (see chapters 6 and 7; Jones et al., 2017b; 2018). This is important as being physically active is likely to have a number of health benefits for the transgender population. The findings reported on in this thesis also suggest that long waiting times at transgender health services may leave some transgender people feeling out of control in relation to their medical transition (see chapter 8 and section 10.4.5.). To gain a sense of control, some transgender people may engage in disordered eating behaviours (see chapter 8 and section 10.4.5.). Making the initial assessment process more efficient at transgender health services is therefore evidently important and may facilitate increased accessibility to gender affirming medical interventions and reduce waiting times. At the Nottingham Centre for Transgender Health (from which most of the data for this thesis were collected), the assessment process spans over three appointments with two separate clinicians (see section 1.5.4.). Research that has investigated this service found that 60% of patients were recommended for gender affirming medical interventions after the assessment process (Jones et al., 2017c). In comparison to patients who were not recommended for gender affirming medical interventions, people who were recommended for interventions had socially transitioned prior to assessment, did not smoke (cessation of smoking is recommended prior to gender affirming medical interventions), were taking cross-sex hormones prior to assessment, were older, and had been assigned male at birth (Jones et al., 2017c). This is the first study that has been able to identify factors that are associated with being recommended for gender affirming medical interventions and may be able to be used to identify people who would benefit from a shorter assessment. In addition to this, a high level of agreement was found between both assessors within this study (Jones et al., 2017c). This raises the question as to whether two assessors are required. Having one assessor would reduce the length of the assessment process and consequently increase accessibility to gender affirming medical interventions. Although it is acknowledged that this recommendation cannot be generalised to transgender health services outside the UK due to differences in assessment processes, it may pose questions to these transgender health services about how they can also increase accessibility to transgender health services in the context of their health systems.
Additionally, it is important that the care and treatment offered at transgender health services is appropriately and meaningfully evaluated. This will help to improve the quality and timeliness of care and will allow service and personal factors associated with a positive and negative outcome to be identified (e.g., Dawson, Doll, Fitzpatrick, Jenkinson, & Carr, 2010). Identification of factors associated with a positive outcome is important for decisions regarding the allocation of healthcare resources. Prior to the development of the Gender Congruence and Life Satisfaction Scale (GCLS; see study 4, chapter 9), self-report measures used to assess important treatment outcomes had not been developed or validated with the transgender population. This has had implications in relation to specificity of measurement and the conclusions drawn. Clinicians working with transgender people and implementing self-report outcome measures into their practice need to consider the reliability of these assessments. As part of the research that comprises this thesis, the GCLS was developed and validated with the transgender population. This measure is multifactorial in that it assesses gender distress, gender congruence, related mental well-being and life satisfaction. It is therefore recommended that this measure is employed within clinical practice to assess treatment outcomes.

10.6. Strengths and limitations of the thesis

10.6.1. Strengths

The initial aims of the thesis were to conduct systematic reviews relating to physical activity and sport (chapter 2) and to body dissatisfaction and disordered eating in the transgender population (chapter 3). These systematic reviews have significantly added to the literature by synthesising two disparate and important fields of research. Additionally, both systematic reviews in this thesis were conducted in accordance with the PRISMA statement (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009) and therefore followed evidence-based guidelines for reporting systematic reviews. Clarity and consistency in reporting systematic reviews is vital as these pieces of evidence can go on to have widespread impact including influencing and informing policy and healthcare decision making (Moher et al., 2009). In addition to this, the systematic reviews included within this thesis were able to highlight important gaps within the current literature and inform some of the empirical chapters of this thesis.
The systematic review concerned with physical activity and sport in chapter 2 highlighted that there was a dearth of research concerned with physical activity and recreational sport engaged in for leisure and fitness. Due to the lack of research in this area, the empirical chapters of the thesis began with a qualitative study to explore the experiences that this population have when being (or attempting to be) active (study 1; chapter 6). Following this study, more specific research questions and hypothesis were formulated and a quantitative study was conducted (study 2; chapter 7). Triangulation of research methods can strengthen findings as it allows researchers to obtain complementary perspectives on one phenomenon (McEvoy & Richards, 2006). For instance, in this thesis quantifying the amount of physical activity that transgender people engaged in (see study 2; chapter 7) allowed us to understand the potential health implications that not being able to access physical activity and sport could have for transgender people (see study 1; chapter 6). Additionally, triangulation allows the limitations of one design (e.g., qualitative) to be overcome by the other (e.g., quantitative). For example, findings from study 1 (chapter 6) cannot be generalised due to their qualitative nature however the findings from the quantitative study (chapter 7) can be more widely generalised and used to inform the development of interventions. Study 2 (chapter 7) was also strengthened by controlling for variables that have consistently been shown to impact physical activity engagement within the cisgender population (age and gender). In study 2, age and gender were controlled for by rigorously matching participants in the between subject groups on these variables. In study 3 (chapter 8), the statistical procedures were implemented in order to control for variables that had been shown to impact eating disorder psychopathology (i.e., ANCOVA was employed). Controlling for potential confounding variables is essential for increasing the internal validity of research findings.

The majority of research that comprised this thesis was conducted with transgender people who had been referred to the Nottingham Centre for Transgender Health and were either awaiting assessment or had been accepted onto the treatment programme. Treatment seeking transgender people may be seen as the most vulnerable to physical inactivity, body dissatisfaction and poor mental health in comparison to transgender people who have undergone a transition or are not treatment seeking (e.g., Dhejne et al., 2016; Jones et al., 2017b; Khoosal et al., 2009). Therefore, focusing research on treatment seeking transgender people is of great importance for directly improving the lives of this population. Recruiting transgender people from transgender health services also allows for the recruitment of
homogeneous groups in relation to stage of transition as objective information regarding their medical transition can be obtained. In this thesis, this has helped to further our knowledge regarding physical activity, body (dis)satisfaction and mental health in transgender people and enhanced our understanding of important nuances in people who are at different stages of social gender role and medical transition.

Although there are several benefits of having a homogenous sample as discussed above, to ensure research is representative heterogeneous samples are also important. In study 4 (chapter 9), not only were transgender people recruited from the Nottingham Centre for Transgender Health but also the community via LGBT support organisations. Consequently, transgender people at different stages of social gender role and medical transition who may have never been in contact with transgender health services, or were not currently in contact with a transgender health service, were recruited and contributed to the development of the new health outcomes measure. Therefore the findings of study 4 are applicable to transgender people in the community who may not be accessing transgender health services as well as those who are.

Both systematic reviews in this thesis identified that the current research concerned with physical activity and sport (chapter 2) and with body dissatisfaction and disordered eating in the transgender population (chapter 3) had usually been conducted with very small sample sizes. Having small sample sizes in quantitative research is problematic as it can impact the ability to generalise findings and inflates the probability of a Type 1 error. In response to this, the research comprising this thesis recruited larger samples of participants to allow for greater power to detect a difference (i.e., to reduce the probability of a Type 1 error; see Table 5.2.).

The findings of the research reported on in this thesis have made important advances in important, under-researched areas of transgender health. One of the most notable and immediate advances of the research from this thesis is the development and validation of a new outcome measure; the Gender Congruence and Life Satisfaction Scale (GCLS). This measure will allow for more reliable data to be collected from transgender health services in relation to short and long term outcomes. The GCLS has already begun to be implemented in transgender health services across Europe and the USA. At the same time, more reliable data
within a research capacity can be collected. As use of the GCLS increases, comparisons across studies can be made more easily.

10.6.2. Limitations

Although recruiting participants from transgender health services has several benefits, it is acknowledged that not every transgender person will access a transgender health service and wish to undergo gender affirming medical interventions (e.g., Beek, Kreukels, Cohen-Kettenis, & Steensma, 2015). In addition, the assessment process and treatment offered at transgender health services differs around the world. Consequently, the findings from data collected from the Nottingham Centre for Transgender Health within this thesis cannot be generalised beyond treatment seeking transgender adults who are accessing a transgender health service within the UK. Within the empirical studies that comprise this thesis, the majority of transgender participants identified within the binary gender system (i.e., male or female), even though this was not an inclusion criterion for any of the empirical studies. There are an increasing number of people who identify outside the binary gender system (e.g., non-gender, gender queer, bigender; Beek et al., 2015; Richards, Bouman, Seal, Barker, Nieder, & T'Sjoen, 2016) and, consequently, the findings of this thesis cannot be generalised to transgender people who identify outside the binary gender system.

The empirical research that comprises this thesis was cross-sectional. While this research design has allowed significant inroads to be made in exploring physical (in)activity, body (dis)satisfaction and mental health within the transgender population, cause and effect cannot be determined. In addition to this, studies 2, 3 and 4 (chapters 7, 8 and 9) within this thesis employed self-report measures. Self-report measures are an efficient way to collect large amounts of data and can be administered in a paper or online form, which can facilitate recruitment. However, as with all questionnaire research, participants may be susceptible to over or under reporting. The issue of social desirability may be particularly pertinent for transgender people recruited from transgender health services as they may feel that by framing themselves in a particular way through the responses they give, it will impact the care and treatment they receive. For instance, some people may over report mental health problems in an effort to access gender affirming medical interventions in a timely manner despite the fact that participants recruited from the Nottingham Centre for Transgender Health were explicitly told that their responses would not affect the care and treatment that
they received from the service. To minimise social desirability bias, it was made clear to all research participants from the outset that their responses would be anonymous and stored confidentially.

Within studies 2 and 3 it could have been beneficial to include data on BMI given that BMI has been associated with levels of physical activity and eating psychopathology within the cisgender population. Future research may wish to consider the inclusion of BMI. Additionally, information about cross-sex hormones treatment collected in studies 2 and 3 was limited by not knowing the dosage or length of time that the patient has been taking the hormone. Future research would benefit from obtaining more precise details about cross-sex hormone treatment to facilitate a better understanding of the potential impact of this treatment on transgender individuals’ health and well-being.

10.6.3. Self-reflection

Within qualitative research it is important to consider the subjectivity of the researcher and the ways in which they may have affected how the research was conducted and findings interpreted (Sparkes & Smith, 2014). In light of this, acknowledging the PhD candidate’s gender identity and how this may have affected the research process is important (Galupo, 2017). I am a cisgender woman conducting research with the transgender population which might have affected the formulation of research questions, the way questions were phrased in an interview, and the way in which results are interpreted and framed. In order to minimise the impact of this, the qualitative study was reviewed by, and included input from, members of the transgender population (as were studies 2, 3 and 4). The qualitative study within this thesis was discussed with the Patient and Public Involvement (PPI) group at the Nottingham Centre for Transgender Health. This PPI group consists of 21 people who were attending, or had attended, the service and agreed to provide feedback for research projects taking place at the service. Undertaking this process also allowed the PhD candidate to ensure that the research questions were of interest and relevant, and that the research methods and language employed were acceptable to the transgender population.
10.7. Future research

10.7.1. Recruitment and samples

Future research should consider recruiting larger community samples of transgender people to further explore physical activity, body (dis)satisfaction and mental health. By working with community samples, the experiences of people who are not accessing transgender health services, or who do not wish to undergo gender affirming medical interventions, are then more likely to be explored. Expanding the recruitment method to the community may also mean that more people with a variety of different gender identities are recruited (not just male and female). Future research should be concerned with exploring nuances in physical (in)activity, body (dis)satisfaction and mental health between transgender people with binary and non-binary gender identities, especially as non-binary transgender people are more likely to make partial treatment requests (Beek et al., 2015; Richards et al., 2016) and report poorer mental health than binary transgender people (Rimes, Goodship, Ussher, Baker, & West, 2017; Warren, Smalley, & Barefoot, 2016).

10.7.2. Research design and measurement

Research now also needs to replicate and extend the findings reported on in this thesis using a longitudinal design so that temporal relationships can be explored. Such a design would be useful in further exploring the role of gender affirming medical interventions (i.e., cross-sex hormones and genital affirming surgery) in relation to physical (in)activity, body (dis)satisfaction and mental health. When using such a design, it is important that measurement is reliable and valid. Future research concerned with physical activity may wish to employ objective measures, such as accelerometers, to obtain more reliable outcome data. Researchers should also consider employing the Gender Congruence and Life Satisfaction Scale (GCLS) that was developed as part of this thesis. This measure is capable of assessing the most important outcomes (gender incongruence and distress as well as mental well-being, body (dis)satisfaction and life satisfaction) in one tool. It can be used in research to identify factors that are associated with a positive or negative outcome. Additionally, it is important to follow-up patients not only when they are in the treatment programme, but also after they have been discharged from transgender health services. The GCLS has two clusters which represent short and long term outcomes that will likely facilitate such research. For example, the cluster that represents long term outcomes may facilitate the development of interventions.
that are capable of alleviating body dissatisfaction after a transgender person has undergone gender confirming medical interventions.

### 10.8. Conclusions

This research reported on in this thesis aimed to further our understanding around physical (in)activity, body (dis)satisfaction and mental health of transgender people. Body dissatisfaction is core to explaining many of findings of this thesis. Body dissatisfaction was found to be one of the biggest contributing factors to physical (in)activity among transgender people. Body dissatisfaction was also found to be related to many of the other barriers to engaging in physical activity and sport that transgender people experienced, such as changing facilities and sport-related clothing. These barriers need to be addressed by increasing awareness of transgender people (i.e., training days, television awareness campaigns), increasing the presence of gender neutral changing facilities, developing more gender neutral and less revealing sports clothing, developing effective yet comfortable chest binders, having a greater presence of transgender only physical activity and sport spaces, and increasing the number of mainstream mixed gendered sports teams. Improving access to, and engagement with, physical activity and sport is likely to facilitate the alleviation of body dissatisfaction and increase mental well-being in this vulnerable group.

The findings from this thesis have shown that people who have taken cross-sex hormones engage in more physical activity, report less body dissatisfaction and fewer mental health problems in comparison to transgender people who have not taken cross-sex hormones (but are seeking intervention). However, this research was cross-sectional. In light of this, longitudinal research that aims to explore the temporal relationship between gender affirming medical interventions (i.e., cross-sex hormones and genital affirming surgery), physical activity, body (dis)satisfaction and mental health is needed. The newly-developed Gender Congruence and Life Satisfaction Scale (GCLS) has been confirmed as a suitable, valid and reliable tool to evaluate treatment offered at transgender health services. The use of this measure in clinical and research settings will help to improve the quality and timeliness of care and will allow service and personal factors associated with a positive and negative outcome to be identified. Ultimately, further advances in these research areas will continue to contribute towards increasing the well-being of the transgender population.


References


References


International Association of Athletics Federation. (2011). IAAF Regulations Governing Eligibility of Athletes who have Undergone Sex Reassignment to compete in Women’s Competition. Retrieved from: [http://media.wix.com/ugd/2bc3fc_476cfbe00df48c3aa5322a29d5e11b2.pdf](http://media.wix.com/ugd/2bc3fc_476cfbe00df48c3aa5322a29d5e11b2.pdf)


References


References


http://media.wix.com/ugd/2bc3fc_63894095ad33464bb3a00fdba17cc0a7.pdf

http://media.wix.com/ugd/2bc3fc_d4601f281da449648ca4c60d0d81a526.pdf


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Appendix A: Flyer advertising study 4

Participants needed!
For a study exploring gender, the body and quality of life

Who can take part?
- Anyone who is 18+ years old
- Anyone who identifies as transgender or cisgender (non-trans)

What will I need to do?
- Complete a short online survey which asks questions about gender, the body and quality of life
- Completion of the survey will take approximately 10 minutes

If you would like to find out more or take part in the survey, please visit the following website:

https://lboro.onlinesurveys.ac.uk/gender
Appendix B: Summary explaining the aims of study 4

Gender, the body and quality of life study

The aim of this research study is to test how well a newly-developed scale (the Nottingham Gender and Body Dysphoria Scale) assesses feelings about gender, the body and quality of life. We hope that this scale will be a useful tool to help health professionals understand more about the feelings and experiences of transgender individuals and to support their treatment and care. To help us with this process we are looking for transgender people to complete the survey, as well as cisgender people (people who are content with the gender they were assigned at birth).

If you would like to find out more, or take part in the research then please follow the link: https://lboro.onlinesurveys.ac.uk/gender
Appendix C: Information sheet for study 1

Nottinghamshire Healthcare NHS
NHS Foundation Trust

Trans people's experiences of exercise, physical activity and sport participation

Participant Information Sheet

Study investigator: Bethany Jones

Supervisors: Dr Emma Haycraft, Professor Jon Arcelus and Dr Walter Bouman

What is the purpose of the study? The purpose of this study is to establish the type and amount of exercise, sport or physical activity trans people participate in. We want to better understand why people may or may not be motivated to engage in physical activity, sport or exercise.

Who is doing this research? The primary investigator of this study is Bethany Jones, a PhD student at Loughborough University. The study is being supervised by Dr Emma Haycraft, a Senior Lecturer at Loughborough University, Professor Jon Arcelus, a Consultant Psychiatrist at the Nottingham Centre for Gender Dysphoria and a Professor at Loughborough University and Dr Walter Bouman, Lead Clinician and Consultant Psychiatrist at the Nottingham Centre for Gender Dysphoria

Who will be taking part in the research? We are looking to recruit approximately 20 participants who are in the treatment programme at the Nottingham Centre for Gender Dysphoria.

What will I be asked to do? You will be asked to take part in a one-to-one, face-to-face interview at the Nottingham Centre for Gender Dysphoria. You will be reimbursed for your travel expenses if you cannot coincide the interview with your appointment. During the interview you will be asked questions about your sport, exercise and physical activity participation. These interviews will last between 30 minutes to an hour and will be audio recorded with your permission and destroyed following transcription. If you are unable to travel to the Nottingham Centre for Gender Dysphoria, then a telephone interview can be arranged. During the interview you do not have to answer any questions you do not wish to and have the right to stop the interview at any time point. The interviewer will also stop the interview should you become unduly distressed.

Once I take part, can I change my mind? Yes. After you have read this information and asked any questions you may have we will ask you to complete an informed consent form. However if at any time, before, during or after the interview you wish to withdraw from the study, please just contact the main investigator and provide your unique identifier code. You can withdraw at any time, for any reason, and you will not be asked to explain your reasons for withdrawing. However, once the results of the study are aggregated (expected to be by December 2015) it will not be possible to withdraw your individual data from the research. Withdrawing from the study will not affect your care at the Nottingham Centre for Gender Dysphoria in any way.

What personal information will be required from me? During the interview you will be asked about how much you participate in exercise, physical activity or sport. We will also ask questions about what motivates or puts you off engaging in exercise, physical activity or sport.
Are there any risks in participating? There are no anticipated risks. However, if you feel distressed or upset during or after the study then please raise these issues with the researcher, your clinician, or contact your local GP, The Samaritans or MIND for support.

Will me taking part in this study be kept confidential? NHS and Loughborough University ethical approval for this study has been granted. Procedures for handling, processing, storing and destroying your data meet the requirements of the Data Protection Act, 1998. All information which is collected about you during the course of the research will be kept strictly confidential. At the start of the interview you will be assigned a unique identifier code and all your personal information and interview will be stored under this code. All your data will be stored on a password protected memory stick or in a locked filing cabinet. All data will be kept securely for 10 years. After this time your data will be disposed of securely.

What will happen to the results of the study? The findings of the research will contribute towards an evidence base about how we can encourage trans people to participate in sport, exercise and physical activity in a safe, healthy and enjoyable way. The findings of this study will also be shared with the Nottingham Centre for Gender Dysphoria. The research will also contribute towards the doctoral thesis of Bethany Jones and there is the potential that this research may be published. Extracts from the interviews will be used in the final report and in any publications, and so, to protect your anonymity all names will be changed. You can request a summary of the findings upon completion of the overall study.

I have some more questions, who should I contact? If you have any questions please do not hesitate to contact the study investigator, Bethany Jones (Email: B.Jones@lboro.ac.uk Phone: 0115 8760160) or her supervisors, Dr Emma Haycraft (Email: E.Haycraft@lboro.ac.uk, Phone: 01509 228160), Professor Jon Arcelus (Email: j.arcelus@lboro.ac.uk Phone: 0115 8760160) or Dr Walter Bouman (Email: walter.bouman@nottshc.nhs.uk Phone: 0115 8760160)

If you would like independent advice about taking part in research, you may wish to contact Patient Advice Liaison Service (PALS): Phone: 0800 015 3367, Email: PALS@nottshc.nhs.uk, Website: www.pals.nhs.uk (for general information only)

Further support If you feel that you require further support then please discuss your issues with your clinician, GP or contact:

The Samaritans Email: jo@samaritans.org Telephone: 08457 90 90 90 Website: http://www.samaritans.org/

MIND Email: info@mind.org.uk, Telephone: 0300 123 3393, Text: 86463, Website: http://www.mind.org.uk/
Appendix D: Online consent form for study 1

Nottinghamshire Healthcare NHS Foundation Trust

Sport, exercise and physical activity interview study

Thank you for agreeing to take part in this study. As you will know from reading the information sheet, the aim of this study is to establish the type and amount of exercise, sport or physical activity trans people do. Below is a consent form which you are required to complete before the interview. If you have any questions please don’t hesitate to contact Bethany Jones (Email: B.Jones@lboro.ac.uk, Telephone: 0115 8760160).

Full name: 

Date:

1. The purpose and details of this study have been explained to me. I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the Loughborough University Ethics Approvals (Human Participants) Sub-Committee and NHS ethics committee.
   ○ Yes
   ○ No

2. I have read and understood the information sheet and this consent form.
   ○ Yes
   ○ No

3. I have had an opportunity to ask questions about my participation.
   ○ Yes
   ○ No

4. I understand that I am under no obligation to take part in the study.
   ○ Yes
   ○ No
5. I understand that I have the right to withdraw from this study at any stage for any reason, and that I will not be required to explain my reasons for withdrawing.
   - Yes
   - No

6. I agree to the interviews being recorded on the understanding that the recordings will be destroyed following transcription
   - Yes
   - No

7. I understand that all the information I provide will be treated in strict confidence and will be kept anonymous and confidential to the researchers unless (under the statutory obligations of the agencies which the researchers are working with), it is judged that confidentiality will have to be breached for the safety of the participant or others.
   - Yes
   - No

8. I agree to participate in this study.
   - Yes
   - No
Appendix E: Paper consent form for study 1

Nottinghamshire Healthcare NHS Foundation Trust

Trans people’s experiences of exercise, physical activity and sport participation

INFORMED CONSENT FORM
(to be completed after Participant Information Sheet has been read)

The purpose and details of this study have been explained to me. I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the Loughborough University Ethics Approvals (Human Participants) Sub-Committee and NHS ethics committee.

Yes □ No □

I have read and understood the information sheet and this consent form.

Yes □ No □

I have had an opportunity to ask questions about my participation.

Yes □ No □

I understand that I am under no obligation to take part in the study.

Yes □ No □

I understand that I have the right to withdraw from this study at any stage for any reason, and that I will not be required to explain my reasons for withdrawing.

Yes □ No □

I agree to the interviews being recorded on the understanding that the recordings will be destroyed following transcription

Yes □ No □

I understand that all the information I provide will be treated in strict confidence and will be kept anonymous and confidential to the researchers unless (under the statutory obligations of the agencies which the researchers are working with), it is judged that confidentiality will have to be breached for the safety of the participant or others.

Yes □ No □

I agree to participate in this study.

Yes □ No □

Your name.....................................................

Your Signature..............................................

Investigators Signature.................................

Date ..............................................
Appendix F: Information sheet for studies 2 and 3 (transgender participants)

Nottinghamshire Healthcare NHS Foundation Trust

Participant Information Sheet
Please retain this information sheet for your own reference

Clinical correlates and outcomes of treatment for trans people

Introduction

Please read this information sheet carefully. It is important for you to understand why the information is being collected and what it would involve if you agree to take part. If you have any questions please contact one of the Nottingham Centre for Transgender Health team members – contact details are at the end of this sheet. Please take time to consider whether or not you wish to take part.

What is the purpose of this study?

The purpose of this study is to identify what influence treatment has on mental health, self-esteem, self-harming behaviours, body image, social support and interpersonal functioning of people with gender dysphoria. People who have gender dysphoria face a number of difficulties unique to their gender identity or gender presentation. These difficulties can be alleviated through treatment, including hormone therapy and gender surgery. This study will help clinicians better understand the role that treatment pathways plays in people with gender dysphoria.

Why have I been chosen?

All patients attending the Nottingham Centre for Transgender Health will be invited to take part in this research project. We need to know how they were before treatment, in order to identify how they are after hormones and after surgery (if they wish to have surgery).

You have been invited to take part because you meet the recruitment criteria for the research project. You may either have been invited for assessment at the service, you are on hormone treatment or you have had surgery.

Although the information from the questionnaires will be used as part of the assessment and follow-up process at the Centre, we would like to ask your permission for this information to be used as a research study investigating how people with gender dysphoria benefit from treatment.

Who is organising the study?

This research is being organised by Dr Walter Pierre Bouman, Head of Service; Professor Jon Arcelus, Consultant Psychiatrist, Dr Gemma Witcomb, Non-clinical psychologist, Christina Richards, Senior Specialist Psychology Associate, Dr Meghan Thurston and Bethany Jones from the Nottingham Centre for Transgender Health.

Do I have to take part?

Your help in the study is entirely voluntary. If you do not want to take part, you do not have to give a reason. If you do take part and later decide to withdraw from the study, you have the right to have your data withdrawn and destroyed at any time up until publication (all data is anonymous). You do not have to give a reason to withdraw.
What do I have to do?

If you have any questions or concerns, please do not hesitate to contact us before proceeding (contact details are provided at the end of this sheet).

If you are interested in taking part and have no further questions, you will first need to sign the consent form enclosed in this pack. The pack also contains a set of demographic questions and several questionnaires related to outcome measures for you to complete. This should take you approximately one hour. To return your questionnaire pack, please use the stamped and addressed envelope provided or hand it in to your clinician in person.

What are the possible disadvantages of taking part?

These questionnaires should not cause you any discomfort or distress. However, if you do feel distressed at any point during the study we would strongly advise you to talk to your clinician. Alternatively you may wish to speak to your local GP or The Samaritans (telephone no. 08457 909090).

If you decide not to take part in the study, your decision will in no way affect your care at the Nottingham Centre for Transgender Health.

What are the possible benefits of taking part?

There are no direct benefits of participating in this study but your participation in this study may help clinicians understand what the influence is of hormone treatment on quality of life, mental health, self-esteem, self-harming behaviours, body image, social support and interpersonal functioning of people with gender dysphoria. If you wish to receive a summary of the study’s findings on completion of the project, you may request this from the researchers via email.

Will my taking part in this study be kept confidential?

All information given will be kept strictly confidential and will only be accessible to the clinical team at the Nottingham Centre for Transgender Health. All questionnaire data entered into the research database will be assigned a unique identifier code to achieve anonymity. Completed questionnaire packs and consent forms will be separated and stored in your notes in a locked filing cabinet at the Centre for Transgender Health. The procedure for handling, processing, storage and destruction of your data will be compliant with the Data Protection Act 1998.

What happens if I don’t want to carry on with the study?

You can withdraw from the study at any time without giving a reason for doing so. If you wish to withdraw, your data will be discarded from the study and subsequently destroyed. Again this decision will not affect your care at the Nottingham Centre for Transgender Health.

What will happen to the results of the research study?

The study’s findings will be shared with the clinical team at the Nottingham Centre for Transgender Health and may be published in academic journals and presented at research conferences in order to help other clinicians working with people with gender dysphoria. Also a summary of the study’s findings will be made available on request to participants on completion of the study.

Who has reviewed the study?

This study has been reviewed and was given a favourable ethical opinion for conduct by the regional NHS Research and Ethics Committee.
What if I have any other questions or concerns?

If you have any questions or concerns about this study, please contact any of us at the Nottingham Centre for Transgender Health

Dr Walter P. Bouman or Professor Jon Arcelus

Nottingham Centre for Transgender Health
3 Oxford Street
Nottingham
NG1 5BH
Telephone: 0115 876 0160

If you would like independent advice about taking part in research, you may wish to contact Patient Advice Liaison Service (PALS):

Tel: 0800 015 3367

Website: [www.pals.nhs.uk](http://www.pals.nhs.uk) (for general information only)

Thank you for taking the time to read this information sheet and for considering taking part in the study. Please retain this information sheet for future reference.
Appendix G: Consent form for studies 2 and 3 (transgender participants)

Nottinghamshire Healthcare NHS Foundation Trust

INFORMED CONSENT
To be completed after the Participant Information Sheet has been read

Clinical correlates and outcomes of treatment for trans people

*Please read the following carefully. Please initial each box and sign at the bottom to show you have read and understood what is expected of you.*

I hereby give my consent to participate in the questionnaire study clinical correlates and outcomes of treatment at the Nottingham Centre for Transgender Health. I **confirm that:**

- I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the regional Ethics Committee.

- I have read and understood the Participant Information Sheet (version 4. Dated 8/03/17).

- I have been informed that my participation in the study will involve completing a set of questionnaires and that my responses will be kept anonymous and confidential.

- I understand that relevant sections of my medical notes and data collected during my assessment may be looked at by individuals from the Nottingham Centre for Transgender Health where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.

- I understand that I am under no obligation to take part in the study; I have the right to withdraw at any stage for any reason; and that I will not be required to explain my reasons for withdrawing.

Your name  

Your Signature  

Signature of Investigator  

Date  

273
Appendix H: Information sheet for study 2 (cisgender participants)

The differences and predictors of physical activity in trans and cisgender people

Participant Information Sheet

What is the purpose of the study? To explore physical activity levels in males and females.

What will I be asked to do? You will be asked to complete an online survey that should take approximately 10 minutes.

Will me taking part in this study be kept confidential? Loughborough University ethical approval for this study has been granted. Procedures for handling, processing, storing and destroying your data meet the requirements of the Data Protection Act, 1998. All information which is collected about you during the course of the research will be kept strictly confidential. All your data will be stored on a password protected memory stick. All data will be kept securely for 10 years. After this time your data will be disposed of securely.

I have some more questions, who should I contact? If you have any questions please do not hesitate to contact the study investigator, Bethany Jones (B.Jones@lboro.ac.uk) or her supervisors, Dr Emma Haycraft (Email: E.Haycraft@lboro.ac.uk, Phone: 01509 228160), Professor Jon Arcelus (Email: Jon.Arcelus@nottshc.nhs.uk Phone: 0115 8760160) or Dr Walter Bouman (Email: Walter.Bouman@nottshc.nhs.uk Phone: 0115 8760160)

Further support: If you are concerned about your activity level or your ability to engage in physical activity then please contact your GP.
Appendix I: Consent form for study 2 (cisgender participants)

INFORMED CONSENT FORM

(to be completed after Participant Information Sheet has been read)

Please ensure that you have read the information sheet prior to completing this consent form.

I give my consent to participate in the above study. I understand that I do not have to complete the questionnaires and that I can withdraw from the study at any time by closing the web page.

Name:………………………

Date:………………………. 
Appendix J: Information sheet for study 4 when transgender people were recruited from the transgender health service

Information Sheet: Validation of the Nottingham Gender and Body Dysphoria Scale

Bethany Jones, Study Investigator

What is the purpose of the study? This study aims to test how well a newly-developed measure (the Nottingham Gender and Body Dysphoria Scale) assesses feelings about gender, the body and quality of life. We hope that this scale will help those involved in the care of transgender people to determine how good treatment available through the NHS is. A summary of the finding will be available at the end of the study.

What will I be asked to do? You will be invited to complete a series of questionnaires relating to how you feel about your gender, body and quality of life. You will also be asked to complete a questionnaire about gaming behaviour to determine whether this questionnaire is different to the Nottingham Gender and Body Dysphoria Scale. Completion of these questionnaires should take no longer than 20 minutes. Please return your questionnaire pack, either in the designated box at Nottingham Centre for Gender Dysphoria or by post. You do not have to answer any question that you do not want to. Taking part in the study is completely voluntary.

How will information about me be stored and will I be identifiable? You will not be asked to provide any information that would make you identifiable (e.g., your name). Unidentifiable information collected from this study will be stored securely for 5 years (under your unique identifier code) on a password protected computer or in a locked filing cabinet at the NHS premises.

What if I change my mind after I have taken part? You can withdraw your data within three months of taking part in the study by providing your unique identifier code (given at the top of the questionnaire pack). Withdrawing from the study will not affect your care at the Nottingham Centre for Gender Dysphoria.

I have some questions, who should I contact? The study investigator, Bethany Jones (Email: B.Jones@lboro.ac.uk, Phone: 07541054823), or her supervisors:
- Dr Emma Haycraft (Email: E.Haycraft@lboro.ac.uk, Phone: 01509 228160)
- Professor Jon Arcelus (Email: jon.arcelus@nottingham.ac.uk, Phone: 0115 8760160)
- Dr Walter Bouman (Email: walter.bouman@nottshc.nhs.uk, Phone: 0115 8760160)

If you would like independent advice about taking part in research, you may wish to contact Patient Advice Liaison Service (PALS): Phone: 0800 015 3367, Email: PALS@nottshc.nhs.uk, Website: www.pals.nhs.uk (for general information only).

Further support: There are no anticipated risks. This study has been reviewed by the regional NHS Research and Ethics Committee. However, if you feel distressed or upset during or after the study then please raise these issues with your clinician, contact your local GP or contact:

MIND Email: info@mind.org.uk, Telephone: 0300 123 3393, Text: 86463, Website: http://www.mind.org.uk/
Appendix K: Information sheet for study 4 when transgender and cisgender participants were recruited from the community

Validation of the Nottingham Gender and Body Dysphoria Scale

What is the purpose of the study? This study aims to test how well a newly-developed measure (the Nottingham Gender and Body Dysphoria Scale) assesses feelings about gender, the body and quality of life. We hope that this scale will help those involved in the care of transgender people to determine how good treatment available through the NHS is. A summary of the finding will be available at the end of the study.

What will I be asked to do? If you are age 18 or over and identify as cisgender (content with the gender you were assigned at birth) or transgender, you will be invited to complete a series of questionnaires relating to how you feel about your gender, body and quality of life. You will also be asked to complete a questionnaire about gaming behaviour to determine whether this questionnaire is different to the Nottingham Gender and Body Dysphoria Scale. Completion of these questionnaires should take no longer than 20 minutes. Taking part in the study is completely voluntary.

How will information about me be stored and will I be identifiable? Loughborough University ethical approval for this study has been granted. All information which is collected about you during the course of the research will be kept confidential and stored anonymously. All data will be kept securely for 10 years. After this time your data will be disposed of securely.

What if I change my mind after I have taken part? You can stop the study at any time by exiting the webpage and your responses will be destroyed. After completion of the questionnaires, you can withdraw your data within one month of taking part in the study by providing your unique identifier code to Bethany Jones.

I have some questions, who should I contact? The study investigator, Bethany Jones (Email: B.Jones@lboro.ac.uk, Phone: 07541054823), or her supervisors:
- Dr Emma Haycraft (Email: E.Haycraft@lboro.ac.uk, Phone: 01509 228160),
- Professor Jon Arcelus (Email: jon.arcelus@nottingham.ac.uk, Phone: 0115 8760160)
- Dr Walter Bouman (Email: walter.bouman@nottshc.nhs.uk, Phone: 0115 8760160)

Further support: There are no anticipated risks. However, if you feel distressed or upset during or after the study then please raise these issues with your GP or contact:

The Samaritans Email: jo@samaritans.org Telephone: 08457 90 90 90 Website: http://www.samaritans.org/

MIND Email: info@mind.org.uk, Telephone: 0300 123 3393, Text: 86463, Website: http://www.mind.org.uk/
Appendix L: Consent form for study 4 when transgender and cisgender participants were recruited from the community

CONSENT FORM: Gender and body dysphoria study

Important—Please ensure that you have read the information sheet before providing consent.

Please read and the consent form and indicate whether or not you agree with each statement by ticking ‘yes’ or ‘no’. By ticking ‘yes’ to all the statements, you will be providing informed consent.

The purpose and details of this study have been explained to me. I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the Loughborough University Ethics Approvals (Human Participants) Sub-Committee.

I have read and understood the information sheet and this consent form.

I have had an opportunity to ask questions about my participation.

I understand that I am under no obligation to take part in the study.

I understand that I have the right to withdraw from this study within a month of taking part, without providing a reason.

I understand that all the information I provide will be treated in strict confidence and will be kept anonymous and confidential to the researchers unless (under the statutory obligations of the agencies which the researchers are working with), it is judged that confidentiality will have to be breached for the safety of the participant or others.

I agree to participate in this study.
Appendix M: Evidence of ethical approval for studies 1, 2, 3 and 4

Study 1: NHS ethical approval for transgender participants

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**National Research Ethics Service**
NRES Committee North West - Liverpool Central

3rd floor
Barlow House
4 Minshull Street
Manchester
M1 3 DZ

Telephone: 0161 625 7819

26 May 2015

Miss Bethany Jones
School of Sport, Exercise and Health Sciences Epinal Way
Loughborough
LE11 3TU

Dear Miss Jones

**Study title:** Physical activity, exercise and sport participation in trans people: A qualitative study

**REC reference:** 15/NW/0473

**IRAS project ID:** 179989

Thank you for your e-mail of 26 May 2015. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 26 May 2015

**Documents received**

The documents received were as follows:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant consent form</td>
<td>6.0</td>
<td>26 May 2015</td>
</tr>
<tr>
<td>Participant information sheet (PIS)</td>
<td>6.0</td>
<td>26 May 2015</td>
</tr>
</tbody>
</table>
Approved documents

The final list of approved documentation for the study is therefore as follows:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview schedules or topic guides for participants [Schedule]</td>
<td>version 5.0</td>
<td>20 May 2015</td>
</tr>
<tr>
<td>Other [Debrief Sheet]</td>
<td>5</td>
<td>20 May 2015</td>
</tr>
<tr>
<td>Participant consent form</td>
<td>6.0</td>
<td>26 May 2015</td>
</tr>
<tr>
<td>Participant information sheet (PIS)</td>
<td>6.0</td>
<td>26 May 2015</td>
</tr>
<tr>
<td>REC Application Form [REC_Form_22052015]</td>
<td></td>
<td>22 May 2015</td>
</tr>
<tr>
<td>Research protocol or project proposal [Proposal]</td>
<td>Version 5.0</td>
<td>20 May 2015</td>
</tr>
<tr>
<td>Summary CV for Chief Investigator (CI) [Jones CV]</td>
<td>version 1.0</td>
<td>21 May 2015</td>
</tr>
<tr>
<td>Summary CV for supervisor (student research) [Arcelus]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary CV for supervisor (student research) [Bouman]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary CV for supervisor (student research) [Haycraft]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor's responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

15/NW/0473 Please quote this number on all correspondence

Yours sincerely

Miss Regina Caden
REC Assistant
E-mail: nrescommittee.northwest-liverpoolcentral@nhs.net

Copy to: Ms Shirley Mitchell, Nottinghamshire Healthcare Trust
Dear Dr Haycraft,

I can confirm that your ethics checklist: *Exploring physical activity levels in community participants* has been approved. The reference number is SSEHS-1891

Kind regards

**Charlotte Barradell**

Finance and Research Office, J80.16
School of Sport, Exercise and Health Sciences
Loughborough University
Loughborough
Leicestershire LE11
3TU Tel: +44 (0) 1509 226416
Appendix M

Studies 2 and 3: NHS ethical approval for clinical transgender participants (2012-2014)

26 June 2012
Miss Amanda Davey
Nottingham Gender Clinic
Mandala Centre
Gregory Boulevard
Nottingham
NG7 5LB

Dear Miss Davey

<table>
<thead>
<tr>
<th>Study title:</th>
<th>Predictors of Psychological Wellbeing in Transgender Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>REC reference:</td>
<td>12/WM/0150</td>
</tr>
</tbody>
</table>

Thank you for your letter of 11 June 2012, responding to the Committee’s request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Non-NHS sites

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at [http://www.nrfoforum.nhs.uk](http://www.nrfoforum.nhs.uk).

A Research Ethics Committee established by the Health Research Authority
Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covering Letter</td>
<td></td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Investigator CV</td>
<td>Miss Amanda Davey</td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Other: CV</td>
<td>Jon Arceus</td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Other: CV</td>
<td>Professor Caroline Meyer</td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Other: CV</td>
<td>Walter Pierre Bouman</td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Participant Consent Form</td>
<td>2</td>
<td>06 June 2012</td>
</tr>
<tr>
<td>Participant Information Sheet</td>
<td>2</td>
<td>06 June 2012</td>
</tr>
<tr>
<td>Protocol</td>
<td>1</td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Questionnaire: Questionnaire Pack</td>
<td>2</td>
<td>06 June 2012</td>
</tr>
<tr>
<td>REC application</td>
<td>102070/318856/1/369</td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Response to Request for Further Information</td>
<td>11 June 2012</td>
<td></td>
</tr>
</tbody>
</table>

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback
You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

12/WM/0150 Please quote this number on all correspondence

With the Committee’s best wishes for the success of this project

Yours sincerely

Dr Helen Brittain
Chair

Email: Wendy.Rees@nottspct.nhs.uk

Enclosures: "After ethical review – guidance for researchers" [SL-AR2]

Copy to: Dr Peter Miller, Nottingham Healthcare NHS Trust
Appendix M

Studies 2 and 3: NHS ethical approval for clinical transgender participants (2014-2016)

Health Research Authority
NRES Committee East Midlands - Nottingham 1
The Old Chapel
Royal Standard Place
Nottingham
NG1 6FS
Telephone: 0115 8839695

31 March 2014

Dr Walter Pierre Bouman
Nottingham Gender Clinic
Gregory Boulevard
Nottingham
NG7 6LB

Dear Dr Bouman

| REC reference: | 14/EM/0092 |
| IRAS project ID: | 142544 |

Thank you for your email of 27 March 2014. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 20 March 2014

Documents received

The documents received were as follows:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
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<tr>
<td>Participant Information Sheet: For patients 6 months after chest reconstructive surgery</td>
<td>2</td>
<td>24 March 2014</td>
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<tr>
<td>Participant Information Sheet: For patients 6 months after genital surgery</td>
<td>2</td>
<td>24 March 2014</td>
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<tr>
<td>Participant Information Sheet: For patients on hormone treatment for more than 1yr</td>
<td>2</td>
<td>24 March 2014</td>
</tr>
</tbody>
</table>

Approved documents

The final list of approved documentation for the study is therefore as follows:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covering Letter</td>
<td></td>
<td>11 February 2014</td>
</tr>
<tr>
<td>Investigator CV</td>
<td>Dr Walter Pierre Bouman</td>
<td>27 January 2014</td>
</tr>
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</table>
Participant Consent Form: For patients on hormone treatment for more than 1 year 1 27 January 2014
Participant Consent Form: For patients 6 months after genital surgery 1 27 January 2014
Participant Consent Form: For patients 6 months after chest reconstructive surgery 1 27 January 2014
Participant Information Sheet: For patients 6 months after chest reconstructive surgery 2 24 March 2014
Participant Information Sheet: For patients 6 months after genital surgery 2 24 March 2014
Participant Information Sheet: For patients on hormone treatment for more than 1 yr 2 24 March 2014
Protocol 1 27 January 2014
Questionnaire: Questionnaire Pack 1 27 January 2014
REC application 142544/563097/1/617 10 February 2014

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor’s responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

<table>
<thead>
<tr>
<th>Document Description</th>
<th>Number</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Consent Form: For patients on hormone treatment for more than 1 year</td>
<td>1</td>
<td>27 January 2014</td>
</tr>
<tr>
<td>Participant Consent Form: For patients 6 months after genital surgery</td>
<td>1</td>
<td>27 January 2014</td>
</tr>
<tr>
<td>Participant Consent Form: For patients 6 months after chest reconstructive surgery</td>
<td>1</td>
<td>27 January 2014</td>
</tr>
<tr>
<td>Participant Information Sheet: For patients 6 months after chest reconstructive surgery</td>
<td>2</td>
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</tr>
<tr>
<td>Participant Information Sheet: For patients 6 months after genital surgery</td>
<td>2</td>
<td>24 March 2014</td>
</tr>
<tr>
<td>Participant Information Sheet: For patients on hormone treatment for more than 1 yr</td>
<td>2</td>
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<td>Protocol</td>
<td>1</td>
<td>27 January 2014</td>
</tr>
<tr>
<td>Questionnaire: Questionnaire Pack</td>
<td>1</td>
<td>27 January 2014</td>
</tr>
<tr>
<td>REC application</td>
<td>142544/563097/1/617</td>
<td>10 February 2014</td>
</tr>
</tbody>
</table>

14/EM/0092 Please quote this number on all correspondence

Yours sincerely

Miss Helen Wakefield
REC Manager
E-mail: nrescommittee.eastmidlands-nottingham1@nhs.net

Copy to: Dr Walter Pierre Bouman, Nottingham Gender Clinic
Dr Gopi Krishnan, Nottinghamshire Healthcare NHS Trust
Study 4: Loughborough University ethical approval for transgender people and cisgender people recruited from the community

Research Office
Loughborough University Leicestershire LE11 3TU UK
Switchboard: +44 (0) 1509 222222 Department: +44 (0) 15 0 9 222451

Beth Jones
School of Sport, Health and Exercise Sciences
Loughborough University
Loughborough
Leicestershire LE11 3TU

16 May 2016

Dear Beth,

Research Project: R16-P0GG: Validation of the Nottingham Gender and Body Dysphoria Scale

Main Investigator:

Emma Haycraft

Other Researchers:

Beth Jones

I can confirm that the Loughborough University's Ethics Approvals (Human Participants) Sub-Committee has considered the ethical implications of this research proposal and has confirmed that the research is acceptable. The Sub-Committee has issued clearance to proceed.

Yours sincerely,

Jacqueline Green
Secretary, Ethical Approvals (Human Participants) Subcommittee
Study 4: NHS ethical approval for clinical transgender participants

Appendix M

Health Research Authority
East Midlands - Nottingham 1 Research Ethics Committee

03 June 2016

Miss Bethany Jones
School of Sport, Exercise & Health Sciences
Loughborough Universality
Loughborough
LE11 3TU

Dear Miss Jones,

<table>
<thead>
<tr>
<th>Study title:</th>
<th>Validation of the Nottingham Gender and Body Dysphoria Scale</th>
</tr>
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<tbody>
<tr>
<td>REC reference:</td>
<td>16/EM/0183</td>
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<tr>
<td>Protocol number:</td>
<td>2</td>
</tr>
<tr>
<td>IRAS project ID:</td>
<td>201989</td>
</tr>
</tbody>
</table>

Thank you for your letter of 27 May 2016, responding to the Committee’s request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair. We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact the REC Manager, Ms Rachel Nelson, NRESCommittee.EastMidlands-Nottingham1@nhs.net.

Confirmation of ethical opinion
On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion
The REC favourable opinion is subject to the following conditions being met prior to the start of the study.
Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise). Guidance on applying for NHS permission for research is available in the Integrated Research Application System, www.hra.nhs.uk or at http://www.rdforum.nhs.uk.

Where a NHS organisation’s role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publicly accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact Catherine Blewett (catherineblewett@nhs.net), the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Non-NHS sites
Approved documents
The final list of documents reviewed and approved by the Committee is as follows:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
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<tr>
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<td>2</td>
<td>23 May 2016</td>
</tr>
<tr>
<td>Other [Debrief]</td>
<td>1</td>
<td>15 April 2016</td>
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<td>Other [PIS for community]</td>
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<td>Participant information sheet (PIS)</td>
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<tr>
<td>Research protocol or project proposal</td>
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<td>23 May 2016</td>
</tr>
<tr>
<td>Response to Request for Further Information</td>
<td></td>
<td>27 May 2016</td>
</tr>
<tr>
<td>Summary CV for Chief Investigator (CI)</td>
<td>1</td>
<td>15 April 2016</td>
</tr>
<tr>
<td>Summary CV for student</td>
<td>1</td>
<td>15 April 2016</td>
</tr>
<tr>
<td>Summary CV for supervisor (student research)</td>
<td>1</td>
<td>15 April 2016</td>
</tr>
<tr>
<td>Summary CV for supervisor (student research)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validated questionnaire</td>
<td>2</td>
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</tbody>
</table>

Statement of compliance
The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements
The attached document “After ethical review – guidance for researchers” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback
The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/
HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

With the Committee's best wishes for the success of the project,

Yours sincerely,

Dr Carl Edwards
Chair

Email: NRESCommittee.EastMidlands-Nottingham1@nhs.net

Enclosures: “After ethical review – guidance for researchers”

Copy to: Ms Shirley Mitchell
Appendix N: Interview schedule for study 1

1. Do you currently engage in any exercise, physical activity or sport?

2. If so...
   • How frequently do you engage in exercise, physical activity or sport?
   • Is this at a group or individual level?
   • What is it like being a trans person in your sports group? (or doing exercise, physical activity?)
   • What do you perceive other people’s attitudes to be like in relation to you engaging in exercise, physical activity or sport? (e.g., team players/coaches/other users of the facilities)
   • Can you discuss the barriers (personal and societal) regarding sport, exercise and physical activity participation?
   • What can be done to help address these barriers?

3. If not...
   • Why not?
   • Can you discuss the barriers (personal and societal) regarding sport, exercise and physical activity participation?
   • What can be done to help address these barriers?

4. Can you explain why you might be motivated to participate in physical activity, exercise or sport? (even if you do not always engage in this behaviour)
   • Can you explain whether you feel engaging in sport, exercise or physical activity can help the way you feel about your body?
   • Can you explain whether you feel engaging in sport, exercise or physical activity to have any benefits regarding your physical health?
   • Can you explain whether you feel engaging in sport, exercise of physical activity to have any benefits regarding your well-being? (for instance, your confidence or self-esteem)

5. How do you feel about changing facilities?

6. How do you feel about going swimming?

7. Can you discuss if hormone treatment has changed the amount you participate in physical activity sport or exercise?
   • Compared to before your social transition, do you engage in more or less sport, physical activity or exercise?

8. Can you discuss how dysphoric you feel when you engage in sport/exercise?

9. How would you describe body dysphoria?

10. Can you discuss whether you ever attend sporting events?
    • Have you had any negative experiences?
    • Have you done this in the past?
    • Why don't you do it now?
    • Do you think it would be easier or harder at different stages of your transition?
Appendix O: Socio-demographic questionnaires used in studies 1, 2, 3 and 4

**Study 1:**

**Demographic Information**

1. Age:……

2. What gender were you assigned at birth: □ Male □ Female

3. Ethnic origin: *(please tick the appropriate)*
   - □ White
   - □ Black Caribbean
   - □ Black African
   - □ Indian
   - □ Pakistani
   - □ Bangladeshi
   - □ Chinese
   - □ Other Ethnic Group (please specify)…………………………………………………………

4. Employment status:
   - □ Employed full-time
   - □ Employed part-time
   - □ Unemployed
   - □ Student
   - □ Retired
   - □ Other (please specify)………………
     
     If employed (or previously employed) please specify your occupation:………………………………………………………………………………

5. Do you have any children: □ Yes □ No

If yes, how many:……………………

6. Living situation:
   - □ With family
   - □ Alone
   - □ Shared (non-partner(s))
   - □ With partner only
   - □ With children only
   - □ Other (please specify)………………

7. How do you identify yourself in relation to gender:…………………………

8. Have you socially transitioned? □ Yes □ No

If yes, when did you socially transition:………………………………………………

9. Are you currently using cross-sex hormones? □ Yes □ No

If yes, when did you start using cross-sex hormones:………………………………

10. Are you currently using blockers? □ Yes □ No

If yes, when did you start using blockers?:………………………………………………

11. Have you undergone any sex reassignment surgery? □ Yes □ No

If yes, what type of surgery:………………………………………………………………………………
Appendix O

Studies 2 and 3:

Personal Details

1. Age: ……..

2. Biological Gender
   □ Male
   □ Female

3. Ethnic origin: (Please tick the appropriate box)
   □ White
   □ Black Caribbean
   □ Black African
   □ Black Other
   □ Indian
   □ Pakistani
   □ Bangladeshi
   □ Chinese
   □ Other Ethnic Group (Please specify)

4. Employment status: (Please tick the appropriate box)
   □ Employed full-time
   □ Employed part-time
   □ Student
   □ Volunteer work
   □ Housewife/husband
   □ Disabled
   □ Unemployed
   □ Retired
   □ Other (Please specify)

   If in work, please state how many weekly hours undertaken:……..

5. Civil status: (Please tick the appropriate box)
   □ Single, never married
   □ Married/Civil partnership
   □ Separated / Divorced
   □ Co-habiting I partner
   □ Widowed
   □ Other (Please specify)

6. Do you have any children?
   □ Yes
   □ No

   If Yes, how many? ……………
   Please state their ages ………………….. 

7. Living situation: (Please tick the appropriate box)
   □ With family of origin
   □ Alone
   □ Share with non-partner/s
   □ With partner only
   □ With partner and child/ren
   □ With child/ren only
   □ Other (Please specify)
8. **Religion (please specify):** ..............................................

9. **Do you smoke?**
   - Yes
   - No

10. **Age when you were first referred to any gender clinic:**...............................

11. **Age of coming out:**.................................

12. **Age of transition:**.................................

13. **How would you describe your gender identity?**
   - I identify as a man
   - I identify as a woman
   - I identify partly as a man, and partly as a woman
   - I identify neither as a man, nor as a woman
   - I don't know what my gender identity is (yet) or I am questioning my gender identity
   - Other (please specify):.................................

14. **How do you identify yourself?**
   - Trans*
   - Gender neutral / neutrois
   - Trans
   - Non-binary gender
   - Transvestite
   - Pangender
   - Transgender
   - Bigender
   - Transsexual
   - Genderqueer
   - Androgynous
   - I don't know
   - Cisgender (you are content to remain the gender you were assigned at birth)
   - Other (please specify).................................................................

15. **Current stage of gender programme: (Please tick all that apply))**
   - Assessment period
   - Post-surgery
   - In 'Real Life Experience'/ treatment program

16. **Are you currently using any hormones?**
   - Yes
   - No
   - If yes: how did you obtain the hormones?
     - Internet
     - Friends/family
     - From a doctor (Dr Name:............................................)
     - Other.................................................................

17. **Have you undergone any sex reassignment surgery? (Please tick the appropriate box)**
   - Yes *(Please give details in the box below)*
   - No

   **Type of surgery:**

   **Date (month/year):**
Study 4:  

Background questions

UNIQUE IDENTIFIER NUMBER (e.g., 250991): ............

1. Age: ........

2. Country of residents: ....................

□ When you were born, what gender were you assigned based on your sex characteristics?  
   □ Male □ Female

3. How do you identify yourself in relation to gender?
   □ Male
   □ Female
   □ Trans male
   □ Trans female
   □ Androgynous
   □ Gender neutral
   □ Non-binary gender
   □ Pangender
   □ Bigender
   □ Genderqueer
   □ Gender fluid
   □ Other ..................................................

Note: if the gender you were assigned at birth (based on your sex characteristics) and your gender identity are the same, then please move on to the next questionnaire (Nottingham Gender and Body Dysphoria Scale).

If your gender identity is different to the gender you were assigned at birth:

4. How much of your time do you spend living (socially, at work or education, with friends and family, outside the house) as your gender identity:
   □ Less than 50% of the time
   □ More than 50% of the time (but not all the time)
   □ All the time (100%)

5. Are you currently using cross-sex hormones? □ Yes □ No

6. Are you currently using blockers? □ Yes □ No

7. If you see yourself as a trans man, have you undergone chest reconstructive surgery? □ Yes □ No □ Not relevant to me

8. Have you undergone any gender confirming surgery? □ Yes □ No
Appendix P: Transgender Congruence Scale (TCS; Kozee, Tylka, & Bauerband, 2012)

Transgender Congruence Scale

Gender identity is defined as the gender(s) that you experience yourself as; it is not necessarily related to your assigned gender at birth. For the following items, please indicate the response that best describes your experience over the past two weeks.

[Items removed for copyright reasons]

Scoring:

- Items are scored as follows: ‘strong disagree’ = 1, ‘somewhat disagree’ = 2, ‘neither agree nor disagree’ = 3, ‘somewhat agree’ = 4, ‘strongly agree’ = 5.
- Items 6, 8 and 10 are reversed scored (where 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1).
- A total scale score is calculated using the mean of the responses to all 12 items.
- The Appearance Congruence subscale comprises items 1, 2, 3, 4, 5, 6, 7, 8 and 9.
- The Gender Identity Acceptance subscale comprised of items 10, 11 and 12.
- Mean scores are calculated for each subscale.
- A higher score indicates a higher level of transgender congruence.
Appendix Q: Experience of Transphobia Scale (Clements-Nolle, Marx, & Katz, 2006; Nuttbrock et al., 2010)

### Experience of transphobia scale

The following questions ask you about your experience of discrimination or victimisation on the basis of your gender identity or gender expression. Please indicate the response that best describes your experience.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Once</th>
<th>A few times</th>
<th>Several times</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you ever been verbally abused or harassed due to your gender identity or presentation?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Have you ever been physically abused or beaten due to your gender identity or presentation</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Scoring:**
- Items are scored as follows: ‘never’ = 0, ‘once’ = 1, ‘a few times’ = 2, ‘several times’ = 3
- Each question is analysed separately.
- A higher score indicates a higher experience of transphobia.
Appendix R: Hamburg Body Drawing Scale (HBDS; Becker et al., 2016)

Hamburg Body Drawing Scale

How satisfied are you currently with the following of your body features?

Please give each body part one of the following scores by circling your response:

1= very dissatisfied, 2=dissatisfied, 3=average, 4=satisfied, 5=very satisfied, NA=Not applicable

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<th>Body Part</th>
<th>Very dissatisfied</th>
<th>Dissatisfied</th>
<th>Average</th>
<th>Satisfied</th>
<th>Very satisfied</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hair</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>2. Ears</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>3. Beard/facial hair</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
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<tr>
<td>4. Jaw</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
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<tr>
<td>5. Shoulders</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
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<td>6. Axillary hair (under arm hair)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>7. Arms</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>8. Pubic hair</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>9. Hands</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
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<tr>
<td>10. Feet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
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<td>11. Forehead</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>12. Nose</td>
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<td>2</td>
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<td>13. Chin</td>
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<td>2</td>
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<td>4</td>
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<td>14. Adam’s apple</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>15. Upper arms</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>16. Chest/breasts</td>
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<td>17. Stomach</td>
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<td>18. Waist</td>
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<td>NA</td>
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<td>19. Hips</td>
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<td>20. Bottom</td>
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<td>2</td>
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<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>21. Thighs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>22. Calves</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>23. Height</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>24. Weight</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>25. Clitoris</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
</tbody>
</table>
### Appendix R

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>26. Vagina</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>27. Inner labia</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>28. Outer labia</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>29. Penis</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>30. Testicles</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>31. Body hair</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>32. Voice</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>33. Skin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>34. Body odor</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>35. Satisfaction with overall appearance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>36. Other (please specify)…………………….</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Scoring:

- For this thesis, only question 35 was used. It was scored as follows: 'very dissatisfied' = 1, 'dissatisfied' = 2, 'average' = 3, 'satisfied' = 4, 'very satisfied' = 5, 'not applicable' = 9.
- A higher score indicates low body dissatisfaction (i.e. greater body satisfaction).
Appendix S: Eating Disorder Inventory-2 (EDI-2; Garner, 1991)

Eating Disorder Inventory-2

The following items ask about your attitudes, feelings and behaviour. Some of the items relate to food or eating. Other items ask about your feelings about yourself.

For each item, decide if the item is true about you ALWAYS (A), USUALLY (U), OFTEN (O), SOMETIMES (S), RARELY (R), or NEVER (N). Circle the letter that corresponds to your rating. For example, if your rating for an item is OFTEN, you would circle the (O) for that item. Respond to all of the items, making sure that you circle the letter for the rating that is true about you. If you need to change an answer, make an 'X' through the incorrect letter and then circle the correct one.

[Items removed for copyright reasons]

Scoring:

- Items are scored as follows: ‘Always’ = 3, ‘usually’ = 2, ‘often’ = 1, ‘sometimes’ = 0, ‘rarely’ = 0, ‘never’ = 0.
- Items 1, 8, 10, 11, 13, 14, 18, 19, 31, 32 and 35 are reverse scored (where 3 = 0, 2 = 0, 1 = 0, 0 = 1, 0 = 2, 0 = 3).
- The Drive for Thinness subscale comprises items 1, 5, 7, 11, 15, 20 and 27
- The Bulimia subscale comprises items 3, 4, 16, 23, 26, 29 and 34
- The Body Dissatisfaction subscale comprises items 2, 6, 8, 13, 19, 25, 31, 33 and 35
- The Perfectionism subscale comprises items 9, 17, 22, 24 28 and 36
- The Interpersonal Distrust subscale comprises items 10, 12, 14, 18, 21, 30 and 32.
- Subscale scores are calculated using the sum of all relevant items.
- A higher score indicates a higher level of eating psychopathology.
Appendix T: Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)

Hospital Anxiety and Depression Scale

Please answer the questions below by circling the number that relates it you.

[Items removed for copyright reasons]

Scoring:

- Items are scored as follows: ‘Most of the time’ = 3, ‘A lot of the time’ = 2, ‘Occasionally’ = 1, ‘Not at all’ = 0.
- Items 2, 4, 6, 7, 12 and 14 are reverse scored (where 3 = 0, 2 = 1, 1 = 2, 0 = 3)
- Responses to items 1, 3, 5, 7, 9, 11, 13 are summed to comprise the **anxiety** subscale.
- Responses to items 2, 4, 6, 8, 10, 12, 14 are summed to comprise the **depression** subscale.
- Higher scores indicate higher levels of anxiety and depression.
Appendix U: Rosenberg Self-Esteem Scale (Rosenberg, 1965)

Rosenberg Self-esteem Scale

Below is a list of statements dealing with your general feelings about yourself.

- If you strongly agree, circle Strongly Agree
- If you agree with the statement, circle Agree
- If you disagree, circle disagree
- If you strongly disagree, circle Strongly Disagree.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. On the whole, I am satisfied with myself</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. At times, I think I am no good at all</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. I feel that I have a number of good qualities</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. I am able to do good things as well as most other people</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. I feel I do not have much to be proud of</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. I certainly feel useless at times</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. I feel that I'm a person of worth, at least on an equal plane with others</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. I wish I could have more respect for myself</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9. All in all, I am inclined to feel that I am a failure</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10. I take a positive attitude towards myself</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Scoring:

- Items are scored as follows: ‘Strongly agree’ = 3, ‘Agree’ = 2, ‘Disagree’ = 1, ‘Strongly disagree’ = 0
- Items 2, 5, 6, 8 and 9 are reverse scored (where 3 = 0, 2 = 1, 1 = 2, 0 = 3).
- The 10 items are summed to obtain the total score.
- A higher score indicates a higher self-esteem.
Appendix V: World Health Organisation Quality of Life-BREF (WHOQOL-BREF; Harper, 1998)

**WHOQOL-BRIEF**

The following questions ask how you feel about your quality of life, health, or other areas of your life. **Please circle the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks:**

[Items removed for copyright reasons]

**Scoring:**

- Items 3, 4 and 26 are reverse scored (where 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1).
- Item 1 assesses **overall quality of life**.
- Item 2 assesses **overall health**.
- Items 3, 4, 10, 15, 16, 17 and 18 comprise the **physical health** subscale.
- Items 5, 6, 7, 11, 19 and 26 comprise the **psychological** subscale.
- Items 20, 21 and 22 comprise the **relationships** subscale.
- Items 8, 9, 12, 13, 14, 23, 24 and 25 comprise the **environment** subscale.
- To calculate the subscale scores, calculate the mean for the items involved and multiply by four.
- A higher score indicates a higher quality of life.
Appendix W: Rapid Assessment of Physical Activity (Topolski et al., 2006)

**Rapid Assessment of Physical Activity**

Physical activities are activities where you move and increase your heart rate above its resting rate, whether you do them for pleasure, work, or transportation.

The following questions ask about the amount and intensity of physical activity you usually do. The intensity of the activity is related to the amount of energy you use to do these activities.

**Examples of physical activity intensity levels:**
Light activities: walking leisurely, stretching etc.
Moderate activities: fast walking, aerobic class, strength training, swimming gently etc.
Vigorous activities: jogging, running, tennis, badminton, football etc.

**How physically active are you?** *(Check one answer on each line)*

<table>
<thead>
<tr>
<th>Does this accurately describe you?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

### Aerobic physical activity subscale

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I rarely or never do any physical activities.</td>
</tr>
<tr>
<td>2.</td>
<td>I do some light or moderate physical activities, but not every week.</td>
</tr>
<tr>
<td>3.</td>
<td>I do some light physical activity every week.</td>
</tr>
<tr>
<td>4.</td>
<td>I do moderate physical activities every week, but less than 30 minutes every day or less than 5 days a week.</td>
</tr>
<tr>
<td>5.</td>
<td>I do vigorous physical activities every week, but less than 20 minutes a day or less than 3 days a week.</td>
</tr>
<tr>
<td>6.</td>
<td>I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.</td>
</tr>
<tr>
<td>7.</td>
<td>I do 20 minutes or more a day of vigorous physical activities, 3 or more days a week.</td>
</tr>
</tbody>
</table>

* a form of exercise, often rhythmic movements, generally without using equipment or apparatus (e.g. sit-ups, pull-ups, planks)

**Aerobic physical activity subscale scoring**

- To score, choose the question with the highest score with an affirmative response. Any number less than 6 is suboptimal.
Appendix X: Internet Gaming Disorder Scale-Short Form (IGDS9-SF; Pontes & Griffiths, 2015)

Internet Gaming Disorder Scale

The following questions will ask you about your gaming activity during the past year (i.e., the past 12 months). By gaming activity we understand any gaming-related activity that has been played either from a computer/laptop or from a gaming console or any kind of device (e.g., mobile phone, tablet, etc.) both online and/or offline.

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scoring:
- No items are reverse scored.
- For the total score, sum the responses from all nine questions.
- A higher score indicates a higher level of problematic gaming behaviour.