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Using mixed methods to explore Muscle Dysmorphia related symptomology in a male gym going population; 'I've tried all sorts to get bigger'

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Using mixed methods to explore Muscle Dysmorphia related  
symptomology in a male gym going population;

*'I've tried all sorts to get bigger'*

A thesis submitted to the University of Huddersfield in partial  
fulfilment of the requirements for Masters by Research

Liberty Baxter-Cox

U1351611



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Male body image was identified over twenty years ago as a growing research interest (Pope, Gruber, Choi, Olivardia, & Phillips, 1997). Tod, Edwards and Cranswick (2016) identify a more recent specific interest in Muscle Dysmorphia (MD), a branch of Body Dysmorphia (BD). A symptom characteristic of MD is the preoccupation with a perceived lack of muscularity (Grieve, 2007) which often involves those with high levels of the disorder engaging in obsessive eating and exercise patterns (Grieve, 2007). Using a mixed methods approach, the present study aimed to build on the limited, existing research surrounding male body image with a focus on muscle dysmorphia related symptoms. A self-selected sample of 100 male gym members from the North of England, participated in the quantitative element of the study. They completed a background data questionnaire and Hildebrandt, Langenbucher, and Schlundt's (2004) Muscle Dysmorphia Disorder Inventory (MDDI). The first section collected participant demographics, experience with training diet and bodybuilding. The variables were examined in relation to their effect on MDDI scores and its three subscales; Functional Impairment, Appearance Intolerance and Drive For Size. Experience of dieting was found to have a significant effect on Functional Impairment ( $p= 0.01$ ), Length of Training Experience was found to have a significant effect on Drive for Size and Appearance Intolerance ( $p= 0.04$ ,  $p= 0.01$ ) and Age was found to have a significant effect on Drive For Size ( $p= 0.01$ ). Five of the 100 participants formed a purposive sample which was used to conduct semi structured interviews in the qualitative element of the study. Braun and Clarke's (2006) Thematic analysis was used to analyse the interview transcripts. The qualitative findings emphasise the need for future research into development and maintenance models of MD symptomology and further measures of MD.

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I would like to thank my participants without whom this research would not have been possible, particularly those who took part in the follow up interviews and gave up their time. Thank you to my supervisor Derrol Kola-Palmer and to the human and health sciences research and administration office team for being so helpful and proactive throughout my project.

### **List of abbreviations**

APED- Aesthetic and Performance Enhancing Drug

PED- Performance Enhancing Drug

BD- Body Dissatisfaction

BDD- Body Dysmorphic Disorder

DSM-IV – Diagnostic and Statistical Manual of Mental Disorders

MD- Muscle Dysmorphia

MDDI- Muscle Dysmorphia Disorder Inventory

### **Academic Biography**

Liberty is a Master of Research Student at the University of Huddersfield. She graduated with a First-class honour's degree in Psychology from the University of Huddersfield in 2016. She has previous experience using Thematic Analysis to analyse interview transcripts regarding Communities of Practice. Liberty has worked as a Personal trainer for 4 years and has competed as a body builder for three years with 2 British Champion Titles. This research is because of her personal experiences conducted with her academic ability.

## **Introduction**

### Rationale

Alexander (2013) is amongst the many researchers who have highlighted the increased focus on body image research in recent years. Whilst body image research has typically focussed on females (Grieve, 2007), Tod, Edwards and Cranswick (2016) have identified a growing area of studies on male body image. This increase in research has occurred alongside a growing number of men reportedly being dissatisfied with their bodies (Grieve 2007) with a focus on muscularity. First termed Reverse Anorexia by Pope et al., (1997) Muscle Dysmorphia was outlined as a disorder which refers to those with a preoccupation with muscularity that results in social and occupational impairment. Exploring the experiences of MD symptoms in gym goers is a neglected area of research (Suffolk et al., 2013). In turn, the current study was designed to address this gap in the research and make a purposeful contribution to understanding the experience of MD symptoms.

### Body Image

As Cash (2012) discusses, body image refers to several interrelated factors but a broad theme running through them centres around an individual's experience of their appearance. Body Image involves a complex combination of several mental representations made by an individual with regards to their body size and shape (Wang, Liang, Ma, Chen, Cheung, Roalf, Gur, Chan, 2018). According to Cash (2012) body image includes both how an individual perceives their appearance and the attitudes they have formed about their bodies.

'Body Dissatisfaction' (BD) is a term often used to describe negative body image which commonly involves body checking behaviours. These are a way in which males with high BD evaluate themselves with regards to their shape, size, and weight (American Psychiatric Association, 2000; Shafran, Fairburn, Robinson, & Lask, 2004). These social comparisons can be defined as; the frequent evaluation of one's body regarding shape, size and weight (Shafran, Fairburn, Robinson and Lask, 2004). Common methods in which body checking behaviours are undertaken include; checking specific body parts in mirrors, asking for others' opinions towards their body, comparing oneself to others (including via media), checking the fit of items of clothing and repeated weighing (Walker, Anderson & Hildebrandt, 2009).

Body checking has been found to be highly correlated with Muscle Dysmorphia (MD) (Walker, Anderson & Hildebrandt, 2009). As researched by Walker, Anderson and Hildebrandt (2009) body checking behaviour in males was correlated with weight and shape concern, MD symptoms, depression and steroid abuse. Hildebrandt, Schlundt, Langenbucher, & Chung (2006) found that the current weight and shape of male participants significantly affected whether body fat or muscle gain was of more importance. Research by Olivardia, Pope, & Hudson (2000) has shown that the males with the highest levels of MD symptoms check their appearance much more than individuals without the disorder; males with MD check themselves in the mirror much more than those who do not have the condition (Olivardia, Pope, & Hudson, 2000). However, as both those who are under and overweight have been shown to demonstrate a desire to be more mesomorphic (Grieve, 2007) low BD in adolescent male samples has been reported (McCabe and Ricciardelli, 2004). The reported rates of BD are higher in those diagnosed with MD (Olivardia, Pope & Hudson, 2000) which suggests that the

perceptions males hold about their muscularity could have a large impact on the way in which they experience their bodies.

After assessing this growing body of research, the Diagnostic and Statistical Manual of Mental Disorders edition 5 (The DSM-V) included MD under the diagnostic category of Body Dysmorphism Disorder (BDD) and updated the definition to include women (American Psychiatric Association, 2013). Classification of the disorder has been challenging with some researchers supporting MD as an extension of Body Dysmorphic Disorder (BDD; Sandgren and Lavellee, 2018), whilst others argue it should be within the eating disorder spectrum (Grieve, 2007) and other arguing its classification as an obsessive-compulsive disorders (OCD). The varying symptoms suggest that MD could be a combination of all three disorder spectrums (Murray, Rieger, Touyz, & Garcia, 2010; Murray & Touyz, 2013; Nieuwoudt, Zhou, Coutts & Booker, 2012).

According to the DSM-5, body mass is a criterion upon which a diagnosis of MD can be made (American Psychiatric Association, 2000). However, this classification of MD does not explicitly state individuals suffering from MD have increased levels of muscularity. However, excessively lifting weights and becoming preoccupied with muscularity suggest that it is more likely that MD will only be diagnosed in those who are muscular or even hyper mesomorphic although individuals with low levels of muscularity could be at risk for developing MD. The prevalence rate for MD has been estimated to be 10% of American weightlifters (Pope & Katz, 1994) though clinical levels of the disorder have been found in other American populations such as, college students (Goodale, Watkins & Cardinal, 2001).

## Muscle Dysmorphia

As outlined above, MD is a type of body dissatisfaction which can be characterised by a preoccupation with increasing muscle mass and decreasing body fat percentage (Grieve, 2007). The techniques used by individuals to attain this portrayed ideal body, such as extreme eating restrictions and excessive exercise regimes, can have adverse physical and psychological effects (Olivardia, 2001). MD has been found to mainly affect those who regularly engage in weightlifting or body building (Pope, Katz, & Hudson, 1993). However, this finding can be misleading (Suffolk et al., 2013) as many weightlifters and bodybuilders functionally display many of the symptoms associated with MD as part of their non-disorder body building activities. However, a gym environment appears to be ideal to explore the disorder and its related symptoms. The present study aimed to expand on the growing knowledge surrounding MD symptomology in male gym goers without a clinical diagnosis of MD.

Grieve (2007) defines MD as a collection of attitudes and behaviours that are characteristic of an extreme desire to gain muscle mass. The preoccupation with achieving a lean, muscular body shape appears to be persistent in those found to have high levels of these MD symptoms. Individuals with high levels of MD symptoms believe they have an overall lack of muscularity (Olivardia, 2001). Pope and Gruber (2000) found that many Western males, including those from Austria, France, and the United States, desired a body on average 28 pounds more muscular than their own.

Tod, Edwards and Cranswick (2016) add that MD can lead to social and functional impairment as those with high levels often avoid social events and are unable to perform their jobs effectively. Grieve (2007), explains that this is because those with high levels of MD

prioritise their gruelling training regimes and strict diet plans. It has been observed that MD sufferers often arrange their lives so that lifting weights and working out are not interrupted or compromised in any way, continue weight training even when injured and follow extremely strict diet plans.

Studies such as that by Tod, Hall & Edwards (2012), have shown that there is a correlation between the frequency of weight training and the number of supplements consumed by individuals. The plans implemented by those with high levels of MD often include the use of unnecessary or illegal supplements (Olivardia, 2001). These patterns of behaviour are continued despite having knowledge of high risks of adverse physical and psychological consequences (Olivardia, 2001).

#### The Development of Muscle Dysmorphia Measures

Pope, Gruber, Choi, Olivardia & Phillips (1997) first proposed diagnostic criteria for MD based on the DSM-IV criteria for Body Dysmorphia Disorder (BDD). Whilst the measure may seem dated, their proposed criteria remain almost unchanged (Sandgren and Lavellee, 2018). Pope et al., (1997) established that MD was characterised by the preoccupation of not being lean or muscular enough often leading to excessive weightlifting and attention to diet. They proposed that an individual must present with two of the following four criteria: passing up on social events to main a strict workout and dieting routine, avoidance of situations where their bodies may be exposed or by showing signs of distress in these situations, the preoccupation with muscularity results in social, occupational and functional impairment and an individual will

continue to work out, diet and use supplements despite knowing their negative physical and psychological effects (Pope et al., 1997).

Schuldnt, Woodford and Brownlee (2000) developed a 16-point MD questionnaire to assess the characteristics associated with MD more specifically. However, according to Hildebrandt, Langenbucher, and Schlundt (2004), the measure failed to assess the functional impairment involved with MD. To assess the disorder more thoroughly, Rhea, Lantz and Cornelius (2004) designed the Muscle Dysmorphia Inventory (MDI) and based their 27-item questionnaire on the MD criteria proposed by Lantz, Rhea and Mayhew (2001). The measure used a six-point Likert scale (Likert, 1932) with answers ranging from 1 (Never) to 6 (Always). The MDI was composed of six subscales (Baghurst & Lirgg, 2009); Size and Symmetry, Physique Protection, Exercise Dependence, Supplement Use, Dietary Behaviour and Pharmacological Use. However, many of these tools are simply used to measure MD symptoms with limited diagnostic power (Mosely, 2009).

Hildebrandt, Langenbucher, and Schlundt (2004) developed the Muscle Dysmorphia Disorder Inventory ([MDDI]; Rickard, 2014) believing that improvements to measures were still needed. They aimed to assess the cognitive, emotional and behavioural components of MD and attitudes towards body image. The questions listed on the questionnaire consider the desire to increase muscle mass and attitudes to overall size, negative beliefs regarding appearance, anxiety towards their body and the extent to which the faulty thoughts and feelings effect the everyday functioning of respondents' lives. Sandgren and Lavellee (2018) identify the MDDI as one of the most common measures of MD symptomology which is consistent with the preoccupation characteristic of the disorder (Santarnecchi & Dettore, 2011).

## Social Comparison Theory

However, these measures are purely diagnostic and do not explain why these symptoms may occur and how they interact to form the disorder. Festinger's Social Comparison Theory (1954) has been used to explain the development and maintenance of MD. The theory explains the way in which making a social comparison is an evaluative process involving gaining information and making judgements about oneself in relation to others (Jones, 2004). Depending on how these social comparisons make an individual feel, upward or downward comparisons ensue (Festinger, 1954). Upwards comparisons occur when an individual judge themselves to be below the person they have made a comparison with. Cash (2012) highlights the importance of socialisation on these perceptions of self and suggests that they can have several effects, one of which is to evoke comparison. Cash (2012) explains that these comparisons comprise of evaluation and investment elements in which individuals evaluate themselves against others and then invest upon making changes dependent on their evaluation.

As Festinger (1954) points out, the comparisons that are made will be relevant to the individual carrying out the social comparison and their environment (Major, Testa and Bylsma, 1991). Therefore, if the focus of the environment is to have a high muscle to body fat ratio, individuals are more likely to focus on reducing their body fat and building muscle. Using a gym in the current study meant that participants have well-formed existing opinions on their body image and may be used to making social comparisons making it ideal for the research aim.

Another theory of social comparison is the tripartite model (Thompson, Heinberg, Altabe & Tantleff-Dunn, 1999). This model outlines three motivational factors for making comparisons between ourselves and others: self-evaluation, self-improvement and self-enhancement. Self-evaluation occurs when individuals check their status by comparing themselves to others. This seems to explain the process individuals take when exposed to images of body ideals. If the individual feels they need to improve their physical appearance, individuals begin to engage in self-improvement behaviours. This could explain the establishment of strict diet and training routines to meet the perceived ideal standard of physicality that has been internalised. Self-enhancement behaviours occur when individuals look at social models to investigate how they can feel better about themselves.

Smolak, Murnen and Thompson (2005) designed a modified tripartite influence model surrounding body building behaviour. This involved; media, peer and parental influences which moderated these social comparison tendencies, depression and body-esteem levels suggesting that sociocultural factors must be considered when looking at MD development.

#### Models of Muscle Dysmorphia Development

As discussed by Harrison & Cantor (1997) over twenty years ago, media was frequently using images that promoted increasingly impossible male and female body standards as cultural ideals. In females, the ideal body type places emphasis on being smaller than average whereas research has established the perceived male body ideal places emphasis on a generally bulkier, more muscular appearance than average. The male ideal can be characterised by a V-shaped body, broad shoulders, narrow waist and a flat stomach (Leit, Pope, and Gray, 2001). This

physique is often chased by individuals as they make social upwards comparisons with media images. Media idealising these lean and muscular physiques is commonly used in gym settings, often to promote supplements and offer motivation to those using the gym.

Tod and Lavelle (2010) developed a framework developmental and sustainment model for MD which applies Festingers (1954) social comparison theory, operant and classical conditioning. As explained by Tod and Lavelle (2010) MD symptoms is the result of a negative appraisal of muscularity. Operant, classical and social learning theories are applied to how these symptoms are sustained by individuals. The model outlines a maintenance loop of MD which explains why MD symptoms are maintained.

Rhea, Lantz and Cornelius (2004) also propose precursory factors in the development of MD symptoms; self-esteem and body dissatisfaction. Again, these factors are outlined to motivate weight training to increase muscularity which results in muscle development. This could result in improved self-esteem and therefore commitment to these muscle building behaviours. However, this can become problematic if one's self-esteem becomes dependent on this relationship and therefore leads to the development of MD symptoms.

Another model of MD development is Olivardia's biopsychosocial model (2001) which suggests that an individual may have a genetic predisposition to MD symptoms. This predisposition interacts with the environment and existing issues with low self-esteem and muscularity concerns. This results in MD symptoms. Olivardia (2001) explains these precursors motivate individuals to weight train which leads to muscular development and therefore continued weight training. This can lead to dependence in order to improve their self-esteem and could lead to more pathological behaviours, such as steroid use.

Cafri et al., (2005) extended Olivardia's model by examining the development of dangerous behaviour patterns, such as steroid use and extreme dieting for weight loss and muscle gain, and their relationship to the onset of several behavioural outcomes including MD. Cafri et al., (2005) model considered a number of biological (for example, body composition), social body comparison, societal (such as media influence), psychological functioning (such as, self-esteem) and sports participation factors to give a model of general body satisfaction attitudes, rather than focusing on the development of MD.

#### Previous research limitations

Body image disturbance in males has been a neglected area of research (Walker, Anderson and Hildebrandt, 2005) with only a small body of research regarding male body image using qualitative methods (Adams, Turner and Bucks, 2005). However, one of the main limitations of previous research is the sample types which have been used. This is in relation to several factors, namely; age, gender, MD diagnosis and specialisation (for example bodybuilders). As Tiggemann (2004) identifies, most of the research surrounding male body image has chosen college aged (18-21 years old), American samples. These narrow ranges demonstrate the gap existing in the current body of research and the need for using more diverse samples.

The same scales developed for use with female samples have been utilised in studies which use males (McCabe and Ricciardelli, 2004) such as; the Body Checking Questionnaire (Reas, Whisenhunt, Netemeyer, & Williamson, 2002), Body Image Avoidance Questionnaire (Rosen, Srebnik, Saltzberg, & Wendt, 1991), Body Shape Questionnaire (Cooper, Taylor, Cooper,

& Fairburn, 1987) and Body Checking and Avoidance Questionnaire (Shafran, Fairburn, Robinson & Lask, 2004). These scales appear to focus on levels of body fat in areas of the body related to females (Walker, Anderson & Hildebrandt, 2009) including thighs, stomach and buttocks, all of which can be considered as 'female fat hot-spots' (Walker, Anderson & Hildebrandt, 2009).

Existing research has utilised questionnaires which frequently disregard the fact that the desire to gain muscle may outweigh the desire to reduce body fat (Hildebrandt, Schulundt, Lagenbucher & Chung, 2006). Due to the design of many of the scales used in male body image research, it is also unclear whether those males who indicate a wish to gain weight are referring to a desire to increase their muscle mass rather than adipose tissue. Furthermore, where male samples have been used, participants have still not been representative of all males due to their sport specificity as most have been comprised of professional athletes and body builders (Rickard, 2014).

#### Current study

Using quantitative and qualitative methodologies, the current study aimed to expand upon the existing, limited research on the experience of MD symptoms. There is a gap in the existing research for the use of samples with no diagnosis of MD or sport specificity. The MDDI was used to measure the level of MD symptomology in a sample of males without a clinical diagnosis of MD. The MDDI was chosen based upon its established validity and common use in existing research. It is entirely acknowledged that the measure is not a diagnostic tool, rather it is a measure of symptomology. The study explored the effect of participants' age, experience

with dieting and competitive body building, training experience, types of training, frequency of training sessions and motivation to train on MDDI score and subscales. A purposive sample of experienced participants would then be interviewed to expand upon the quantitative findings and explore existing theory.

## **Methodology**

The study used a mixed methods approach with quantitative and qualitative elements in its methodology. This approach was chosen for its ability to add value to findings (Yardley & Bishop, 2015) with both interpretative and objective qualities. Furthermore, a mixed method approach was the most suitable method to address the research aims. Due to the complexity of this approach and its often-lengthy process, few previous studies regarding male body image have used a mixed method design. Despite the time constraints placed upon the research project, every effort to conduct a thorough, well-structured piece of research was made. In turn, the breadth of the data that was collected was considered to ensure the quality of the research was of a high standard.

It should be highlighted that none of the 100 participants disclosed a clinical diagnosis of MD. Whilst it is possible that many of the sample suffer with the disorder to some degree, the results should only be applied to other non-clinical samples. Therefore, the results of the study can only be used to explore the characteristics that are frequently associated with the disorder, rather than MD itself.

The participants were recruited from a gym with strong association in the wider community with body building style training and weight loss transformations. From informal discussion with gym goers in the area, this perception appeared representative of other independent gyms in the area. Further to this, the reputation of the gym appeared to be male orientated, with the fewer, female members being body building champions.

## **Quantitative Methodology**

### **Participants**

A self-selected sample of 100 male participants were recruited in a northern English gym. Each participant completed the quantitative element of the study. Responses were capped at 100, a conscious decision made by the researcher for several reasons; firstly, previous studies had generally utilised much smaller samples. Therefore, it was seen that 100 participants would be a large enough sample to identify valuable contributions to the existing body of research. Secondly, it was felt that 100 participants would be a satisfactory size of sample to represent the gym being studied. It was not felt that that a larger sample would offer additional value to the findings given the environment under study. Gathering 100 participants was an attainable goal given the time constraints of a postgraduate research study.

Participants were aged between 18 and 59 years old and attended the same gym during the three-month recruitment window. Other than gender, no exclusion criteria were in place.

### **Methodology**

Posters (see Appendix C) were designed to advertise the study to males who attended the gym. These were displayed throughout the gym with details of what the study concerned, what was required of participants and how they could express their wish to participate. The first stage of data collection involved participants filling out a two-part questionnaire. The first half of the questionnaire was designed to collect background data of participants relating to training experience, age, diet experience and other related aspect. The purpose of this section was to identify the possible influencing factors on MD that had been discussed at length in previous literature. The demographic variables that had been discussed in previous literature

appeared to affect the intensity, characteristics and development of MD. For example, those with weightlifting training experience appeared to suffer higher rates of the disorder.

Using a questionnaire was an effective way to collect data without researcher supervision in a short space of time. This allowed the study to be completed within the strict time frame required. Pilot tests demonstrated the questionnaire would take no longer 10 minutes to complete and submit. Potential participants who may have been reluctant to discuss their attitudes towards their bodies, had the chance to participate anonymously. As a result, they may have answered more truthfully, adding to the validity of the research. The purpose of using two questionnaires was to allow the researcher to identify potential influencing factors on MDDI scores and its three subscales, such as the training and dieting experience an individual had.

However, using a self-selected sample for the questionnaire stage posed the first opportunity for bias to arise in this study. Self-selected samples allow the opportunity for a certain percentage of the gym goers to complete the questionnaire as some of the potential sample may not have put themselves forward to take part. Furthermore, as the participants knew the researcher, their participation and answers may have been at risk of demand characteristics to be helpful.

Participants had the choice to complete the questionnaire via an online link which could be used off or on sight, or a to fill out a paper version provided by the researcher at the gym. A sealed box was provided by the researcher for paper questionnaires to be deposited however, none of the 100 participants filled out a paper version. The online questionnaire was designed on Google Drive which recorded each response. Designing the questionnaire using Google Drive

meant the researcher could make it compulsory for each question to be completed for the response to be accepted. Therefore, all 100 questionnaires were completed fully and included in the analysis. This online database was password protected and was therefore, only accessible to the researcher ensuring confidentiality. Once 100 responses had been collected, stage one of data collection was complete and new responses were blocked. The raw data generated from Google Drive was transferred into SPSS where it could be analysed more suitably.

The first section of the questionnaire collected participant demographics and exercise behaviours to gain a deeper understanding of the characteristics of the sample population. The second section of the questionnaire was the MDDI designed by Hildebrandt, Lagenbacher & Schuldnt (2004). The 13-item self-report questionnaire uses a 5-point Likert (1932) scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) to assess respondents Drive For Size (DFS), Appearance Intolerance (AI) and Functional Impairment (Hildebrandt, Lagenbacher & Schuldnt, 2004). These subscales were designed to address the cognitive, emotional and behavioural dimensions associated with MD. DFS was assessed exploring participants' thoughts of being smaller, weaker or less muscular than they desired. The subscale exploring AI focussed on measuring respondents' negative beliefs about their body and the anxiety this can cause towards exposing their body to others. FI is concerned with exploring participants' behaviours which relate to maintaining strict exercise regimes, avoidance of social situations and the preoccupation of negative thoughts towards their body.

The MDDI was chosen as a measure of MD symptomology for this study as it is one of the most commonly used in existing MD research (Sandgren and Lavellee, 2018). The MDDI and each its three subscales have been shown to have good reliability, internal consistency and

convergent validity demonstrated (Hildebrandt, Lagenbacher & Schuldnt, 2004). The reliability of the MDDI was tested before it was used with Chronbach's alpha coefficient being 0.73. This result further suggested that the MDDI had very good internal consistency adding further support for use in this piece of research. However, the MDDI is not a diagnostic tool and has no cut off scores.

One-way analyses of variance' (ANOVA) were used to analyse the results where independent variables (IV) had more than two levels. Independent samples T-tests were used to analyse the results where there were only two levels of IV. During analysis, response categories in the first half of the questionnaire with five or less respondents were grouped together, for example, the age brackets 53-58 was merged with 59+.

### **Qualitative Methodology**

The second stage of data collection involved the selection of proportion of the 100 participants to take part in semi-structured interview to complete the qualitative element to the research (Yardley & Bishop, 2015). Of the 100 participants who completed the online questionnaire, 68 gave their contact details. Therefore, at a later stage, the researcher could contact them regarding their participation in the qualitative stage of research, a semi-structured interview. The researcher felt that the five selected participants offered an accurate representation of the 100 males who completed the questionnaire due to their varied questionnaire data. The researcher was aware of the importance to select participants impartially, ignoring any personal details that were perhaps known prior to the conducting the research. This potential extraneous variable was thoroughly considered before making final

interviewee selection. It also appeared that these five participants were most readily available to participate in the interviews and presented a great deal of enthusiasm to take part.

Furthermore, the research was data led and therefore, no more than five interviews were needed as each account appeared to be gather data that was rich in detail of individual experience of a shared community. It was not felt that additional interviews would offer any further valuable information and as discussed by Smith and Sparks (2014), the number of participants in a qualitative study should be kept minimal so as to preserve the individual nature of experience.

In addition, in the context of qualitative research, the average length of the interviews (26 minutes) appeared to be relatively short. However, as the study was mixed methods and was under strict time constraints. alongside the fact the researcher felt that the relevant topics had been covered sufficiently, longer interviews were not seen to be of any benefit. Having a list of topics to use as a guide during each interview meant that interviewees were kept on track to discuss only relevant information and similar elements. Whilst the interviews on reflection may have been short, they were very detailed. This was beneficial given the circumstances for post graduate research time margins as it meant that the transcripts were 'to the point'.

It must be emphasised that none of the interviewees had a clinical diagnosis of MD, however, they all displayed some characteristics consistent with the disorder such as a preoccupation with their perceived lack of muscularity. Furthermore, none of the interviewees presented with extreme values on the MDDI. Where these participants have mentioned names

of people or referred to themselves, pseudonyms have been given to protect the identity of those involved.

However, as previously discussed, the researcher had been personally immersed in the community being studied for several years. This has both methodological and ethical advantages and disadvantages. The well-established rapport was particularly valuable during the interview stage as it meant that interviewees were happy to discuss sensitive and personal details. The detail of accounts may have been enhanced due to the existing familiarity with the researcher. In turn, the data that has been collected may have an increased depth as opposed to data collected by a researcher who did not have the same relationship with their interviewees. However, only data disclosed during an interview was analysed. Information that may have come to light outside of the research environment was not carried forward by the researcher into the data collection or analysis process to limit any bias as much as possible. This was done to ensure that findings were not implied but were entirely rooted in interviewee disclosures during the research period.

As discussed by Smith and Sparkes (2014), qualitative research focuses on the way in which the community being studied interprets their experiences. It is crucial for a researcher to understand the ways in which participants make these interpretations to give accurate meaning to the participants account. Smith and Sparkes (2014) go on to discuss that understanding the social realities of everyone involved must be done so by observing their behaviours and perspectives of experiences. These guidelines for qualitative research are naturally undertaken when the researcher is a part of the community because of their existing understanding of the community and their experiences. It was important to implement the use of a critical friend so

that existing perceptions held by the researcher were not applied to the research therefore, reining subjective (Smith & Sparkes, 2014). A researcher who is a part of the community being studied can add depth to the quality and texture of participants' experience (Smith & Sparkes, 2014) because of their involvement.

However, the almost ethnographic immersion of the researcher into the community being studied poses potential for bias in several ways. The process of selecting interviewees presented the first bias issue as personal information the researcher may have known about the interviewees needed to be actively ignored. It was important the researcher did not carry forward any previously disclosed information about any of the potential interviewees when selecting for the research. To combat the risk of this bias during interviewee selection, the researcher based their selection upon several factors; potential interviewees enthusiasm to participate, their availability to participate and their gym going experience.

### **Interviewees**

The first male was aged 49 and was interviewed for 30 minutes. He scored 63 in the MDDI making him one of the highest scorers in the study and of those who consented to the interview stage. This was the main reason he was selected to take part in the interview stage. Furthermore, Participant One was an ideal candidate to represent an older subsection of the gym going population at the specific gym and that took part in the study. He had around two years training experience, the majority of which was gained with a personal trainer. He was a regular gym user and was readily available to take part in the interview stage. It became apparent during the interview that he exercised as part of his alcohol rehabilitation and strived from a life of routine, this factor was in no way made part of the selection process for the

interview despite the researcher knowing the participants history prior to conducting the interview. It was not felt that Participant One's history with alcohol addiction would influence his interview or play a role in his experience of his body.

The second interviewee was a 29-year-old male selected as he visually represented the increasing trend for young males to have an extreme muscle to fat ratio. He was a well-known, long-term user of steroids; however, he scored only a moderate 39 on the MDDI. Prior knowledge of his substance use was a factor in the selection of participant two. He represented a large percentage of males that used the gym in the study. Furthermore, the obvious visual effects of substance use were perceived as factor that would make him a choice for other researchers to select him. He had over 15 years of training experience and was a daily visitor to the gym being studied, again making him an ideal choice for selection due to his availability.

A third male, aged 34 years old, was chosen because of his representation of fitness professionals. He is the owner of the gym at which the study took place and a personal trainer who had competed in body building. It was felt that his contribution to the study may offer a different insight to the other interviewees. In addition, he also had a long history of performance and aesthetic enhancing substances. During the interview, it became apparent that he suffered with Post-Traumatic Stress Disorder (PTSD) and similarly to Participant One, used exercise as part of his rehabilitation. This knowledge was not known prior to the interview and therefore the risk of bias during the interview was minimal unlike with Participant Two. Participant Three had close to 20 years of training experience and scored 40 on the MDDI.

The fourth interviewee was a male aged 36 who had recently undergone dramatic weight loss. It was felt that exploring his motivations and feelings towards his body would add

balance to the research when in the context of the other interviewees. His reasons for attending the gym were unusual for the population of the gym in question with most of its members training to increase muscle mass rather than to lose weight. In turn, the researcher that selecting Participant Four for the interview would represent the smaller percentage of those who attended the gym and shared the same motivations. He had less than two years' experience of training in the gym and scored 41 on the MDDI.

The fifth, and final interviewee, was a male aged 49 with a long career of training of over 20 years. He represented those in the gym with a long training history and those who were older than the average member. He was enthusiastic to participate in the research and was freely available to take part. It became clear during the interview that he had previous experience with using appearance enhancing substances but had been training naturally for over 10 years. His MDDI score was 32.

### **Interview Topics**

As with the nature of qualitative research, topics that were valuable to be addressed in the interviews were outlined before the interviews took place to prompt the researcher and act as a guide during each of the semi-structured interviews. Therefore, none of the interviews were identical in terms of the questions asked but were each guided by the individual responses given by the participants. Topics that were covered during each interview included:

- Reasons for attending the gym
- Gym attendance
- Training patterns
- Eating patterns

- Feelings about interruptions to routine of workouts
- Feelings about your body

The researcher aimed to stay closely to these topics whilst allowing for individual experiences to be discussed. This allowed for similar experiences to be covered in the interviews. Qualitative research methods had been chosen for the reasons outlined above, therefore, the researcher acknowledged the importance of the free-flowing style of data collection during interviews so that a true representation of individual experience could be portrayed in the final presentation of results. Interviewees could freely discuss their experiences but were prompted by the researcher to keep the data on track and relevant to the study.

## **Methodology**

Interviewees were each given information sheets (see appendix D) outlining the aims of the study, given the option to ask questions and had their right to withdraw explained before signing a consent form (See appendix E) which confirmed that they agreed to being audio recorded. It was essential to gain consent for audio recording each interview so that they could be played back and subsequently transcribed. This protocol ensured that the research adhered to the code of British psychological ethics and the ethics report that had been approved by the university ethics board. It was particularly important to stick to the strict code of ethics in this study with the researching knowing the participants prior to starting the research.

The use of semi-structured interviews allows for a greater understanding of individual experience. One way in which this happens is giving participants the opportunity to expand

upon their questionnaire responses and allows the researcher to explore new topics that are mentioned. In order to keep each interview on a similar path, a topic prompt sheet was created to be used as a guide. This also helped with the flow of each interview and ensured that key topics were discussed during each interview. The interviews took place in the onsite gym office, a setting familiar to each participant, helping to put them at ease, providing the largest opportunity to attain truthful, detailed accounts of interviewees experiences. As discussed by Smith and Sparkes (2014) understanding of a community must be done from 'the inside'. Furthermore, it was convenient environment for the participants to get to as interviews were coordinated with workout times, secondly it was an environment quiet enough to attain quality audio recordings of each of the interviews for subsequent transcription. The interviews were each around half an hour in duration though they ranged in length due to the individual nature of interview disclosures. Furthermore, the interviews were not pushed to last much longer than this as it was felt that data of a high quality was collected in the time and the volume of data was suitable for the time constraints of the project.

Once all the interviews had been conducted, audio recordings of each interview were transcribed and uploaded into QSR NVivo software. The software was used by the researcher to label themes running through the interview transcripts. This allowed the researcher to identify commonalities and differences between the individual accounts given by the interview participants by applying Braun and Clarke's (2006) TA procedure. TA was formally outlined as a systematic method to qualitative data analysis after Braun and Clarke (2012) identified many researchers were using the method but describing their methodology as a mixture of approaches. This is because many of its components are the same as other methodologies,

such as, discourse analysis (Braun & Clarke, 2012). TA was chosen for this analysis for many reasons, but mainly due to its suitability with the research aim of expanding on existing knowledge of MD. The method helps the researcher to see and make sense of individual experiences regarding a shared topic and therefore, was ideal for this study. Another reason TA was chosen is because of its' flexibility as an approach to the discussion of themes and its straightforward methodology procedure to identify, organise and offer insight into theme patterns within and across sets of data. This was an important factor considering the researchers level of experience.

The personal and academic experience of the researcher has an effect on the themes which they create from the data, therefore, the same data set can produce different themes when a different researcher explores the data. This is because it affects their interpretation of data and its meaning. Where the researcher places their research on three main continua is critical in the formation of their assumptions about the data and therefore, their analysis. The first consideration is whether or not the research is inductive or deductive, secondly whether the researcher has an essentialist or constructionist theoretical perspective and thirdly whether the researcher allows the coding and analysis of data to be theory driven or whether it has an experiential or critical orientation (Braun & Clarke, 2012). In this piece of research, the researcher took an inductive approach to data analysis with a bottom-up methodology, therefore, analysis was led by the content of the data that had been collected. It is therefore also experimental in its orientation. However, as Braun and Clarke (2012) point out, the process of coding requires the researcher to show some deductive qualities to code data, which is of importance. For example, the topic prompt sheet that was used during the interview stage. An

essentialist theoretical view was taken to allow the individual experiences of the participants to be revealed.

The process of TA involves the identification of themes within data, which are in direct relation to the research aim. In this case, themes related to a preoccupation with gaining muscle mass and reducing body fat percentage, changing overall appearance and the impact of obsessive diet and exercise regimes on social lives. In turn, similarities and differences between participants emerged from the data and to give a clearer idea of the disorder. As outlined by Braun and Clarke (2012), this method of analysis has six main stages, however, these are not set in stone and are led by the data in each case. Furthermore, experience with TA develops the skills which are then used throughout the analysis process and subsequently affect the way in which the data is interpreted and reported.

The first stage of TA required the researcher to become familiar with the data set which occurred in the interview transcription phase. During the transcription phase, pauses, laughter and other language tools to portray emotion were included to give as much context to the written data as possible. Once transcription was complete, the researcher could continue to read over the data and make initial notes of potentially interesting factors which upon further inspection would be useful. In turn, promoting critical analysis of the interview transcripts in relation to the research aims. No formal coding of the data occurred at this stage, notes were observational in nature to help with the subsequent analysis process.

In keeping with the stages of TA outlined by Braun and Clarke (2012), initial codes were then generated as stage two of the data analysis process. The data at this stage was systematically coded, line by line, so that relevant features of each of the data sets were

identified in a way that the researcher could follow and make sense of. These codes were used by the researcher to summarise points made by the participants, to describe the content of the data and outline the experience of each participant as the researcher interpreted it, guided by how MD is characterised. Anything of potential interest was coded at this point so as not to miss important extracts of the data from the analysis. These codes were general annotations of the transcripts. The codes were labelled throughout the transcripts as the reading process was conducted, as opposed to identifying a code and applying throughout the transcript before returning to the beginning to identify a second code. Once all five interview transcripts had been coded, stage three of analysis could begin. The formation of themes identifies perceived important aspects of the data which directly relate to the research aims (Braun & Clarke, 2012).

These initial codes were grouped together into parent themes based on their shared topic this was an active process requiring the researcher to interpret important details of the data. These parent themes were then revised to include smaller groups of more specifically related codes, for example, 'Positive feelings towards their body', which created sub-themes. Once these themes and sub-themes had been finalised, ensuring that relevant themes which represented the complexity of the data were included, their relationships and contribution to reflecting the data were examined. It was important for the researcher to see how each of the themes stood alone and how they worked together so that the data had a meaning and the researcher could gain full insight and context to each of the accounts. A thematic map was then created (see Appendix F.).

Reviewing potential themes was the next step in the analysis process. During this stage, the candidate themes produced in the previous stage were reviewed in relation to the coded

data and the data as a whole to ensure the themes were of high quality that best represented the data. This stage involved reviewing the theme regarding the coded data within it. Some themes were subsequently redefined, and some coded data was put into a different theme to maintain coherence. The aim of this step was to ensure that the themes gave a useful insight to the data and therefore, the contributed strongly to the aim of the study. A final reread of the data was needed to confirm that the themes accurately captured the most relevant and important aspect of the narration of the data.

Naming the themes was the final step of the analysis process so that the unique features of each theme were effectively highlighted, and in turn their surface relationships could be seen. At this point, it was also clear that the analysis did in fact address the research aim of exploring the individual experiences of the disorder spectrum. The process involved selecting quotes from the coded data of each theme across the data set which most clearly represented the analytical points to be made during the write up.

## **Ethics**

Every effort was made to adhere to the British Psychological Society's Code of Human Research Ethics (2014) from initial conception of the project to finalising the write up. The code of ethics was adhered to in order to maintain moral principles throughout the research process and retain scientific integrity of the research. In turn, meaning that participant involvement was highly valuable. Following submission of an ethics document to the Research Ethics panel at the University of Huddersfield, data collection commenced once approval was given. The Research Ethics Panel ensured that the proposed research met with the ethical guidelines before any data collection and participant interaction occurred. One of the main reasons for maintaining good ethical practice is to instil participant confidence in the researcher. This promoted a valuable level of respect between the participants and the researcher, a factor crucial for collection of meaningful data (The British Psychological Society, 2014). The researcher was fully aware of the responsibility to respect and secure the rights of participants in accordance with the British Psychological Society Ethical Guidelines (2014) and the social responsibility with which they hold.

Participant recruitment procedures ensued, starting with the display of posters within the gym environment. This allowed potential participants to have time to think about their participation and approach the researcher to ask questions without feeling obliged to take part. It gave participants basic information regarding the study with which they could base their decision to participate on. After expressing their wish to take part in the study, either to the researcher or member of gym staff, participants were given the option to complete either the paper or online version of the questionnaire. Both options maintain participant anonymity

unless the participant consented to give their name and a method of contact in anticipation a follow up interview. A sealed box was provided for paper responses to be deposited.

Before completing the questionnaire, participants were given a full summary of what the study would entail, the purpose of the study was explained and what would happen with their data was described. Participants were given the opportunity to give informed consent before giving any data or taking part in the research process. In turn, participants were not deceived and a written debrief was not necessary. In addition, participants who took part in the interview stage were given the opportunity to receive a copy of the final piece of research in which their data would be used.

Participants were informed of their right to withdraw their data from the study at any point leading up to 30/06/17 without giving reason. They were given the relevant information on how to do so including a contact email address and phone number of the researcher. As data analysis started before 30/06/17, withdrawal of data after this point would be detrimental to the final results. Participants were made aware that this was the reason for limiting their right to withdraw. Participants were given the opportunity to opt out of further contact regarding their participation in the interview stage following completion of the questionnaire. Those who agreed to participate in the interview stage needed to be identifiable to the researcher so that their data from each stage could be matched. The questionnaire responses of the interview participants were numbered and their transcribed interviews were given the same number so that their data from each stage could be matched.

Data collected from questionnaires and interviews was collected confidentially to ensure participants were unidentifiable in the final research report. Ethical protocol regarding

the storage and management of data was also upheld by using password protected laptops, memory sticks and online questionnaire response software. Laptops were transported in the boot of a car and paperwork was stored in a locked cabinet with only the researcher having a key.

Pseudonyms have been given to participants when referring to themselves or others during interviews. Due to the nature of topics covered during the interview stage, data surrounding anabolic steroids and other performance enhancing drugs, such as banned fat burners, arose. The sale of anabolic steroids is illegal and therefore, in the introductory and consent stages, participants were made aware that should they have had experience with any of these substances, not to detail how they came in possession as not to implicate any legal issues. Steroid use was not promoted by the research area or researcher. Existing steroid use amongst participants was not affected by participation in the study in any way. Participants who disclosed their engagement in steroid and performance enhancing drug use were given information regarding sources of relevant support.

Furthermore, deep consideration of potential risks to participants were evaluated. For example, participants were not given any indication of the meaning of their questionnaire results to safeguard them from psychological harm. Those who scored highly in the questionnaire stage were given information of support services.

### Quantitative Results

100 male volunteers completed a questionnaire involving two parts; background data and the MDDI. In the first section of the questionnaire, participants were asked about their age, the length of their gym training experience, the frequency with which they trained at the gym, their primary motivations to engage in gym training, the number of training methods they used, and whether they trained outside of the gym environment, had experience in dieting and experience of competitive body building. As discussed, these variables were chosen based upon their evident use in previous, related studies and their influence upon MD related behaviours. The frequency of participants in each of the background variables subcategories are displayed in Table 1.

Table 1. Descriptive statistics for the background data of 100 male volunteer participants

Background Variable		Frequency
Age	16-21	13
	22-27	39
	28-33	17
	34-40	12
	41-46	8
	47+	11
Length of gym training experience	Less than a year	21

	1-2 years	17
	3-5 years	25
	6-9 years	13
	10+ years	24
Frequency of gym training	About once a month	8
	A few times a month	7
	About once a week	5
	A few times a week	55
	Everyday	25
Primary motivation to engage in gym workouts	Health and Weight	49
	Aesthetics	31
	Stress Relief	14
	Sport	6
Number of training methods used	1	47
	2	31
	3	15

	4+	7
Training outside of the gym	Yes	55
	No	45
Experience with dieting	Yes	68
	No	32
Experience with competitive body building	Yes	9
	No	99

The MDDI was presented to the participants in the second section of the questionnaire. SPSS software was used to analyse the data in more detail. Firstly, the participants final MDDI score was explored;  $M= 37.6$  ( $SD= 7.19$ ) with the lowest score being 15 and the highest 63. It can be assumed the data is of normal distribution as it demonstrates an almost, symmetrical, bell-shaped curve. This means that most participants scored within the middle range of possible scores and fewer participants scored towards either extremes. To ensure that the few extreme scores would not affect the results, Skewness and Kurtosis values were examine, though neither showed an effect on the results (skewness=0.10,  $SD= 0.24$ , kurtosis= 1.73,  $SD= 0.48$ ). This shows that the extreme scores did not significantly affect the MDDI score analysis. This is further supported by looking at the normal Q-Q plot which shows scores lay in a relatively straight line (see Figure 1.). We could therefore assume normal distribution of MDDI scores, therefore further analyses of the data were parametric.

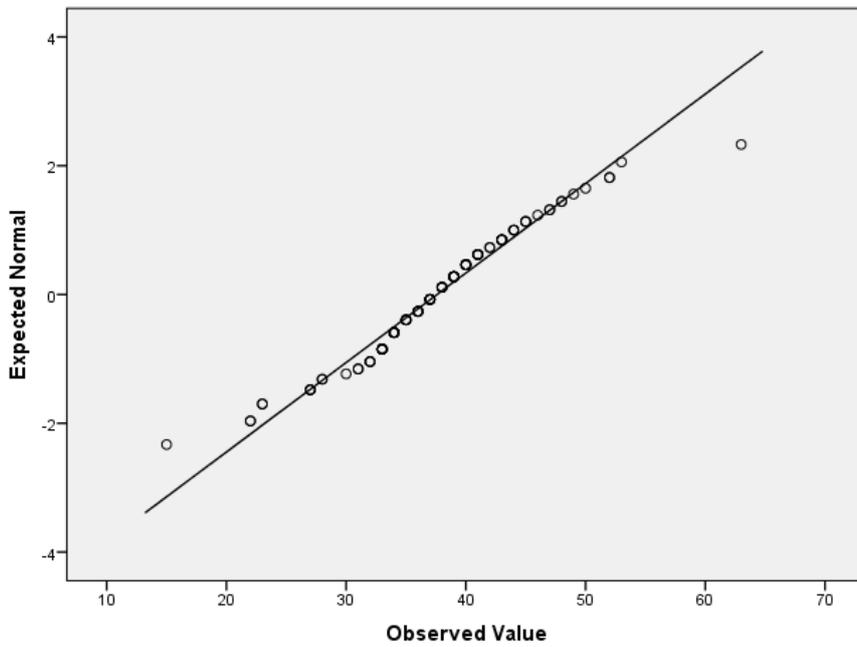


Figure 1. The expected and observed MDDI scores

The means and standard deviations of overall MDDI scores for each background variable subgroup can be seen in Table 2.

Table 2. Mean and standard deviations of Participants MDDI responses

Background Variable		M	SD
Age	16-21	39.08	5.95
	22-27	39.51	5.93
	28-33	36.53	8.44
	34-40	34.42	5.55
	41-46	32.25	6.09

	47+	38.09	10.40
Length of gym training experience	Less than a year	36.29	4.19
	1-2 years	37.88	5.84
	3-5 years	41.56	6.60
	6-9 years	38.31	9.29
	10+ years	34.04	7.19
Frequency of gym training	About once a month	35.88	7.55
	A few times a month	40.00	11.22
	About once a week	35.40	6.07
	A few times a week	37.96	6.69
	Everyday	37.12	7.37
Primary motivation to engage in gym workouts	Health and Weight	36.82	7.72
	Aesthetics	38.06	5.23
	Stress Relief	39.64	8.63
	Sport	36.83	8.61

Number of training methods used	1	36.89	8.16
	2	38.13	6.49
	3	38.13	6.42
	4+	38.86	5.30
Training outside of the gym	Yes	37.11	7.79
	No	38.20	6.42
Experience with dieting	Yes	38.28	7.33
	No	36.16	6.78
Experience with competitive body building	Yes	40.44	4.82
	No	37.32	7.35

Parametric inferential statistics were used to analyse the data in more detail. During analysis the grouping of some of the response categories was conducted to avoid skewing the results. Those grouped together were; the age brackets '47-52' and '53-58' to create the new response of '47+', the type of motivation type 'weight control' and 'health' into 'Health reasons' and the number of types of training used '4' and '5' into '4+ types'.

Age had 6 levels after merging some of the response groups; 1 (16-21), 2 (22-27), 3 (28-33), 4 (34-40), 5 (41-46) and 6 (47+). A one-way between groups analysis of variance (ANOVA) was conducted to explore the effect of age on MDDI score and the three MDDI subscales (DFS, AI and FI). There was a statistically significant difference at the  $p < .05$  level in DFS scores between the age groups:  $F(5, 94) = 4.14, p = .01$ . Despite reaching statistical significance, the actual difference between each groups' mean scores was relatively small. This may have been affected by the small sample size despite normal distribution of scores. Post-hoc comparisons

using the Tukey HSD test indicated that the mean score for those aged 41-46 ( $M= 12.13$ ,  $SD= 3.52$ ) was significantly different from those aged 16-21 ( $M= 17.92$ ,  $SD= 3.33$ ) and 22-27 ( $M= 17.31$ ,  $SD= 3.83$ ). Age did not significantly affect overall MDDI score, AI or FI.

The length of training experience was given five levels; 1 (less than a year), 2 (1-2 years), 3 (3-5 years), 4 (6-9 years) and 5 (10+ years). A one-way ANOVA was used to explore the effect of length of training experience on MDDI score and subscale scores. There was a statistically significant effect found for length of training experience on overall MDDI score, DFS and AI;  $F(5, 95) = 4.01$ ,  $p = .01$ ,  $F(9, 95) = 4.15$ ,  $p = .00$ ,  $F(9, 95) = 2.58$ ,  $p = .04$ . The actual difference between MDDI, DFS and AI means were small, again this may be related to the relatively small sample size used in the study. The effect size for MDDI score, using eta squared was 0.14, a large effect according to Cohen (1988). Post-hoc comparisons using Tukey HSD indicated that there was a significant difference in MDDI scores between those participants that had 3-5 years training experience ( $M= 41.56$ ,  $SD= 6.60$ ) with those with 10+ years' experience ( $M= 34.04$ ,  $SD= 7.82$ ). For DFS, the effect size was also 0.14. Post-hoc comparisons showed that there was a significant difference in DFS between those with 10+ years' experience ( $M= 13.96$ ,  $SD= 4.05$ ) and participants with 1-2 years ( $M= 17.41$ ,  $SD= 3.36$ ) and 3-5 years training experience ( $M= 17.92$ ,  $SD= 3.76$ ). The effect size for AI was 0.09, again this large effect size (Cohen, 1988) may have been affected by the sample size. Post-hoc comparisons using Tukey HSD showed no significant differences between AI means. No significant effect for the impact of length of training experience was found for FI.

Training frequency also had five levels; 1 (about once a month), 2 (a few times a month), 3 (about once a week), 4 (a few times a week) and 5 (every day). The effect of training

frequency on participants over all MDDI, DFS, AI and FI scores was measured using a one-way ANOVA. A significant result was found for FI ( $F(4, 95) = 4.67, p = .00$ ). Despite reaching statistical significance the actual difference between means was only moderate. Using eta squared, the effect size was calculated; 0.16, a large effect size (Cohen, 1988) though this may be because of the relatively small sample size. Post-hoc comparisons using Tukey–HSD indicated that differences between the groups lay between those who exercised about once a month ( $M = 6.50, SD = 4.31$ ) and both those who exercised a few times a week ( $M = 11.04, SD = 3.08$ ) and those who exercised every day ( $M = 11.72, SD = 3.81$ ). No significant effect was found for MDDI score, DFS or AI.

Primary motivation to workout was also explored using a one-way ANOVA. This variable had four levels also; Health and Weight, Aesthetics, Stress Relief and Sport. No significant differences were found for the type of motivation on MDDI score ( $F(3,96) = .63, p = .60$ ), DFS ( $F(3,96) = 1.93, p = .13$ ), AI ( $F(3,96) = 1.9, p = .14$ ) or FI ( $F(3,96) = .72, p = .55$ ).

The merging of possible responses meant that there were 4 levels of the number of training methods used by participants; 1 (1 type), 2 (2 types), 3 (3 types) and 4+ (four or more types). There was no significant effect found for the number of types of training used by the participants on MDDI ( $F(3,96) = .30, p = .83$ ), DFS ( $F(3,96) = 1.26, p = .30$ ), AI ( $F(3,96) = 1.13, p = .34$ ) or FI ( $F(3,96) = .68, p = .57$ ).

Whether participants trained outside of the gym environment, had experience with dieting or competitive body building each had two levels; 1 (yes) and 2 (no). Each variable was explored in their relation to affecting overall MDDI score, DFS, AI and FI scores using independent samples T-tests. No significant differences were found in MDDI, DFS, AI or FI

scores between those who did and those who did not participate in exercise outside of the gym environment, did or did not have experience with dieting to reach their goals or those who did or did not have experience with competitive bodybuilding (see Table 2.).

Table 3. The mean, standard deviations and p values for T-tests on participant experience with dieting, competitive body building and exercising outside of a gym environment

		MDDI			DFS			AI			
		Mean	SD	p value	Mean	SD	p value	Mean	SD	p value	
Exercised out of the gym	Yes	7.11	.80	.45	5.82	.19	.75	0.71	.58	.21	0.58
	No	8.20	.42		6.09	.12		1.64	.84		0.47
Experience with competitive bodybuilding	Yes	0.44	.82	.22	7.67	.64	.19	0.00	.06	.34	2.78
	No	7.32	.35		5.77	.17		1.24	.68		0.31
	Yes	8.28	.33	.17	5.62	.34	.26	1.49	.98	.16	1.18

Exper											
ience with	o	6.16	.78		6.63	.66		0.38	.00		.16
dieting											

### Qualitative Results

Interviews were transcribed and scrips were analysed using Thematic Analysis (TA; Braun & Clarke, 2006). As outlined in Qualitative methodology section, initial codes were formed during familiarisation of the data, revision and grouping of these initial codes produced eight themes; Feelings towards body, Steroids, Gym as a part of life, Behaviour changes, External Influences, Gym Community, Training and Identity. Three of these themes were the subdivided to create sub-themes (see Table 4). For example, Behaviour Changes was sub-divided into Changes Post Gym and Obsessive Behaviours. The relationship of the emergent themes will be discussed in relation to the quantitative findings and existing theoretical frameworks.

Table 4. Theme hierarchy and Illustrative Data quotes for Thematic Analysis

Theme	Sub Theme	Illustrative Quotes
Feelings towards body	Unhappiness towards body	<ul style="list-style-type: none"> <li>I'll look at myself in the mirror and I'll think I've got miles to go and come back down again, not come back down but I'll get un happy about it</li> </ul>

		<ul style="list-style-type: none"> <li>I'm still not happy with the way I am</li> </ul>
	Normalisation of MD behaviours	<ul style="list-style-type: none"> <li>I've started buying shirts now Small, to make me look bigger</li> <li>all the time! Everything I eat! Everything I eat I judge 'Can I get away with eating that?', 'Can I get away with that?', 'Can I eat that?'</li> </ul>
	Positivity	<ul style="list-style-type: none"> <li>I'm quite happy with how I look at the moment</li> </ul>
	Feelings based on others' opinions of appearance	<ul style="list-style-type: none"> <li>They say you know 'You look really good' you know 'You're in good shape' so you know, quite happy with that</li> </ul>
	Actions to change appearance	<ul style="list-style-type: none"> <li>I always think 'Right, I've got the size now let's fucking trim up' then I trim up, then I think 'Mmm, lost a bit of size, let's get that size back on'.</li> <li>I've tried all sorts to get bigger</li> </ul>
Steroids	<ul style="list-style-type: none"> <li>Everybody I know is taking steroids</li> </ul>	

		<ul style="list-style-type: none"> <li>• So then you start to take them again to make yourself go up so I suppose it is an addiction isn't it? Cause you're doing it to make yourself feel good like any drug</li> <li>• Well addictive. I'm addicted to them now. Definitely, definitely- I'm on steds right now, definitely addicted to them.</li> <li>• I did feel better on them. I felt, better, bigger, stronger.</li> <li>• before you know it I'm injecting steroids into myself at the age of 18 and I started to look like him and I wanted to look like that</li> <li>• I just think it's a training aid, I think there's use and there's abuse</li> </ul>
Gym as a part of life	Positive effects of gym attendance	<ul style="list-style-type: none"> <li>• They've been life changing for me, coming here has been life changing for me, for the better</li> </ul>
	Relationship between Gym life and Non-gym life	<ul style="list-style-type: none"> <li>• My kids' lives revolve around me going to the gym I come home from work and I go to the gym, what time we all have tea revolves around me going to the gym</li> </ul>
Behaviour changes	Behaviour changes post gym	<ul style="list-style-type: none"> <li>• I no longer eat, what I define as shit; ready meals, umm, chippy, full breakfasts, all them have gone out the window</li> </ul>
	Obsessive behaviours	<ul style="list-style-type: none"> <li>• I always come to the gym on a Monday, a Thursday and a</li> </ul>

		<p>Saturday. A bit obsessive but, it's just natural to me</p> <ul style="list-style-type: none"> <li>• There is no way I'm doing anything on a Saturday until I've been to the gym</li> </ul>
External influences	<ul style="list-style-type: none"> <li>• She says they're too skinny compared with my top half</li> <li>• I'm a guy that owns the gym, people expect the guy that owns the gym maybe to be big</li> <li>• To have somebody else do it with you...it, it pushes you more</li> <li>• They encouraged me to go (to the gym)</li> </ul>	
Gym community	<ul style="list-style-type: none"> <li>• then you get in conversations and stuff like that and the next thing you're high fiving and you're shaking hands or you know hugging or whatever</li> <li>• This gym has helped even again with my arm I couldn't have gone to another gym because this gym I just felt a bit comfortable because it's only quiet and I sorta know everyone and they know what I've done to my arm I couldn't have gone to another gym</li> <li>• I talk to everybody, everybody here's very friendly, welcoming</li> </ul>	
Training	<ul style="list-style-type: none"> <li>• I tend to lean more towards heavy lifting than running</li> <li>• I'd only ever trained upper body</li> <li>• I get bored, of doing the same thing</li> <li>• I do the same set of exercises all the time</li> </ul>	

	<ul style="list-style-type: none"> <li>• the training is more about how I look, rather than, I would say rather than about health and fitness, it's more about how I look</li> </ul>
Identity	<ul style="list-style-type: none"> <li>• I'm constantly flattered. Every shop I go to they call me 'Big Lad'</li> <li>• I've just always been Seb, I don't know if it's big personality, big size- it's just always been 'Big Seb'</li> <li>• My physical appearance, I mean, obviously like I've built up a reputation through it</li> </ul>

### Feelings towards body

The quantitative results found that the average MDDI response for 'I think my body is too small' and 'I feel I have too much body fat' was that participants agreed, though most participants disagreed with 'I hate my body'. These elements are used to measure the psychological components of MD symptomology as outlined by Grieve (2007) which include body distortion and internalisation. Interview transcripts also appear to suggest that despite an overall desire to increase muscle mass and reduce body fat percentage, participants were not found to hate their bodies.

Five sub-themes emerged; Unhappiness towards body, Normalisation of MD behaviours, Positivity, Feelings based on others' opinions of appearance and Actions to change appearance.

The subthemes are guided by Grieve's (2007) MD conceptual model of characteristics.

### Normalisation of MD behaviours

Interviewees appeared to experience MD symptoms in different ways with some symptoms being severe and others much milder or even absent as Pope et al., (1997) discussed. Despite the variation of MD symptomology between individuals, one common feature is the normalisation of irrational thoughts experienced regarding their body mass, body ideal and body distortion.

Experiencing these thoughts appeared to fuel extreme behaviour in order to achieve their perceived body ideal, for example, the extreme changes to dieting, training intensity and use of PED's are often normalised behaviours by those experiencing MD symptoms. These behaviours are consistent with those outlined by Rhea, Lantz and Cornelius (2004).

Furthermore, the qualitative findings appeared to suggest that social comparison theory, outlined by Festinger (1954), could be used to explain the how upwards comparisons increase the risk for the normalisation of MD thoughts. It became apparent that the interviewees observed others around them to establish their social selves and process social information. This highlights the importance of the environment in which males exercise in the development of MD symptomology. These social comparisons were discussed by the interviewees, providing support for the conception and internalisation of the ideal body as outlined by Grieve (2007).

In support of the significant quantitative finding between length of training experience and MDDI score, Participant Four (aged 36) also discussed that the negative thoughts he experiences towards his body have increased. During the interview, Participant Four discussed that his thoughts appear to have become more specific towards increasing his muscle mass whilst reducing his body fat percentage and appeared to believe that these shifts in feelings and attitudes towards his body are normal;

*'instead of just thinking about a weight and where I want to get to, I think about muscle groups, and they're not right' (Participant Four, aged 36)*

His change of thinking from improving health and losing weight to building muscle, could be explained by Tod and Lavellee (2009) model of MD development and sustainment. In this model, Tod and Lavellee (2009) implement Festinger's (1954) social comparison theory where individuals make comparisons between themselves and others. If the perception is that the other individual is closer to the perceived ideal, an upward comparison is made. This results in lowered self-esteem and behaviours to become closer to the ideal. Participant One discussed that the expected standard of aesthetics for males at the gym in this study appears to have affected the normalisation of these thoughts;

*'when you're in an environment, you know, and lads are coming in bigger than you and more toned than you' (Participant One, aged 49)*

This provides further support that the environment in which males exercise appears to play a large role in the normalisation of negative thoughts towards one's body. In this instance, those around the exerciser are engaging in extreme behaviour to achieve their perceived ideal body's. Those who are newer to exercise then perceive these males as having 'normal' aesthetics and behaviours too thus adding to their normalisation.

Strict dieting was a commonly normalised behaviour throughout the interviews. The term ‘dieting’ refers to the eating behaviours observed in individuals and includes the type of food consumed, the amount and the patterns of eating. Strict dieting is frequently discussed in MD literature, stemming from Pope et al., (1993) first naming MD as ‘Reverse Anorexia’, through disputes surrounding the classification of MD (Tod, Edwards and Cranswick, 2016) and the similarities between the development of MD and eating disorders (Lamanna et al., 2010). However, no component of the MDDI refers to dieting behaviour. The quantitative findings found experience with dieting to significantly affect FI score, supported by each of the five interviewees who discussed dieting and obsessive eating behaviours in relation to achieving their ideal body’s. This also appears to support the existing literature surrounding the strict eating behaviours of those displaying MD symptoms suggested by Lamanna et al., (2010). Participant Two (aged 29) discussed obsessive behaviour towards his diet and eating behaviours believing that implementing a strict diet would help him to achieve his ideal body;

*‘Everything I eat I judge ‘Can I get away with eating that?’, ‘Can I get away with that?’, ‘Can I eat that?’ (Participant Two, aged 29)*

All interviewee’s expressed feelings of being insufficient in the way that they looked. This is a common MD symptom outlined in the DSM5 that each participant normalised. It appears that normalisation of thoughts and behaviours were the results of upwards social comparisons as discussed by Tod and Lavellee (2009). For example, Participant Three (aged 34, with experience of body building) reported:

*'after 23 weeks of dieting and training and not quite looking how everybody else seemed to look' (Participant Three, aged 34)*

#### Unhappiness towards body

Each interviewee expressed unhappiness in some way towards their bodies, but it was clear that the severity of the unhappiness was varied. Furthermore, some interviewees expressed towards their whole body whereas for others, the unhappiness was in specific relation to a body part. The interviewees appeared to be generally unhappy with their weight, with specific referral to their body fat percentage which supports the quantitative findings that participants agreed their body fat was too high and that they were in general 'too small'. There appeared to be a fear at appearing 'skinny' to others supporting Grieve (2007) in that both those who are under and those who are overweight desire to appear more muscular as described. Therefore, losing weight was not consistently seen as positive during the interviews because this was associated with appearing to be 'skinny' as Participant Three (aged 34) discusses:

*'I don't wanna be skinny! I just don't like how it looks'*

*(Participant Three, aged 34)*

Participant Five (aged 49) expressed a great deal of discomfort at the fact he has lost weight:

*'Right this minute I feel like I've lost quite a lot of weight, too much weight coz I've, pft, well yeah, I just feel a bit skinny at*

*the moment' (Participant Five, aged 49)*

Furthermore, Participants Two (aged 29) and Three (aged 34) both referred to a purposeful manipulation of their weights depending on their aesthetic preference and goal at the time.

Participant Two (aged 29) stated;

*'Right, I've got the size now let's fucking trim up' then I trim up,  
then I think 'Mmm, lost a bit of size, let's get that size back on'*

*(Participant Two, aged 29)*

This demonstrates the continuous dissatisfaction towards their bodies often seen in those with MD symptoms and supports the inclusion of perfectionism within the existing MD literature, such as Grieve (2007) discussing the pursuit of unrealistic goals. It also demonstrates evidence for a maintenance loop with which symptoms intensify as outlined by Tod and Lavellee (2010). Antecedent variables, such as the individual's personality and physiological characteristics, interact and cause negative appraisals which ultimately lead to MD symptoms. Social learning theory is applied to explain how the variables interact and cause symptoms of MD.

Participant Four (aged 34) discussed his unhappiness towards his body directly because of his perceived high body fat percentage, rather than weight itself. He discussed that this feeling will be longstanding given his history of being overweight and that he expects others to perceive this too;

*'I always still say that I'm fat and ugly, umm and I think that that's how other people perceive me as well' (Participant Four, aged 36)*

Participant Two (aged 29) discussed in great detail his fixated desire to increase his weight over a period of time:

*'Coz I'd just been that 13.10 for say, 6 months say, and I were fuckin' flat out smashing it... (I) weren't comfortable being that 13.10 right and you get a load of gear and go to fuckin' 14.10 and the next time I went on um I was 15, then I was 15 and a half, then I think, I was 16 stone' (Participant Two, aged 29)*

As discussed, none of the participants had a clinical diagnosis of MD, though these results suggest that there needs to be more research exploring MD symptomology in gym users. There is a clear representation of many of the related symptoms of MD in these participants alone, such as dieting and perfectionism as discussed by Lamanna et al., (2010) and Kuennen and Waldron (2007).

### Positivity

Despite all five interviewees expressing a desire to change or improve their appearance in some way, three participants (Two aged 29, Three aged 34 and Five aged 49) also expressed some positive feelings towards their body's. These findings support the normal distribution of MDDI scores found by the quantitative analysis whereby the extreme scores on the MDDI were far less

frequent than those in the mid-range. These three participants had over 60 years of training experience between them which could support the significant quantitative findings for training experience and age. For example, Participant Three (aged 34, 15 years training experience) said:

*'I don't really have any hang ups like I don't look at myself and go 'Urgh I look horrible like that's 'angin,' I'm quite happy in my own skin!'* (Participant Three, aged 34)

There is a lack of literature discussing the potential positivity experienced by males who are conscious of their body image however, as discussed in the introduction of this paper, previous studies have looked at the positivity female athletes express towards their bodies (Krane, Choie, Baird, Aimar & Kauer, 2004). The MDDI doesn't measure positivity, and so an individual's scores may be misleading as they do not reflect the whole attitudes expressed by individuals.

Participant Five (aged 49, 20 years training experience) had little to say about further improving his appearance, he stated;

*'I'm coming here just to maintain what I've sort of done for myself really'*  
(Participant Five, aged 49)

Participant 4 (aged 36, 18 months training experience) who had trained for the least amount of time of the interviewees, reported experiencing a shift in his attitudes towards his body from

starting with health as the primary motivation, to being strongly motivated to improve his aesthetics;

*'when I first came it was all about weight and now- a target weight,  
and now I realise what I wanna look like' (Participant Four, 36)*

This qualitative finding provides further support for the quantitative findings that training experience significantly affected MDDI subscale scores DFS and AI and the presence of a maintenance loop as described by Tod and Lavellee (2010). It appears that the participants make social comparisons which lead to negative appraisals and intensified MD symptoms as they seek to improve their self-esteem and therefore body positivity.

However, Participants who had moderate training experience didn't appear to experience the same positivity towards their body. They often acknowledged that their ideal body type was unachievable for them for various reasons such as, age and work commitments, for example, Participant One (aged 49, 2 years training experience) said;

*'I'm only here 3 times a week and I can't- not that it's an excuse,  
but I can't seem to fit everything in' (Participant One, aged, 9)*

Furthermore, Participant One (aged 49) referred positively to how they had previously looked, but did not share the same positivity for their current shape, he reported;

*'I had decent muscly legs' (Participant One, aged 49)*

This finding further suggests that more research is needed exploring MD symptomology and training experience as there appears to be a varied attitude in body image alongside varied training experience.

Feelings based on others' opinions of appearance

The MDDI does not measure how respondents believe others will perceive them however, it does refer to how respondents may feel around others. The qualitative results suggest that the way male gym goers believe others perceive them has a profound effect upon their behaviour in terms of social learning theory and the internalisation of their ideal bodies (Tod and Lavellee, 2009). None of the participants had experienced negativity from others in relation to their bodies and four of the five participants revealed they had a history of receiving positive reassurance about their appearance from those around them. This influenced the way that they subsequently felt towards their bodies and their self-esteem for example, Participant One reported:

*'people used to tell me I had the body to die for...It just made me smug'*

*(Participant One, aged 49)*

However, it appears that the various comments made by others that focus on participants' appearance, specifically their muscular tone, was enough for participants to perceive pressure to

look a certain way. Participant Three (aged 34) discussed the use of social media to demonstrate his physical achievements as a social justification;

*'I've got pictures to prove that I can get in good shape...social media,  
you'll post a throwback of when you used to look good just to remind  
people that you're not a fat parcel all the time' (Participant Three, aged 34)*

Being able to prove that he could look a certain way was method of maintaining the positive light in which other perceive his aesthetics in order to boost his self-esteem. As discussed throughout MD literature, self-esteem has been found to be a predictor of MD and the disorders symptoms (Grieve, 2007; Macfarland and Kaminski, 2009; Lantz, Rhea and Mayhew, 2001; Greenway and Price, 2018).

The MDDI directly measures the use of loose clothes as a way of hiding their bodies from others but it does not account for sufferers using tight clothing to emphasise their physiques. This could account for participants disagreeing with this component in the quantitative results of this study. The interviews appear to suggest that MD sufferers use clothing to emphasise parts of their body they feel are socially acceptable or that would be perceived by others as desirable. For example, Participant One (aged 49) said:

*'I've started buying shirts now, Small, to make me look bigger' (Participant  
One, aged 49)*

The anticipation of what others would think of their physiques appears to be strong enough to affect interviewees behaviours.

#### Actions to change appearance

Each of the interviewees went to the gym to change their appearance; reporting that their training regimes were generally aimed at reducing body fat and increasing muscle mass despite their existing appearance. As discussed earlier, this supports Grieve (2007) who found that both under and overweight individuals sought to achieve a more mesomorphic physique. All five of the participants had experience with steroids to aid these changes, with Participant Five (aged 49) revealing;

*'I've tried all sorts to get bigger' (Participant Five, aged 49)*

Furthermore, making changes to their diets was a way each had tried to achieve their ideal bodies as discussed in the Normalisation of Behaviours theme. Participant One (aged 49) reported obsessive behaviour when buying food, a common behavioural outcome of MD although not referred to by the MDDI;

*'I'm always conscious of products I buy, food products, because I will check protein content, carbohydrate content, fat content, and if they're excessive in any way shape of form, one way or another I won't get them'*

*(Participant One, aged 49)*

The interviews revealed that interviewees adopted a range of various behaviours to change their appearance including changes to diet, the type and frequency of exercise and supplementation behaviours. These findings support much of the existing literature including Rhea, Lantz and Cornelius (2004) and Pope et al., original diagnostic criteria (1997) in which preoccupation with muscle building affects individuals' behaviours. Although the quantitative findings demonstrated that 68% of respondents had experience with dieting, and the interviewees accounts of dieting appeared consistent, the findings cannot be related directly to the MDDI. Although the qualitative element of the study did not measure PED use, the qualitative element appears to suggest that the use of PED's is widespread amongst gym going males suggesting the link between MD symptomology needs researching. This highlights the need to explore the interaction between dieting behaviours, supplementation and PED use with MD symptomology in future research including the adaptation of the MDDI.

### **Steroids**

The second theme identified in the transcripts was the use of steroids and other PED's. No component of the MDDI or background information questionnaire referred to steroid use however, all five participants had experience with them and other appearance altering substances, such as fat burners. Steroid use has been identified in the existing literature as a common behavioural outcome of MD symptomology (Grieve, 2007; Tod and Lavellee, 2009) though its role in MD remains an under researched element of the disorder, its symptoms and measures of the disorder such as the MDDI.

Three of the five participants revealed that they were currently using appearance enhancing substances. Participant One (aged 49) was an intermittent user. Participants Two (aged 29) and Three (aged 34) were heavy and consistent users and had been for over twenty years between them.

Each discussed in detail experiences of health issues that arose from using these drugs and demonstrated that they were willing to compromise their health in order to achieve their ideal body's by continuing to use these substances. This finding supports Pope et al. (1997) diagnostic criteria with which risky behaviour is engaged in with disregard of negative outcomes. For example, Participant Three (aged 34) had been admitted to hospital from administering a steroid intravenously incorrectly, resulting in an abscess and septicaemia and Participant Two (aged 29) discussed the development of a lump in one of his nipples;

*'That lump in my nipple right is because (of changing) my hormones'*

*(Participant Two, aged 29)*

He explained that because of the artificial manipulation of his testosterone levels, he was able to self-medicate the lump by continuing his of PED's to level out his hormones because his body has become accustomed to the artificial levels it is frequently subjected to;

*'The actual cure to them (the lumps) was getting back on steroids'*

*(Participant Two, aged 29)*

The cognitive effects of PED use on Participant Two led to normalisation of the risky behaviours and their effects;

*'I'm just, enhancing' (Participant Two, aged 29)*

As discussed by Grieve (2007) those with a preoccupation strong enough to indicate MD. continue their risky behaviour despite compromising aspects of their lives, a construct measured by the MDDI as Functional Impairment. Although no interviewee had a diagnosis of MD, it appeared to be clear that many were willingly compromising their health to pursue their unrealistic goals. This finding highlights the need for future research in those with clinical diagnosis of MD.

Participant One (aged 49) discussed some common side effects of using steroids but claimed that they would not stop him using steroids in the future because steroids helped him to achieve his goal;

*'The side effects aren't bad enough to put me off using them- hot sweats and a few spots on your shoulders I can cope with, and if it gives me bigger traps and some bigger tits!' (Participant One, aged 49)*

The same participant also discussed his cautious approach to taking steroids due to his age yet still wanted to use them, supporting Rohman (2009) in that steroid use is a perpetuating factor in

MD symptomology. Participant One (aged 49) revealed that despite this caution, he was not aware of which substances he was taking or how much of each he should take. He placed a great deal of trust in those that he acquired them from and trusted them for directly administering the correct amounts of the drugs at the correct time;

*'I didn't know what I was using' (Participant One, aged 49)*

Participant Four (aged 34) also revealed that when he has previously taken appearance enhancing substances, he did not know what they were, what each of the drugs were designed to do or how much of each to take. He explained that he could be tempted to use steroids again in the future but, that he would research them himself beforehand;

*'I'd like to think not but maybe when I get to my goal, and I looked at it, then I could be very tempted to do it again-if I ever did it again I would do my research into a lot before I ever even thought about doing it again'*

*(Participant Four, aged 36)*

Putting his health in the hands of another individual appears to suggest this participants investment in his environment. The environment he found himself in appears to normalise this behaviour. This finding supports other identified themes where risky behaviour has been normalised by the environment which has been studied.

Participant Two (aged 29) further justified his use of steroids when discussing the mental effect of taking steroids. He explained that they gave him a better sense of purpose generally and found his training to be of a better quality. This justification was supported by each of the other four participants who described a heightened energy and motivation to train at a higher intensity. For example, Participant Three (aged 34) said:

*'it just keeps me so alert, so driven, so motivated, but without it I feel tired'*

*(Participant Three, aged 34)*

It appears that many of these secondary effects of steroid use were desirable to each of the interviewees and motivated the interviewees to continue their use. It appears that the side effects had a positive effect on the interviewees self-esteem which created a positive feedback loop.

Despite having experience with using steroids in the past, Participant Four (aged 49) explained that steroids were not actually necessary to achieve the ideal body type, rather that they sped up the process of gaining muscle mass. Participant One (aged 49) supported this view when he discussed his experience of starting to use steroids:

*'I never thought I would originally, but you know, when you're in an environment you know and lads are coming in bigger than you and more toned than you and I thought, I'll see about getting some from somewhere'*

*(Participant One, aged 49)*

PED use seems to be highly influenced by the environment which males find themselves. Steroid use has been normalised in this case, and the health risks associated appear to have been overridden by the preoccupation to achieve their ideal body. This supports Grieve (2007) in which risky behaviour is continued despite knowledge of negative consequences. These findings may be unique to this gym though they offer support for Tod and Lavellee (2009) theory where PED use necessary for those with MD symptoms to increase their self-esteem. These findings also provide further evidence to suggest that adaptation of the MDDI is needed to include engagement in risky behaviour. It appears that each of the five participants had varied justifications and views on steroid use despite using similar cycles and/or substances. The vicious cycle of using these PED's was acknowledged by the interviewees who described the effects experienced whilst on a course of these substances were in themselves addictive, rather the substances themselves being addictive. This leaves a future research opportunity into the motivations of steroid use in those with symptoms of MD.

### **Identity formation**

Another theme identified during the analysis of interview transcripts was Identity Formation. It appeared that the identities of those interviewed had been influenced in some way because of attending the gym or by having a socially desirable physique which they achieved by attending the gym. These results support Festinger (1954) in which individuals make comparisons with those around them to process social information and form their identities. Routine, socialising and stereotypes were common factors discussed by interviewees that appeared to shape their

identities. Whilst identity is not measured by the MDDI or background questionnaire, the perception of appearance appeared to have a direct link upon the identities of the interviewees.

For Participants One and Three, attending the gym was important in the formation of their identities because it impacted upon the way in which they lived their lives. It appeared that they both used attending the gym as a method of therapy for their mental health, more specifically, as rehabilitation from alcohol addiction and Post Traumatic Stress Disorder (PTSD). Both disorders were disclosed within the interviews by the interviewees freewill. The disorders were discussed only in relation to MD symptomology. For Participant One, routine is vital in his life as a whole and felt highly disrespected by others when his routine of attending the gym was interrupted;

*'I find it very annoying to be honest because coming to the gym, other than reading, is the only me time I get' (Participant One, aged 49)*

Participant One (aged 49) discussed experiencing anxiety from this as it meant he would miss sessions in the gym, a commonly experienced feeling of those with high levels of MD. Anxiety from missing workouts is measured by the MDDI and routine disruption is discussed by Grieve (2007) as an indicator of MD symptomology. These results appear to support Grieve's theory (2007) and the application of Festinger's Social learning Theory (1954) by Tod and Lavellee (2009) MD symptom and development model.

However, Participant Three's (aged 34) identity was influenced because of his role in the gym as the owner. This appeared to shape his identity as he discussed feelings of great pressure to

adhere to a stereotype that he believes exists for male gym owners. His appearance is directly influenced because of this perceived pressure which in turn has implications on the formation of his identity and who he was as a person;

*'You come in and I'm a guy that owns the gym, people expect the guy that owns the gym maybe to be big' (Participant Three, aged 34)*

He felt a direct pressure to behave in a certain way regarding his diet, training and steroid use, all as a way of effecting his appearance and adhering to a stereotype. Similarly, Participant Two (aged 29) experienced his large physique as part of his identity, particularly by how other people perceived him based on his appearance;

*'Every shop I go to they call me 'Big Lad'. First conversation anyone ever starts with me is obviously about the gym' (Participant Two, aged 29)*

Maintaining a physique clearly sculpted by exercise shaped the participant's identities because it affected how others perceived them (as discussed as a subtheme in Feelings Towards Body). Participant Two discussed that his size was a way of overcoming his lack of confidence to project his identity and how he wished to be perceived by others;

*'Everything, everything I do is over the top. My tan's over the top, my-my size is sometimes over the top, I just I am not as confident*

*as I do come across. Definitely not but I dunno I just think I do  
overcompensate to be honest with you' (Participant Two, aged 29)*

The way in which each of the participants looked appeared to impact upon their identities by affecting how they felt they should behave, how they were perceived by others and their self-esteem. These findings appear to suggest that there is more to MD related symptoms than a preoccupation with building muscle. The findings suggest that many MD related behaviours may be engaged in as a way of maintaining perceived social status which could provide evidence for a maintenance loop. This supports Tod and Lavellee (2009) model in which operant conditioning is applied to the maintenance of MD symptoms. Here individuals receive praise for looking a certain way which reinforces behaviours consistent with MD.

### **Community**

The interviewees described that interaction with those around them when they exercised served as a distraction from some of the negative thoughts towards their appearance. These findings suggest that having a social element to training at the gym could serve to intercept or reduce some symptoms of MD. Community and belonging are not measured by the MDDI, but the interviews suggest that they are important factors in MD symptomology and should therefore be further examined. The analysis demonstrated that the gym itself a large part of each participant's experience of MD symptoms. They each felt a great deal of trust from those around them as Participant Four (aged 36) demonstrates when discussing the use of steroids;

*'people sort of know what to do and how to take them and how to*

*be pretty much safe with them really' (Participant Four, aged 36)*

This reinforces the engagement in risky behaviours because it is seen as accepted by the community as discussed in the Normalisation of Behaviours theme. This could suggest a link between community influence and the experience of MD symptoms as enhancing aesthetics further than the natural limits is condoned, distorting what is perceived as 'normal'. Social comparison theory (Festinger, 1954) is clearly having an effect on behaviour as suggested by Tod and Lavellee (2009) as this more extreme aesthetic is fuelled by comparisons with those seen as 'normal'.

Participant One (aged 49) discussed the social element involved in attending the gym and how it made him feel accepted into the wider gym community. It appeared that for several of the other participants this was also a large factor in their gym attendance as committing to a training partner kept them in a routine and therefore increased their self-esteem. Participant Two (aged 29) identified that the interaction with the gym community helped improve his mental wellbeing and improved his attitude towards his body;

*'I think that has helped me a lot to be honest with you training  
with someone. Coz I'm not just me in the fuckin' mirror' (Participant Two,  
aged 29)*

There was a strong community spirit felt by all in which support, friendship and motivation was based. Having confidence in the gym community affected the behaviours that each of the participants engaged in ranging from how they structured their workouts to the use of PED's. This demonstrates the importance of the environment in which exercise is undertaken as it clearly effects the behaviours which are engaged in. More research is needed to investigate the relationship between exercise environment and MD symptoms.

### **Gym as a part of life**

As discussed throughout, the gym was a distinct part of each of the interviewees lives regardless of their training experience, age or preferred style of training. They discussed the various positive effects that attending the gym has on them and their lives, and some of the difficulties they face whilst they try to balance their strict training regime and their non-gym life. The role of the gym and training is not entirely explored by the MDDI other than referring to the anxiety that may be caused from missing training sessions or passing up on meeting new people by avoiding social situations. However, the interviewees highlighted the importance that the training environment plays on their behaviour and thought processes towards their bodies.

#### **Positive effects of gym attendance**

Mental and physical benefits were outlined by each of the participants. It appears that whilst each of the interviewees appeared to have experienced some negative outcomes from gym attendance, namely enhanced MD symptoms, they each had positive effects too, though these were not directly related to their appearance. For example, Participant Four (aged 36) discussed attending the gym mainly in its relation to improving health and aiding his weight loss. He

expressed experiencing a boost in self-esteem from training in addition to the health benefits from losing eight stone;

*'you feel strong; you have the buzz obviously you feel better about yourself'*

*(Participant Four, aged 36)*

Whilst many of the other themes that emerged focus on the potential negative effects that an environment can have; this finding shows that there should be some attention directed to the positive outcomes that can occur. The improvement of self-esteem observed in the interviews supports Greenway and Price (2018) and the theoretical framework of Lantz, Rhea and Mayhew (2004). The social comparisons discussed in the existing literature by Tod and Lavellee (2009) may increase some positive behaviours too if the individual feels that their appearance is socially acceptable. For example, Participant Five (aged 49) discussed the positive effects which training at a gym had on his confidence and disclosed that attending the gym was the best thing he could've done for himself. For Participant Three (aged 34), the positive effect he experiences from attending the gym routinely was his mental health. As previously discussed in Identity Formation, training at the gym aided his PTSD therapy;

*'I train as part of my medication' (Participant Three, aged 34)*

These findings indicate that there are opportunities for positive outcomes that can be gained from attending the gym however, much of the existing literature appears to focus on the potential

negative outcomes. As discussed as part of Identity Formation, Participants One and Three used training in the gym as a method of stabilising their mental health. However, it appears that their exercise routines were not enough to combat the negative feelings towards their bodies. This provides evidence for Tod and Lavellee (2009) model of maintenance as individuals experience temporary relief from negative MD symptoms and increased self-esteem levels, starting a feedback loop. The qualitative findings suggest that the positive outcomes from attending the gym should also be assessed to give a more balanced view of the individual's experience of MD symptoms.

#### Relationship between Gym life and Non-gym life

Each of the participants discussed some of the struggles they face as result of attending the gym obsessively or because of their obsessive behaviours relating to MD symptoms, such as steroid use and strict dieting. These varied struggles arose when finding a balance between attending the gym and maintaining other aspects of their lives, such as attending social events. The MDDI concerns the anxiety caused by missing training sessions and the extent to which their social lives may be affected from attending the gym. Quantitatively, most participants agreed they feel anxious when they miss one or more workout days and disagreed that they pass up on social activities due to their workout regimes. However, the qualitative results appear to suggest that each of the interviewees social lives, family lives and work lives were affected by their workout routines suggesting functional impairment which is measured by the MDDI. For example, Participant One (aged 49) disclosed:

*'if we have visitors you know 'don't come on a Monday coz I'll*

*be at the gym' (Participant One, aged 49)*

This demonstrates a clear dysfunction in socialising, an element shown to be highly indicative of MD. It also shows the obsessive nature of gym attendance and inflexibility of routine for this participant supporting the literature exploring the obsessive nature of the disorder. Participant Two discussed the impact that his training routine has on his social life by purposefully avoiding social situations so that his routine is uncompromised;

*'All the time! I ducked one on Saturday, I coulda gone out Saturday, 17 lads,  
all night paid for, absolutely mint night and at the very last minute I thought*

*'Pft, I'd rather go gym in the fuckin' mornin'' (Participant Two, aged 29)*

Participant Three (aged 34) demonstrated a clear impact on his communication, relationships and energy at work due to his excessive training regime and steroid use providing further support that MD symptoms can lead to social impairment and work life dysfunction as the DSM-5 criteria outlines;

*'I couldn't be arsed working, didn't wanna be with my girlfriend didn't-  
like I speak to my mum every day and I know this sounds ridiculous but*

*I didn't ring my mum for about 5 weeks and that doesn't happen'*

*(Participant Three, aged 34)*

Furthermore, Participant Two (aged 29) showed that the life of his family is also dictated by his training regime:

*'my kids lives revolve around me going to the gym I come home from work and I go to the gym, what time we all have tea revolves around me going to the gym' (Participant Two, aged 29)*

Participant One (aged 49) explicitly discussed his anxiety from missing training sessions;

*'I do feel a little bit anxious, because it's messing my routine up'*  
*(Participant One, aged 49)*

Based on these findings, it seems plausible to suggest that gym going males struggle to balance their gym and non-gym lives. Changes to routine result in negative effects in relation to their family lives or their mental health from missing workouts.

### **Behaviour changes**

For some, attending the gym had always been a part of their lives, for others it had not.

Irrespective of when they interviewees started training, consistencies in their behaviour were found relating to their eating behaviours, training behaviours and food buying behaviours once attending the gym was part of their routine. The interview results appear to support the

significant quantitative finding that behavioural changes become more extreme with training experience.

#### Behaviour after joining a gym

There were clear changes to each of the interviewee's behaviour following becoming a member of a gym regardless of when this happened in their lives. The MDDI does not directly explore changes to MD sufferers' behaviour but there is a clear result of the disorder. Participant Fours (aged 36) behaviour dramatically changed following joining he gym as he was motivated to workout due to health risks identified by his doctor. Having limited training experience, it appeared that noticing a difference in his health intensified these changes in his behaviour;

*'I was out of breath after a couple of minutes and physically pathetic...  
now I'm training for the marathon, so it's changed quite a bit' (Participant  
Four, aged 36)*

Changes to participants' eating behaviours were seen in all interviewee's accounts and as Participant Three (aged 34) discussed, these changes occurred as a result of going to the gym. Participant Three explained that he went from not needing to think about his nutrition and energy expenditure whilst in the army, to needing to consider his style of training and diet in order to maintain his physique;

*'I never used to cook I never used to plan my meals and I left the*

*Army so I stopped doing fitness, stop doing fitness you're gunna get fat.*

*Errm, when I was in the Army I was always in good shape you didn't really*

*realise why because I still ate shit but if you're having to do two runs a*

*day because you're that's what you have to do you're going to always*

*keep that body fat off' (Participant Three, aged 34)*

Furthermore, Participant One (aged 49) addressed changes to his buying habits relating to food and clothes after being more body conscious since joining the gym;

*'I no longer eat, what I define as shit; ready meals, umm, chippy,*

*full breakfasts, all them have gone out the window' (Participant One, aged 49)*

Participant Two, who as discussed under 'Steroids', engaged in regular steroid use and detailed that after joining the gym and establishing a strict training regime, his views on steroids changed impacting upon his behaviour;

*'I used to be proper against them' (Participant Two, aged 29)*

The qualitative results indicate that changes to body image resulted in changes to interviewees behaviour. Functional impairment is measured by the MDDI however, this does not account for changes that are experienced because of the development of MD symptoms. As discussed by

Tod, Edwards and Cranswick (2016) a limitation of current research is that specialised samples who may functionally display characteristics of MD have been used. For example, bodybuilders display signs of MD with regards to their eating and training behaviours without necessarily having the disorder. Therefore it may be worthwhile in future research to explore the changes that occur to individuals behaviour once exercise is introduced.

### Obsessive behaviours

The anxiety experienced by interviewees surrounding missing a workout or having their routine disrupted appeared to be consistent and provides support for Grieve (2007) model of MD symptoms. For example, exercise routine was discussed by Participants One and Five in relation to times of the week they trained, times of the day, length of training sessions and session content;

*'I always come to the gym on a Monday, a Thursday and a Saturday'*

*(Participant One, aged 49)*

*'I always do the same, for probably the last few years. I come in, and*

*I do 4 exercises, 4 sets of 10' (Participant Five, aged 49)*

For Participant Two (aged 29), gym attendance had become viewed as a compulsory part of life;

*'it's not even an option to my head not to go to the gym' (Participant*

*Two, aged 29)*

Furthermore, Participant Five (aged 49) who had attended the gym for over twenty years explained that attending the gym was ingrained into his routine claiming;

*'it's a big part of my life coming to the gym yeah. I can't see a point now where I'd never not be a member of a gym, where I'd not come and do what I do' (Participant Five, aged 49)*

These accounts indicate a clear display of behaviours which arise and become an obsession for the gym goers. The dispute outlined by Tod, Edwards and Cranswick (2016) details the confusion surrounding the classification of MD as an obsessive disorder, the DSM5 finally classifying MD under obsessive compulsive disorders. This classification indicates the obsessive nature of the disorder which these findings appear to support. Despite none of the interviewees having a clinical diagnosis of MD, these results and the existing literature appear to suggest that adapting the MDDI to involve the levels of obsessiveness may be valuable.

### **External influences**

There were clear external influences affecting the behaviour and thought processes of each of the interviewees. These influences affected how the interviewees felt towards their bodies and therefore impacted on the behaviour in which they engaged. The MDDI explores how respondents expect other people to judge them with components relating to anxiety when few

clothes are worn and to what extent lose clothing is worn to hide their bodies. Most participants disagreed with both these components of the MDDI. The qualitative findings suggest that external influences play a significant role in the development of MD symptoms.

Behaviours such as steroid taking were reinforced by the interviewee's environments whereas other, such as cardiovascular exercise, were discouraged because of their impact on an individual's physique. These findings support the main characteristics of MD outlined by Grieve (2007) such as engaging in excessive weightlifting and consumption of mass gaining supplements due to the preoccupation to increase muscle mass. Furthermore, these findings support the significant role that the exercise environment plays in the development and maintenance of MD symptoms as suggested by Tod and Lavellee (2009). For example, Participant Two claimed;

*'everyone, even the lads who aren't that big- everyone is just on steds'*

*Participant Two (aged 29)*

This appears to support the view that MD symptoms are present in those who are on their way to improving their physiques regardless of their current body type as discussed by Grieve (2007) in which all body types strive to become more mesomorphic. This may be as a result of making social comparisons in the gym environment where there are many muscular males which further supports Tod and Lavellee's (2009) model of development and maintenance. The interviewees discussed the effect of those around them on their training behaviour for example, Participants One and Four discussed the effect of having a personal trainer on their training behaviour;

*'I think a personal trainer just throws you around and pushes you a lot harder than you push yourself' (Participant One, aged 49)*

This external influence has a direct impact upon the individual's behaviour and may shape their future behaviour. Participant Five (aged 49) explained that his social group encouraged him attend the gym and how the same group then became a reason to maintain his attendance;

*'they encouraged me to go' (Participant Five, aged 49)*

All behaviours influenced by external factors were motivated by changing appearance in some way. It appeared that comments made by those who were not necessarily involved in the gym community, further reinforced the societal norm of low body fat and increased muscle mass in males as Participants One and Four discussed;

*'you might get a nice comment and even just working with the lads and they call you 'Big Nige' (Participant One, aged 49)*

*'the woman was looking at me then she said, 'Have you lost some weight?'*  
*I was like shocked by it because it's just a woman in the petrol station*  
*but yeah, a lot of people do notice' (Participant Four, aged 36)*

These results suggest that more research is needed to look at the effect of external influences and not just social comparisons made with others.

### **Training**

Despite several obsessive behaviours being identified throughout the interviewee's accounts, it appeared that the types of training they engaged in did not follow such a strict pattern as might be expected. It came to light that the interviewees were often reluctant to engage in the behaviour that would effectively help them to achieve their goal of lower body fat as cardiovascular exercise was not promoted in the environment in which they trained. Participant One (aged 49) discussed that he would like to lose body fat around his stomach and identified that cardiovascular exercise would be the most efficient way of achieving this, yet he reported his reluctance to engage in this behaviour preferring muscle building behaviour only;

*'I'm a bit lazy, I'll be honest I'm a bit lazy on the cardio... I'm working on other parts of my body it's like, it takes precedence over what would achieve my flat stomach' (Participant One, aged 49)*

This appears to support Grieve (2007) theory of muscle building preoccupation. Participant Three (age 34) discussed the changes in trends in the fitness industry and its influence on his style of training which reemphasises the effect of external influences on behaviours;

*'at the moment I'm not that interested in being much bigger*

*than I am err, I would just like to be more aesthetically pleasing...  
the fitness industry seems to be changing. It's not about being the  
strongest guy anymore, it's about looking good, not looking like  
you're taking juice... the training is more about how I look, rather  
than, I would say rather than about health and fitness, it's more  
about how I look' (Participant Three, aged 34, gym owner)*

Furthermore, Participant Three (aged 34) discussed his lack of a strict training routine as a means to combat boredom. He actively varied his training so that he would continue to enjoy attending the gym and training, key factors in his livelihood;

*'My training pattern? Erratic. Like, pfft, I won't actually plan it'*

*(Participant Three, aged 34)*

However, this appears to contradict some of the findings relating to the general obsessive nature of MD sufferers. It suggests that the content of a training session for some sufferers is not a crucial component to their mental well-being, it is rather the frequency of sessions that is of importance. This further contradicts the quantitative findings which found that training frequency was not significant regarding MDDI score. Participants One and Five shared particularly contradictory views to Participant Three when discussing the content of their training sessions;

*'I do the same set of exercises all the time' (Participant One, aged 49)*

*'I always do the same, for probably the last few years. I come in, and I do 4 exercises, 4 sets of 10, so I might- on a Monday I might do my back, on a Tuesday I might do my chest, might do my legs on a Wednesday, might do my shoulders on Thursday do my biceps and triceps on Friday'*

*(Participant Five, aged 49)*

The findings highlight the individualistic nature of the experience of MD symptomology and suggest that more research is needed into the experience of MD symptom development.

## Discussion

The results of this study offer mixed support for the existing literature surrounding MD symptomology. Significant results were found for three of the eight variables in the quantitative section of the study; Age significantly affected DFS ( $p= 0.01$ ), Length of Training Experience had a significant effect on DFS ( $p= 0.04$ ) and AI ( $p= 0.01$ ) and Experience of Dieting had a significant effect on FI ( $p= 0.01$ ). These results suggest many of the prevalent symptoms described by Grieve (2007) and the DSM-5 such as strict dieting and consistent regimented training interact to cause functional impairment, a preoccupation with muscle building and perceived flaws of their bodies. These findings suggest that future research is needed to establish the direct effect that these variables have on not only the development of MD symptoms, but also on the maintenance of them. Expansion of Tod and Lavellee (2009) and Lantz, Rhea and Mayhew (2001) models of MD development and maintenance would help in establishing these relationships more clearly.

The qualitative results provide support for a maintenance loop as outlined by Tod and Lavellee (2009) in which social comparison theory (Festinger, 1954) is applied to the processing of social information and negative appraisals of self. The interview data showed that the individuals made comparisons with those around them against their internalised body ideals which they then compared with their current shape. Behaviours such as dieting, missing social events and having a preoccupation with muscle building were evident throughout, providing support for the quantitative results and existing literature such as Lamanna et al (2010), Kuennen and Waldron (2007) and Grieve (2007). The results also support Olivardias (2001) Biopsychosocial model as they highlight the importance of the exercise environment on the development of MD symptoms.

The results emphasise the need for future qualitative research in the field of MD symptomology as using the MDDI alone could not detect the potential for a symptom maintenance model where the interviews could. The results provide a starting point for future research with this finding.

### Quantitative Discussion

Variables in the first section of the questionnaire were analysed in their relation to the effect on the three MDDI subscales; FI, AI and DFS. Age significantly affected DFS ( $p= 0.01$ ), Length of Training Experience had a significant effect on DFS ( $p= 0.04$ ) and AI ( $p= 0.01$ ) and Experience of Dieting had a significant effect on FI ( $p= 0.01$ ).

A significant effect was found between Age and DFS ( $p= 0.01$ ) with post-hoc comparisons identifying a direct link between those aged 41-46 with those aged 16-21 and 22-27. These findings suggest that MD symptoms, such as muscle building behaviours and supplementation, are experienced differently in those who are in the younger age bracket and those who are in the middle-aged group, though the direction of the effect is unclear. The differences in behaviour between these groups may be explained by the differences they place upon achieving a larger frame. The power of the one-way ANOVA was 40% due to the sample size; therefore, the results must be treated with caution. Few studies have looked at MD symptoms across a range of age groups, though Rozin and Fallon (1988) compared age groups' MD symptomology. Their findings suggested a significant decrease in MD symptomology as age increases. Both sets of results suggest a need for more studies to be conducted exploring the direct effect of age on MD symptoms. Previous research has relied heavily upon college aged

male samples (Tod, Edwards and Cranswick, 2016) adding to the need of more varied ages of samples to be studied in relation to MD symptomology.

Post hoc comparisons for the effect of Length of Training Experience identified an interaction between three and five years of training experience with those who had trained for over ten years DFS and AI. However, the results do not show the direction of the effect. The power of the one-way ANOVA was 40% due to the sample size; therefore, the results must be treated with caution, but they provide the starting point for future research using a larger sample. Emphasising the health benefits that exercise provides, such as reducing the risk of diabetes and high blood pressure, from the start of an individual's training experience may avoid the development or reduce the intensity of MD symptoms. This could equip individuals with the knowledge to attain functional thought processes towards their bodies and exercise.

The study found Experience of Dieting to be significant with FI. The power of the t-test was 90% meaning that the sample size was large enough to detect a true result. They suggest that experience with dieting supports the previous literature discussing the strict eating patterns of those with MD such as Hildebrandt, Schlundt, Langenbucher, & Chung (2006). Furthermore, excessive dieting has been found to be correlated with the drive for muscularity (Edwards, Tod, Morrison & Molnar, 2012) though dieting itself does not necessarily indicate MD symptoms. According to Tod and Lavellee (2009) previous research has utilised specialised samples, such as body builders, who may functionally show signs of MD when only dieting behaviour is explored or measured. The results of this study show that dieting behaviours significantly effect the everyday lives of the participants in terms of their social and workplace functioning. It is not clear which direction the effect is in, but it is appropriate to assume a positive correlation. Further research is needed to establish this effect, perhaps with concern to FI.

The lack of significant results for frequency of training contradicts existing literature, such as Grieve (2007), where excessive training is characteristic of MD. It is surprising that those who train every day are statistically no different to those who train once a month in relation to their MDDI or subscale scores. Due to the definition, the preoccupation with muscularity and leanness (Pope et al., 1997) lends itself to obsessive, frequent muscle building training.

It is unsurprising that experience with bodybuilding did not show a significant effect on MDDI subscales due to the functional presence of many MD characteristics such as strict dieting, social impairment, frequent body checking and supplementation. Many of these behaviours are demonstrated in a functional way, not as the result of a MD. However, much of the existing literature bases their findings on bodybuilding samples (Tod and Lavellee, 2009) which suggests that existing literature is not generalisable to non-bodybuilding populations. It may also suggest that using non-specialised samples may reflect MD more accurately.

It is also unsurprising that the number of training types used was insignificant to MDDI subscales considering that the definition given by the DSM-5 involves those with MD to engage in muscle building behaviours. This could partially explain the insignificant finding as those who engage in multiple methods of training may not be preoccupied with muscularity and leanness (Pope et al., 1997). This could also help to explain why no significant effect was found for training out of the gym environment as those who display signs of MD will be more invested in spending time in the gym so they can build muscle.

No significant effect was found for primary motivation to exercise. This result is surprising given that a key indicator of MD is the preoccupation with muscularity (Grieve,

2007). It would therefore be logical to assume that individuals displaying MD characteristics would be primarily motivated to exercise to increase their muscularity.

Overall, the quantitative results provide the starting point for future research due to their mixed support for variables often associated with symptoms of MD by previous research.

### Qualitative Discussion

The interview data generally supported the quantitative findings in terms of factors discussed by interviewees such as dieting and training experience with the experience of MD symptomology such as missing social events and being preoccupied with muscularity. The findings also highlight the need for more factors to be measured when exploring MD such as steroid and supplement use. Support for key development and maintenance models were also found, such as the role of social learning theory as described by Tod and Lavellee (2009) and Lantz, Rhea and Mayhew (2001) in regards to low self-esteem and body dissatisfaction appearing to be precursors to MD symptoms.

Each of the interviewees discussed positive and negative attitudes towards their bodies and as outlined by Grieve (2007), interviewees discussed these feelings in terms of their whole body. Where interviewees discussed negative feelings towards their body, there appeared to be a focus on mass and weight as opposed to a direct desire to increase muscle mass. This contradicts the diagnostic criteria given by Pope et al., (1997) and the DSM-5 that individuals will have a preoccupation with increasing muscularity. However, analysis of the interview transcripts revealed a frequent fixation placed upon increasing overall mass measured by tracking their

weight rather than using body composition analysis to display increase of muscle and fat percentage.

Despite the negative feelings towards their bodies, the interviews also brought to light that the participants experienced feelings of positivity. Whilst measures of MD are designed only to measure symptoms of the disorder, the results of studies using these measures may be misleading. A participant who scores highly on the MDDI may be expected to have very low body satisfaction and show extreme MD symptoms, though the interview data appears that even these extreme cases, such as Participant Five, also experience positivity towards their appearance. This strengthens the need for more qualitative and mixed methods research to be done in the field of MD as quantitative research can restrict the data that is collected. Allowing explanation for MDDI scores offers a deeper insight into the experiences of MD symptoms and is therefore valuable for future research.

It also became apparent that many of the negative feelings participants experienced lead to extreme behaviours that were normalised, such as obsessive training routines and strict dieting. It is challenging to discuss these findings in relation to the MDDI as no component is designed to measure the 'normalisation' of symptoms. For example, no component of the MDDI relates to dieting behaviours, yet each of the participants discussed in detail the extreme changes they have made, restrictions they apply to themselves and the obsessive nature in which they think about food. Dieting behaviour is also a common feature of much of the existing literature, such as Lamanna et al., (2010), since many models of development are based on those of eating disorders (Grieve, 2007). It seems appropriate to suggest, based on these result consistencies, that future research must acknowledge the importance of exploring dieting behaviour and perhaps lead to the development of a new MD measure.

Furthermore, it appeared that many of the behavioural normalisations that were made were done so as a result of upwards comparisons made in their workout environment. Social comparisons are not measured by the MDDI but appeared to be of great importance in the development of MD symptoms in each of the interviewees accounts. Whilst the interviews were conducted on only a small number of individuals, each of the participants discussed in detail the process of comparing their physiques to those around them. For example, Participant One, Three and Five, all with different levels of training experience, physiques and motivations, consistently compared themselves to others at the gym. This appeared to directly influence the way they felt towards their bodies and subsequently effected the behaviours they engaged in. These findings suggest upwards comparisons play a huge role in the level of body satisfaction experienced by individuals. This supports existing literature, such as Lantz, Rhea and Mayhew (2001) as lower body dissatisfaction appears to be a precursor to MD symptoms, such as strict exercise routines and engagement in muscle building behaviour.

The results also indicate that the environment in which individuals make these social comparisons is crucial to the development of MD symptoms. This finding supports Fitzsimmons-Craft et al., (2015) where social comparisons are relevant to the individual and their environment and appear perpetuated when surrounded by individuals who also frequently engage in body checking behaviours. In further support, the interviews revealed that these social comparisons increase body dissatisfaction. This also supports Lantz, Rhea and Mayhew (2001) developmental model of MD symptoms in which low body satisfaction is a precursor for MD symptoms. They also suggest the role of a maintenance feedback loop where negative appraisals are made resulting in a change in behaviour. It appears that body checking alone is not enough for MD

symptoms to occur, body dissatisfaction is heightened when other behaviours are compared too, such as training and dieting behaviours as outlined by Fitzsimmons-Craft et al., (2015).

The physiques and behaviours associated with the development and maintenance of these physiques appeared to impact upon each of the interviewee's identities. Their perceived role in the gym community influenced the behaviour which they thought they ought to carry out and how they felt about themselves. Attending the gym was a major part of each of their lives and therefore part of their identity. It appeared that MD symptoms could develop and become accepted as part of individuals' identity, which could explain the frequent normalisation of many MD symptoms as discussed. The effect of MD symptoms on interviewees identities appeared to interact with social media prompting the need for future research. Participant Three discussed how he used social media to reinforce his physical prowess to others and maintain his perceived role in the community. It seems that there is a clear need for more research to explore the dynamics between how individuals expect others to perceive their bodies and the resulting behaviours.

Attending the gym and working out was discussed as integral part of each of the interviewees lives which was also a source of anxiety at times. This was particularly apparent if a scheduled session was missed, this supports the quantitative findings which suggested that most participants agreed that skipping a workout would be a cause of anxiety. The expectation of this anxiety also meant that many of the participants purposefully avoided social situations so that their workout schedule and strict dieting was not interrupted. The interviewees discussed at length the struggled they often faced as result of balancing their gym related and non-gym related lives, such as that of missing out on social events. This further supports the literature

which discusses the social and occupational dysfunction that is experienced by those suffering with MD (Tod, Edwards and Cranswick, 2016).

The feelings which each of the interviewees expressed about their bodies appeared to be heavily influenced by the opinions of those physically around them, irrespective of their involvement within the gym community. External influence is another factor not explicitly explored by the MDDI, however, components such as 'I am shy about letting others see me without my top' do in part explore this factor. The quantitative results suggest that participants mainly disagreed with this statement though, the qualitative findings contradict this. They suggest that there is an element of paranoia experienced by individuals with MD upon which they expect others to make negative judgements about their bodies. These individuals therefore change their behaviour accordingly to avoid negative opinions being formed by others around them. Furthermore, components of the MDDI which could be related to avoiding negative judgements being made by others such as 'I wear loose clothing to hide my body' were discussed during interviews. Participant One explained that he chose to wear tighter fitting clothing as a way of showing others he filled his clothes due to his muscular physique. This further demonstrates the MDDI must be revised and that there is a need for more qualitative research to be conducted.

The effect of other opinions in promoting faulty thought processes appeared to be controlled for in some cases because of a sense of belonging in the gym community. This further supports the findings of this study which appear to suggest that the environment affects MD symptoms. The confidence with which the interviewees experienced their bodies seemed to be affected as they felt the community accepted their perceived flaws. For example, during the interview's participants explained that visiting a new gym would induce a significant level of

anxiety because they felt they would be judged. It also appeared that the role of the community partly explained why MD symptoms are often normalised because many of the obsessive behaviours are accepted by the community. This factor is also missed by the MDDI and much of the previous literature.

The presence of a training partner further appeared to affect MD symptoms which expands the notion that the community significantly affects MD symptomology. Training partners were discussed in relation to their effect on training intensity and how they served as a distraction from the constant mirror checking when they trained alone. However, they also served to reinforce some of the extreme behaviours often engaged in, such as excessive substance use, and obsessive training regimes. This provides another lead for further studies to explore the effect of training partners.

Another factor which the MDDI fails to explore was the use of APED's. Their use was a consistent feature of the interview data with all five participants having experience of using them. Although this is a small sample, the consistent use amongst these varied individuals suggests that there is a relationship between MD and substance use. Their use was justified by Participant's Two and Three not only in relation to their promotion of muscle gain but also because of their aid in adhering to a stereotype, their effect on energy levels and therefore daily social and occupational functioning, supporting the previous literature (Tod, Edwards and Cranswick, 2016). APED use is discussed at length in the literature, yet previous studies have found no difference in levels of MD in those who use APED's, such as steroids, and those who do not (Baghurst and Lirgg, 2009). Whilst the use of the substances does not appear to have a causal effect on MD, their use appears to be a frequent consequence of MD. This demonstrates another clear example of the role of the exercise community upon normalising risky behaviours.

There appears to be a clear need for a measure of MD to measure APED use and potentially an individual's dependence upon them as the results and the existing literature suggest their integral role in MD experiences. The findings also support the previous literature in which risky behaviours are engaged in order to reach the ideal physique.

Although many of the seemingly obsessive behaviours demonstrated by individuals with high levels of MD appear to be negative, the interviewees also discussed some of the behaviours with positive regard. It appeared that many of them saw their very strict routine as a positive aspect of their life which helped them in the rest of their lives. Again, the perceived positive effects of MD related behaviours are not measured by the MDDI. Though, perceiving some of the symptoms as positive may be characteristic of an individual with high levels of the disorder. For example, Participants One and Three explained their strict routine and perceived control over their lives had helped them deal with their mental health issues. These findings offer support for the previous literature which discusses the predisposition of MD in those who have had previous experience of mental health disorders such as depression (Walker, Anderson and Hildebrandt, 2009).

Surprisingly, from the interview data it became apparent that the content of each training session was not something which participants found must follow a strict routine. For example, the training often demonstrated by body builders involves a split routine by which an individual train a body part at a point each week. Each interviewee discussed the strictness of their routine in terms of training at certain times on certain days of the week but, discussed that the content of each session was not necessarily as strict. The only factor which seemed to be of importance with regards to training was the prioritisation of building muscle. This meant that other types of training, such as cardiovascular exercise, were not performed despite the acknowledgement that

they would be beneficial in achieving their ideal body by lowering body fat percentage. This further supports that more research, regarding the type of training which is engaged in, is required.

### Limitations of using the MDDI

As discussed throughout the Qualitative Discussion chapter, the MDDI fails to explore many of the factors that appeared to be of significance to the interviewees and the development of their MD symptoms. Whilst it could be argued that a different sample of interviewees may have produced different findings, the appearance of consistent influencing factors, such as dieting behaviours and steroid use, suggest that the lack of components relating to these factors should be revised. Their inclusion is supported by the large body of literature surrounding these factors and MD.

As discussed throughout the literature, the MDDI is limited in its application to diagnosing MD but can be used as a measure of symptoms. Despite its function to measure the amplitude of MD symptoms, no boundaries to demonstrate low, moderate and high levels of symptomology appear to have been established. The contribution to the existing literature is therefore limited because the prevalence rate cannot be established. Furthermore, the exploration of related disorders such as the drive for muscularity and the drive for leanness, appear to be the focus of the most recent literature regarding male body image. However, there are clear points surrounding MD identified by this research which suggest more research is needed.

The exclusion of these scales in this study was due to the time constraints of the project, however, this provides an opportunity to expand upon the current study.

### Limitations of current study

Despite the apparent valuable findings of this research, there are several ways in which the current study may have been improved. Firstly, the small sample size means that the results may not be generalisable to the wider population of male gym goers. The time scale available, alongside the researcher experience, should be considered however, as a larger scale study may have been unrealistic to conduct to a high standard. Furthermore, whilst mixed methods research can be valuable in gaining well rounded results, it does mean that the researchers time is split between both methods of research. As a result, neither set of data is perhaps as detailed as it could be if it were the sole focus of the research study. This has effects on the existing time restraints of conducted a study at master's level too. Researching a smaller sample does also have its strengths despite not producing generalisable findings as insights that can be used to help the members of the specific community that is involved are produced. In this case, the gym must endeavour to promote the health benefits gained from exercise and normalise these behaviours rather than the risky behaviours which are currently normalised.

Furthermore, the sample may have been vulnerable to several bias'. Firstly, due to the location of the gym which may have affected the potential participants' demographics, such as age and social expectations of masculinity. With, many of the participants being aged between 22 and 27 years old, with most previous studies being conducted on younger, college aged males between, 18 and 21 years of age. Furthermore, the reputation of the gym in question appeared to be built upon a stereotype that it was frequented by males who abused performance enhancing substances and engaged specifically in body building training. Upon inspection, this this appeared to be representative of the area's other small, independent gyms.

In addition, the sample was self-selected, by which participants volunteered themselves. This could mean that a percentage of the potential participants did not come forward to take part in the research although they may have added a great deal of value to the findings. This bias is therefore extended to the interviewee selection process despite every effort being made to include a cross section of the sample. However, this selection was not empirical and was based upon the researchers' beliefs on which participants would best contribute to the research in terms of their sample representation and account detail. It could also be argued that the sample is unrepresentative of the general population because it was all male. However, this was a conscious decision made by the researcher because of its direct comparison to much of the existing literature. This also highlights the need for more research into MD related symptoms in females.

Furthermore, a clear ethical issue is the researcher being a dominant member of the gym community itself. This may have produced demand characteristics from the sample because the motives of the study were known in greater detail than what may have been the case with a different sample unfamiliar to the researcher. The researcher may therefore have been at risk at bias in the interpretation of the results too. The interviews may also have been affected because of this and therefore the entirety of the qualitative data and analysis. However, the emersion of the researcher into the participants' lives for over five years bears a resemblance to ethnographical studies. It may be that in fact, that the potential demand characteristics displayed by participants were over ridden because of this familiarity.

The design of the recruitment posters must also be considered when looking at potential sources of bias in the sample. The images used may have suggested to the participants that the

way that they feel towards their bodied may not necessarily be the way that they appear and may have encouraged participants to feel uncertain about their body image.

The researcher identified a flaw in the background questionnaire upon analysis of the results. This related to the options for reporting age, as the option to respond for '40 years' was absent. In addition, the results of the background questionnaire were found to need recoding. Responses to questions relating to participants' work out motivation and the number of types of the training engaged in had not been made exclusive to one response when inputting the questionnaire into Google Drive. Therefore, responses could not be analysed in SPSS because multiple cells contained more than one value.

There are also limitations to using the MDDI, many of which have been discussed throughout this paper. For example, the qualitative findings suggested that many symptoms which are experienced by these males with body image are not explored by the MDDI, such as drug use and the positive outcomes gained through body image awareness. However, as discussed using just one scale which has been found to be validated was the most suitable method of collecting quantitative data in a mixed methods piece of research.

## **Conclusion**

### **Aims**

The study aimed to explore MD related symptoms in gym going males using mixed methods. The research was exploratory in nature and identifies areas in need of further research. The significance of just two of the eight variables in this study suggests a discrepancy between variables frequently found by other research to effect MD symptoms, such as training frequency (Tod, Hall & Edwards, 2012). Post hoc power analysis showed that the t-tests achieved power of 90%. Age was found to have a significant effect on DFS and Experience with dieting was found to significantly affect FI. Both findings suggest a potential effect on a variety of MD symptoms by different variables prompting further research.

The qualitative results suggest a need to look more closely at the symptom maintenance loops outlined by Tod and Lavellee (2009) and Rhea, Lantz and Mayhew (2001). Analysis of the interview transcripts provided support for the presence of feedback maintenance loops whereby negative appraisals of self occur leading to increasingly extreme behaviour in order to increase self-esteem and improve perceived physical flaws. These behaviours are maintained and intensified as individuals show perfectionist traits by which their goals are unachievable. The results also identify the role of social comparisons upon these maintenance loops with interviewees discussing the appearance of those around them impacting upon their self-esteem and subsequent muscle building behaviours. However, the interaction between constructs such as self-esteem, perfectionism, appearance intolerance and body checking behaviours remains unclear and provides a starting point for future research. These findings highlight the need for qualitative research in the field of models of MD symptom development and maintenance.

## **Limitations**

General limitations of the study include time frame and sample size though this could be said of much of exploratory research. Post hoc power analysis shows that for 90% power a one-way ANOVA with five sub-groups requires a sample size of 255. However, using a sample of 100 achieved power of 47%, meaning that 53% of the time existing differences were not found. With the time restraints of a post graduate master's degree, both quantitative and qualitative samples were not as large they ideally would have been given more time. Using a small sample for interviews runs a potential for additional codes to have been missed as more interviewees may have given increased breadth of experience.

Another limitation of the study involves the use of the MDDI. Whilst the MDDI is one of the commonly used measures of MD symptoms in existing MD research (Sandgren & Lavellee, 2018) it is purely a measure of symptoms and cannot be used to make a diagnosis of the disorder or to infer the level of severity and risk the symptoms pose on individuals due to the lack of cut off scores. It is therefore at practitioner's discretion to make a diagnosis. Using the MDDI makes it challenging to give meaning to the results in terms of identifying individuals who may need professional help. Another criticism of using the MDDI is that many of the behaviours associated with the disorder are not measured, for example, steroid use or supplementation as discussed by Rhea, Lantz and Cornelius (2004) and the interviewees of this study.

## **Future Research**

The study prompts the need for future research into the design of a model of MD symptom development, sustainment and social comparison. There is a clear need for more qualitative research in the field to establish how these constructs interact. Effective therapeutic methods

could be designed as a way of reducing MD symptoms or by providing coping strategies. However, without details of a model which incorporates these factors and their interactions, it limits the efficacy of existing therapy or help systems can have for those with high levels of MD symptoms. Replication of the study with the addition of a timeline during the interview stage may be beneficial in establishing the development of symptoms and the way in which these symptoms are maintained and intensified.

There is also a need to address the limited sample types used in MD research, such as by using female participants who are also general gym goers rather than comparison studies between female bodybuilders and female gym goers as Hale et al., (2013) and Goldfield (2009) have completed. A comparison between the development, maintenance and experience of MD symptoms would provide further insight into the disorder and its generalisability.

### **Practitioner Recommendations**

Furthermore, gyms, other exercise facilities and medical professionals, have a responsibility to protect individuals from MD symptom development. The results of this study identify that those aged 41-46 who have experience with dieting are most at risk of developing MD symptoms. These individuals will show signs of a high drive for size and functional impairment. It may be beneficial for these individuals to be directed towards information regarding their wellbeing in relation to their feelings towards their bodies. Another example may be at needle exchange services where individuals who show clear of APED use should be encouraged to reflect upon their behaviour and be given information as to how these substances are harmful. Organisations should also be made aware of the potential maintenance loops identified by the results of this study and as suggested by theoretical models such as Tod and Lavellee (2009) and Lantz, Rhea and Mayhew (2001). These maintenance loops intensify the symptoms associated

with MD. Therefore, an understanding of these mechanisms is essential for practitioners when working with those individuals at risk further highlighting the need for future research into the variables associated with MD symptoms. It should be acknowledged that not only are many individuals with high levels of MD symptoms aware of the negative effects on their bodies their behaviour has, they will still engage in the risky behaviours as discussed by Pope et al. (1997) and Grieve (2007).

## References

- Adams, G., Turner, H., & Bucks, R. (2005). The experience of body dissatisfaction in men. *Body Image, 2*, 271-283. doi: 10.1016/j.bodyim.2005.05.004
- Alexander, S. M. (2003). Stylish hard bodies: Branded masculinity in Men's Health magazine. *Sociological Perspectives, 46*, 535–554.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Publishing.
- Baghurst, T., & Lirgg, C. (2009). Characteristics of muscle dysmorphia in male football, weight training, and competitive natural and non-natural bodybuilding samples. *Body Image, 6*, 221-227. doi: 10.1016/j.bodyim.2009.03.002
- Baird, A.L., & Grieve, F.G. (2006). Exposure to male models in advertisements leads to a decrease in men's body image. *North American Journal of Psychology, 8*, 115–122.

Bergeron, D., & Tylka, T.L. (2007). Support for the uniqueness of body dissatisfaction from drive for muscularity among men. *Body Image, 7*, 288-295. doi: 10.1016/j.bodyim.2007.05.002

Blanchard, C.M., Rodgers, W.M., & Gauvin, L. (2004). The influence of exercise duration and cognitions during running on feeling states in an indoor running track environment. *Psychology of Sport and Exercise, 5*, 119–133. doi: 10.1016/S1469-0292(03)00006-2

Blouin, A.G., Goldfield, G.S. (1995). Body image and steroid use in male bodybuilders. *International Journal of Eating Disorders, 18*, 159 – 65.

Braun, V., & Clarke, V. (2006). Using thematic analysis in Psychology. *Qualitative Research in Psychology, 3*.

Cafri, G., Thompson, J.K., Ricciardelli, L., McCabe, M., Smolak, L., & Yesalis, C. (2005). Pursuit of the muscular ideal: Physical and psychological consequences and putative risk factors. *Clinical Psychology Review, 25*, 215–239.

Cash, T.F. (2012). Cognitive-Behavioral Perspectives on Body Image. *Encyclopaedia of Body Image and Human Appearance, 1*(334-343). doi: 10.1016/B978-0-12-384925-0.00054-7.

Cooper, P.J., Taylor, M.J., Cooper, Z., & Fairburn, C.G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders*, *6*, 485–494.

Edwards, C., Tod, D., Morrison, T.G., & Molnar, G. (2012). Drive for muscularity. In D. Tod & D. Lavalley (Eds.), *Psychology of strength and conditioning: Current perspectives* (pp. 148–172). London: Routledge

Esco, M. R., Olson, M. S., & Williford, H. N. (2005). Muscle dysmorphia: An emerging body image concern in men. *Strength and Conditioning Journal*, *27*, 76–79.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*, 117–140.

Furnham, A., & Calnan, A. (1998). Eating disturbance, self-esteem, reasons for exercising and body weight dissatisfaction in adolescent males. *European Eating Disorder Review*, *6*, 58–72.

Garner, D.M., Olmsted, M.P., Bohr, Y., & Garfinkel, P.E. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine*, *12*, 871–878.

Grieve, F.G. (2007). A Conceptual Model of Factors Contributing to the Development of Muscle Dysmorphia. *Eating Disorders, 15*, 63-80. doi: 10.1080/10640260601044535

Grieve, F.G., & Shacklette, M.D. (2012). Brief report on men's bodies and mood: Correlates between depressive symptoms and muscle dysmorphia symptoms. *North American Journal of Psychology, 14*(3), 563-568.

Goldfield, G.S., Blouin, A.G., & Woodside, D.B. (2006). Body image, binge eating, and bulimia nervosa in male bodybuilders. *Canadian Journal of Psychiatry, 51*, 160–168

Goodale, K.R., Watkins, P.L., & Cardinal, B.J. (2001). Muscle dysmorphia: A new form of eating disorder? *American Journal of Health Education, 32*, 260-266.

Haas, A.M., Prapavessis, H., Owens, F.G. (2002). Perfectionism, social physique anxiety and disordered eating: A comparison of male and female elite athletes. *Psychology of Sport and Exercise, 3*, 209-222.

Harrison, K., & Cantor, J. (1997). The relationship between media consumption and eating disorders. *Journal of Communication, 47*, 40-67.

Harmatz, M.G., Gronendyke, J., & Thomas, T. (1985). The underweight male: The unrecognized problem group of body image research. *The Journal of Obesity and Weight Regulation, 4*, 258–267.

Henson, C.T. (2004). Potential antecedents of muscle dysmorphia. Unpublished master's thesis. Western Kentucky University. Bowling Green: KY.

Hildebrandt, T., Langenbacher, J., & Schlundt, D.G. (2004). Muscularity concerns among men: Development of attitudinal and perceptual measures. *Body Image, 1*(2), 169-181.

Hildebrandt, T., Schlundt, D., Langenbacher, J., & Chung, T. (2006). Presence of muscle dysmorphia symptomology among male weightlifters. *Comprehensive Psychiatry, 47*(2), 127–135

Homan, K.J., & Tylka, T.L. (2014). Appearance-based exercise motivation moderates the relationship between exercise frequency and positive body image. *Body Image, 11*, 101-108.  
doi: 10.1016/j.bodyim.2014.01.003

Jones, D.C. (2004). Body image among adolescent girls and boys: A longitudinal study. *Developmental Psychology, 40*, 823–835.

Krane, V., Choi, P.Y.L., Baird, S.M., Aimar, C.M., & Kauer K.J. (2004). Living the paradox: Female athletes negotiate femininity and muscularity. *Sex Roles, 50*, 315–329. doi:

10.1023/B:SERS.0000018888.48437.4f

Lantz, C.D., Rhea, D.J., & Cornelius, A.E. (2002). Muscle dysmorphia in elite-level power lifters and bodybuilders: A test of differences within a conceptual model. *Journal of Strength and Conditioning Research, 16*, 649–655

Lantz, C.D., Rhea, D.J., & Mayhew, J.L. (2001). The drive for size: A psycho-behavioral model of muscle dysmorphia. *International Sports Journal, 5*, 71–86.

Leit, R.A., Pope Jr., H.G., & Gray, J.J. (2001). Cultural expectations of muscularity in men: The evolution of Playgirl centrefolds. *International Journal of Eating Disorders, 29*, 90–93.

Lepage, M.L., & Crowther, J.H. (2010). The effects of exercise on body satisfaction and affect. *Body Image, 7*, 124–130.

Likert, R. (1932). A Technique for the Measurement of Attitudes. *Archives of Psychology, 140*: 1–55.

Lorenzen, L.A., Grieve, F.G., & Thomas, A. (2004). Exposure to muscular male models decreases men's body satisfaction. *Sex Roles, 51*, 743-748.

Major, B., Testa, M., & Bylsma, W.H. (1991). Responses to upward and downward comparisons: The impact of esteem-relevance and perceived control. In J. Suls & T. A. Wills (Eds.), *Social comparison: Contemporary theory and research* (pp. 237–260). New Jersey: Lawrence Erlbaum Associates.

McCabe, M.P., & Ricciardelli, L.A. (2004). Body image dissatisfaction among males across the lifespan A review of past literature. *Journal of Psychosomatic Research, 56*, 675-685. doi: 10.1016/S0022-3999(03)00129-6

McCreary, D.R. & Sasse, D.K. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *Journal of American College Health, 48*, 297-304.

McCreary, D. R., Sasse, D. K., Saucier, D. M., & Dorsch, K. D. (2004). Measuring the drive for muscularity: Factorial validity of the Drive for Muscularity Scale in men and women. *Psychology of Men & Masculinity, 5*, 49–58.

McCreary, D., Hildebrandt, T., Heinberg, L., Boroughs, M., & Thompson, J.K. (2007). Body image influences on men's fitness and nutritional goals. *American Journal of Men's Health, 1*, 307–316.

McFarland, M.B., & Kaminski, P.L. (2009). Men, muscles, and mood: The relationship between self-concept, dysphoria, and body image disturbances. *Eating Disorders, 10*, 68-70.

doi: 10.1016/j.eatbeh.2008.10.007

Mosely, P.E. (2009). Bigorexia: Bodybuilding and Muscle Dysmorphia. *European Eating Disorders Review, 17*, 191-198. doi: 10.1002/erv.897

Morrison, T. G., Morrison, M. A., Hopkins, C., & Rowan, E. T. (2004). Muscle mania: Development of a new scale examining the drive for muscularity in Canadian males. *Psychology of Men and Masculinity, 5*, 30–39.

Mülazimoğlu-Balli, Ö, Koca, C., & Asçi, F.H. (2010). An examination of social physique anxiety with regard to gender and level of sport involvement. *Journal of Human Kinetics, 26*(1), 115–122. doi:10.2478/v10078-010-0055-9

Murray, S.B., Maguire, S., Russell, J., & Touyz, S.W. (2012). The emotional regulatory features of bulimic episodes and compulsive exercise in muscle dysmorphia: A case report. *European Eating Disorders Review, 20*(1), 68-73.

Murray, S.B., & Touyz, S.W. (2013). Muscle dysmorphia: Towards a diagnostic consensus. *Australian and New Zealand Journal of Psychiatry, 47*(3), 206-207.

Nieuwoudt, J.E., Zhou, S., Coutts, R.A., & Booker, R. (2012). Muscle dysmorphia: Current research and potential classification as a disorder. *Psychology of Sport and Exercise, 13*(5), 569-577.

Olivardia, R. (2001). Mirror, mirror on the wall, who's the largest of them all? The features and phenomenology of muscle dysmorphia. *Harvard Review of Psychiatry, 9*, 254–259.

Olivardia, R., Pope, H.G., Boroweicki, J.J., Cohane, G.H. (2004). Biceps and body image: The relationship between muscularity and self-esteem, depression, and eating disorder symptoms. *Psychology of Men and Masculinity, 5*, 112-120.

Olivardia, R., Pope, H.G., Jr., & Hudson, J.I. (2000). Muscle dysmorphia in male weight lifters: A case control study. *American Journal of Psychiatry, 157*, 1291–1296. doi: 10.1176/appi.ajp.157.8.1291

Pickett, T.C., Lewis, R.J., & Cash, T.F. (2005). Men, muscles, and body image: Comparisons of competitive bodybuilders, weight trainers, and athletically active controls. *British Journal of Sports Medicine, 39*, 217–222.

Pliner, P., Chaiken, S., & Flett, G.L. (1990). Gender differences in concern with body weight and physical appearance over the life span. *Personality and Social Psychology Bulletin, 16*, 263–273.

Pope, Jr H.G., Gruber A.J, Choi, P, Olivardia, R., Phillips, K.A. (1997). Muscle dysmorphia. An underrecognized form of body dysmorphic disorder. *Psychosomatics*, 38, 548 - 57.

Pope, H.G., & Katz, D.L. (1994). Psychiatric and medial effects of anabolic-androgenic steroids. A controlled study of 160 athletes. *Archives of General Psychiatry*, 51, 375-382.

Pope, H.G., Katz, D.L., & Hudson, J.I. (1993). Anorexia nervosa and “reverse anorexia” among 108 bodybuilders. *Comprehensive Psychiatry*, 34, 406-409.

Pope, H.G., Olivardia, R., Boroweicki, J.J., & Cohane, G.H. (2001). The growing commercial value of the male body: A longitudinal survey of advertising in women’s magazines. *Psychotherapy and Psychsomatics*, 70, 189-192.

Pope, H.G., Phillips, K.A., & Olivardia, R. (2000). *The Adonis complex: The secret crisis of male body obsession*. New York: Free Press.

Pope, C.G., Pope, H.G., Menard, W., Fay, C., Olivardia, R., & Phillips, K.A. (2005). Clinical features of muscle dysmorphia among males with body dysmorphic disorder. *Body Image*, 2(4), 395–400.

Portman, R.M., Bradbury, J., & Lewis, K. (2018). Social physique anxiety and physical activity behaviour of male and female exercisers. *European Journal of Sport Science*. doi: 10.1080/17461391.2017.1417485

Raedeke, T.D. (2007). The relationship between enjoyment and affective responses to exercise. *Journal of Applied Sport Psychology*, 19, 105–115. doi: 10.1080/10413200601113638

Reas, D.L., Whisenhunt, B.L., Netemeyer, R., & Williamson, D.A. (2002). Development of the Body Checking Questionnaire: A self-report measure of body checking behaviors. *International Journal of Eating Disorders*, 31, 324–333.

Rhea, D.J., Lantz, C. D., & Cornelius, A.E. (2004). Development of the Muscle Dysmorphia Inventory (MDI). *The Journal of Sports Medicine and Physical Fitness*, 44, 428– 435

Rickard, A. (2014). Evaluation of the prevalence of muscle dysmorphia symptomology and the association with dietary intake in college age males. The Pennsylvania State University.

Ridgeway, R.T., & Tylka, T.L. (2005). College men's perceptions of ideal body composition and shape. *Psychology of Men and Masculinity*, 6, 209-220.

Rosen, J.C., Srebnik, D., Saltzberg, E., & Wendt, S. (1991). Development of a body image avoidance questionnaire. *Psychological Assessment*, 3, 32–37.

Sabiston, C.M., Pila, E., Pinsonnault-Bilodeau, G., & Cox, A.E. (2014). Social physique anxiety experiences in physical activity: A comprehensive synthesis of research studies focused on measurement, theory, and predictors and outcomes. *International Review of Sport and Exercise Psychology*, 7(1), 158– 183. doi:10.1080/1750984X.2014.904392

Schimidt. U. (2002). Risk factors for eating disorders. In K.D Brownell & C.C Fairburn (Eds.), *Eating disorders and obesity: A comprehensive handbook* (2<sup>nd</sup> ed., pp. 247-250). New York: Guilford.

Schur, E.A, Sanders, M., & Steiner, H. (2000). Body dissatisfaction and dieting in young children. *International Journal of Eating Disorders*, 27, 74– 82.

Schroeder, E.C., Welk, G.J., Franke, W.D., & Lee, D-C. (2017). Associations of Health Club Membership with Physical Activity and Cardiovascular Health. *PLoS ONE*, 12(1). doi: doi:10.1371/journal.pone.0170471.

Shafran, R., Fairburn, C. G., Robinson, P., & Lask, B. (2004). Body checking and its avoidance in eating disorders. *International Journal of Eating Disorders*, 35, 93–101.

Shafran, R., Lee, M., Payne, E., & Fairburn, C.G. (2007). An experimental analysis of body checking. *Behaviour Research and Therapy*, 45, 113–121.

Shaw, J., & Waller, G. (1995). The media's impact on body image: Implications for prevention and treatment. *Eating Disorders: The Journal of Treatment & Prevention*, 3, 115–123. doi: 10.1080/10640269508249154.

Smolak, L., & Murnen, S.K. (2008). Drive for leanness: Assessment and relationship to gender, gender role and objectification. *Body Image*, 5, 251–260.

Smolak, L., Murnen, S.K., & Thompson, J.K. (2005). Sociocultural influences and muscle building in adolescent boys. *Psychology of Men and Masculinity*, 6, 227-239.

Stanford, J.N, & McCabe, M.P. (2005). Sociocultural influences on adolescent boys' body image and body change strategies. *Body Image*, 2, 105-113.

The British Psychological Society (2014). *Code of Human Research Ethics*. Leicester: The British Psychological Society.

Thompson, J. K., & Cafri, G. (2007). *The muscular ideal: An introduction*. In J. K. Thompson & G. Cafri (Eds.), *The muscular ideal: Psychosocial, social, and medical perspectives* (pp. 3–13). Washington, DC: American Psychological Association.

Thompson, J.K., Heinberg, L.J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington DC, US: American Psychological Association

Thompson, J.K., van den Berg, P., Roehrig, M., Guarda, A.S., & Heinberg, L.J. (2004). The Sociocultural Attitudes Towards Appearance Scale-3 (SATAQ-3): Development and validation. *International Journal of Eating Disorders*, 35, 293–304. <http://dx.doi.org/10.1002/eat.10257>

Tiggemann, M. (2004). Body image across the adult life span: stability and change. *Body Image*, 1, 29-41. doi: 10.1016/S1740-1445(03)00002-0

Tod, D., Hall, G., & Edwards, C. (2012). Gender invariance and correlates of the Drive for Leanness Scale. *Body Image*, 9, 555–558. <http://dx.doi.org/10.1016/j.bodyim.2012.06.004>

Tod, D., Edwards, C., & Hall, G. (2013). Drive for leanness and health-related behaviour within a social/cultural perspective. *Body Image*. In Press. doi: 10.1016/j.bodyim.2013.05.002

Tod, D., Edwards, C., & Cranswick, I. (2016). Muscle dysmorphia: current insights. *Psychology Research and Behaviour Management*, 9, 179-188. doi: 10.2147/PRBM.S97404.

Tod, D., Lavellee, D. (2010). Towards a conceptual understanding of muscle dysmorphia development and sustainment. *International Review of Sport and Exercise Psychology*, 3(2), 111-131. doi: 10.1080/17509840903428513

Van den Berg, P., Paxton, S.J., Keery, H., Wall, M., Guo, J., & Neumark-Sztainer, D. (2007). Body dissatisfaction and body comparison with media images in males and females. *Body Image*, 4, 257-268. doi: 10.1016/j.bodyim.2007.04.003

Vocks, S., Hechler, T., Rohrig, S., & Legenbaugher, T. (2009). Effects of a physical exercise session on state body image: The influence of pre-experimental body dissatisfaction and concerns about weight and shape. *Psychology and Health*, 6, 713-738. 8. doi: 10.1080/08870440801998988

Wang, K., Liang, R., Ma, Z-L., Chen, J., Cheung, E.F.C., Roalf, D.R., Gur, R.C., Chan, R.C.K. (2018). Body image attitude among Chinese college students. *Institute of Psychology, Chinese Academy of Sciences*, 7(1), 31-40. doi: 10.1002/pchj.200.

Walker, D.C., Anderson, D.A., & Hildebrandt, T. (2009). Body checking behaviour in men. *Body Image*, 6, 164-170. doi: 10.1016/j.bodyim.2009.05.001

Wood-Barcalow, N.L., Tylka, T.L., & Augustus-Horvath, C.L. (2010). "But I like my body": Positive body image characteristics and a holistic model for young-adult women. *Body Image, 7*, 106–116. doi: 10.1016/j.bodyim.2010.01.001

Wroblecka A.M. (1997). Androgenic-anabolic steroids and body dysmorphia in young men. *Journal of Psychosomatic Research, 42*, 225–234. doi: 10.1016/S0022-3999(96)00302-9

Yardley, L., & Bishop, F.L. (2015). Using mixed methods in health research: Benefits and challenges. *British Journal of Health Psychology, 20*, 1–4. doi:10.1111/bjhp.12126.

## Appendices

### Appendix A

#### Background questionnaire

Age range

16-21 22-27 28-33 34-39 41-46 47-52 53-58 59+

-Training experience

Less than a year 1-2 years 2-5 years 5-9 years over 10 years

- Training frequency

Once a month A couple of times a month Once a week 2-4 times a week Everyday

-Main workout motivation

Health Aesthetics Stress relief Social aspects

Other (Please specify) \_\_\_\_\_

-Main type of gym activity

Low intensity Cardio High Intensity Cardio Bodybuilding Circuits  
Strength and Conditioning Mixture

-Do you participate in fitness activities outside the gym environment?

Yes No (Please specify type, frequency and environment)

\_\_\_\_\_

-Do you have experience of competitive bodybuilding?

Yes No (Please specify type, frequency and environment)

\_\_\_\_\_

-Do you have experience of dieting to reach your fitness goal?

Yes No (Please specify type, frequency and environment)

\_\_\_\_\_





## Appendix C

Poster used during participant recruitment



University of  
**HUDDERSFIELD**  
Inspiring tomorrow's professionals

### Do you have a spare 5 mins?

As part of Libs' Master's Degree, **MALE** participants are needed to **answer a short questionnaire regarding body image** in those who go to the gym of **any experience and body type!**



Need more info?  
**Ask Lib!**

Information will be kept  
**anonymous**



If you are free to participate,  
please let Lib/Matt/Kate know!

Thanks!

You may be asked to take part in a follow up interview which you can opt out of



## Appendix D

### Participant Information Sheet



### Evaluating the prevalence of muscle dysmorphia in male gym goers using a mixed methods approach

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#### PARTICIPANT INFORMATION SHEET

You are invited to take part in a study regarding male muscle dysmorphia in the gym going population. Before you decide to take part, it is important that you understand why the research is being done and what it will involve, you can discuss any concerns with me at this stage or email me [Liberty.Baxter-Cox@hud.ac.uk](mailto:Liberty.Baxter-Cox@hud.ac.uk)

#### What is the study about?

The purpose of this study is to explore the prevalence of male muscle dysmorphia in the gym going population. Muscle dysmorphia is a body image disturbance characterized by a perceived lack of muscularity and a preoccupation with increasing muscle mass (Grieve and Shacklette, 2012) often involving obsessive eating and exercise patterns. Some behaviours associated with the disorder may include steroid use. Should this subject be discussed in this interview stage please do not give detail of how you became in possession of such substances.

#### Do I have to take part?

It is your decision whether or not you take part. You will be free to withdraw your information until 31/8/17 without giving reason.

#### What will I need to do?

You will answer questions regarding your answers given in the questionnaire and other related topics.

#### What will happen to my data?

You will be unidentifiable in the published research. All information disclosed within the interview stage will be kept confidential, only identifiable by the researcher so that continuity of data can be maintained.

#### What will happen to the information?

It is anticipated that the research may, at some point, be published in a journal or report. Should this happen, your anonymity will be ensured, although it may be necessary to use your words in the presentation of the findings and your permission for this is included in the consent form.

If you require any further information about the research or wish to withdraw you data before 31/8/17, please contact me on: [Liberty.Baxter-Cox@hud.ac.uk](mailto:Liberty.Baxter-Cox@hud.ac.uk)

If you require further information or support regarding the disorder please consult:

- <http://bddfoundation.org/muscle-dysmorphia-body-image-in-men/>
- <https://www.anred.com/musdys.html>
- <http://www.mirror-mirror.org/muscle-dysmorphia.htm>

- <https://www.eatingdisorderhope.com/information/body-image/muscle-dysmorphia-in-males>
- <https://www.mccallumplace.com/muscle-dysmorphia.html>
- <https://www.eatingdisorderhope.com/blog/support-group-options-males-dealing-body-dysmorphic-disorder>
- <http://americanaddictioncenters.org/male-eating-disorders/body-dysmorphia/>

**Appendix E**

Participant Consent Form



### CONSENT FORM

**Evaluating the prevalence of muscle dysmorphia in male gym goers using a mixed methods approach**

It is important that you read, understand and sign the consent form. Your contribution to this research is entirely voluntary and you are not obliged in any way to participate, if you require any further details please contact your researcher [Liberty.Baxter-Cox@hud.ac.uk](mailto:Liberty.Baxter-Cox@hud.ac.uk). If you are satisfied that you understand the information and are happy to take part in this project, please put a tick in the box aligned to each sentence and print and sign below.

- I have been fully informed of the nature and aims of this research as outlined in the information sheet
- I consent to taking part in this study
- I understand that I have the right to withdraw from the research until 31/08/17 without giving any reason
- I understand that the information collected will be kept in secure conditions at the University of Huddersfield
- I understand that no person other than the researcher will have access to the information provided.
- I understand that my identity will be protected in the report and that no written information that could lead to my being identified will be included in any report.
- I consent to being audiotaped during this interview

Signature of Participant: _____ Print: _____ Date: _____	Signature of Researcher: _____ Print: _____ Date: _____
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### Appendix F

Thematic map created on QSR NVivo software

