WHAT IS THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND SEXUAL ACTIVITY IN MEN?

by

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Bachelor of Science (Psychology, Mount Allison University, 2011)

A Thesis Submitted in Fulfillment
of the Requirements for the Degree of

Master of Science in Exercise and Sport Science

in the Graduate Academic Unit of Kinesiology

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This thesis is accepted by the
Dean of Graduate Studies

THE UNIVERSITY OF NEW BRUNSWICK

May 2019

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ABSTRACT

Physical activity and sexual activity are both important aspects of quality of life. Anecdotal evidence suggests there is a relationship between these two variables, but research is limited. The objective of the current study is to explore the relationship between physical activity and sexual activity in men via correlational and parallel mediation analyses, using motives for exercise and body image as mediators. A total of 659 heterosexual men between the ages of 19-75 years (M=31.9 years, SD=10.4 years) were surveyed on their physical activity levels using the Godin Leisure Time Exercise Questionnaire and asked the frequency of sexual intercourse and sexual desire occurring in one week. Participants were given the Multidimensional Body-Self Relations Questionnaire and the Exercise Motives Inventory-2 to explore whether these variables mediated the relationship between physical activity and sexual activity. The results showed a positive correlation between physical activity and sexual activity in men (r = .12, n = 659, p = .008). Two parallel mediation analyses revealed that the BASS was a significant mediator of the relationship between physical activity and sexual frequency for younger men, while fitness/health orientation was a significant mediator for older men. For exercise motives, competition was a significant mediator for younger men. The current study adds to the existing literature and provides valuable insight for future research on this subject.

ACKNOWLEDGEMENTS

Thank you to my supervisor, my committee members and the Faculty of Kinesiology for their continued support throughout my time at the University of New Brunswick.

Thank you to my Mom, Dad, stepdad, friends and partner for sharing ideas with me, listening to me rant and for being a continuous source of support!

I did it!

Table of Contents

ABSTRACT ii
ACKNOWLEDGEMENTS iii
Table of Contents iv
List of Tables vi
List of Figures vii
Chapter 1 1
Introduction 1
1.1 Background Information 1
1.2 Purpose 4
1.3 Research Question 4
1.4 Hypotheses 4
1.5 Significance 5
CHAPTER 2 6
Literature review 6
2.1 Sexual Activity 6
2.2 Physical Activity 7
2.3 Physical Activity and Sexual Activity 9
2.4 Body Image 12
2.4.1 Body image and sexual activity 16
2.4.2 Body image and physical activity 17
2.5 Motives for Physical Activity. 18
2.6 Rationale 20
CHAPTER 3 21
Methodology 21
3.1 Participants 21
3.2 Measures 22
3.3 Procedure 25
3.4 Outcomes, Predictors and Mediators 26
3.5 Design and Analysis 26
3.5.1 Power analysis. 26

3.5.2 Data entry. 26
3.5.3 Data analysis. 27
CHAPTER 4 29
Results 29
CHAPTER 5 36
Discussion 36
5.1 Physical Activity and Sexual Activity 38
5.2 Body Image 40
5.3 Exercise Motives 43
5.4 Middle-Aged Men 44
5.5 Limitations and Future Research 45
5.6 Conclusion 48
References 50
Appendix A: Demographics 61
Appendix B: Sexual Frequency Questionnaire 63
Appendix C: Godin Leisure-Time Exercise Questionnaire (GLTEQ) 64
Appendix D: Exercise Motives Inventory 2 (EMI-2) 66
Appendix E: EMI-2 Scoring 71
Appendix F: Multidimensional Body-Self Relations Questionnaire 72
Appendix G: MBSRQ Scoring 78
Appendix H: Consent Form 79
Appendix I: Information Letter 80
Curriculum Vitae ……

List of Tables

Table 1. *Means (M) and standard deviations (SD) of the GTLEQ moderate-strenuous scores, sexual frequency (days per week) and sexual desire (days per week) for all participants (N = 486).* 29

Table 2. *Means (M), standard deviations (SD) and correlations between sexual frequency (SF) and physical activity (PA) per age group. Note: *p<.001*..... 31

List of Figures

Figure 1. Simple mediation model with one mediator variable (M) mediating the relationship between the independent variable (X) and the outcome variable (Y) (Hayes, 2018; Kane & Ashbaugh, 2017). 28

Figure 2. Visual representation of the body image mediators examined in the parallel mediation analysis (n = 352) between physical activity and sexual frequency in men using unstandardized co-efficients. Notes: *p < .05, **p < .001..... 32

Figure 3. Visual representation of the exercise motive mediators examined in the parallel mediation analysis (n = 369) between physical activity and sexual frequency in men using unstandardized co-efficients. Notes: *p < .05, **p < .001..... 34

Chapter 1

Introduction

1.1 Background Information

Are physically active men more sexually active? Anecdotal evidence suggests that higher levels of physical activity are associated with increased sexual activity. A simple online search will yield many different results including specific exercise programs to improve one's sex life, but what evidence underlies these claims? To date, this topic has been relatively under-explored academically.

The discussion of sexual activity is typically shied away from; however, it is important to explore this topic because research has shown that regular sexual activity is an important aspect of quality of life (Lindau & Gavrilova, 2010). Men specifically place a greater emphasis on the importance of sexual activity with respect to quality of life, and in general, report a greater desire and frequency of sexual activity in comparison to women (Beutel, Stobel-Richter, & Brahler, 2008; DeLamater, 2012). It has also been documented that although frequency of sexual activity does show a trend to decline with growing age, men do remain relatively sexually active into old age (Karraker, DeLamater, & Schwartz, 2011; Lindau et al., 2007).

It is well recognized that increased levels of physical activity produce many health advantages. Regular physical activity is associated with a reduced disease risk of

nearly 25 conditions, decreased mortality and increased longevity. (Colley et al., 2011; Public Health Agency of Canada, 2011). In order to achieve such benefits, it is recommended that adults partake in 150-minutes of moderate to vigourous activity per week (Colley et al., 2011). Physical activity is important in every stage of life, from childhood and adolescence, through middle age and well into older age. It can significantly improve the quality of life of older individuals and extend years of independent living (Fei, Norman, & While, 2013). Men are also consistently more physically active in comparison to women across all ages (Caspersen, Pereira, & Curran, 2000; Statistics Canada, 2019).

What is the relationship between physical activity and sexual activity? Research suggests that frequency of sexual behaviour and desire for sexual activity is significantly correlated with physical activity in middle aged-men (Frauman, 1982). Also, middle-aged men participating in an exercise intervention displayed greater levels of sexual responsiveness and functioning (White, Case, McWhirter, & Mattison, 1990). For older populations, regular physical activity is generally associated with better erectile functioning, a primary indicator of sexual satisfaction, and higher sexual activity, even in men 70 years and older (Bacon et al., 2003; Bortz & Wallace, 1999). This is particularly meaningful because it has been shown that the primary limiting factor of sexual activity in old age for men is their health and as a result, men lose more years of a sexually active life (Karraker, DeLamater, & Schwartz, 2011; Laumann et al., 2005; Lindau & Gavrilova, 2010).

In addition to age, body image and motives for physical activity may impact the relationship between physical activity and sexual activity. Body image is defined as an individual's perceptions, feelings and attitudes towards their own body and physical appearance (Burlew & Shurts, 2013). Body image has been traditionally thought of as strictly a female problem, but body image concerns among men are on the rise. In fact, it is estimated that 15-43% of men present with some form of body image concern (Schoolar & Ward, 2004). It is thought that this is partly caused by the portrayal of the ideal male body in the media, which has in turn increased the degree of body image concerns, particularly in younger men (Burlew & Shurts, 2013). Body image concerns can impact sexual functioning and significantly reduce sexual behaviour in both men and women (Davison & MacCabe, 2005; Faith & Schare, 1993; Gillen, Leftkowitz, & Shearer, 2006; Trapnell, Meston, & Gorzalka, 1997; Weiderman, 2002). There is evidence to suggest that, although overall body satisfaction remains relatively stable across the lifespan, older individuals show a shift from appearance focus to functional focus (Reboussin et al., 2000; Tiggemann, 2004). For example, this may include becoming less satisfied with their hands or eyes (something that is needed functionally) compared to being less satisfied with their weight (something that is appearance based).

Research has indicated that younger men tend to be motivated to exercise by more ego-based and appearance factors (Kilpatrick, Hebert, & Bartholomew, 2005) while older individuals tend to be motivated by more health-related factors and less concerned with how exercise may improve their overall appearance (Kolt, Driver, & Giles, 2004; Schuler

et al., 2004). Middle-aged individuals have shown a combination of both appearance and health-related motives, but this research has not been entirely consistent (Ingledew & Markland, 2008; Koslow, 1988).

1.2 Purpose

The primary purpose of this study is to explore the relationship between physical activity and sexual activity in men and to determine if body image and motives for exercise mediate this relationship.

1.3 Research Question

The following research questions are proposed for this study: What is the relationship between physical activity and sexual activity in men? Do body image and motives for exercise mediate the relationship between physical activity and sexual activity?

1.4 Hypotheses

To fulfill the abovementioned research question, the following hypotheses will be tested:

1. There will be a positive correlation between physical activity and sexual activity in men.
2. Body image and motives for exercise will mediate the relationship between

physical activity and sexual activity. Physical activity in young men will be mediated by body image and motive variables that are appearance focused, while physical activity in older men will be mediated by body image and motive variables that are health focused.

1.5 Significance

The current study will provide insight into the relationship between physical activity and sexual activity in men, while accounting for and incorporating age, body image, and motives for exercise as covariates. The current study will add to the existing literature and provide valuable information into the relationship among physical activity, sexual activity, body image and motives for exercise in men. It is anticipated that the results of this study will generate new insight for future research on this topic.

CHAPTER 2

Literature review

2.1 Sexual Activity

Although sexual activity can encompass a variety of behaviours, for the purpose of this study it will solely refer to sexual intercourse (i.e., penetrative sex). Frequency of sexual intercourse differs from person to person; therefore, it is essential to identify some averages. According to the Kinsey Institute, it is estimated that 18-29-year olds are engaging in sexual intercourse approximately 112 times per year, 30-39 years old approximately 86 times per year followed by 69 times a year for 40-49-year olds (Mintz, 2012). An additional empirical study found that men aged 25-39 years reported the highest amounts of sexual intercourse, but this steadily declined through the following years In the last few decades, interest into the sexual activity of older individuals has grown extensively. Even though sexual activity has been shown to decline with age (Karraker et al., 2011; Lindau et al., 2007), older individuals do remain relatively sexually active into old age. For example, a US national survey indicated that more than half of people aged 57-85 years were sexually active, and approximately one third of those between the ages of 75-85 years were sexually active (Lindau & Gavrilova, 2010).

With respect to gender, significant differences between men and women have been identified. Men consistently show more frequent and stronger sexual desire than women (Beutel et al., 2008), and are also more likely to rate sex as being important to

overall quality of life (DeLamater, 2012). It has been argued that the prominent loss of sexual activity in old age is due a decline in sexual health and functioning (Bortz & Wallace, 1999) and for men sexual problems are more likely to be associated with overall physical health and aging in comparison to women (Laumann et al., 2005). One survey indicated that men with excellent to good health aged 60 years and older were twice as likely to engage in vaginal intercourse over a period of 90 days compared to men with fair to poor health (Reece et al., 2010). Additionally, men tend to lose more years of sexually active life due to health in comparison to women, and men also self-report their own health as being a primary factor for loss of sexual activity (Karraker et al., 2011; Lindau & Gavrilova, 2010). Another factor to account for is the participant's relationship status. Results from a national probability sample from 2,522 men aged 18-94 years indicated that vaginal intercourse in the past 90 days was more common among partnered men in comparison to single men (Reece et al., 2010).

2.2 Physical Activity

Physical activity, as defined by the World Health Organization, is "any bodily movement produced by skeletal muscles that requires energy expenditure" (World Health Organization [WHO], 2016). Although the terms physical activity and exercise are often used interchangeably, exercise is a subset of physical activity that is planned and structured, with the goal of improving or maintaining one's physical fitness (Caspersen, Powell, & Christenson, 1985). Regular physical activity is an important aspect of life as it is essential for proper growth and development. It is well documented that regular

physical activity leads to positive health outcomes, including reducing the risk of approximately 25 chronic conditions such as cancer, cardiovascular disease and diabetes, as well as improving problems with mental health such as depression and anxiety (Colley et al., 2011; Public Health Agency of Canada, 2011). In order to achieve such benefits, it is recommended that adults partake in 150-minutes of moderate to vigourous activity per week (Colley et al., 2011).

A lack of physical activity, more commonly referred to as sedentary behavior, is "identified as the fourth leading risk factor for global mortality causing an estimated 3.2 million deaths globally" (WHO, 2016). In fact, research suggests that approximately half of the functional decline from the age of 30 to 70 is a result of insufficient physical activity and not only aging itself (Public Health Agency of Canada, 2011). Sedentary behavior is growing more and more common today. ParticipACTION, a Canadian organization whose mandate is to make physical activity a vital part of everday life, estimates that the average Canadian adult spends 9.5 hours of their waking day being sedentary. For the purpose of this study, physical activity will be assessed using the Godin Leisure Time Exercise Questionnaire (GLTEQ). The GLTEQ conceptualizes physical activity as 'leisure time physical activity' or LTPA, which refers to any type of physical activity, planned or unplanned, that occurs during a regular day excluding occupational physical activity (Godin & Shephard, 1997). The GTLEQ is then scored to produce three categories reflecting the benefits to health: active (substantial benefits to

health), moderately active (some benefits to health) and insufficiently active (low benefits to health).

With respect to age, physical activity patterns across the lifetime do change. Using cross-sectional data from an American National Health Interview Survey, Caspersen and colleagues (2000) found that regular vigorous activity patterns were lower in young adults, but remained relatively stable in middle adulthood (30-64 years of age). At retirement age (65 years), there was a tendency to improve physical activity patterns, but this later decreased into older age. Data on LTPA from Statistics Canada (2016) from 2010-2014 reveals a similar pattern. Analyzing self-reported data from individuals aged 12 and older, it was shown that LTPA declined steadily with age, but a stabilizing period among those in middle adulthood was present. Gender differences in levels of physical activity have also been established. On average, men are more physically active in comparison to women, across all age groups (Caspersen et al., 2000; Statistics Canada, 2019).

2.3 Physical Activity and Sexual Activity

Physical activity and sexual activity both play an important role in human functioning and overall quality of life. Although there is a fair amount of anecdotal evidence suggesting that there is a positive relationship between physical activity and sexual activity, there are minimal empirical studies that offer concrete evidence.

In 1982, Frauman hypothesized that greater physical activity levels would be associated with higher self-reported frequency of sexual activity and desired sexual

activity. Two samples were used for the study: a classroom sample comprised of 53% males (86% of whom were 18-25 years of age) and a field house sample comprised of 42% males (42% of whom were 18-25 years of age). Participants were questioned about their physical activity, sexual intercourse and sexual desire. For both samples, frequency of sexual behaviour and desire for sexual activity were significantly correlated with the amount of physical activity meaning those reporting higher sexual frequency and desire were those who exercised more frequently. It was also found that younger males in the field house sample desired more frequent sexual activity. Even when age and gender were accounted for, there was still a significant positive correlation between physical activity and desire for sexual activity.

White and colleagues (1990) sought to investigate the link between exercise and sexual activity. A sample of 78 healthy but sedentary men (mean age = 48 years) married to or living with a sexually active female partner participated. The experimental group participated in supervised exercise sessions an average of 3.5 days a week while a control group participated in organized walking an average of 4.1 days per week. Over nine months several variables were measured before and after, including body composition, fitness (measured as the aerobic working capacity) and an open-ended exercise and sexuality diary. It was hypothesized that participants who partake in regular exercise will function better sexually and the degree to which they function better sexually will be positively correlated with an increase in physical fitness.

It was found that exercising correlated with greater sexual responsiveness and functioning, specifically, sexual arousal and activity were greater among exercisers in comparison to non-exercisers (White et al., 1990). Those who exercised also had lower incidences of sexual dissatisfaction and erectile dysfunction. Furthermore, the degree of fitness improvement was positively correlated with the degree of sexual enhancement. This study provided important systemic evidence in a non-clinical sample of a relationship between exercise, sexual functioning and physical fitness.

The previously cited studies only included younger and middle-aged men, but positive associations between physical activity and sexual activity have also been observed in older populations. Sexual activity does decline with age and for men, this loss is due primarily to health problems, including erectile competence (Bortz & Wallace, 1999). Similar to the results found with younger men, a large cross-sectional survey of 31,742 men between the ages of 53 to 90 years, found that physical activity was associated with better erectile functioning and lower sexual dysfunction (Bacon et al., 2003). Another study utilizing members of a Fifty-Plus (50+) Fitness Association (range of 50-94 years) discovered that members of this active community were highly satisfied with their sexual activity (which included variables of both intimacy and intercourse), with men being more satisfied than women (Bortz & Wallace, 1999). Men also had a higher frequency of sexual activity across all age groups, with 53% of those aged 70 years or more reporting one or more bouts of sexual intimacy per week. Physical activity has also been shown to enhance endurance, muscle tone and body composition, as well as

encourage blood flow to the genital region, factors which in turn improve sexual functioning (Krucoff & Krucoff, 2000; Stanten & Yeager, 2003).

From the abovementioned studies, it is apparent that sexual activity can be enhanced with exercise for those who are sedentary or only exercising at low levels, but some research suggests that high level endurance exercise can inhibit sexual activity (Arce & De Souza, 1993). In a study with men aged 29-72 years, it was found that moderate intensity physical activity increased the frequency of sexual intercourse and masturbation, but vigorous physical activity decreased the frequency (Goh & Tong, 2009). More recently, Hackney, Lane, Register-Mihalik, and O'Leary (2017) tested the relationship between endurance training and sexual desire in men. They found that higher amounts of intense endurance exercise were associated with lower sexual desire (libido) scores. Conversely, low-to-moderate intensity exercise with a shorter to moderate duration had greater odds of having normal to high libido scores in comparison to those who did longer duration endurance exercise.

There seems to be a relationship between physical activity and sexual activity for both young, middle aged and older men, depending on the intensity of the physical activity. As previously mentioned, sexual activity has been found to decline with age, and for men, poor health seems to be the greatest contributor to this decline.

2.4 Body Image

Body image is defined as an individual's perceptions, feelings and attitudes towards their own body and physical appearance (Burlew & Shurts, 2013). It is a

multifaceted construct such that body image can possess evaluative (i.e., the appraisal of one's own body) and behavioral components (i.e., avoiding certain activities or behavior due to poor body image) in addition to the subjective feelings about one's own body (Milhausen, Buchholz, Opperman, & Benson, 2015).

The bulk of research done on body image has been primarily concerned with women (Daniel & Bridges, 2013), but it is now "apparent that men also experience body image issues related to their weight, body shape, and appearance" (Burlew & Shurts, 2013, p.428). With the use of gender sensitive instruments, empirical evidence now suggests that men conceptualize body image concerns differently than women, specifically men do not always desire to lose weight, but may desire to gain weight (muscle) in some instances (Davison & McCabe, 2005). It is estimated that 15-43% of men present with some form of body image concern (Schoolar & Ward, 2004). Poor body image has been related to a series of quality of life issues such as depression, anxiety, reduced interpersonal functioning, use of performance enhancing substances, and low self-esteem (Davison & McCabe, 2005; Olivardia, Pope Jr., Borowiecki III, & Cohane, 2004).

Garner (1997) found that 528 men, aged 14-82 years, did present with body image concerns such that 63% had dissatisfaction with their abdomens, 52% with their weight, 45% with muscle tone, 43% with overall appearance and 38% with their chest. Interestingly, 22% of the men who were dissatisfied with their weight indicated the desire to gain weight. This agrees with research conducted on male first year college students,

in which 41% wishes to be smaller and 24% wished to be larger (Gillen & Lefkowitz, 2006).

It is hypothesized that the rise of body image concerns in males may be due to increasing predominance and representation of the 'ideal' male body in the media (Burlew & Shurts, 2013). Today, the idealized male figure is one that is mesomorphic in shape: tall and lean with broad shoulders and visible abdominal muscles in addition to being young, masculine, strong and self-confident (Burlew & Shurts, 2013; Mulgrew & Cragg, 2015). The media depiction of this idealized male figure has also grown more muscular over time (Daniel & Bridges, 2013) and since this is a difficult body ideal to obtain or maintain for most, body image concerns in men are on the rise. A population that is particularly impacted by the unrealistic media portrayal of men is college-aged men (Hargreaves & Tiggemann, 2009; Mulgrew & Craig, 2015) and it has been estimated that upwards of 95% of college-aged men present with some form of body image dissatisfaction (Labre, 2005).

A study by Mulgrew and Cragg (2015) sought to investigate the impact of idealized male figures on groups of younger (18-30 years old), middle-aged (31-55 years old) and older-aged men (56-77 years old). Using pre- and post-test measures of body satisfaction, mood, and social comparison, each group viewed 5 minutes clips of either scenery, average looking males or attractive muscular males. It was found that the only group to have immediate negative body image effects after viewing the attractive muscular clips was the youngest age group. This may perhaps be due to social

comparison: younger men are more susceptible to social comparison in contrast to their older counterparts (Mulgrew & Craig, 2015). A similar study using solely undergraduate men found that, when viewing television commercials with men who possess the current muscular ideal, participants had lower muscle satisfaction. Men who already possessed higher appearance orientations (those who focused more on their appearance) were the most vulnerable and presented with greater social comparison and more pronounced changes in body satisfaction (Hargreaves & Tiggemann, 2009).

Perceptions of body image can also change across the male lifespan. It is often assumed that body image becomes poorer as one ages: from changing shape to developing wrinkles and going grey. However, it is important to note that many of these age-related changes are much more pronounced for women, particularly due to our society where women are more revered for their appearance. As such, older men tend to be judged less harshly than older women and are generally valued for a broader range of qualities in addition to appearance (Tiggemann, 2004). Although understudied, there is evidence to suggest that body dissatisfaction remains relatively stable across the adult lifespan into old age, but there appears to be a shift of focus from body appearance to body function as age increases, for example, becoming less satisfied with eyes or hands as opposed to weight (Tiggeman, 2004). Reboussin and colleagues (2000) examined the correlates of body satisfaction and body appearance in middle-aged and older-aged men. They found that the relationships observed among body satisfaction differed with age,

suggesting that older-aged men may value body function more so than body appearance in comparison to middle-aged men.

2.4.1 Body image and sexual activity. Poor body image can promote depression and anxiety, but it has also been linked to impaired sexual functioning (Weiderman, 2002). Negative body image is associated with a reduction in sexual behaviour and individuals who have a negative body image are more likely to be sexually avoidant, report lower levels of satisfaction with their sex lives, are less sexually assertive, engage in sex less frequently and are less comfortable with sexual experiences in general (Davison & McCabe, 2005; Faith & Schare, 1993; Gillen, Lefkowitz, & Shearer, 2006; Trapnell et al., 1997). It has been proposed that body image concerns negatively impact one's sex life due to a concept known as 'spectatoring', when an individual monitors or fixates on their own body parts and sexual functioning during sexual activity, which can fuel anxiety and impede sexual functioning (Faith & Schare, 1993). Cash, Maikkula, and Yamamiya (2004) also found that college-aged men and women with more anxious/avoidant appearance self-focus reported less enjoyment of their sex lives, less consistency and quality of arousal and less sexual desire in general.

Research on body image and sexual activity in men is very limited. One study found that disturbances in body image in middle-aged men are specifically related to problematic sexual functioning, such that the higher the disturbances in body image, the higher the dysfunction of interpersonal variables (Davison & McCabe, 2005). Sanchez and Kiefer (2007) found that, among a convenience sample of heterosexual men and

women, body dissatisfaction lowered sexual pleasure and promoted sexual problems. Holt and Lyness (2007) revealed similar results such that a significant positive difference was found in both men and women between body image and sexual satisfaction, with no significant differences among men and women suggesting men were equally affected by poor body image.

2.4.2 Body image and physical activity. The relationship between physical activity and body image has been studied extensively. A hallmark meta-analysis by Hausenblas and Fallon (2006), that incorporated the findings of 121 studies related to physical activity and body image, demonstrated a clear relationship between the two variables: physical activity is significantly associated with improved body image. Specifically, the researchers compiled three main findings from the studies analyzed: 1) exercisers displayed a more positive body image in comparison to non-exercisers, 2) participants in an exercise intervention program had a more positive body image post intervention in comparison to a control group and 3) exercisers have significant improvements in body image scores following an exercise intervention (Hausenblas & Fallon, 2006). The meta-analysis also indicated that physical activity improved body image across all age groups. For those older than 55 years of age, smaller effect sizes were observed, perhaps indicating a shift in body image focus from appearance to function (Hausenblas & Fallon, 2006).

This work is corroborated by a second meta-analysis that focused solely on exercise interventions with pre and post-test data and their impact on body image found

positive relationships between physical activity and body image. A total of 57 studies were identified and after review, it was concluded that exercise interventions, in comparison to controls, did promote favourable body image (Campbell & Hausenblas, 2009).

Although the relationship between physical activity and body image has been studied extensively, the bulk of the research is concerned with women. There is, however, some evidence of how physical activity and body image impact men. One survey of approximately 200 male university students found that physical activity was one of the strongest negative predictors of body image dissatisfaction in men (Hausenblas & Fallon, 2002). This work is supported by a recent meta-analysis examining 84 individual effect sizes from studies investigating physical activity and body image in men and boys (Bassett-Gunter, McEwan, & Kamarhie, 2017). Overall, it was shown that physical activity is positively related to body image in men. There was a significant relationship found specifically for adult men, however, results were less conclusive for older aged men mainly due to lack of research on this demographic.

It is evident that, for men, body image can impact both sexual activity and physical activity, indicating its importance as a covariate in the current study.

2.5 Motives for Physical Activity.

It is important to understand what motivates an individual to start or maintain physical activity. It has been documented that young adults tend to place a greater emphasis on appearance motives (Koslow, 1988). A total of 300 participants were

equally divided among age groups of 18-30, 31-40 and 41-50 years. They were asked to rank their exercise interest in four categories: health benefits, aesthetic benefits, social/emotional benefits, and training benefits. It was found that the youngest age group rated aesthetic benefits as the most important motive. The other age groups (31-40; 41-50 years) still did rate aesthetics as being highly important, but also equally rated health as important. This is supported by a study of middle-aged adults (M=40 years) in which the highest physical activity motivators were found to be health, fitness and physical appearance (Ingledew & Markland, 2008).

Kilpatrick, Hebert and Bartholomew (2005) found that a young college-aged sample (*M*=22 years) of males and females were more likely to report motives for exercise as being more focused on appearance, weight and stress management. In addition to this, the researchers also found a significant gender difference, such that men were more likely to report ego-related motives like challenge, endurance and social recognition.

How do the exercise motives of older adults compare to those of younger or middle-aged adults? Kolt, Driver and Giles (2004) studied a sample of older age Australians, ranging from 55 to 93 years (*M*=63.6 years) and found that many of the top reasons for participating in regular physical activity for both men and women were health related. They also found that ratings of fitness motives (i.e., “I want stay in shape”) were more important in the middle-age group (55-64 years) in comparison to the older-age groups (65+ years). The 75-year and older age group rated medical reasons as an

important motive for physical activity. In comparison to the previous research on younger males, the older males in the current study rated the 'ego'-related motives, such as social recognition, as the lowest motivators for physical activity.

This agrees with the work by Schuler et al. (2004) examining body-shape perceptions and motivations for exercise were studied. The sample consisted of 74 men and 101 women between the ages of 50-98 years (*M*=72 years). Participants were asked to identify their current body shape out of a silhouette scale then to indicate their ideal body shape. They were also asked if they exercised and if so, what their reasons were. Despite the sample indicating some levels of body shape dissatisfaction, body shape perceptions (physical appearance) did not motivate this sample to exercise. The most common reasons for exercise were physical health and physical fitness. It was also proposed that, "as individuals reach advanced age categories, their decision to exercise may no longer be motivated by a desire to *'look good'* but rather *'feel good'* (Schuler et al., 2004, p. 1259).

2.6 Rationale

Evidence suggests that a connection exists between physical activity and sexual activity. Physical activity and sexual activity are both important factors for quality of life and the current study will provide valuable insight into this relationship.

CHAPTER 3

Methodology

3.1 Participants

A total of 713 males were surveyed. Participants who were missing data on the following variables were removed from the study: age, sexual frequency, sexual desire, and a Godin total score (values for moderate and strenuous added together). Men who experienced erectile problems and indicated that medication did not resolve their issue were also excluded from the study.

A final sample of 659 heterosexual men was obtained. Participants ranged in age from 19 years to 75 years (M=31.9, SD=10.4). When classified into age groups, there were 323 young men (19-29 years, M = 23.8, SD=3.0), 286 middle-aged men (30-49 years, M = 36.4, SD=4.9) and 50 older-aged men (50-75 years, M = 57.9, SD=5.7). Participants had an average weight of 186.5 lbs, an average height of 1.80m and an average BMI of 26.0. Three hundred and eighty-three (78.8%) of the sample were classified as having access to a sexual partner (married, in a committed relationship, or single but dating one or more people), with a mean relationship length of 8.8 years (SD=8.9 years), while 103 (21.2%) of the sample indicated they were single and not dating. According to the GTLEQ question "*How often do you engage in regular physical activity to work up a sweat during a typical 7-day week?",* 32.7% of the sample indicated

'*often*', 45.9% indicated '*sometimes*' and 21.2% indicated '*never/rarely'*, indicating that the sample was relatively active.

3.2 Measures

Participants were asked the following demographic questions: age, height (feet and inches), weight (lbs), relationship status, length of current relationship, sexual orientation, and experience of any erectile problems and if this has been alleviated via medication. The following self-report surveys were also included in the study:

1) Godin Leisure-Time Exercise Questionnaire: a self-report questionnaire consisting of a 4-item query to assess leisure time physical activity with no specified time component. It divides the exercise categories into strenuous (heart beats rapidly), moderate (not exhausting) and mild exercise (minimal effort) with examples of activities provided for each category and asks participants how often during a typical week they partake in each category. Each category is then multiplied by their respective METs (9, 5 and 3) to obtain a total leisure activity score. Examples of activities satisfying these MET requirements were added to the GTLEQ to provide clarity. These examples were adapted from the Compendium of Physical Activities (Ainsworth et al., 2011). The GTLEQ also asks whether the participant engages in regular physical activity to work up a sweat during a typical 7-day week (often, sometimes or never/rarely) to gauge the physical activity proportions of the sample (Godin & Shephard, 1997). Concurrent validity was assessed by comparing the GLTEQ to values of body fat (BF) percentage and maximum oxygen intake (VO_2 max). A value of .30 was found which is "high enough for

eliminating the possibility that the classification would have occurred by chance (Godin & Shephard, 1985). This indicates that the GLTEQ was relatively accurate in classifying individuals into groups (Thin or Fat) according to the results of BF percentage and VO_2 max. In addition, the "reliability coefficients for the optimum discriminant functions classifying VO_2 max percentile and BF percentile were 0.83 and 0.85 respectively. Two-week test-retest reliability indicated 0.94 (strenuous), 0.46 (moderate), 0.48 (light) and 0.80 (sweat-inducing exercise). For total scoring to reflect health benefits, Godin (2011) recommends totalling the strenuous and moderate activity scores. Total scores of 24 units or more are considered active (i.e., benefits to health), scores between 14-23 units are considered moderately active (i.e., some benefits to health) and scores less than 14 units are considered insufficiently active (i.e., low benefits to health).

2) Exercise Motives Inventory 2 (EMI-2): a 51-item self-report measurement scale of motivations to exercise, ranging from 0 'not at all true for me' to 5 'very true for me'. It includes many different personal influences on motivation and is comprised of 14 subscales: stress management, revitalization, enjoyment, challenge, social recognition, affiliation, competition, health pressures, ill-health avoidance, positive health, weight management, appearance, strength and endurance, and nimbleness. The EMI-2 has been shown to be a factorially valid method to measure exercise motivation across males and females as well as those who do and do not exercise regulary (Markland & Ingledew, 1997). Research has found an internal consistency of the 14 subscales to have a Cronbach's alpha of 0.63-0.90 and a test-retest reliability (4-5 weeks) of 0.58-0.88

(Markland & Hardy, 1993; Markland & Ingledew, 1997). The scales that regularly show the lowest consistency are the *Health Pressures* and *Revitalization* scales. In the current study, Cronbach's alpha values ranged from 0.52 to 0.95.

3) Sexual Frequency: participants were asked to indicate how often they engage in sexual intercourse (penetrative sex) in a typical 7-day week. They were also asked how often they desire or wish they had sexual intercourse (penetrative sex) during a typical 7-day week.

4) Multidimensional Body-Self Relations Questionnaire MBSRQ: a 69-item self-report measure that assesses self-attitudinal aspects of body image including cognitive, evaluative and behavioural dispositions towards the physical self (Cash, 2000b). It includes seven factor subscales: appearance evaluation, appearance orientation, fitness evaluation, fitness orientation, health evaluation, health orientation and illness orientation (see Appendix E for detailed descriptions). The appearance related factors are comprised evaluative dispositions and the orientation factors include cognitive and behavioural dispositions. It also includes 3 special multi-item subscales: The Body Areas Satisfaction Scale, The Overweight Preoccupation Scale and The Self-Classified Weight Scale. The MBSRQ has been used extensively in empirical studies due to its multidimensional nature. It has been used in basic psychometric studies as well as clinical research. It is intended for use with adolescents and adults aged 15 years or older. For males, reliability values have ranged from .70-.91 with a 1-month re-test reporting values from .71-.89. The author has published substantial research on the MBSRQ and has confirmed strong

convergent, discriminant, and construct validity (Brown, Cash, & Mikiluka, 1990; Cash, 2000b; Cash, Jakatdar, & Williams Fleming, 2004). Cronbach's alpha values in the current study ranged from 0.70 to 0.90.

3.3 Procedure

Participants were recruited in person and online. Those recruited in person were provided with a verbal description of the study, were asked to sign the consent form and then given a link to the survey online. A brief description of the study was posted on Facebook with the option to re-share the link to enhance participation. On reddit, a similar approach was taken, except the description was posted in several subreddits designed for men (/AskMen, /men, /menshealth, /askmenover40, /over60). Upon clicking the link, participants first encountered the consent form detailing the purpose of the study. Participants were informed that the survey should take no longer than 15 minutes to complete. Those who did not consent were redirected to a page thanking them for their time. Those who did consent were first directed to the consent form followed by a series of questionnaires. Upon completion of the survey, participants were re-directed to a debriefing letter that further explained the purpose of the study and provided contact information should any questions or concerns arise. A total of 96% of the participants were recruited online.

3.4 Outcomes, Predictors and Mediators

The current study assessed the relationship between physical activity and sexual activity in men, while also considering the variables of age, motives for exercise and body image. The predictor variable (Y) is the total score on the GTLEQ while the outcome variables are sexual frequency and sexual desire (X). Motives for exercise and body image will be used as mediators (M), comparing the results with and without age as a covariate (C).

3.5 Design and Analysis

3.5.1 Power analysis. A power analysis using the g*power software was conducted (Faul, Erdfelder, Lang, & Buchner, 2007; Faul, Erdfelder, Buchner, & Lang, 2009) using the proper value to obtain a moderate effect size f = 0.25 (Cohen, 1992), an alpha of 0.05, and a power of 0.80. The resulting desired total sample size is 179.

3.5.2 Data entry. All demographic data and survey results were imported into IBM Statistical Packages for the Social Sciences (SPSS) for Mac Version 25. The data was screened, cleaned and assessed for outliers. Using height and weight, body mass index (BMI) was calculated for each participant using the following formula: $BMI=kg/m^2$. Participants were grouped such that those with access to a sexual partner were coded as '1' (married, in a committed relationship, single but dating one or more people) and '2' (single and not dating).

Total GLTEQ scores were calculated using the strenuous and moderate questions only (Godin, 2011), where a score of 24 or more is considered "*active*", a score between 14-23 is "*moderately active*" and a score below 14 is "*insufficiently active".* The EMI-2 scores were simply totalled across the 14 scales, yielding a single score for each scale for each participant. The MBSRQ items were totalled to produce the respective sub-scales. To cut down on the number of moderator variables, and according to the suggestion provided by the author (Cash, 2000b), the health evaluation and fitness evaluation/health orientation and fitness orientation scores were combined and averaged to produce a single health/fitness evaluation variable and a health/fitness orientation variable.

3.5.3 Data analysis. All data analyses were completed in IBM Statistical Packages for the Social Sciences (SPSS) for Mac Version 25. For each analysis, an alpha level of $p < .01$ was used. To address whether men who engage in regular physical activity are more sexually active in comparison to men who are minimally physically active, the data was explored using Pearson's correlation. First, correlations were completed with the whole sample; one with physical activity and sexual frequency, the other with physical activity and sexual desire. Secondly, the same correlations were completed by dividing the sample by access to a sexual partner and thirdly, by age.

To determine if motives for exercise and body image influence the relationship between physical activity and sexual activity, two parallel mediation analyses were conducted using the PROCESS macro (v. 3.2.01) for SPSS (Hayes, 2018).

The mediation procedure (Figure 1.), proposes that a mediator variable (M) explains the relationship between an independent variable (X) and an outcome variable (Y). The independent variable may influence the mediator (pathway *a*) which in turn may influence the outcome variable (pathway *b*), also know as the indirect effect (*ab*). There is also the direct effect (*c'*) which is the effect of independent variable on outcome while holding mediator constant. The combination of the indirect and direct effects results in the total effect (*c*), which is the regression of the outcome on the independent variable (Hayes, 2018; Kane & Ashbaugh, 2017).

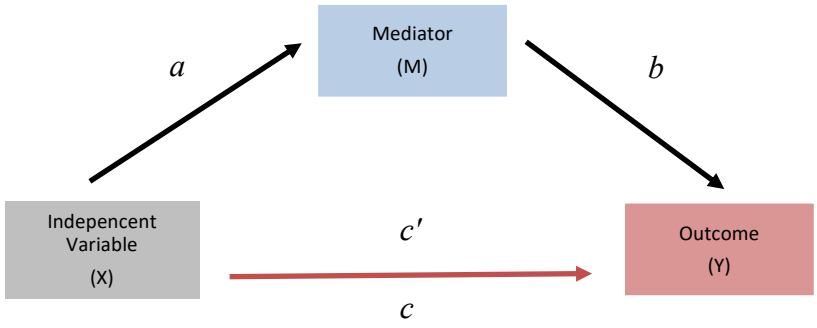


Figure 1. **Simple mediation model with one mediator variable (M) mediating the relationship between the independent variable (X) and the outcome variable (Y) (Hayes, 2018; Kane & Ashbaugh, 2017).**

The indirect effect (*ab*) is considered to be significant if the lower limit and upper limit of the 95% percentile bootstrap confidence interval does not contain zero. If this is this case, mediation has successfully occurred. For the current study, a series of parallel

mediation analyses were conducted which means multiple mediators were used as opposed to a single mediator.

CHAPTER 4

Results

Descriptive results for the main independent and dependent variables are presented in Table 1. According to the GTLEQ scores (calculation of the strenuous and moderate scores), the sample was insufficiently active for health benefits. On average, participants had sexual intercourse two days per week and desired sexual intercourse five days a week.

Table 1. ***Means (M) and standard deviations (SD) of the GTLEQ moderate-strenuous scores, sexual frequency (days per week) and sexual desire (days per week) for all participants (N = 659).***

Variable	M (SD)	Range
GTLEQ	6.00 (4.56)	0-30
Sexual Frequency	2.02 (2.13)	0-14
Sexual Desire	5.11 (3.05)	0-14

To first explore the relationship between physical activity and sexual activity in men, a series of Pearson's product moment correlations were conducted. Preliminary analyses were performed to ensure no violation of assumptions, including normality,

linearity, homoscedasticity, and outliers. Participants reporting greater than 14 times/week for sexual frequency and sexual desire were considered outliers.

There was a small positive correlation between physical activity and sexual frequency (r = .12, n = 659 p = .008) indicating that men who scored higher on the GTLEQ (higher levels of physical activity) also had higher levels of sexual frequency. There was no significant relationship found between the physical activity and sexual desire.

The sample was then segregated based on access to a sexual partner (married, in a committed relationship, single but dating on or more people) or no access to a sexual partner (single and not dating). No significant correlations were found between physical activity, sexual frequency and sexual desire for participants who had no access to a sexual partner (n = 103). For those with access to a partner, a significant positive correlation between physical activity and sexual activity was found (r = .21, n = 383, p = <.001). There was no significant relationship found between physical activity and sexual desire for those who had access to a sexual partner.

With respect to age, the sample was divided into three age groups: young (19-29 years, n = 162, M = 23.85 years, SD = 2.95 years), middle (30-49 years, n = 188, M = 36.59 years, SD = 5.15 years), and older (50-75 years, n = 33, M = 58.39 years, SD = 5.85 years). Only participants who had access to a sexual partner were included in the analysis. As shown in Table 2., a significant correlation between physical activity and sexual activity was only found among the young age group.

Table 2. ***Means (M), standard deviations (SD) and correlations between sexual frequency (SF) and physical activity (PA) per age group. Note: *p<.001***

Age Group	M (SD)		r
	SF	PA	
Young (19-29 years)	3.06 (2.23)	5.94 (4.44)	.296*
Middle (30-49 years)	2.18 (2.03)	5.91 (4.03)	.133
Older (50-75 years)	1.43 (1.13)	4.30 (3.66)	-.049

Due to the lack of relationship found between physical activity and sexual desire, all further analyses focused solely on sexual frequency as the main variable representing sexual activity. Additionally, only men categorized as having access to a sexual partner were included in the analyses. The first parallel mediation analysis included six mediator variables from the MBSRQ: fitness/health evaluation, fitness/health orientation, appearance evaluation, appearance orientation, illness orientation and the BASS (body areas satisfaction scale).

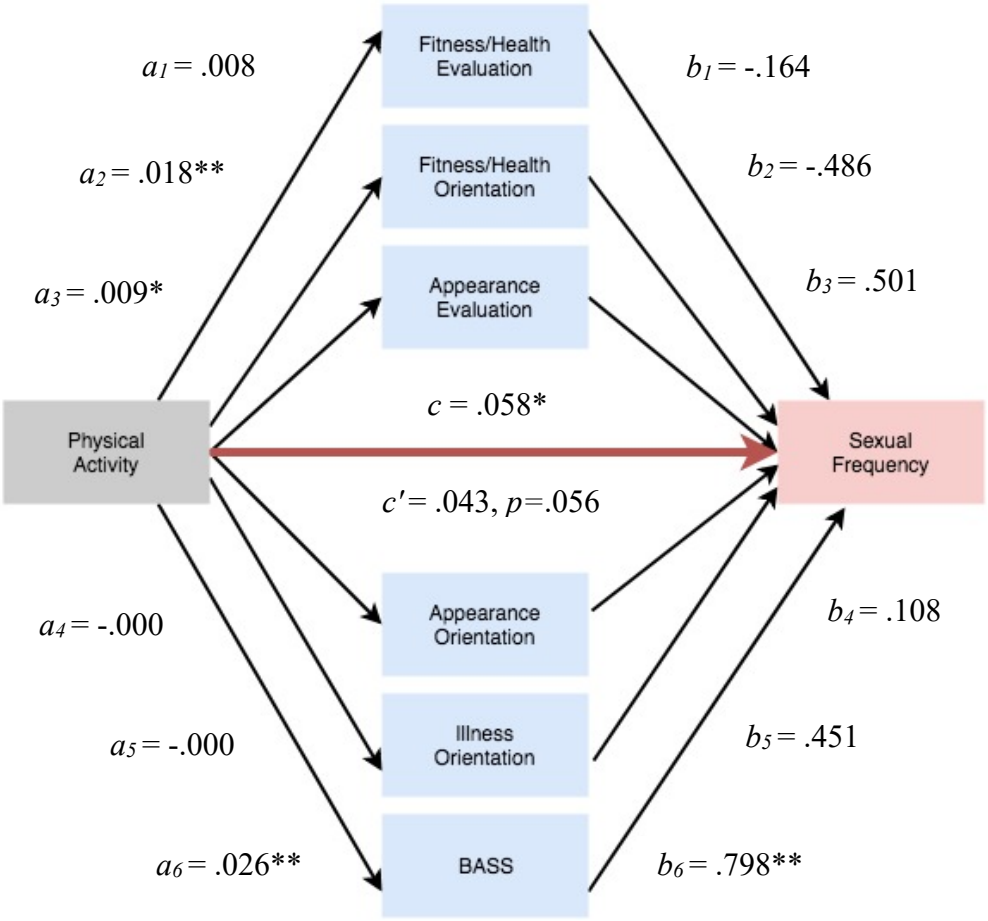


Figure 2. **Visual representation of the body image mediators examined in the parallel mediation analysis (n = 352) between physical activity and sexual frequency in men using unstandardized coefficients. Notes: *p < .01, **p < .001.**

As shown in Figure 2, the results indicate that physical activity is indirectly related to sexual frequency through the body areas satisfaction scale. Physical activity resulted in greater levels of body area satisfaction (a_6 = .026, p < .001) and greater levels of body area satisfaction were related to increased levels of sexual frequency (b_6 = .798, p

<.001). Through a 95% confidence interval using 5000 percentile bootstrapped samples, the indirect effect through body areas satisfaction was found to mediate the relationship between physical activity and sexual activity while holding all the other mediators constant (a_6b_6 = .019, *SE* = .009, CI [.001, .038]).

To determine the difference between age groups, the same parallel mediation analysis was conducted with each age group (young = 19-29 years, middle = 30-49 years and older = 50-59 years) in order to compare the indirect effects by a single-group design (Ryu & Cheong, 2017). For young men, greater levels physical of activity resulted in higher scores on the BAS (a = .041, p <.001), and increased BAS scores resulted in more sexual frequency (b = .923, p = .01). The 95% confidence interval using 5000 percentile bootstrap samples was significant (ab = .038, *SE* = .012, CI [.010, .078]) indicating the indirect effect through body areas satisfaction was found to mediate the relationship between physical activity and sexual frequency. Contrarily, older men greater levels of physical activity resulted in higher scores on the fitness/health orientation scale (a = .056, p = .002), and increased fitness/health orientation scores resulted in more sexual frequency (b = 1.628, p = .01). The 95% confidence interval using 5000 percentile bootstrap samples was significant (ab = .089, *SE* = .046, CI [.004, .188]) indicating the indirect effect through fitness/health orientation was found to mediate the relationship between physical activity and sexual frequency. No significant mediation was found for middle aged men.

The second parallel mediation analysis included six mediator variables that were selected apriori based on reliability from the EMI-2: social recognition, competition, ill-health avoidance, positive health, appearance, and strength and endurance.

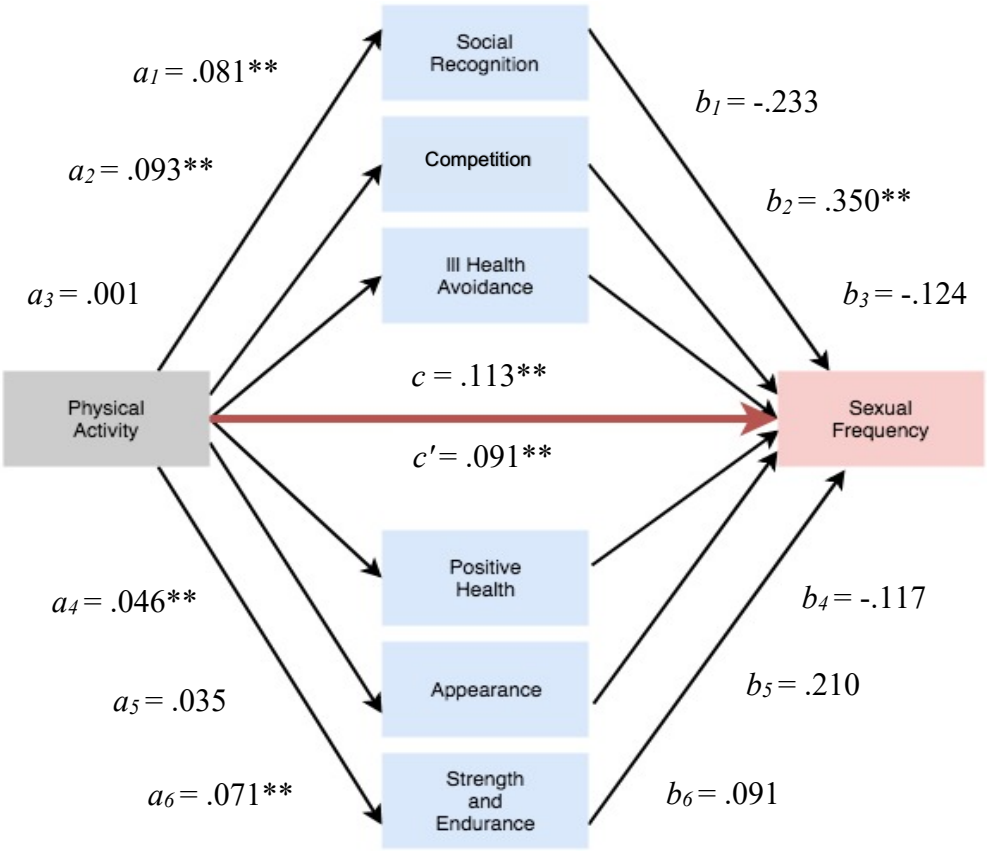


Figure 3. **Visual representation of the exercise motive mediators examined in the parallel mediation analysis (n = 369) between physical activity and sexual frequency in men using unstandardized coefficients. Notes: *p < .01, **p < .001.**

As shown in Figure 3, the results indicate that physical activity is indirectly related to sexual frequency through the exercise motive of competition. Physical activity

resulted in greater levels of competition as an exercise motive (a_2 = .093, p = .000) and greater levels of competition were related to increased levels of sexual frequency (b_2 = .350, p = .000). Through a 95% confidence interval using 5000 percentile bootstrapped samples, the indirect effect through competition was found to mediate the relationship between physical activity and sexual activity while holding all the other mediators constant (a_2b_2 = .033, *SE* = .011, CI [.014, .056]). Additionally, physical activity resulted in increased sexual frequency even when considering physical activity's indirect effect through the six exercise motive mediators (c' = .091, p = .001).

When comparing the age groups, it was found that for young men greater levels of physical activity resulted in higher scores of competition motives for exercise (a_1 = .117, p <.001) and increased competition motives resulted in more sexual frequency (b_1 = .352, p = .009). The 95% confidence interval using 5000 percentile bootstrap samples was significant (*ab* = .041, *SE* = .018, CI [.011, .085]) indicating the indirect effect through the motive of competition was found to mediate the relationship between physical activity and sexual frequency. No significant mediating effects were found for the middle and older age groups.

CHAPTER 5

Discussion

The purpose of the current study was to examine the relationship between physical activity and sexual activity in men as well as to explore the impact of body image and exercise motives as mediators to this relationship. It was being hypothesized that (1) there would be a positive relationship between physical activity and sexual activity in men and (2) body image and motives for exercise would mediate the relationship between physical activity and sexual activity.

A sample of 659 heterosexual men aged 19 years to 75 years (M=31.9, SD=10.4), were primarily recruited online and completed an online survey containing demographic questions, measures of physical activity, sexual activity, body image and exercise motives. Physical activity was measured using the GTLEQ which conceptualizes physical activity as 'leisure time physical activity' and refers to any type of physical activity, planned or unplanned, that occurs during a regular day excluding occupational physical activity (Godin & Shephard, 1997). Sexual activity was measured by the frequency of both sexual intercourse and sexual desire occurring during a typical seven-day week. Initial correlation analyses partially supported the first hypothesis; there was a small positive correlation (r = .12) between sexual frequency and the GTLEQ scores, indicating that men who were more physically active had sex more frequently. No significant correlation was found between physical activity and sexual desire. The sample

was then divided by those who had access to and no access to a sexual partner since partnered men are more likely to partake in sexual intercourse compared to single men (Reece et al., 2010). A small positive correlation (r = .21) was found between sexual frequency and physical activity, but not between sexual desire and physical activity. Due to the lack of significant findings with sexual desire as an outcome, this variable was dropped from further analyses. The sample of men who had access to a sexual partner was then divided by age: young (19-29 years), middle (30-49 years) and older (50-75 years). A significant positive correlation between physical activity and sexual frequency was only found among the young age group which coincides with previous research (Mintz, 2012). The results from the current study also indicated a trend for physical activity and sexual activity to decline with age, which coincides with data from previous studies (Karraker, DeLamater, & Schwartz, 2011; Lindau et al., 2007; Statistics Canada, 2016).

To test the second hypothesis, a series of parallel mediation analyses were completed. The first mediation analysis included six body image variables from the MBSRQ as mediators: fitness/health evaluation, fitness/health orientation, appearance evaluation, appearance orientation, illness orientation and the BASS (body areas satisfaction scale). The results indicated that the BASS was the only significant predictor of sexual frequency, and through mediation, accounted for a significant portion of the relationship between physical activity and sexual frequency. When the sample was

divided into age groups, the mediating relationship of the BASS only persisted for the younger age group (19-29 years).

The second parallel mediation analysis included six exercise motive variables from the EMI-2: social recognition, competition, ill-health avoidance, positive health, appearance, and strength and endurance. The results indicated that the competition exercise motive was a significant predictor of sexual frequency and mediated the relationship between physical activity and sexual activity. When the sample was divided into age groups, young men with greater levels physical activity had higher scores of competition motives for exercise and increased competition motives resulted in more sexual frequency. No significant mediating effects were found for the middle and older age groups.

5.1 Physical Activity and Sexual Activity

Physical activity and sexual activity are both important aspects of quality of life. On average, men are more sexually active and physically active in comparison to women (Caspersen et al., 2000; Beutel et al., 2008; Statistics Canada, 2016). Furthermore, levels of both physical activity and sexual activity show a trend to decline with progressing age (Karraker et al., 2011; Lindau et al., 2007; Statistics Canada, 2016). Results from the current study support these findings; the younger participants were, on average, more sexually active and physically active in comparison to older participants. In additional to physical health, another factor that significantly impacts the frequency of sexual activity is access to a sexual partner (Reece et al., 2010). A study found that healthy but sedentary

men living with a partner who participated in an exercise intervention program presented with greater sexual responsiveness and functioning in comparison to controls (White et al., 1990). In the current study, physical activity and sexual frequency were found to be positively correlated, and this correlation was enhanced when only men with access to a sexual partner were included in the analysis.

Research on the relationship between physical activity and sexual activity in men is sparse. Studies that have been conducted tend to focus on younger or middle-aged men and have indicated that improvements in physical activity and fitness are associated with enhancements to sexual activity, sexual functioning, sexual pleasure, libido and frequency (Bortz & Wallace, 1999; Bacon et al., 2003; Frauman, 1982; Krucoff & Krucoff, 2000; Stanten & Yeager, 2003). For older men, health has been shown to be the primary limiting factor of sexual activity and, as a result, men with a lower health status lose more years of a sexually active life in comparison to healthier men (Karraker, DeLamater, & Schwartz, 2011; Laumann et al., 2005; Lindau & Gavrilova, 2010). Additionally, findings suggest that physical activity results in improvements to erectile functioning and lower levels of sexual dysfunction (Bacon et al., 2003) which can slow the decline of sexual activity with aging.

The current study established that a significant correlation exists between physical activity and sexual frequency for younger men. However, sexual desire was not found to be a significant correlate in the current study. This partially coincides with previous research involving younger men (18-25 years) where both frequency of sexual activity

and desire for sexual activity are significantly correlated with increased levels of physical activity (Frauman, 1982). Research has also shown a similar relationship between physical activity and sexual frequency for middle aged and older men (Bacon et al., 2003; White et al., 1990) but the current study did not detect a significant relationship between physical activity and sexual frequency for these age groups. This may be due to the low levels of physical activity found in this sample, as well as the selected distribution of the age samples. Had more older men been recruited, as well as those with higher levels of physical activity, a significant result may be been found.

5.2 Body Image

Body image is a multifaceted construct that includes an individuals' perceptions, feelings and attitudes towards their own body (Burlew & Shurts, 2013). Research has consistently shown that physical activity improves body image as demonstrated by two large meta-analyses encompassing over a hundred studies on the topic; specifically, exercisers report more positive body image in relation to non-exercisers, and individuals directly involved in exercise interventions report more positive body image compared to controls (Hausenblas & Fallon, 2006; Campbell & Hausenblas, 2009). Traditionally, much of the research relating to body image has focused on women (Daniel & Bridges, 2013), but the creation of gender sensitive instruments has now shown that men do present with body image concerns; they simply display them differently than women (Davison & McCabe, 2005). For example, desire for increased muscle tone and gaining

weight are common body image concerns that males express (Garner, 1997; Gillen & Lefkowitz, 2006).

In the current study, the MBSRQ contains a subscale directly related to concerns for physical aspects of the body, the Body Areas Satisfaction Scale (BASS). The BASS measures "satisfaction with discrete aspects of one's appearance…high composite scorers are generally content with more areas of their body…and low scorers are unhappy with the size or appearance of several areas" (Cash, 2000b, pg. 3). The data from the BASS indicated that younger men, in comparison to the older aged group, tended to report more concern for area such as their upper torso (chest, shoulders, arms), mid torso (waist, stomach), muscle tone, and weight which is similar to previous research on body image concerns in men (Garner, 1997; Hargreaves & Tiggeman, 2009; Mulgrew & Craig, 2015). This may be partly due to younger men being more heavily impacted by social comparison when compared to older men (Mulgrew & Craig, 2015). Younger men tend to be more influenced by the portrayal of the ideal male body in the media, one that is growing more muscular over time (Hargreaves & Tiggeman, 2009; Daniel & Bridges, 2013). Generally, it is difficult to achieve this ideal without implementing some form of physical activity; therefore, those that are physically active will likely see some form of improvement to their physique and will in turn have more favorable body image (Hausenblas & Fallon, 2002). The present study demonstrated that the degree of physical activity in younger men correlated with the degree of body areas satisfaction.

Research has indicated that poor body image also has a significant impact on sexual behaviour, such that individuals with less favorable body image are less satisfied with their sex lives, engage in sex less frequently, and are less comfortable with sexual experiences in general (Davison & McCabe, 2005; Faith & Schare, 1993; Gillen, Lefkowitz, & Shearer, 2006; Trapnell et al., 1997). A recent study by van den Brink et al. (2018) found that negative body attitudes and body self-consciousness during intimacy were significantly correlated with sexual dissatisfaction. Specifically, negative attitudes towards muscularity, body fat, height and genitals were correlated with sexual dissatisfaction. The current study demonstrated that for younger men, physical activity significantly improved body image and this improvement in body image resulted in greater levels of sexual frequency, where the BASS served as a significant mediator for this relationship. This provides a link between two streams of research, the first indicating that physical activity improves body image and the second that positive body image is associated with high levels of sexual frequency. Additionally, with respect to the MBSRQ, older men who exercised displayed higher scores on the fitness/health orientation subscale, where high scorers are "health conscious and try to lead a healthy lifestyle" and they also "value fitness and are actively involved in activities to enhance or maintain their fitness" (Cash, 2000b, pg. 3) had greater levels of sexual frequency. Older men were less impacted by the BASS, in comparison to younger men in the sample. This provides evidence supporting the notion that, although body image levels remain relatively stable across the lifespan, there may in fact be a shift in the focus; from

appearance to functionality (Reboussin et al., 2000; Tiggeman, 2004). Older men may be less concerned with how they look and more concerned with how their body is functioning.

5.3 Exercise Motives

It is important to determine why an individual may partake or maintain physical activity, however, this task can prove to be complicated as many variables can contribute to why an individual may engage in physical activity, including personality and stages of change (Courneya & Hellsten, 1998; Ingledew, Markland, & Medley, 1998). This relationship can also vary with age. Generally, research has indicated that younger men tend to be motivated by ego-related and interpersonal motives, while older men tend to be motivated by health and physical fitness (Kilpatrick, Hebert, & Bartholomew, 2005; Koslow, 1988; Quindry, Yount, O'Bryant, & Rudisill, 2011).

The current study found that the competition exercise motive was a significant mediator of relationship between physical activity and sexual activity for younger men. It has been proposed that, with respect to young adults, mate selection plays a role in the expressed motives for physical activity. Younger adults are more concerned with developing or maintaining intimate relationships and appearance is an important factor relating to this, especially in today's society, therefore appearance-related concerns should be more motivating for younger individuals (Trujillo, Brougham, & Walsh, 2004). On the contrary, older men in the current study who were physically active were more likely to be exercising for health enhancement motives (approaching significance) and as

a result, had greater levels of sexual frequency. With ageing, older individuals tend to experience more concern for their own health as they age as well as experiencing "limitations brought on by their declining physical strength" (Trujillo et al., 2004, p. 350). This suggests that older individuals should show a greater interest in the health-related benefits of physical activity in comparison to younger adults. This also closely ties in with the concept of a switch of body image focus from appearance to function as age increases.

The combination of these age-related results supports the notion that, as individuals age, they may be exercising to feel good and be functional, rather than to satisfy ego-related motives and look good (Schuler et al., 2004).

5.4 Middle-Aged Men

Interestingly, the current study did not result in any significant findings for middle-aged men, with respect to both exercise motives and body image. This could be due to the sampling distribution of the participants and the resulting age groups. Since the sample was predominately young, men categorized not the middle-aged group were still relatively young (30-49 years), with most of these participants being under the age of 35 (M = 32.8). Ideally, this age grouping would have contained older participants, possessing a mean age closer to what is considered middle-age. Secondly, middle-aged men represent a complex population with respect to body-image and this may influence the results. Although evidence suggests that body image remains relatively stable across the lifespan, the shift from body focus to a focus on functionality is multifaceted

(Reboussin et al., 2000; Tiggeman, 2004) and often, middle-aged men will display conflicting results. For example, middle-aged men may still show appearance-related concerns and motives, but at the same time, functional concerns and motives (Ingledew & Markland, 2008; Koslow, 1988).

This is supported by the work of Quindry et al. (2011), who discovered that a sample of middle-aged individuals (equally divided genders) displayed a mix of exercise motives when compared to their younger and older counterparts. The researchers divided the EMI-2 into several thematic subscales: fitness, interpersonal, body related, psychological and health. It was found that middle-aged participants presented with all the motives, while younger participants presented with fitness and interpersonal motives, and older participants with health and fitness motives. Younger participants were less likely to engage in exercise for health benefits, but as they aged, there was a loss for interpersonal motives and a shift towards health motives. Middle-aged men seem to represent a balance between appearance and functionality.

5.5 Limitations and Future Research

A limitation of the current study is the sampling method of the participants. Men were primarily recruited online and therefore may only represent a specific subset of the population. Also, the sample was disproportionate in age distribution: 162 young men (19-29 years, M = 23.85 years, SD = 2.95 years), 188 middle aged men (30-49 years, M = 36.59 years, SD = 5.15 years), and 33 older aged men (50-75 years, M = 58.39 years, SD = 5.85 years). It would have been ideal for the sample to have more older aged

participants as the mean age for the older group was only 58.39 years, which is still quite young. A more even distribution would have permitted in depth age comparisons, as previous research has indicated that physical activity and sexual activity vary with age (Caspersen et al., 2010, Herbenick et al., 2010). Future research should focus on obtaining a sample with comparable age groups to further comprehend the relationship between physical activity and sexual activity across the lifespan and how body image and motives for exercise influence this relationship. More focus could be placed on recruiting those living in retirement communities, or independent living facilities. It is also important to note that some research has indicated that individuals who readily participate in studies relating to sexuality are different than those who do not consent to participate. Although limited, it has been shown that those who participate in sexuality research may represent a more liberal and open sample, and that it might include those who engage in sex more frequently and have a more positive attitude towards their own sexuality (Morokoff, 1986; Strassberg & Lowe, 1995).

The present study did not include any measures of genital body image and this may also contribute to sexual activity. Studies have determined that a favorable genital perception (including penis size, circumference and appearance) is positively correlated with body image in men (Morrison et al., 2005; Algars et al., 2011). Moreover, height, body hair and head hair also represent potential areas of concern for men (Tiggemann, Martins, & Churchett, 2008). Additionally, there may be other confounding variables related to sexual dysfunction and reduced sexual activity such as level of education, race,

ethnicity, smoking status, emotional stress, and previous sexual victimization (Laumann, Paik & Rosen, 1999; Saigal, Wessells, Pace, Schonlau, & Tilt, 2006). These may be important variables to control for in any further examination of the relationship between physical activity and sexual activity.

Another limitation of the current study was the way in which sexual desire was measured. In the question "How often, in a typical 7-day week, do you desire or wish you had sexual intercourse (penetrative sex)?", some participants may have interpreted this as how often they think about having intercourse, as opposed to how often they realistically want to have it. For example, several participants reported very high values in response to this question, suggesting a misunderstanding, as having sex a hundred times in a week is unrealistic, whereas thinking about sex itself may happen more frequently. Future research could include a more robust measure of sexual desire to deter similar errors. Additionally, measures of perceived levels of sexual satisfaction may be beneficial. Although an individual may score lower than what is considered average on either sexual frequency or sexual desire, they may consider their current level of sexual satisfaction to be acceptable. For example, having sex four times a week might be satisfactory for one individual but might be completely unsatisfactory for another.

The GTLEQ is an acceptable measure of leisure time physical activity, however, future research could focus on implementing physiological metrics as measures of physical activity, such as VO_2max testing to determine the degree of physiological fitness, in addition to subjective measures, such as the GLTEQ. This may be valuable

because the GTLEQ excludes occupational physical activity. An individual may be more physically fit due to the nature of the occupation but may not have high levels of LTPA. Moreover, the GTLEQ only assesses the frequency and intensity of physical activity, not the total time, and it bases the METs on typical energy expenditure for said activity as opposed to representing a range. It would also be beneficial to recruit participants with a broader range of physical activity scores, as the sample in the current study were mainly categorized as being 'insufficiently active' for health benefits. A recent study indicated that four 40-minute sessions of moderate to vigorous intensity exercise per week can significantly reduce erectile dysfunction (Gerbild, Larsen, Graugaard, & Areskoug Josefsson, 2018). Additionally, short and intense sessions of physical activity are associated with greater levels of testosterone which has been linked to increased sexual behaviour (Krucoff & Krucoff, 2000). Participants in the current study were not directly involved in a structured exercise intervention like the abovementioned studies, but were a random sample of men from the general population who presented with relatively low to moderate physical activity levels.

5.6 Conclusion

Physical activity and sexual activity are two variables which can be assessed and interpreted in a variety of ways, both with physiological and psychological metrics. Although previous research has indicated that some sort of relationship does exist between these two variables (Frauman, 1982; Bacon et al., 2003; Bortz & Wallace, 1999; White et al., 1990) due to their complexity, this is a difficult relationship to discern. It has

been shown that, although there is a positive relationship between physical activity and sexual activity, this relationship can be mediated by variables relating to one's motive for physical activity and one's perception of their body. Additionally, the current study has highlighted that, despite physical activity and sexual activity being significantly related, the underlying mechanisms mediating this relationship differed with age; younger men present with greater physical appearance concerns and interpersonal motives for exercise, while older men are more focused on physical health and functionality. The current study has provided valuable insight into the complex relationship between physical activity and sexual and has provided a stepping stone to future research on this topic.

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Appendix A: Demographics

Participant#_____

Please answer the following demographic questions.

1. What is your age? _____years old

2. How tall are you? _____feet_____inches

3. How much do you weigh? _____lbs

4. Relationship status:

- ☐ Married
- ☐ In a committed relationship
- ☐ Single but dating one or more people
- ☐ Single and not dating
- ☐ Widowed

5. Length of current relationship in years and months (if applicable):

Years_____Months_____

6. What is your sexual orientation? (please circle)

- ☐ Heterosexual
- ☐ Homosexual
- ☐ Bisexual
- ☐ Transgender
- ☐ Other_____ (specify)

7. Do you experience any difficulty in achieving or maintaining erection prior to or during intercourse that negatively impacts intercourse?

- ☐ Yes

☐ No

8. If yes, has medication resolved any of these issues?

☐ Yes

☐ No

Appendix B: Sexual Frequency Questionnaire

1. How often, in a typical 7-day week, **would you engage in sexual intercourse** (penetrative sex)? Please add the total number of instances of intercourse over 7 days, including if intercourse happens multiple times a day.

_____ times per week

2. How often, in a typical 7-day week, **do you DESIRE or WISH you had sexual intercourse** (penetrative sex)?

_____ times per week

Appendix C: Godin Leisure-Time Exercise Questionnaire (GLTEQ)

Participant#_____

During a typical **7-day period** (a week), how many times on the average do you do the following kinds of exercises for **more than 15 minutes** during your free time (write on each line the appropriate number).

a) STRENUOUS EXERCISE **Times**

HEART BEATS RAPIDLY **Per Week**

(e.g., running, jogging, hockey, football, soccer,
squash, basketball, vigorous swimming,
vigorous long distance bicycling, cross-country skiing) _____

b) **MODERATE EXERCISE** **Times**

NOT EXHAUSTING **Per Week**

(e.g., fast walking, weight lifting, resistance training,
power yoga, baseball, tennis, easy swimming, easy bicycling,
moderate effort yard work, alpine skiing) _____

c) **MILD EXERCISE** **Times**

MINIMAL EFFORT **Per week**

(e.g., yoga and stretching, fishing from riverbank,
bowling, horseshoes, golf, archery, snowmobiling,
easy walking) _____

During a typical **7-day period** (a week), in your leisure time, how often do you engage in any regular activity **long enough to work up a sweat** (heart beats rapidly)?

Often Sometimes Never/rarely

GLTEQ Scoring (Godin, 2011)

Using the categories of strenuous and moderate intensities only, the following cut off points are suggested for overall health benefits.

24 units or more: active (substantial benefits)

14-23 units: moderately active (some benefits)

Less than 14 units: insufficiently active (less substantial or low benefit

Appendix D: Exercise Motives Inventory 2 (EMI-2)

Participant#_____

On the following pages are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, *or would be true* for you personally if you did exercise. If you do not consider a statement to be true for you at all, circle the '0'. If you think that a statement is very true for you indeed, circle the '5'. If you think that a statement is partly true for you, then circle the '1', '2', '3' or '4', according to how strongly you feel that it reflects why you exercise or might exercise.

Remember, we want to know why *you personally* choose to exercise or might choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

	Personally, I exercise (or might exercise) …	Not at all true for me					Very true for me
1	To stay slim	0	1	2	3	4	5
2	To avoid ill-health	0	1	2	3	4	5
3	Because it makes me feel good	0	1	2	3	4	5
4	To help me look younger	0	1	2	3	4	5
5	To show my worth to others	0	1	2	3	4	5
6	To give me space to think	0	1	2	3	4	5

	Personally, I exercise (or might exercise) …	Not at all true for me					Very true for me
7	To have a healthy body	0	1	2	3	4	5
8	To build up my strength	0	1	2	3	4	5
9	Because I enjoy the feeling of exerting myself	0	1	2	3	4	5
10	To spend time with friends	0	1	2	3	4	5
11	Because my doctor advised me to exercise	0	1	2	3	4	5
12	Because I like trying to win in physical activities	0	1	2	3	4	5

13	To stay/become more agile	0	1	2	3	4	5
14	To give me goals to work towards	0	1	2	3	4	5
15	To lose weight	0	1	2	3	4	5
16	To prevent health problems	0	1	2	3	4	5
17	Because I find exercise invigorating	0	1	2	3	4	5
18	To have a good body	0	1	2	3	4	5
19	To compare my abilities with other peoples'	0	1	2	3	4	5
20	Because it helps to reduce tension	0	1	2	3	4	5
21	Because I want to maintain good health	0	1	2	3	4	5
22	To increase my endurance	0	1	2	3	4	5
23	Because I find exercising satisfying in and of itself	0	1	2	3	4	5

		Not at all true for me					**Very true for me**
Personally, I exercise (or might exercise) …							
24	To enjoy the social aspects of exercising	0	1	2	3	4	5
25	To help prevent an illness that runs in my family	0	1	2	3	4	5
26	Because I enjoy competing	0	1	2	3	4	5
27	To maintain flexibility	0	1	2	3	4	5
28	To give me personal challenges to face	0	1	2	3	4	5

29	To help control my weight	0	1	2	3	4	5
30	To avoid heart disease	0	1	2	3	4	5
31	To recharge my batteries	0	1	2	3	4	5
32	To improve my appearance	0	1	2	3	4	5
33	To gain recognition for my accomplishments	0	1	2	3	4	5
34	To help manage stress	0	1	2	3	4	5
35	To feel more healthy	0	1	2	3	4	5
36	To get stronger	0	1	2	3	4	5
37	For enjoyment of the experience of exercising	0	1	2	3	4	5
38	To have fun being active with other people	0	1	2	3	4	5

		Not at all true for me					**Very true for me**
Personally, I exercise (or might exercise) …							
39	To help recover from an illness/injury	0	1	2	3	4	5
40	Because I enjoy physical competition	0	1	2	3	4	5
41	To stay/become flexible	0	1	2	3	4	5
42	To develop personal skills	0	1	2	3	4	5
43	Because exercise helps me to burn calories	0	1	2	3	4	5
44	To look more attractive	0	1	2	3	4	5

45	To accomplish things that others are incapable of	0	1	2	3	4	5
46	To release tension	0	1	2	3	4	5
47	To develop my muscles	0	1	2	3	4	5
48	Because I feel at my best when exercising	0	1	2	3	4	5
49	To make new friends	0	1	2	3	4	5
50	Because I find physical activities fun, especially when competition is involved	0	1	2	3	4	5
51	To measure myself against personal standards	0	1	2	3	4	5

Appendix E: EMI-2 Scoring

Scoring: Scores are calculated by summing the items in each subscale.

Subscales:

Stress Management: (Q 6, 20, 34, 36)

Revitalization: (Q 3, 17, 31)

Enjoyment: (Q 9, 23, 37, 48)

Challenge: (Q 14, 28, 42, 51)

Social Recognition: (Q 5, 19, 33, 45)

Affiliation: (Q 10, 24, 38, 49)

Competition: (Q 12, 26, 40, 50)

Health Pressures: (Q 11, 25, 39)

Ill-Health Avoidance: (Q 2, 16, 30)

Positive Health: (Q 7, 21, 35)

Weight Management: (Q 1, 15, 29, 43)

Appearance: (Q 4, 18, 32, 44)

Strength and Endurance: (Q 8, 22, 36, 47)

Nimbleness: (Q 13, 27, 41)

Appendix F: Multidimensional Body-Self Relations Questionnaire

THE MBSRQ

INSTRUCTIONS--PLEASE READ CAREFULLY

The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally.

Your answers to the items in the questionnaire are anonymous, so please do not write your name on any of the materials. In order to complete the questionnaire, read each statement carefully and decide how much it pertains to you personally. Using a scale like the one below, indicate your answer by entering it to the left of the number of the statement.

EXAMPLE:

_____ I am usually in a good mood.

In the blank space, enter a **1** if you **definitely disagree** with the statement;
enter a **2** if you **mostly disagree**;
enter a **3** if you **neither agree nor disagree**;
enter a **4** if you **mostly agree**;
or enter a **5** if you **definitely agree** with the statement.

There are no right or wrong answers. Just give the answer that is most accurate for you. Remember, your responses are confidential, so please be completely honest and answer all items.

(Duplication and use of the MBSRQ only by permission of Thomas F. Cash, Ph.D., Department of Psychology, Old Dominion University, Norfolk, VA 23529)

1	2	3	4	5
Definitely Disagree	**Mostly Disagree**	**Neither Agree Nor Disagree**	**Mostly Agree**	**Definitely Agree**

_____ 1. Before going out in public, I always notice how I look.

_____ 2. I am careful to buy clothes that will make me look my best.

_____ 3. I would pass most physical-fitness tests.

_____ 4. It is important that I have superior physical strength.

_____ 5. My body is sexually appealing.

_____ 6. I am not involved in a regular exercise program.

_____ 7. I am in control of my health.

_____ 8. I know a lot about things that affect my physical health.

_____ 9. I have deliberately developed a healthy lifestyle.

_____ 10. I constantly worry about being or becoming fat.

_____ 11. I like my looks just the way they are.

_____ 12. I check my appearance in a mirror whenever I can.

_____ 13. Before going out, I usually spend a lot of time getting ready.

_____ 14. My physical endurance is good.

_____ 15. Participating in sports is unimportant to me.

_____ 16. I do not actively do things to keep physically fit.

_____ 17. My health is a matter of unexpected ups and downs.

_____ 18. Good health is one of the most important things in my life.

_____ 19. I don't do anything that I know might threaten my health.

continued on the next page

1	2	3	4	5
Definitely Disagree	**Mostly Disagree**	**Neither Agree Nor Disagree**	**Mostly Agree**	**Definitely Agree**

_____ 20. I am very conscious of even small changes in my weight.

_____ 21. Most people would consider me good-looking.

_____ 22. It is important that I always look good.

_____ 23. I use very few grooming products.

_____ 24. I easily learn physical skills.

_____ 25. Being physically fit is not a strong priority in my life.

_____ 26. I do things to increase my physical strength.

_____ 27. I am seldom physically ill.

_____ 28. I take my health for granted.

_____ 29. I often read books and magazines that pertain to health.

_____ 30. I like the way I look without my clothes on.

_____ 31. I am self-conscious if my grooming isn't right.

_____ 32. I usually wear whatever is handy without caring how it looks.

_____ 33. I do poorly in physical sports or games.

_____ 34. I seldom think about my athletic skills.

_____ 35. I work to improve my physical stamina.

_____ 36. From day to day, I never know how my body will feel.

_____ 37. If I am sick, I don't pay much attention to my symptoms.

_____ 38. I make no special effort to eat a balanced and nutritious diet.

continued on the next page

1	2	3	4	5
Definitely Disagree	**Mostly Disagree**	**Neither Agree Nor Disagree**	**Mostly Agree**	**Definitely Agree**

_____ 39. I like the way my clothes fit me.

_____ 40. I don't care what people think about my appearance.

_____ 41. I take special care with my hair grooming.

_____ 42. I dislike my physique.

_____ 43. I don't care to improve my abilities in physical activities.

_____ 44. I try to be physically active.

_____ 45. I often feel vulnerable to sickness.

_____ 46. I pay close attention to my body for any signs of illness.

_____ 47. If I'm coming down with a cold or flu, I just ignore it and go on as usual.

_____ 48. I am physically unattractive.

_____ 49. I never think about my appearance.

_____ 50. I am always trying to improve my physical appearance.

_____ 51. I am very well coordinated.

_____ 52. I know a lot about physical fitness.

_____ 53. I play a sport regularly throughout the year.

_____ 54. I am a physically healthy person.

_____ 55. I am very aware of small changes in my physical health.

_____ 56. At the first sign of illness, I seek medical advice.

_____ 57. I am on a weight-loss diet.

continued on the next page

For the remainder of the items use the response scale given with the item, and enter your answer in the space beside the item.

_____ 58. I have tried to lose weight by fasting or going on crash diets.

1. Never
2. Rarely
3. Sometimes
4. Often
5. Very Often

_____ 59. I think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

_____ 60. From looking at me, most other people would think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

continued on the next page

61-69. Use this 1 to 5 scale to indicate how dissatisfied or satisfied you are with each of the following areas or aspects of your body:

1	2	3	4	5
Very Dissatisfied	**Mostly Dissatisfied**	**Neither Satisfied Nor Dissatisfied**	**Mostly Satisfied**	**Very Satisfied**

_____ 61. Face (facial features, complexion)

_____ 62. Hair (color, thickness, texture)

_____ 63. Lower torso (buttocks, hips, thighs, legs)

_____ 64. Mid torso (waist, stomach)

_____ 65. Upper torso (chest or breasts, shoulders, arms)

_____ 66. Muscle tone

_____ 67. Weight

_____ 68. Height

_____ 69. Overall appearance

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Appendix G: MBSRQ Scoring

Appearance evaluation = (B5+B11+B21+B30+B39-B42-B48+12)/7

Appearance orientation = (B1+B2+B12+B13+B22+B31+B41+B50-B23-B32-B40-B49+24)/12

Fitness evaluation = (B24+B51-B33+6)/3

Fitness orientation = (B3+B4 +B14+B26+B35+B44+B53-B6-B15-B16-B25-B34-B43+36)/13

Health evaluation = (B7+B27+B54-B17-B36-B45+18)/6

Health orientation = (B8+B9+B18+B19+B29+B52-B28-B38+12)/8

Illness orientation = (B46+B55+B56-B37-B47+12)/5

Body areas satisfaction = (B61+B62+B63+B64+B65+B66+B67+B68+B69)/9

Overweight preoccupation = (B10+B20+B57+B58)/4

Self-classified weight = (B59+B60)/2.

Appendix H: Consent Form

You are being invited to participate in a research study looking at the relationship between physical activity and sexual activity.

You will be asked to answer a series of questionnaires and the total time should be approximately 15 minutes. All data collected is confidential and anonymous. Results from the questionnaires will be included in a research article that will be submitted for publication. Participation in this study is completely voluntary and you may withdraw at any point, without consequence, should you feel uncomfortable.

Participants may contact any of the following individuals should any concerns arise or if you have further questions.

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By signing this consent form, you agree that you have read the above information and are consenting to having your data used in this research study. Please leave your e-mail if you wish to receive the results of this study. This e-mail address will be kept separate from your survey results.

Signature: _____

Email: _____

This project is on file with the UNB Research and Ethics Board as REB#

Appendix I: Information Letter

UNB
EST. 1785
UNIVERSITY OF NEW BRUNSWICK
Kinesiology

Thank you for participating!

Physical activity and sexual activity are both important aspects of quality of life. Anecdotal evidence suggests there is a relationship between these two variables, but research is limited. The purpose of the current study is to determine whether physically active men are more sexually active in comparison to their sedentary or minimally active counterparts. This relationship will be explored across age and also include the variables of body image and motives for physical activity.

Results from the study will be sent out once the project is complete and you will be sent information via the e-mail address you left on the consent form (if you decided to do so).

If you have any questions or concerns, please do not hesitate to contact any of the individuals listed below.

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Belke, T.W., Kervin, E.K., Kervin, L.B., Craig, B.P., Ferdinand, J.C.H. & Henry, J.L. (2014). Local response rates on variable-ratio schedules of wheel-running reinforcement are relatively invariant compared to sucrose. *The Psychological Record, 64(3),* 361-369.

Bulman, D., Rickards, T., Henry, J.L., McCloskey, R., & Deitch, P. (2017). Information, services, and support needs of people experiencing memory loss: Qualitative findings. *ISBN* 978-0-11126—6-4. *Digital edition* 978-0-11126-7-1.