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Of Mirrors and Men

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**Of Mirrors and Men:
The Effects of Exercising in Front of Mirrors on the Body Self-Consciousness and Body
Image of College Age Men**

by

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A Thesis

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Abstract

The purpose of this study was to examine the differences in body self-consciousness and exercise self-efficacy between college males exercising in the presence or absence of mirrors in a general gym atmosphere. It was hypothesized that the presence of mirrors would increase body self-consciousness and increase exercise self-efficacy. The treatment group (n = 15) exercised in an environment where the mirrors had been covered up with dark paper and the control group (n=15) exercised in an environment where the mirrors were present. Body self-consciousness was assessed using the Objectified Body Consciousness Scale OBCS which is comprised of three subscales: body shame, body surveillance and appearance control beliefs. Exercise self-efficacy was assessed using the Self Presentational Efficacy Scale SPES which is comprised of three subscales: efficacy expectancy, outcome expectancy and outcome value. No significant differences were found between treatment and controls groups in body self-consciousness and exercise self-efficacy. Correlations identified that males in a mirror free environment experience an increase in both body shame and body surveillance from Pre-exercise ($r=.664$) to Post-exercise ($r=.845$). This suggests that exercise experienced males are engaging in self-reference through some other means than their reflection.

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Chapter 1: Introduction

As you walk into the gym – a testament of chalk, sweat, and iron – you see the walls adorned with posters and images of what western culture deems the perfect body (i.e., low body fat, slender, muscular, and tan). The pungent yet familiar smell of high school physical education fills the air. As you get a little further into this gym you look around and what do you see? It is as if you walked out of the regular world and into a house of mirrors. Every direction you look all you can see is yourself.

We have all been in a gym at one point in time. Undoubtedly, you noticed the copious number of mirrors present. You may have even used these mirrors to evaluate how you look, be it good or bad. Perhaps you used the mirror as a tool to evaluate technique, to see how good you look in your fitness gear, or to compare yourself to others in the room. Most people tend to evaluate others in the gym; this can be a positive or negative experience.

The majority of work done in the field of exercise and mirrors has focused on women with few if any men included as participants. In the existing research, the environment was either that of an exercise classroom, physical education class, or a laboratory setting. This suggests research should be done focusing on the understudied group of men in the unutilized environment of a general gym atmosphere. This will not only yield new information but is also a very practical piece of research as mirrors are present in most gyms.

Purpose

The purpose of this study was to examine the differences in body consciousness and self-presentational efficacy in college age males exercising in either mirrored or non-mirrored exercise settings.

Limitations

This study had several limitations. It focused on a narrow population of college age males, excluding more than half the population, women, and all other ages. This study was performed during “free week” at the university fitness center. This allowed for a greater sampling of the university as many students use the “no fee” period at the beginning of the semester to become more familiar with the fitness center. However, this limited data collection period led to a more narrow range of participants. The small sample size has less power than a larger study would. Lastly, using only one facility limited the external validity of the results.

Hypotheses

1. College males exercising in a mirrored environment will have increased body surveillance and body shame.
2. College males exercising in a mirrored environment will have increased self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value.
3. College males with less than six months of exercise experience exercising in a mirrored environment will have increased body shame and body surveillance.
4. College males with less than six months of exercise experience exercising in a mirrored environment will have increased self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value.
5. College males exercising for the first time in a facility will have increased body shame and body surveillance.

6. College males exercising for the first time in a facility will have increased in self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value.

Significance of the Study

Self-efficacy and body image perceptions can limit or prevent a person from exercising. With the ever-growing number of people becoming overweight and obese the last thing a fitness facility wants to do is to discourage potential customers from joining or utilizing their facility. This research can help facilities to adjust gym layouts so that potential members will be more likely to join and new members will be more likely to utilize the facility.

Chapter 2: Literature Review

Mirrors are present in most gyms. In fact, the American College of Sports Medicine (ACSM) previously recommended that mirrors be installed on at least two of the four walls in an exercise room (1997). It's unclear why mirror location was recommended, however it is generally understood that mirrors are used as a way of critiquing form during exercise by either fitness professionals while instructing clients or lay persons while working out. ACSM has removed this recommendation about mirror location from its guidelines about exercise facilities (ACSM, 2012). Interestingly, it no longer recommends specific locations for mirrors but rather focuses on nonabrasive and flush surfaces. There is no mention of why ACSM no longer mentions mirrors, but it does raise the question. Why are mirrors so prevalent in gyms today? This is an especially important question when multiple studies have indicated a negative reaction to the presence of mirrors (Focht, Scales, & Raedeke, 2007; Lamarche, Gammage & Strong, 2009; Martin Ginis & Gauvin, 2003; Martin Ginis, Burke, & Gauvin, 2007). A variety of factors could contribute to a negative reaction when some people exercise in front of mirrors including body image and exercise self-efficacy.

Body Image

Any number of descriptors can be used to explain how we perceive, think and feel about our bodies. For example, people may image their body as athletic, out of shape, attractive, too muscular, fat, or average. The options are endless. Body image is a person's perceptions, thoughts, and feelings about his or her body (Grogan, 2008).

Body image is a multidimensional construct that is generally defined in four dimensions: perceptual dimension (how we perceive our bodies to be), cognitive dimension (how we think or evaluate our body's appearance and function), affective or emotional dimension (feelings

experienced in relation to our body's appearance and function) and behavioral dimension (actions that reflect how we feel, our perception and thoughts) (Lox, Ginis, & Petruzzello, 2006). The perceptual dimension is how we picture our body in our minds. It is how we see ourselves in the mirror and how we image ourselves to look (examples: thin, fat, muscular, lean and so on). The cognitive dimension describes our belief in our attractiveness, strengths, fitness of various body parts and the things we say to ourselves about our bodies. The affective or emotional dimension describes our feelings experienced in relation to our bodies such as positive (e.g. pride and comfort) or negative (e.g. disgust, shame and anxiety). The behavioral dimension are actions that reflect how we feel about ourselves and are either positive or negative. These can be seen in the clothes one wears or the activities one engages in.

Body image does not occur in a vacuum, however. It is influenced by three external, social factors, specifically, peers, parents, and the media (Tylka, 2011). If a person is larger than their peers, a negative body image might result. If a person's parents are larger than they are, they might have a more positive body image of themselves. The media constantly provides images of what is perceived as a "perfect" body. Being bombarded by the media about ideal body types certainly influences most people's body image, for good or bad. These influences have a direct impact on body dissatisfaction and an indirect impact through internalization of social ideal body type and appearance comparison (Tylka, 2011). An example of this would be watching television; all you typically see are people with low body fat and a slender physique. Being repeatedly exposed to this imagery causes the individual to see this as the norm. When this is perceived as the norm it is not uncommon to compare oneself to this norm and notice discrepancies. If discrepancies are noticed an increase in body dissatisfaction is likely. Another example of internalizing the socially ideal body type would be to grow up as the "fat kid" in

school. Looking around at your peers and seeing they are different from you will lead you to compare differences. This comparison will underscore the fact that you appear different and will cause an increase in body dissatisfaction. Body image is also affected by a person's mood, physically activity self-efficacy, self-confidence, fitness and positive exercise experiences (Brehm, 2014). These concepts will be discussed later in the review.

Body image is a moving target based on the idea that body image is not just a perceptual construct but a reflection of attitudes and interactions. Body image is never a complete structure (Schilder, 1950). It is developed over time by exposure to different people and body types. That being said, each individual is different in how they perceive the body images around them. Schilder (1950) proposes that our own body image is intertwined with the body images of others around us. In essence, if you were always surrounded by obese individuals and never saw a healthy body shape, obesity would seem normal to you. Entering a gym and seeing fit individuals will highlight the fact that you are not as fit as you thought, or would like to be. Over time, one can retrain their idea of body image into a healthy one or into a bad one depending on the information they receive and how they perceive it on a constant basis. A thin physique is viewed as being attractive and healthy, especially in Western culture. The question is though, is having extremely low body fat truly healthy? Being very thin can look great but that does not mean it is healthy (Grogan, 2008) The idea that exercise-related changes in physical self-efficacy are a vital element of exercise-related changes in body image is validated. Grogan suggests the positive effects of exercise on men's body image are less clear. The majority of work done in this area has been with women and demonstrates a need for more research in this area of study.

Research examining body. A study was performed to research the idea that mirrors have an effect on body image (Radell, Adame, & Cole, 2004). Mirrors are frequently used in ballet

studios to critique technique. The relationship between mirrors and body image was examined in 30 female college age, novice ballet dancers participating in a 14-week ballet program. Half of the dancers were trained in a mirrored environment while the other half was trained in a non-mirrored environment. The dancers in both conditions were video recorded during the 5th and 14th weeks of the program. The video was then reviewed by three evaluators with a minimum of an MFA in dance and five years of teaching experience. Dancers were assessed on rhythmic accuracy, ease and flow of movement, mastery of steps and alignment. The dancers also completed the Multidimensional Body Self-Relations Questionnaire (MBSRQ). The data focused on was the results from the Body-Area Satisfaction Scale (BASS) part of the MBSRQ. The BASS is an 8-item measure of body image evaluation that assesses satisfaction/dissatisfaction with aspects of one's body areas and parts or features.

Dancers in the non-mirrored environment demonstrated greater levels of improvement from the initial assessment to the last. No statistically significant differences in body image were noted when comparing the two environments. However, this is likely due to the small sample size. The researchers then divided the dancers into two groups, high performers and low performers. High performing dancers in the non-mirrored class exhibited no decrease in body satisfaction whereas 63% of the high performing dancers in the mirrored class did experience a decrease in body satisfaction. Low performing dancers demonstrated no differences in body satisfaction between the mirror and non-mirror environments. Researchers suggested that the presence of mirrors served as a distraction. Students could be distracted looking at other students rather than focusing on their technique or by engaging in self comparison with others rather than focusing on their own movements. Thus, these students dancing without mirrors were likely less distracted by others and less likely to engage in comparison of the self to others.

Another dynamic to mirrors in gyms is how people orient themselves to the mirrors. Prichard and Tiggman (2010) explored the variables of exercise environment, body image and orientation to mirrors. Participants were female aerobics participants ($n = 571$, age $R = 18-71$) from six different fitness centers. They were asked to identify their preferred location for the mirror in an aerobics room from these options: front, side, back, and not at all. Participants were also asked where they preferred to stand in an aerobics room (front, middle, back and anywhere). The Objective Body Consciousness Scale (OBCS), Body Esteem Scale for Adolescents and Adults (BESAA) and the drive for thinness, body dissatisfaction, and bulimia subscales of the Eating Disorder Inventory were used. One way between groups ANOVAs were used and no significant differences were found between groups for self-objectification relative to mirrors, $F(3, 548) = 1.80$, $p > .05$. For body esteem, $F(3, 537) = 19.83$, $p < .001$, and disordered eating, $F(3, 554) = 10.21$, $p < .001$, a significant difference was found. Post hoc analysis revealed that women who preferred no mirrors had more symptoms of disordered eating and lower body esteem than other women. Groups differed significantly on self-objectification relative to location, $F(3, 554) = 5.03$, $p < .01$. A post hoc analyses revealed that women standing in the back of the room practice more self-surveillance than those in the front or anywhere else. Significant differences were also found between groups on body esteem, $F(3, 543) = 13.58$, $p < .001$ and disordered eating, $F(3, 560) = 9.38$, $p < .001$. Women who preferred the back of the aerobics room had higher disordered eating and lower body esteem than other participants. This suggests those with lower body esteem feel the need to hide or be in the back of the room where they feel safe or obstructed from the view of others. How someone orients themselves in an exercise setting has not been studied in males. Given that other studies have indicated mirrored effects are negative for men, location within the exercise setting would be an additional and interesting area

of focus. In most gyms, an emphasis on health is noted, but you are surrounded by images of people who are so thin they are unhealthy. Is this beneficial for the gym user or does it cause them to become objectively self-aware? As supported by Prichard and Tiggman (2010), objective self-awareness plays a key role in evaluating mirror effects on body image.

Objective Self-Awareness Theory (OSAT)

To understand how objective self-awareness applies to research, the theory must first be understood. Objective Self-Awareness Theory (OSAT) describes two states of mind, the subjective self-aware and the objective self-aware (Duval & Wicklund, 1972). When the individual's attention is directed away from one's self it is referred to as subjective self-awareness. When an individual is in a subjective self-aware state the person is not self-aware. They may experience feedback from actions and various feelings from the body but cannot focus attention on themselves as an object in the world. Subjective self-awareness can be described as the feeling of control over the environment. It is assumed that subjective self-awareness is the primary state because normally there are enough stimuli to draw attention toward the environment. This means the self is totally excluded from attention. An example of the subjective self-aware state is when your mind is occupied by another task and not self-referencing. This could occur while juggling, swinging a baseball bat, or jumping rope. The mind is actively engaged in the actions occurring and not wondering how you look. The mind is focused on the task at hand and experiencing that. The mind is not engaged in self referencing or comparison of the self to another.

Objective self-awareness is the opposite state of mind. The objectively self-aware state is characterized by being exclusively focused on the self, one's personal history and one's body. Objective Self-Awareness Theory describes a situation in which the individual's attention is

directed inward and the individual's consciousness is focused on them (Duval & Wicklund, 1972). The individual in effect becomes the object of their own consciousness. OSAT assumes that the individual will not react to themselves impartially, but will begin to evaluate themselves as the objective state occurs. The individual views themselves as another object in the world. An example of this would be walking through a hall. The mind is engaged in the world around it and the activities of the day. As you pass a mirror you catch a glimpse of yourself and see your hair is not the way you left it this morning. This realization has transitioned the mind from subjective self-awareness (viewing the world outside the self) to the objective self-awareness (viewing and comparing the ideal self in the mind with the object or image of the self in the mirror). To understand comparing the ideal self-standards of correctness must first be defined.

Self-evaluation is based on the existence of a psychological system of standards of correctness each person possesses. Standards are defined as mental representations of correct attitudes, behaviors and traits. Together these standards form the idea of a correct person. This theory assumes that when attention is focused on the self a comparison of the self with the standards of correctness will occur. If the self is not identical to the standards of correctness, a discrepancy is perceived. If a discrepancy between the actual self and the ideal self is perceived, negative effects such as loss of efficacy, lowered self-esteem, and increase in body dissatisfaction can occur. For a person to become objectively self-aware, conditions that remind them of their status as an object in the world must be present. Examples of such conditions would be looking into a mirror, hearing a recording of one's own voice, seeing a photo of one's self or any other setting where a reflection or manifestation of their person external to themselves can be perceived by themselves. The presence of another person may cause an individual to enter

into an objectively self-aware state simply by knowing the other person is aware of them, environment and previous experience with the individual are factors that affect this.

Essentially, as an individual, you are unaware of yourself in the gym. Once you experience something that causes you to self-reference such as a mirror, poster, television and other exercisers, you enter into an objective state becoming self-aware. Once in this self-aware state, self-evaluation occurs. Objective Self-Awareness Theory assumes that when focused on the self, there is an automatic comparison of the self and the perception of what is ideal. Perceptions can lead to discrepancies between self-perception and the ideal. These discrepancies can lead to negative reactions. OSAT proposes a negative effect occurs anytime a discrepancy is noticed between self-perception and ideal perception. For example, when a person sees themselves in a mirror in a gym, they enter into an objective state. While in this objective state, they begin to compare themselves to what they perceive as ideal. If the person's self-perception differs at all from their perception of ideal, they could potentially experience lower self-esteem, lower self-efficacy and lower body image satisfaction.

Research supporting OSAT. A qualitative study sought to describe the relationship between the self and a mirror and individual perceptions of the mirror (Haelyon, 2012). Participants were Israeli women (age 20-50 years) who worked out in the gym at least once a week. The study was initially conducted by email, however, due to low participant response (16) the survey method was changed to face to face interviews (17) which yielded 33 participants/responses.

Text analysis revealed three central themes or zones relative to the mirror: preferring to avoid gazing in the mirror, accepting/even needing the mirror, and subversive usage of the mirror. One individual described her relationship with the mirror as a pre-courting stage. She

gradually became more comfortable with the mirror as her relationship developed, but she was still not comfortable looking at the mirror while others are present. Women's comfort was dependent on not having the other gender present. When the mirror loses its utilitarian function for body enhancement, it is met by resistance and rejection by the exerciser. Gazing into the mirror can be associated with a sense of entitlement, having attained the "desired body." The research suggests that the mirror establishes zones which produce different gazes in different contexts. One zone is body efficiency and physical performance which happens when the mirror is accepted and assumes a functional role. The second zone involves examining the body and its appearance. During this second zone, the mirror is rejected and the gaze of others is perceived. In the third zone, subversive change happens which allows women to take back control and the ability to define their body. This study only included women, but it does bring up some unique ideas about how people use and or perceive mirrors in a gym setting. The relationship one has with the mirror can affect whether the mirror is a tool that helps build efficacy in the individual or serves to bring it down.

Self-Efficacy

Our beliefs about ourselves influence our confidence we can succeed. The concept of self-efficacy is commonly used to conceptualize these beliefs. Specifically, self-efficacy is the belief we have in our ability to successfully execute actions to produce desired outcomes (Bandura, 1997). Self-efficacy beliefs come from four sources of information: mastery experiences, vicarious experience, verbal persuasion/social influences, and physiological and affective states.

Mastery experiences describe a way self-efficacy can be developed by repeatedly completing a specific task. Repeatedly failing a task will reduce self-efficacy. Mastery

experiences are the most effective at changing efficacy beliefs. By successfully completing a challenging task, a task increases mastery self-efficacy. For example, if a person has a history of exercising, they are more likely to believe they can be successful at engaging in a regular exercise program again.

Vicarious experience describes a way in which self-efficacy can be developed or reduced by observing another completing a task or modeling it. The more the individual is perceived to be similar to the person they observe, the more influence this will have on the development or reduction of self-efficacy. This means if you witness someone similar to yourself successfully complete a task it will increase your belief that you can also perform the task. So, seeing someone like yourself working out hard in the weight room is likely to increase your exercise self-efficacy. However, if the exercise room is primarily filled with people much fitter than yourself, your exercise self-efficacy is likely to decrease.

Verbal persuasion/social influences describe a way in which efficacy levels are maintained through the use of self-talk, expressed faith in abilities by significant others and evaluative feedback. This type of persuasion is limited in its power to create long lasting efficacy but it can bolster positive change. A fitness instructor who continually provides positive feedback about a client's effort and improvement is likely to have a client who has higher self-efficacy than a fitness instructor who is negative or demeaning.

Lastly, our perceptions of somatic indicators are related to self-efficacy by how they influence our psychological and affective states. In a more applied context, experiencing fatigue, aches, windedness and pains during physical activity may be contributors to low self-efficacy in some exercisers.

Self-efficacy has diverse affects and influences on what an individual chooses to pursue, how much effort they put forth, how long they pursue something and how resistant they are to adversity. A person's belief in their efficacy affects everything they do, from how they think, how they feel, how they behave, how they motivate themselves and can become part of one's self-concept. Self-efficacy is a judgment of one's confidence in their abilities while self-concept is a description of their perceived self. Bandura (1997) also suggests that self-concept reflects one's own beliefs in their personal efficacy. Self-concept in this context is a composite view of the individual that is formed through direct experience and evaluations from significant others. Self-concept can be described as an individual's beliefs and evaluations about themselves. This includes beliefs about ones attributes, both physical and mental. This concept is important for understanding how mirrors affect the individual. It is hard for someone to exercise if they have low self-efficacy and exercise is not important to their self-concept.

If a person does not believe their efforts will produce results (low self-efficacy), they are unwilling to even try. Low self-efficacy will lead to a defeatist attitude. An individual will literally not be able to perform the task, not because of physical issues, but because they have such low efficacy they cannot bring themselves to perform the task. Efficacy beliefs have been shown to be strong predictors of behavior (Bandura, 1997). If an individual has low self-efficacy they will be less likely to perform tasks. If they are a novice exerciser entering into a new gym they would be less likely to adhere to an exercise schedule than an individual that has greater self-efficacy in that task. This can be seen in those who exercise regularly and continue to do so, compared to an individual who joins a new facility. Those with high self-efficacy in exercise continue to exercise while those with low self-efficacy in exercise fail to adhere to an exercise schedule, will miss exercise sessions and eventually leave the facility.

Efficacy beliefs affect performance both directly and by influencing intentions. Exercise self-efficacy has been established as both a consequence and a determinant of physical activity participation. Changes in efficacy over time have been linked to changes in exercise behavior. If an individual spends enough time exercising and experiencing success they will gain self-efficacy in exercise and be more likely to continue exercising. Another idea Bandura put forth was that to develop efficacy one must attain mastery of skill and knowledge which requires many hours of hard work. This is easily observable in any task performed over time. At first you are uncomfortable with the task and unsure about it. Over time you grow more familiar with it and more confident in the performance of the task. This can be seen in studies where a participant at first felt uncomfortable while gazing in a mirror but grew comfortable with it over time (Haelyon, 2012). The idea of growing more comfortable with mirrors over time will be used to examine self-efficacy as it pertains to the individual in a gym setting.

Research supporting self-efficacy. Other studies have examined the effects of mirrors on college age individuals. Plante et al. (2014) researched the effects of exercise environment on the mood states and perceived exertion of 104 college students ($M = 49$; $F = 55$, mean age = 18.8). Participants were recruited via a list of psychology studies as part of a mandatory undergraduate course requirement. Participants worked out on an exercise bike at 70% of their maximal heart rate for 20 minutes in three different conditions: 1) exercising on a stationary bike in front of a mirror and posters showing ideal fit body types, 2) exercising on a stationary bike in front of a mirror only, 3) or a control condition in which participants exercised on a stationary bike without a mirror or posters. Their exertion was measured by their bike speed in miles per hour at 5 minute intervals. Mood state was assessed before and after exercising using the

Activation-Deactivation Adjective Check List (AD-ACL). The AD-ACL measures tension, energy, tiredness and calmness.

A 2 (Male, Female) X 3 (mirror/poster present, mirror present, no mirror/poster present) ANOVA was run. Results indicated a significant interaction for gender and condition for tension, $F(2, 95) = 4.27, p < .05$. Women felt more tension after exercise but worked out more intensely in the presence of mirrors and posters together. In contrast, men felt tenser after working out in front of a mirror alone and the fitness poster did not affect their mood. The findings show an increased tension for men after working out in front of a mirror. No significant effects were found for condition, $F(2, 95) = .31, p > .05$, gender, $F(1, 95) = .001, p > .05$, or interactions of gender and condition for energy, tiredness and calmness ($p > .05$). A significant effect for condition on average speed or exertion was found, $F(2, 101) = 3.70, p < .05$. Post-hoc tests demonstrated that participants exercised faster in the mirror plus poster condition when compared to the control condition ($p < .05$). The mirror only condition did not significantly differ from the control condition ($p > .05$). A main effect for gender was found, $F(1, 98) = 5.29, p < .05$, in that males exercised faster than females but no significant interaction existed between condition and gender, $F(2, 98) = 1.47, p > .05$. The authors concluded that the increase in tension is likely because the exerciser has the freedom of not being cognitively preoccupied while exercising on a stationary bike and lets the eyes wonder. The exerciser is able to engage in self-evaluation/comparison, whereas in more dynamic conditions such as a step class or a dance class this is unable to occur because the individual is preoccupied with the task at hand.

The aforementioned studies further our understanding of the influence of mirrors on body image, self-perception and mood state. Mirrors can have a positive or negative affect on self-efficacy depending on the task being performed. The research on ballet dancers shows those

novices learned better without the distraction of a mirror (Radell et al., 2004). This is likely true for men assuming similar conditions are imposed. What can also be deduced from these studies, and what is also seen in the stationary bike study (Plante et al., 2014), is that mirrored environments can have negative effects. These results suggest that mirrored environments set the stage for comparison, be it with others or the self. In the exercise bike situations, the subject was unchallenged and able to engage in Objective Self Awareness (OSA). OSA is when attention is directed inward, the individual is focused on them self (Duval & Wicklund, 1972). It is likely that men engage in OSA situations in front of mirrors when unchallenged, that is, not actively engaging in form-critiquing. The following study sought to find a connection between a representation of one's self and self-efficacy.

The effects on self-efficacy were studied via self-representation in the form of an exergame (e.g., PlayStation 2 Eye Toy Kinetics) (Song, Peng, & Lee, 2011). Body dissatisfaction was used as part of the selection criteria for the study. Of the 198 college student initially recruited, 85 scored in the top thirty percent or bottom thirty percent for body dissatisfaction and were selected to move forward with the study. The experiment used a 2 (image on screen, not seeing self) x 2 (low body image, high body image) between-subjects ANOVA. Thirty-nine of the participants (F = 20, M = 19) had low body dissatisfaction while 46 (F = 40, M = 6) had high body dissatisfaction. These participants exercised in one of two groups. Approximately half (M = 12, F = 31) exercised with a virtual trainer and could not see themselves, whereas the other half (M = 13, F = 29) exercised while seeing themselves on the screen. Body image dissatisfaction, self-awareness (revised version of the Private Self-Consciousness Scale), positive mood and exercise self-efficacy (revised version of the General Exercise Self-Efficacy Scale) were measured via self-report post-exercise. To test the

hypothesis an ANCOVA was conducted with the following variables: pre-exercise self-efficacy, BMI, exercise time and gender.

A significant interaction was found for exercise self-efficacy, $F(1, 77) = 5.83, p < .05$. For those who were not satisfied with their body, seeing their images on the screen resulted in lower exercise self-efficacy ($M = 4.81$) when compared to the non-seeing condition ($M = 6.21$). No significant differences between conditions were found for participants who liked their body image. There was no main effect of body image dissatisfaction, $F(1, 77) = .23, p > .05$ but there was a significant main effect for seeing oneself on screen, $F(1, 77) = 6.24, p < .05$. A simple effect analysis revealed that the main effect of seeing oneself was only statistically significant in the high body dissatisfaction group.

There was a significant interaction effect on positive mood and the two independent variables. Those satisfied with their body image, after seeing themselves, reported a more positive mood than the non-seeing group. The opposite was true for high body image dissatisfaction which reported a more positive mood not seeing themselves than did the seeing themselves group. Neither the main effect of body image dissatisfaction nor the main effect of seeing oneself was significant. Similar results were reported for enjoyment. The results suggest that people with low body image dissatisfaction had a positive reaction and increased positive mood to the feature of seeing the image of themselves. Also, seeing the image of themselves had negative effects such as lower exercise self-efficacy and decreased positive mood in those with high body image dissatisfaction.

Song et al.'s findings (2011) about observing a representation of one's self relate to research done by Martin Ginis, Burke, and Gauvin (2007). Ginis et al. (2003) had 92 sedentary female undergraduate students (mean age = 20.2) exercise on Monark 817 exercise bicycles for

20 minutes. The participants were in one of four exercise environments: not alone/mirrored, alone/mirrored, alone/non-mirrored, and not alone/non-mirrored. Feeling states of the participants were assessed via the Exercise-Induced Feeling Inventory (EFI) at the 10-minute mark and 5 minutes after cooldown. The EFI assesses four exercise related states: revitalization, tranquility, positive engagement and physical exhaustion. Six items were written for this study assessing social comparison, self-consciousness, and social evaluative concerns. The EFI positive engagement subscale differed between the no mirrors, mirror conditions in that mirror conditions decreased positive engagement. The EFI revitalization subscale revealed different patterns of change between conditions. A 2 (mirror, no mirror) x 2 (pre-treatment, post-treatment) MANOVA was used to analyze the data. Women in mirrored condition experienced half the magnitude of improvement experienced by women in non-mirrored condition. Also, there was a body image/exercise condition interaction ($\gamma_{03} = 5.47, p = .002$). Participants with higher levels of body image concerns experienced the greatest levels of physical appearance anxiety. An interaction between body image and time ($\gamma_{12} = 1.79, p = .002$) participants with greater body image concerns experienced increased physical appearance anxiety. All participants experienced an increase in self-efficacy from pre- to post-test ($\gamma_{10} = 14.63, p < .001$)

Researchers found that participants in the not alone/mirror condition were more self-conscious about their physical appearance than those in the alone/no mirror condition ($p = .01$). They also concluded that changes in self-efficacy were unrelated to exercise environment and body image did not moderate changes to self-efficacy.

These studies are similar in that they both researched the effects of a self-representation on the individual's feeling states, be it through an Eye Toy or a mirror. The exergame concept used the representation of the self in videogame format rather than a reflection in a mirror, but an

effect was still observed. Ginis et al. (2007) and Song et al. (2011) showed that self-comparison occurs when an individual is faced with a representation of the self, the image in the game, the person in the mirror or having someone near you to engage in comparison with. Where these studies differ is that the mirror/no mirror study brought other people into the equation. Both studies found that exercise self-efficacy was negatively impacted. This idea is important for the concept that mirrors affect body image and self-efficacy in men. It shows that representation of the self can have a negative effect on self-efficacy be it mirrored or digitally represented. This idea correlates with the findings, mentioned above, that men had a negative reaction to mirrored environments in a stationary bike setting (Plante et al., 2014).

The presence of other people and how these people present themselves was further examined in an aerobics room setting (Focht, Scales, & Raedeke, 2007). This study included 99 females between 18 and 27 years old. Participants were recruited as part of required University physical activity course. A 9-item version of the Social Physique Anxiety Scale (SPAS) was administered along with a survey on exercise and body image.

The SPAS has a scoring range from 9 to 45 rated on a 1-5 Likert scale. Participants were selected based on a high SPAS score (over 36). Researchers examined presence or absence of mirrors and appearance oriented classes or health oriented classes.

The instructor wore loose fitting gym attire and gave health oriented cues during exercise sessions in the health emphasis classes. In the appearance oriented classes, the instructor wore tight fitting athletic gear and use motivational cues about looking better throughout the exercise sessions. Affective responses were measured through the Felt Arousal Scale (FAS) which measures perceived activation (low or high arousal) and the Feeling Scale (FS) which measures immediate states of pleasure and displeasure. Feeling states were also assessed using the

Exercise-Induced Feeling Inventory (EFI). Exercise enjoyment was assessed via the short version of the Physical Activity Enjoyment Scale (PACES) which assess how much the individual enjoyed the exercise session. Task efficacy was assessed using a 7-item scale created for this study. Future intentions were assessed by asking participants to rate from 0%-100% how likely they would join a similar class in the future.

Dependent t-tests examined the changes on affect and self-efficacy pre- and post-exercise revealing participants felt better with higher arousal post-exercise. They also felt positively engaged and revitalized but less tranquil. There was also an increase in self-efficacy from pre to post-exercise.

ANCOVA analysis of feeling states showed significant main effect for leadership style $F(1, 92) = 7.16, p = .009$) Participants in the health oriented condition reported a more positive affect post exercise than those in the appearance-oriented condition. The main effect for mirrors and the interaction between mirrors and leadership style was not significant $F(1, 2), p = .27$. The felt arousal scale showed no differences between conditions ($p > .90$) and exercise induced feeling inventory subscales revealed main effect for leadership style on feelings of engagement $F(1, 93) = 9.07, p = .003$, revitalization $F(1, 93), = 4.88, p = .03$ and exhaustion $F(1, 93), = 5.33, p = .02$. The main effect for mirrors and interaction between mirrors and leadership style were not significant for all EFI subscales (in all cases $p > .49$). No main effects or interactions were revealed for self-efficacy. Leadership style and absence or presence of mirrors had no influence on post-exercise efficacy.

Researchers discovered that participants responded feeling better overall, more engaged, revitalized and less exhausted in the health oriented classes then the appearance oriented classes. However, this study only looked at these variables in females. Research should be done to see

what affects these variables would have on males. If nothing else, this study shows an interesting relationship between attire worn, environment in the gym, and how individuals react to it.

The idea of personal presentation was looked at in work done by Lamarche et al. (2009), who examined the use of mirrors in a gym and their influence on self-presentational efficacy and state social anxiety in females. Participants ($n = 51$, mean age = 20.5) exercised of an average 3.6 times per week. The most frequent activities were cardio equipment, recreational sports, weight training, running/jogging and walking. The participants 41 indicated they had participated in a step aerobics class (average 2.1 times). While participants 10 indicated they exercised in group aerobics classes regularly. The average group size for each aerobics class was 6-8 participants and there were a total of seven classes held.

Participants completed the Self-Presentational Efficacy (SPE) inventory to assess how confident they were in their ability to present themselves favorably in exercise. Their concerns about being evaluated by others or the instructor was assessed via the State Social Anxiety (SSA) measure. Half of the participants exercised in a mirrored environment and half exercised in a non-mirrored environment. Participants filled out the SPE and SSA prior to engaging in the 20 minute aerobics class which comprised of a series of 32-count combinations. After completion of the class participants immediately filled out another SPE and SSA. There was a research assistant present but unseen to ensure consistency between classes.

MANOVA demonstrated no significant group (mirror/non-mirror) effect $F(2, 48) = .01$, $p > .05$ but the within subjects factor (pre- to post-exercise) was significant $F(2, 48) = 7.41$, $p = .002$. Both self-presentation efficacy $F(1, 49) = 7.90$, $p = .007$ and state social anxiety $F(1, 49) = 13.5$, $p = .001$) changed significantly from pre- to post-exercise. Means comparison showed that

state social anxiety decreased pre ($m=15.37$) to post-exercise ($m=12.86$) while self-presentational efficacy increased (pre = 65.89, post =70.78).

Lamarche et al.'s (2009) findings contradicted the findings of previous work done by Focht et al. (2007). The authors suggest this is because other studies have manipulated multiple factors and this study has only manipulated the presence or absence of mirrors. Lamarche et al. (2009) found that regardless of the presence or absence of mirrors, self-presentational efficacy improved and social state anxiety decreased from pre to post-test. This could in part due to the simplicity of the tasks being done. That is, the more complex the task is the more self-presentational efficacy and social state anxiety will improve regardless of the presence of mirrors. It would be interesting to see if this would hold true with men as well.

Summary

Several of these studies have laid the ground work for the idea that mirrors will have a positive effect on the male body image and self-efficacy. Previous research has suggested that mirrors can influence an individual in a gym setting, however, this research has focused primarily on women in fitness classes. Future research should focus on men in a general gym setting and not an aerobics room. This setting could have a positive influence on body image and self-efficacy for several reasons. First, in a general gym setting one is constantly moving and seldom stays in one place for too long. The feeling of constant observation by others will be mitigated by the fact that they are not constantly surrounded by mirrors. Secondly, as supported by several studies, mirrors, when used as technical feedback, do not have negative effects (Focht et al., 2007; Haelyon, 2012).

The use of mirrors as a tool to perform a specific task such as a bicep curl does not negatively affect the exerciser. It is likely that a novice exerciser will at first be intimidated by all

the mirrors and the perception of others viewing them. This feeling of intimidation could go away over time (as demonstrated by Haelyon's research). Moreover, the idea that you grow more comfortable with the mirror over time supported in other research (Bandura, 1997; Haelyon, 2012). Future research should examine the psychological impact of the presence or absence of mirrors in males.

Chapter 3: Methodology

Participants

Participants were 30 college age males recruited from St. Cloud State University in St. Cloud, Minnesota. Convenience sampling was used to recruit participants. Participants were asked if they were willing to participate in a research study as they entered the university's fitness center during the fee free first week of the spring semester. During data collection other exercisers were using the facility. This included both males and females that were not taking part in this study.

Measurement

Body image and self-efficacy were assessed via self-report questionnaires. Body image was assessed by using the Objectified Body Consciousness Scale (OBCS). Self-efficacy was assessed by using the Self Presentational Efficacy Scale (SPES) (Gammage, Hall & Martin Ginis, 2004).

Body image. The Objectified Body Consciousness Scale (OBCS) is a 24-item self-report scale that examines body consciousness (Appendix A). It has a demonstrated internal reliability of Cronbach's $\alpha=.75$ (McKinley & Hyde, 1996).

The OBCS is comprised of three subscales: body surveillance, body shame and appearance control beliefs. Body surveillance ($\alpha= .89$) assesses the body by how it looks rather than how it feels (McKinley & Hyde, 1996). It refers to seeing oneself as others see them. A person begins to see their body as if they are an external onlooker. This self-surveillance can have negative implications. A high scorer in body surveillance will frequently watch their body and think of their body in terms of looks rather than how it feels.

Body shame ($\alpha = .75$) assesses whether a person believes they are achieving cultural body standards. If they don't meet cultural standards for what a body should look like they may feel shame. This is indicated by a higher score.

Appearance control ($\alpha = .72$) evaluates whether a person believes they can control their appearance or if it is controlled by other factors. A high scorer will believe that they can control their weight and appearance if they work hard.

The OBCS is scored on 1-7 Likert scale (1=Strongly Disagree – 7=Strongly Agree) and takes approximately 10 minutes to complete. Total scores range from 24-168. Higher scores indicate a higher body consciousness.

Self-presentational efficacy. The Self Presentational Efficacy Scale (SPES) is a 15-item self-report inventory developed to measure self-presentational efficacy (Appendix B) (Gammage et al., 2004). Self-presentational efficacy is the subjective probability of conveying desired impressions to others with an interaction between three aspects: self-presentational efficacy (related to behavior), self-presentational outcome expectancy (belief about which impressions/behaviors lead to a desired outcome) and self-presentational efficacy outcome value (importance placed on the outcome) (Gammage et al., 2004).

The SPES is comprised of three exercise related subscales (self-presentational efficacy, $\alpha = 0.92$, self-presentational outcome expectancy, $\alpha = 0.89$ and self-presentational efficacy outcome value, $\alpha = 0.88$). The first five questions assess self-presentational efficacy expectancy. Participants are scored on a scale from 0% - 100% on how confident they are during performance behaviors and presenting images that would lead to specific self-presentation outcomes. The second five questions assess the individual's beliefs that specific self-presentational outcomes will result from regular exercise and are rated on a 6-point scale ranging

from 1 (strongly agree) to 6 (strongly disagree). The last five questions examine the self-presentational outcome value and also assess the importance of achieving those outcomes. These questions area also rated on a 6-point scale ranging from 1 (strongly agree) to 6 (strongly disagree). Higher scores indicate higher self-presentational efficacy and value beliefs. The SPES should take no longer than 5-10 minutes to complete.

Procedures

This study was conducted at the St. Cloud State University's fitness center. College age males were recruited when they entered the fitness center on Monday, January 9th, 2017 during the first week of the semester. During this week, no fees were charged for using the facility. Those who agreed to participate completed an Informed Consent form (Appendix C). Participants were asked upon entering the facility if they were willing to participate in a research study. Roughly half of those asked were willing to participate in this study. Once consent was obtained, participants completed the Objectified Body Consciousness Scale, the Self-Presentational Efficacy Scale, and a demographic form including information about exercise experience, exercise frequency, and familiarity with the facility (Appendix D) prior to working out. The OBCS and SPES questionnaires were counterbalanced. After completing these measures, the participants engaged in their exercise session. Participants completed the OBCS and SPES again after their workout concluded. Additional information about where in the facility the participant worked out, what type of exercise they did, the duration of the workout and the mirrored condition in which the workout was conducted was collected on the demographic questionnaire.

Participants worked out in one of two conditions. The treatment group worked out with the mirrors in the fitness center physically covered with dark colored paper. The other half of the

participants exercised with the mirrors in the fitness center uncovered. Due to limited access of the fitness center (only being allowed to collect data for one day), the mirrors were only covered for the first half of the day. This allowed the facility to be prepped the night before so data collection could begin as soon as possible.

All participants exercised in the same general area of the fitness center. This ensured the equipment, presence of others, and physical space was the same with the exception of whether the mirrors were covered or not.

Statistical Analysis and Design

This purpose of this study was to examine the differences in body self-consciousness and exercise self-efficacy between college males exercising in the presence or absence of mirrors. A repeated measures factorial design was used to analyze body image/body shame and self-presentational efficacy/outcome expectancy/outcome value. A combination of two, 3-way 2 (pre and post exercise) x 2 (subscale) x 2 (mirrored vs non-mirrored) and two 2-way 2 (mirrored vs non-mirrored) x 2 (pre and post exercise) ANOVAs were used to test for differences. A significance level of $\alpha \leq 0.05$ was set a priori. If a significant difference was found, a Bonferroni post hoc test was run to determine these specific differences.

Chapter 4: Results

Demographic Information

Thirty one college age males participated in this study, with thirty completing both the pre-exercise and post-exercise questionnaires. One participant did not have time to finish the post-exercise questionnaire because of another obligation. The average age of the participants was 20.8 years, R=18-26. Fifteen participants exercised in the mirror covered environment and fifteen exercised in the mirror present environment.

Exercise Experience

Eighty percent of the participants reported exercising for 18-24 months within the past two years (n=24). Only one participant reported having 1-6 months of exercise experience in the last two years. Exercise frequency in the preceding semester varied between participants. Fifty seven percent of the participants exercised 4-6 times per week, 20% exercised 3-4 days per week, and 23% exercised 1-3 days per week during the previous semester. The number of monthly visits to the fitness center also varied. Sixty percent of the participants used the fitness center 16-30 days each month in the previous semester, so at least every other day. Seventeen percent used the fitness center 11-15 days each month during the first semester. Thus, 77% of the participants typically worked out in this facility at least every third day. Two participants indicated they had not used the facility before. All fifteen participants in the mirror covered group expressed preference for the presence of mirrors. In the mirror uncovered group, nine participants preferred the mirror being present, whereas six participants preferred the mirror not be present.

Analysis

Hypothesis 1. Hypothesis 1 predicted college males exercising in a mirrored environment would have increased body surveillance and body shame. The hypothesis was not supported. A 2 x 2 x 2 factorial ANOVA was conducted to compare the main effects of the presence or absence of mirrors and the interaction effect between mirror presence or absence on body shame and body surveillance (see Table 1). The only significant main effect was found for body surveillance and body shame ($p = .002$), thus indicating a significant difference between body surveillance ($M = 31.1$) and body shame ($M = 26.4$) with participants showing greater amounts of body surveillance vs body shame. No significant main effect was found between pre and posttests and none of the interactions were significant.

Table 1

Effects of Mirrored Environment on Body Shame and Body Surveillance

Variable	<i>df</i>	<i>F</i>	η	<i>p</i>
Pre/Post	1,28	2.062	.069	.162
Pre/Post x Mirror/No-Mirror	1,28	.256	.009	.617
Body Shame/Body Surveillance	1,28	11.51	.291	.002*
Body Shame/Body Surveillance x Mirror/No-Mirror	1,28	.636	.022	.432
Pre/Post x Body Shame/Body Surveillance	1,28	.088	.003	.769
Pre/Post x Body Shame/Body Surveillance x Mirror/No-Mirror	1,28	.001	.000	.982
Note: * $p < .05$				

Hypothesis 2. Hypothesis 2 predicted college males exercising in a mirrored environment would have increased self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value. To analyze this hypothesis self-presentational efficacy was examined independently from self-presentational outcome expectancy and self-presentational outcome value due to its wider scoring range. The self-

presentational efficacy scale is scored on a 0-100 scale while self-presentational outcome expectancy and value scales are both scored on a 1-7 Likert scale. A 2 x 2 factorial ANOVA was conducted to compare the main effects of the presence or absence of mirrors and the interaction effect between the presence or absence of mirrors on self-presentation efficacy expectancy, as shown in Table 2. No significant main effect was found between pre-test and the posttest scores ($p = .08$), and the hypothesis was not supported. Participants did have slightly higher, albeit non-significant, self-presentational efficacy post workout ($M = 480.7$) compared to pre-workout ($M = 454.3$). The inability to reach significance for this main effect is likely due to a lack of power resulting from the small sample size. If the study had a larger sample size, it could increase the chance of finding a significant difference at the a priori .05 level.

Table 2

Effects of Mirrored Environment on Self-Presentation Efficacy Expectancy

Variable	<i>df</i>	<i>F</i>	η	<i>p</i>
Pre/Post	1,28	3.29	.105	.080
Pre/Post x Mirror/No-Mirror	1,28	1.116	.038	.300
Note: * $p < .05$				

Analysis of self-presentational outcome expectancy and outcome values was achieved using a 2 x 2 x 2 factorial ANOVA. There was no main effect and no significance difference was found for self-presentational outcome expectancy or outcome value (see Table 3). The hypothesis was not supported.

Table 3

Effects of Mirrored Environment on Self-Presentational Outcome Expectancy and Outcome Value

Variable	<i>df</i>	<i>F</i>	η	<i>p</i>
Pre/Post	1,28	.353	.012	.557
Pre/Post x Mirror/No-Mirror	1,28	2.18	.072	.151
Outcome Expectancy/Outcome Value	1,28	.845	.029	.366
Outcome Expectancy/Outcome Value x Mirror/No-Mirror	1,28	1.63	.055	.212
Pre/Post x Outcome Expectancy/Outcome Value	1,28	1.27	.043	.269
Pre/Post x Outcome Expectancy/Outcome Value x Mirror/No-Mirror	1,28	1.44	.049	.242
Note: * $p < .05$				

Hypothesis 3. Hypothesis 3 predicted college males with less than six months of exercise experience exercising in a mirrored environment would have increased body shame and body surveillance. Only one participant had less than six months of exercise experience. This number is too small to statistically analyze.

Hypothesis 4. Hypothesis 4 predicted college males with less than six months of exercise experience exercising in a mirrored environment would have increased self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value. Only one participant had less than six months of exercise experience. This number is too small to statistically analyze.

Hypothesis 5. Hypothesis 5 predicted college males exercising for the first time in a facility would have increased body shame and body surveillance. Only two participants had not used the facility before. This number is too small to statistically analyze.

Hypothesis 6. Hypothesis 6 predicted college males exercising for the first time in a facility would have increased in self-presentational efficacy expectancy, self-presentational

outcome expectancy and self-presentational outcome value. Only two participants had not used the facility before. This number is too small to statistically analyze.

Non-Hypothesized Results and Interpretation

Because hypotheses 3-6 were unanalyzable, correlations were completed to find possible directions for future research. The significant correlations were assessed (See Table 4). Body surveillance and body shame were significantly correlated at both pre-exercise ($r = .664$) and post-exercise ($r = .845$) in the mirror covered environment. Thus, as body surveillance scores increased, body shame scores also increased. These variables were not significantly correlated in participants who exercised with uncovered mirrors either at pretest or posttest. This suggests participants were engaging in increased body surveillance and body shame both before and after exercising in a mirror covered environment. Objective Self-Awareness Theory (Duval & Wicklund, 1972) suggests participants may have been engaging in self-reference with those around them rather than the reflection in the mirror.

Body shame and efficacy expectancy had a significant inverse relationship in the mirror covered group during pre-workout ($r = -.626$) a relationship that was not significant at post exercise. Thus, at pretest as body shame decreased, efficacy expectancy increased. Exercising in front of a covered mirror could have contributed to participants' lowered confidence about their exercise behavior after their workout.

Efficacy expectancy and outcome expectancy were significantly negatively correlated at both pre- and post-exercise in participants who exercised in front of uncovered mirrors ($r = -.572$). This shows a moderate inverse relationship between efficacy expectancy and outcome expectancy in the uncovered mirror environment that is not present in the mirror covered environment. This suggests that participants started out motivated to reach their exercise goals but after completing

their exercise session realized that action is not as easy as thought. This may explain why there was a decrease in outcome expectancy and increase in efficacy expectancy post exercise. The increase in efficacy expectancy can be explained by the positive effects gain by exercising. Perhaps the lack of mirrors also contributed to decreased belief they would reach their goal.

Outcome expectancy and outcome value had significant correlations for both pre-exercise and post-exercise and in mirror covered environment. However, in the uncovered environment outcome value and outcome expectancy are significant only in pre-exercise ($r = .596$) and not significant post-exercise ($r = .472$). This difference may be due to the small sample size.

Table 4

Correlations

Group	Variable	Pre-exercise r	Post Exercise r
Mirror Covered	Body Shame/Body Surveillance	.664**	.845**
Mirror Covered	Body Shame/Efficacy Expectancy	-.626*	-.423
Mirror Covered	Outcome Expectancy/Outcome Value	.620*	.640*
Mirror Uncovered	Outcome Expectancy/Efficacy Expectancy	.077	-.572*
Mirror Uncovered	Outcome Value/Efficacy Expectancy	-.520*	-.591*
Mirror Uncovered	Outcome Value/Outcome Expectancy	.596*	.472

Note: * $p < .05$; ** $p < .01$

Chapter 5: Discussion

This study examined the differences in body self-consciousness and exercise self-efficacy between college males exercising in the presence or absence of mirrors in a general gym atmosphere. Six hypotheses were tested, and only one main effect was found to be significant. The results are discussed in this chapter.

Body Image

The hypothesis that college males exercising in a mirrored environment will have increased body surveillance and body shame was not supported. This is likely due to a difference in the way males perceive mirrors compared to females. Previous research has suggested that males use mirrors more frequently as a way of critiquing form and performance (Gammage, Hall & Rodgers, 2000; Katula, McAuley, Mihalko, Bane, 1998). Plante et al. (2014) found similar results with male subjects, in that a mirrored condition was not significantly different from a control, non-mirrored, condition. The increased correlation of body shame and body surveillance from pre-test to post-tests may be affected by the presence of other exercisers be it male or female. This concurs with previous research which suggests that males attribute feelings of anxiety to interpersonal comparison with other males (Rothberger, Harris, Czech, & Melton, 2015).

The higher relationship between body shame and surveillance from pre-exercise to post-exercise suggests those engaging in body surveillance are also experiencing body shame. This is interesting because it is happening in the mirror covered and not the mirror uncovered environment. This suggests that participants are surveilling something other than their reflection in the mirror while exercising, and it is impacting their body shame. The lack of mirrors may also be contributing to body shame. This may in part be due to participants' exercise experience.

Self-Efficacy

The hypothesis that college males exercising in a mirrored environment will have increased self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value was not supported. Katula et al. (1998) suggests that male exercisers may use mirrors for different reasons than female exercisers. This may explain why there is no significant difference in self-efficacy between mirror presence and absence. Rothberger et al. (2015) suggest that males attribute feelings of anxiety to interpersonal comparison with other males. This may explain why in the mirror covered environment there is a stronger relationship between outcome expectancy and outcome value from pre- to post-exercise.

These results support OSAT theory in that another person or images around you can cause a person to engage in self-reference. It also suggests that more experienced exercisers have a different relationship with mirrors than less experienced ones. Most participants in this study were regular exercisers but, correlations point in the direction alluded to by Haelyon (2012) that suggested that an exerciser's relationship with a mirror in an exercise context changes over time. More experienced exercisers likely have a different relationship with the mirror and therefore, when the mirror is removed, the exerciser begins to self-reference against things other than the reflection in front of them.

Exercise Experience

This study examined the differences in body self-consciousness and exercise self-efficacy in college males exercising in the presence or absence of mirrors. It was hypothesized that the presence of mirrors would increase body image awareness and increase self-efficacy. However, no significant difference in body image or self-efficacy was found between the treatment and controls groups. Exercise experience may explain why there were no significant results.

Eighty percent of participants were regular exercisers with fifty seven percent of participants exercising 4-6 times per week and sixty percent using the fitness center 16-30 days each month. It is possible that the more experienced exerciser engages in self-reference a different way. This may explain the why there was no significant difference pre-exercise to post-exercise. Work by Haelyon (2012) suggests the new exercisers have a different relationship with mirrors than more experienced exercisers do and that overtime that relationship can change. This may also be true not only with mirrors but with how experienced exercisers engage in self reference. This may explain why there is a difference in body shame and surveillance after exercise in the mirror covered environment and not the mirror present environment. The more experienced exerciser has grown accustomed to the passive visual feedback of a mirror and without it, the participant is forced to engage in self-reference with those around them.

Limitations

This study had several limitations which may have affected the results.

1. The fitness facility used for data collection was only made available for one day.
2. Additionally, due to facility requirements for having the mirrors covered for only one day and the time required to cover the mirrors, participants recruited in the morning were in the treatment group and participants in the afternoon were in the control group. Individuals who exercise in the morning may have different characteristics than those workout in the afternoon.
3. A small sample size limited the power of the study, thus allowing only two of the six hypotheses to be analyzed.
4. Lower university enrollment overall coupled with traditionally smaller enrollment in spring semesters compared to fall semesters was also a limitation. Typically, during

semester opening “free week” in the fitness center, a larger influx of students use the facility that would otherwise not. The lower enrollment may account for the low number of first time users or inexperienced users in the facility during data collection.

Future Directions

Future research should account for the methodological constraints identified in this study, namely a larger sample size that would allow for better sampling and analysis of new exercisers or inexperienced exercisers. Future research should also include participants in both treatment and control conditions during both morning and afternoon. It would likely be easier to recruit more participants if data could be collected across multiple days. A significant relationship was found between body shame and surveillance during the mirror covered condition. This suggests that exercise experienced males are engaging in self-reference through some other means than their reflection. This would be an interesting and certainly understudied area for future research. Another study could assess both men and women simultaneously in the general gym atmosphere. It has been demonstrated that the presence of other women influences female exercisers but to my knowledge the presence of men on female exercisers has not been examined and certainly not in this environment.

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Appendix A: Consent to Participate

You are invited to participate in a research study about exercise in a general gym atmosphere.

If you agree to be part of the research study, you will be asked to complete two questionnaires about your exercise experience, before and after you work out today

Benefits of the research: This research will yield new information about an understudied population in an underutilized environment.

Risks and discomforts: With any type of exercise there is a level of inherent risk. By participating in this study, you will encounter no additional risk or discomfort than you would normally experience while engaging in your regular exercise activity.

Data collected will remain confidential. Participants will use their student ID number and as the form of identification. This information will not be revealed to anyone.

Participating in this study is completely voluntary. Your decision whether or not to participate will not affect your current or future relations with St. Cloud State University, or the researcher. If you decide to participate, you are free to withdraw at any time without penalty.

If you have questions about this research study, you may contact Chris DeSpain, (320) 808-5278 and Dr. Laura Finch (320) 308-6002. Results of the study can be obtained from the researcher St. Cloud State University Repository.

If you choose to participate, you will be entered into a drawing for a \$25.00 Target gift card. This gift card will be awarded to the selected participants at the end of the study.

Your signature indicates that you are at least 18 years of age, you have read the information provided above, and you have consent to participate.

Signature

Date

Appendix B: Objectified Body Conscious Scale

Objectified Body Consciousness Scale

For each item, please circle the answer that best characterizes your attitudes or behaviors.

		Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1.	I rarely think about how I look.	1	2	3	4	5	6	7
2.	I think it is more important that my clothes are comfortable than whether they look good on me.	1	2	3	4	5	6	7
3.	I think more about how my body feels than how my body looks.	1	2	3	4	5	6	7
4.	I rarely compare how I look with how other people look.	1	2	3	4	5	6	7
5.	During the day, I think about how I look many times.	1	2	3	4	5	6	7
6.	I often worry about whether the clothes I am wearing make me look good.	1	2	3	4	5	6	7
7.	I rarely worry about how I look to other people.	1	2	3	4	5	6	7
8.	I am more concerned with what my body can do than how it looks.	1	2	3	4	5	6	7
9.	When I can't control my weight, I feel like something must be wrong with me.	1	2	3	4	5	6	7
10.	I feel ashamed of myself when I haven't made the effort to look my best.	1	2	3	4	5	6	7
11.	I feel like I must be a bad person when I don't look as good as I could.	1	2	3	4	5	6	7
12.	I would be ashamed for people to know what I really weigh.	1	2	3	4	5	6	7
13.	I never worry that something is wrong with me when I am not exercising as much as I should.	1	2	3	4	5	6	7
14.	When I'm not exercising enough, I question whether I am a good enough person.	1	2	3	4	5	6	7
15.	Even when I can't control my weight, I think I'm an okay person.	1	2	3	4	5	6	7
16.	When I'm not the size I think I should be, I feel ashamed.	1	2	3	4	5	6	7
17.	I think a person is pretty much stuck with the looks they are born with.	1	2	3	4	5	6	7
18.	A large part of being in shape is having that kind of body in the first place.	1	2	3	4	5	6	7
19.	I think a person can look pretty much how they want to if they are willing to work at it.	1	2	3	4	5	6	7
20.	I really don't think I have much control over how my body looks.	1	2	3	4	5	6	7
21.	I think a person's weight is mostly determined by the genes they are born with.	1	2	3	4	5	6	7
22.	It doesn't matter how hard I try to change my weight, it's probably always going to be about the same.	1	2	3	4	5	6	7
23.	I can weight what I'm supposed to when I try hard enough.	1	2	3	4	5	6	7
24.	The shape you are in depends mostly on your genes.	1	2	3	4	5	6	7

Strongly Disagree Disagree Somewhat Disagree Neutral Somewhat Agree Agree Strongly Agree

Appendix D: Demographic Information**Exercising Study****Pre-Workout Information****St. Cloud State University Fitness Center****Student ID Number:** _____**Age:** _____**Over the past 2 years what is your exercise experience. Circle one**

0 months 1-6 months 6-12 months 12-18 months 18-24 months

How frequently did you exercise in a typical week last semester? Circle one.

1- 2 days 2-3 days 3-4 days 4-5 days 5-6 days 6-7 days

Have you use this facility before? Circle one.Yes No *If no, skip the next question***On average how many times a month did you visit this facility last semester? Circle one.**

1-5 6-10 11-15 16-20 21-25 26-30

Which of the following do you use while exercising? Circle all that apply

TV monitors Cardio equipment Free weights Weight machines Cable machines

Resistance bands Headphones/Earbuds Stability ball Medicine ball Kettlebell

Where do you spend most of your time during your work out? Circle the one that most applies.

By the front desk (cardio area) Free weight area (torque/dumbbell racks) Weight machines

Appendix E: Post Demographic Information**Exercising Study****Post-Workout Information****St. Cloud State University Fitness Center**

Student ID Number: _____

What were the mirrors like when you were working out? Circle one

Covered

Not covered

I don't know

Do you prefer having mirrors present or not? Circle One.

Present

Not present

What was the amount of time you worked out today? Circle one.

20 minutes

40 minutes

60 minutes

80 minutes

100 minutes

120 minutes

What exercises did you do? Circle all that apply

Cardio equipment

Free weights

Weight machines

Cable machines

Resistance bands

Stability ball

Medicine ball

Kettlebell

Appendix F: IRB Approval



Institutional Review Board (IRB)

720 4th Avenue South AS 210, St. Cloud, MN 56301-4498

Name: Christopher DeSpain

Address

USA

Email: ctdespain@stcloudstate.edu

**IRB PROTOCOL
DETERMINATION:
Expedited Review-1**

Project Title: Of mirrors and men

The Institutional Review Board has reviewed your protocol to conduct research involving human subjects. Your project has been: **APPROVED**

Please note the following important information concerning IRB projects:

- The principal investigator assumes the responsibilities for the protection of participants in this project. Any adverse events must be reported to the IRB as soon as possible (ex. research related injuries, harmful outcomes, significant withdrawal of subject population, etc.).
- For expedited or full board review, the principal investigator must submit a Continuing Review/Final Report form in advance of the expiration date indicated on this letter to report conclusion of the research or request an extension.
- Exempt review only requires the submission of a Continuing Review/Final Report form in advance of the expiration date indicated in this letter if an extension of time is needed.
- Approved consent forms display the official IRB stamp which documents approval and expiration dates. If a renewal is requested and approved, new consent forms will be officially stamped and reflect the new approval and expiration dates.
- The principal investigator must seek approval for any changes to the study (ex. research design, consent process, survey/interview instruments, funding source, etc.). The IRB reserves the right to review the research at any time.

If we can be of further assistance, feel free to contact the IRB at 320-308-3290 or email ri@stcloudstate.edu and please reference the SCSU IRB number when corresponding.

IRB Institutional Official:

Dr. Latha Ramakrishnan
Interim Associate Provost for Research
Dean of Graduate Studies

OFFICE USE ONLY

SCSU IRB# 1654 - 2069

1st Year Approval Date: 1/5/2017

1st Year Expiration Date: 1/4/2018

Type: Expedited Review-1

2nd Year Approval Date:

2nd Year Expiration Date:

Today's Date: 1/5/2017

3rd Year Approval Date:

3rd Year Expiration Date:

Appendix G: Debriefing Statement

Of Mirrors and Men

Debriefing Statement

Thank you for your participation in this research of Mirror effects on body image and self-efficacy in college age males.

Activities, Purpose, and Hypothesis

During this research, you were asked to fill out a pre-exercise information sheet, the Objectified Body Consciousness Scale, Self Presentational-Efficacy Scale, exercise and then fill out the Objectified Body Consciousness Scale, Self Presentational-Efficacy Scale and post information sheet. The purpose of this research was to see if mirrors had an effect on college age male's body image and self-efficacy. The following is what is expected to be found:

1. College males exercising in a mirrored environment will have increased body surveillance and body shame.
2. College males exercising in a mirrored environment will have increased self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value.
3. College males with less than six months of exercise experience exercising in a mirrored environment will have increased body shame and body surveillance.
4. College males with less than six months of exercise experience exercising in a mirrored environment will have increased self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value.
5. College males exercising for the first time in a facility will have increased body shame and body surveillance.
6. College males exercising for the first time in a facility will have increased in self-presentational efficacy expectancy, self-presentational outcome expectancy and self-presentational outcome value.

Deception

During the research, information about mirrors being covered or not was withheld so that an accurate recording of the participants perceptions of the environment and effects on the self could be recorded.

Contact information

If you have questions right now, please ask. If you have additional questions later, you may contact me at ctdespain@stcloudstate.edu / or Dr. Laura Finch at lmfinch@stcloudstate.edu You may keep this document for your records.

Right to Withdraw Data

Your decision whether or not to withdraw your data will not affect your current or future relations with St. Cloud State University, the researcher, or Campus Recreation.