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The Effects of an Erotic Video on Exercise

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THE EFFECTS OF AN EROTIC VIDEO ON EXERCISE

A Master's Thesis presented to the Faculty of the
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by

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CERTIFICATE OF APPROVAL

MASTER OF SCIENCE THESIS

This is to certify that the Master of Science Thesis of

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submitted in partial fulfillment of the requirements for the degree of Master of Science in the School of Health Sciences and Human Performance at Ithaca College has been approved.

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ABSTRACT

This study investigated how an erotic video affects submaximal and maximal exercise in heterosexual college-aged men. To that end, 30 subjects aged 18-25 years who were currently exercising at least twice per week, completed exercise sessions using a submaximal rowing test and a maximal cycling test (Wingate). Each subject completed three randomly assigned sessions with different videos present. The control condition was completed with the television off. The first experimental condition was a video of the Victoria's Secret Fashion Show (2007), which acted as the erotic video. The second experimental condition played was a video of a political broadcast (CSPAN) which acted as the "boring" condition. During the testing, heart rate (HR), power output (W), rating of perceived exertion (RPE), peak power output (PPO), and mean power output (MPO) were recorded. There were no significant differences in any variable across the three trails. The results do not support the hypothesis that an erotic video enhances exercise performance in men. Future studies of this nature should consider additional dependent variables (e.g., mood, exercise adherence) and increased exercise duration in presence of an erotic video.

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DEDICATION

For my friend Anthony Brooks. You will be missed.

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Chapter 1

INTRODUCTION

In the blink of an eye, men gather enough visual information from a woman to decide if she is beautiful. Even though beauty may be in the eye of the beholder, there is a common standard of what makes women sexually attractive. Humans, like other animals, are influenced physiologically and psychologically by the opposite sex, and visual cues may tell men when a woman is reproductively fit, and even ovulating (Haselton, Mortezaie, Pillsworth, Bleske-Rechek, & Frederick, 2007). In a mere matter of seconds, this flood of visual information from the opposite sex quickly influences our hormones, and therefore, our behavior.

Social gathering centers such as a gym or school are teeming with male competitiveness, displays of athleticism to impress girls, and sexual tension. Women and men alike observe each other, pass phenotypic judgments, and flirt, and it is no secret that males who perform better at sports have more mating options (Faurie, Pontier, & Raymond, 2004). Advertisers use incredibly vivid images of women in sexual positions to entice consumers to buy their product (Reichert & Lambiase, 2003). These very same images that promote business sales also encourage risk taking in males, and stimulate the areas of the brain responsible for this behavior (Baker, 2007; Knutson, Wimmer, Kuhnen, & Winkielman, 2008). Simply having a female researcher instead of a male increases power output during a cycling test in cardiac patients (Jung, Ferrari, Goebel, & Figulla, 2008). In this situation, the men tried to impress the female researcher by masking their physical discomfort, for instance, by complaining less of pain. This type of behavior is said to hide weakness and demonstrate fertility (Jung et al., 2008).

The drive for this type of behavior from a sexual stimulus depends on the neurotransmitters dopamine and noradrenalin, which are influenced directly by the environment people are in (Pfaff, 1999). Motivation for sexual behavior is described to be modulated by "hormones and sensory cues" which lead to specific behavioral responses (Young, 2000). For instance, salivary testosterone spikes when young adult men view an erotic film stimulus, providing evidence that testosterone secretion responds quickly to psychological stimulation (Hellhammer, Hubert, & Schürmeyer 1985); however, no evidence links this short-term spike to enhanced exercise performance. Previous as well as recent sexual activity, brain and spinal cord dopaminergic receptor activation, and gonadal hormones are believed to be the major regulators of male sexual desire (Kandeel, Koussa, & Swerdloff, 2001). Not unlike other common ergogenic aids such as music and caffeine, an erotic video may provoke the central nervous system and incite additional effort during an exercise bout. Subjective individual excitement to a conspicuous erotic stimulus may enhance oxygen uptake, thereby increasing overall exercise intensity. The pin-up picture or poster of the large breasted, scantily clad model is found in lockers, offices, and even billboards across western culture, but just what sort of power does this image wield on men while they exercise?

If women alone are enough to electrify the central nervous system, inducing men to engage in more risky behavior and hide pain, what could be a more perfect platform for men than exercise to prove their worth to potential mates? Still, can the mere image of attractive females on television affect physical and psychological state during exercise? It is important to know if performance enhancing effects occur when a gym frequenter is watching specific imagery on TV. Research shows that music enhances performance, but the relationship between an erotic video and exercise performance is unknown (Anil, Ashutosh, & Vivek, 2004; Gerra et al., 1998; Hasan, Bakhtiyar, & Azhdar, 2008; Potteiger et al., 2000; Seath & Thow, 1995; Szabo, Small, & Leigh, 1999). Distractions such as music or television may be effective at decreasing perceived exertion during exercise through motivated attention, and an erotic video provides a very prevalent, but under-researched form of media to examine. This study explores the link between an erotic video of attractive women and how it may affect power output in males who exercise.

Statement of Purpose

The purpose of this study was to determine if an erotic video affects performance during a submaximal 8-min rowing ergometer test or a maximal Wingate test.

Research Questions

Do males exert themselves more (power output) in the presence of an erotic video than during neutral or no images while doing a submaximal rowing ergometer test or a 30 sec maximal Wingate test? What happens to heart rate when exposed to these images while exercising for 8 min?

Hypothesis

The null (Ho) hypothesis: Males will have equivalent rowing performance (power output) while at the same rating of perceived exertion (RPE) during all video conditions. The alternative (Ha) hypothesis: Males will have better rowing performance (power output) while at the same rating of perceived exertion (RPE) during the erotic video condition than during the neutral or absent video image condition.

Assumptions of the Study

The following assumptions are being made for this study:

1. The subjects will be present equally in mental and physical status under the three testing conditions.
2. The testing instruments used will record measurements accurately throughout testing.
3. The erotic video used will be considered sexually desirable by all subjects.
4. Erotic images can affect cerebral function and thereby alter physiological response to exercise.

Delimitations of the Study

The delimitations of this study are:

5. All subjects are healthy male college students aged 18-25 years who currently engage in cardiovascular and/or resistance exercise at least two times per week.
6. One condition of a prerecorded erotic video (i.e., Victoria's Secret Fashion Show) previously broadcast on network television will be used.
7. A rowing ergometer will be used for submaximal data (HR, W, and RPE) and a Wingate test using a cycle ergometer will be used for maximal anaerobic data (PPO and MPO).
8. Only a RPE of "13" and maximum intensity are being studied.

Limitations of the Study

The limitations of this study are:

9. The results may only apply to heterosexual male college aged students who are exercise trained.
10. The results may only apply if the erotic stimuli present on television are scantily clad fashion models.
11. HR and power output values may only apply to subjects who perform submaximal rowing exercise.
12. Maximal exercise results may only apply to a Wingate test.

Definitions of Terms

1. Beverage-con: Subjects will be deceived by being informed that the study's purpose is to test a new beverage and measure how it affects performance using an 8-min rowing test and a Wingate Test. They will be told that the use of the television is to simulate gym conditions as to prove that this beverage works under "normal conditions." The beverages will be 178 ml of Gatorade.
2. College-aged: Ages 18 to 25 years old.
3. Cool-down: Period immediately following the Wingate test where subjects will pedal against a one kg resistance for two min.
4. Control condition: Also known as Group C; in this condition the subjects will complete one session of the exercise tests with the television off.
5. Erotic video: Condition also known as Group B; in this condition the subject will complete one session of the exercise tests with a video the 2007 Victoria's Secret

Fashion Show with no commercials played on the television in view of both the rowing ergometer and cycle ergometer.

6. Experimental conditions: Subjects will complete one session with the Victoria's Secret Fashion Show (Group B) present on television and one session with CSPAN political broadcast present on television (Group A).
7. Healthy and trained: The subject has passed the PAR - Q (Appendix A), is not injured, and currently engages in cardiovascular and/or resistance exercise at least two times per week. The subject is also heterosexual as identified by the debriefing questionnaire (Appendix C).
8. Non-erotic video condition: Also known as Group A; in this condition the subject will complete one session of the exercise tests with a video of CSPAN political broadcast with no commercials present.
9. Rowing ergometer test: Consists of 8 min (at a resistance of five) and starts after the subject completes a 4-min warm-up known as the RPE stabilization period. The subject will be instructed to work at a RPE of 13 for the entirety of the test.
10. RPE stabilization period: A warm-up immediately before beginning the 8-min rowing ergometer test where the subject rows for 4-min. Two min will be spent rowing at a RPE of 10-11 and then two additional min will be spent rowing at a RPE of 13 to ensure proper level of exertion for the 8-min test.

Chapter 2

REVIEW OF LITERATURE

Introduction

Erotic stimuli may affect exercise in two ways: 1) stimulate a biologically wired male behavioral response, and 2) act as a distraction, which may enhance or lower (deter) exercise intensity. The purpose of this study was to determine if erotic video images of attractive, scantily-clad female models affect physiological variables during a submaximal rowing ergometer test or a maximal Wingate test. This chapter reviews related literature to this topic. This review will cover: 1) sexual selection, 2) effects of erotic stimuli, and 3) distraction.

Sexual Selection

Men interact on subtle and sometimes very obvious levels with women and may alter behavior accordingly to impress a potential mate. Through the ages, sexually reproducing animals including people are driven, often extremely, to attract a mate. According to Sober (2001), the word "fitness" is often described as the "extent to which an organism is adapted to produce offspring in a given environment." An excellent way for men to show their genetic quality to women is to "display a signal that is too costly for imposters to simulate," (Saad & Vongas, 2009). Only males in peak condition can afford having such a handicap and thrive. A perfect example in the animal world is the Indian peacock. Male peacocks have incredibly colorful and dramatic displays of adornment, with which they display their fitness to attract a mate (Darwin, 1871). The tail's length, weight, and brightness enhance chances of predation, and extract a high metabolic cost, but it shows the female that the male is healthy and of superior genetic quality (Loyau, Saint Jalme, Cagiant, & Sorci, 2005). According to Petrie (1994), peahens that mated with more ornamented males produce offspring that grow faster and survive better than offspring produced by less attractive males.

Though sexual selection is a very complex process, it is well established in the literature that besides physical attractiveness, men's social dominance behavior and resources show potential mates his capacity for parental investment (Barber, 1995). While females tend to select for a mate who is healthy and will share the arduous investment of parenting, a male's optimal reproductive strategy is to mate with as many women as possible, perpetuating his line of genetic information (Barber, 1995). In this respect, a one-night stand would be more costly for a woman, while a man has essentially nothing to lose (Beach, 1976). It stands to reason that men being less selective, and very physical with their displays of fitness to impress females, would have a tendency to increase their athletic performance around women.

What is Attractive

One widely accepted perspective on attractiveness suggests that a woman's sexual attractiveness is based on the potential to reproduce (fertility), and general health (Tovée, Maisey, Emery, & Cornelissen, 1999). One measurement of attractiveness is the waist-to-hip ratio (WHR). WHR is calculated by measuring the waist circumference and dividing it by the hip circumference at its widest part (Singh, 1993). WHR is similar in both sexes during infancy, childhood, and old age, but sex differences are most noticeable from early adolescence until late middle age (Singh, 1994).

A low WHR is suggestive of optimal fat distribution for high fertility, making this shape highly attractive for men (Zaadstra et al., 1993). There are various studies that have tested this theory by rating drawings of women; based on these studies, the optimal waist-to-hip ratio for attractiveness is 0.7 (Furnham et al., 2005; Henss 1995; Singh 1993). Evidence shows that WHR is also correlated with youthfulness, and long-term health risk in women (Singh, 1993). A study focusing specifically on college-aged men shared that men found female figures with a low WHR more attractive, healthier, and of greater reproductive value than female figures with a higher WHR (Singh, 1993).

In one study, researchers studied the somatic preferences of males while looking at detailed anatomical drawings of female figures (Furnham, Hester, & Weir, 1990). The figures depicted various bust, waist, and hip sizes and were rated on a seven point bipolar construct scale, ranging from extremely attractive to extremely unattractive. Male subjects displayed a preference for large busts and hourglass shapes (low WHR) (Furnham et al., 1990). While large busts were important, excess weight in other areas decreases attractiveness (Clayson & Classon, 1989). The effect of obesity as related to attractiveness is more negative and noticeable for females than it is for males (Furnham & Radley, 1989). Though sexual attraction for men is a subjective interpersonal experience, the scientific community has a good idea of what makes a woman attractive to a man. Ethnicity does not seem to play a role in the consensus of men favoring a curvy shape, though there are stereotypes present for different ethnic groups (Singh & Luis, 1994). A study on Indonesian and African-American men and women underwent a similar testing procedure where they were asked to rate drawings. Neither ethnic group differed from their caucasian counterparts, and rated feminine WHR (0.7) as the most attractive, healthy, and youthful of the drawings. It is suggested that various cultural groups have similar criteria for judging an ideal shape for women (Singh & Luis, 1994).

When WHR and body mass index (BMI) are judged on a level of attractiveness using a computer-altered photographic stimulus that represents various WHR, thinner models were consistently judged as more attractive (relating to BMI) and WHR only impacted attractiveness in within subjects designs (Wilson, Tripp, & Boland, 2005). It is important to note that many studies that attempt to gauge attractiveness use drawings or photographs, which may distract from the entire visual "experience" that video images present. There are a plethora of physical characteristics that guide attraction, all rooted in the survival of our species. Men desire more attractive partners, and go to great lengths to impress and attain mates.

Competition and Showing Off

Jung et al. (2008) examined 1170 men and women to determine if the patient's motivation is dependent on the investigator's sex during a cycle stress ECG test. When supervised by a female researcher, the males achieved a higher maximum power output and also complained less frequently about angina pectoris. None of these parameters were dependent on the researcher's sex in female patients (Jung et al., 2008). Jung et al. (2008) concluded that men may try to impress women with physical strength and try to dissimulate physical discomfort or pain to demonstrate fertility and hide weakness. Sports and exercise are a venue where this is quite common for men to display their toughness. It is no secret that male athletes are revered as somewhat of a hero, gaining popularity and attracting more potential mates due to their higher level of "fitness." Women, on the other hand, less often identify themselves with physical activity (Sharp, Coatsworth, Darling, Cumsille, & Ranieri, 2007). When investigating how men and women would like to be remembered, male subjects more often indicate they would like to be kept in mind as an athletic star (Williams & Anderson, 1987). Traditionally speaking, males compete and subsequently "show off" their abilities to other males and females who may be viewing the event. While engaging in competitive efforts, males undergo physiological changes depending on if the game being played leads to victory or defeat. A win can have psychological as well as social rewards.

Women prefer socially dominant men as both long *and* short-term partners (Buss, 1989; Buunk, Dijkstra, Fetchenhauer, & Kenrick, 2002). Social dominance is an indicator of capacity for parental investment and women are tipped-off to these tendencies through dominance behavior, social status indicators, and material or economic resources the male possesses (Barber, 1995). Testosterone is a steroid hormone and also the major male sex hormone produced by the testes. High testosterone levels are associated with dominance behavior and pursuit of dominance status in men and rise as a function of winning dominance contests and feedback to the brain to prime future dominance behavior (Archer, 2006; Mazur & Booth, 1998). Testosterone influences male reproductive physiology and development as well as acting as a modulator for behavior (Dixson, 1998; Nelson, 2005; Wingfield, Hegner, Dufty, & Ball 1990). Apicella et al. (2008) states that the adaptive explanation for elevated testosterone levels is that they influence behavior that may result in costly risks, but increased reproductive payoffs. An additional endocrine change during mate selection is the rise in cortisol, which mobilizes the energy needed for courtship attempts (Roney et al., 2007). Hormonal responses may also operate as a reward system post-competition for dominant males.

Suay et al. (1999) examined hormonal responses in 26 judoists who participated in three sessions (control, judo fight and ergometry). Winners showed higher cortisol levels but normal testosterone and prolactin. Prolactin has been suggested to be a negative feedback sexual satiation mechanism (orgasm-dependent), so it is logical that these levels would remain at baseline (Exton et al., 2000). Winners also showed a higher appraisal of their performance and satisfaction with the outcome, and saw themselves as having more ability to win than the losers of the game (Suay et al., 1999). Suay et al. (1999) concluded that "a hormonal response to competition is not a direct consequence of winning and losing, but is more of a complex psychological process." In hunter gatherer days, competition was more practical because the best hunter or fisher had a better chance for survival and siring offspring. According to the biosocial theory, heightened testosterone increases competitiveness and dominance behavior (Mazur, 1985; Mazur & Booth, 1998). The winner (most dominant) shows other males and females that he is the most fit.

Faurie et al. (2004) suggested that performance in competitive sports can signal phenotypic (visual appearance) quality, and fighting ability. High level performance, especially on the behalf of men, is likely to be attractive to the opposite sex (Faurie et al., 2004). Faurie et al. (2004) found that students involved in competitive sports reported significantly higher numbers of partners than other students in both male and female subjects. Researchers also noted that among athletes, higher levels of performance predicted more partners (Faurie et al., 2004). Male dominance in men and animals is typically correlated with greater reproductive success because of the associated "fitness" of someone who can perform at high levels of athleticism.

Effects of Erotic Stimuli

Associated with erotic or sexual images of women are a set of physiological responses meant to prime the individual for a sexual encounter. A study by Codispoti et al. (2003) showed that there are different neuroendocrine modifications during various affective states. Pleasantness of the visual stimuli was found to have a different effect than neutral and unpleasant pictures (Codispoti et al., 2003). Erotic pictures and unpleasant pictures (mutilated bodies) received the same high score, but a different neuroendocrine pattern was shown: for unpleasant stimuli, there was a decrease in prolactin and increases in noradrenaline, cortisol, and adrenocorticotrophic hormone (ACTH), but the pleasant pictures increased prolactin levels showing that the neuroendocrine system responds differently to motivationally relevant pictures (Codispoti et al., 2003). The sample size for this study was small (N = 10) and it is unknown if the same neuroendocrine effects are replicated for images viewed while performing exercise. In contrast, when endocrine responses to erotic stimulation in a laboratory were studied in eight subjects, it was found that all participants showed clear sexual response to an erotic film stimuli, but levels of testosterone, luteinizing hormone, prolactin, ACTH and β-endorphin remained the same as in the neutral stimuli (Carani et al., 1990). Carani et al. (1990) concluded that "substantial sexual response can occur without accompanying endocrine or biochemical changes."

Hellhammer et al. (1985) examined salivary testosterone levels among 20 young men before, during, and after exposure to erotic, sexual, aggressive, stressful, and neutral films. Salivary testosterone levels increased 15 min after the beginning of the erotic and sexual films, but did not increase for the other three types of film (Hellhammer et al., 1985). Moreover, salivary testosterone dropped during the stressful movie (showing dental surgery). Redouté et al. (2000) and Stoleru et al. (1999) used positron emission tomography (PET) scans to investigate the brain areas involved when watching an erotic film. According to Stoleru et al. (1999), visually evoked sexual arousal was characterized by a threefold pattern of activation: the bilateral activation of the inferior temporal cortex (a visual association area); the right insula and right inferior cortex, which are two paralimbic areas relating highly processed sensory information with motivational states, and the left anterior cingulated cortex, another paralimbic area known to control autonomic and neuroendocrine functions (Stoleru et al., 1999). Activation of some of these areas was positively correlated with plasma testosterone levels (Stoleru et al., 1999).

Other Behaviors in Response to Erotic Stimuli

Roney et al. (2003) found that male college age students who had a short conversation with a young woman had significant increases of salivary testosterone (over baseline levels) versus speaking briefly with a male. Interestingly, the hormonal change correlated with the degree to which the females thought the male subjects were trying to impress them (Roney et al., 2003). After men rated the women as potential romantic partners, both behavioral ratings were compared and it was concluded that human males may exhibit a behavioral and endocrine courtship response that is similar to that observed in males of other vertebrate species (Roney et al., 2003). This study used a moderate sized sample for the female conversation condition (N = 21), but provided evidence suggesting that attractiveness or sexual interest in a potential female mate (compared to any female regardless of sexual interest) correlated with more of a response and the behavior displayed by those men was even evident to the female participants.

When heterosexual men are exposed to positive emotional stimuli (erotic photos of a man and a woman) the area of the brain associated with anticipation of reward is stimulated (Knutson et al., 2008). "In the immediate aftermath of this stimulation, men are consistently more likely to take bigger financial risks than they otherwise would," (Knutson et al., 2008). This study examined heterosexual male undergraduate college students, and used erotic images to elicit a positive response, snake and spider images to prompt a negative response, and office supply images to elicit a neutral response. Each participant was given 10 dollars to gamble before the test, and had the option of either betting 10 cents (low risk) or betting one dollar (high risk). The bets were made after viewing various visual stimuli. Using MRI, the researchers showed that the nucleus accumbens (area of brain associated with taking risks) was more activated after erotic images, and that this activation was correlated with choosing the high risk gamble (Knutson et al., 2008). Similarly, a study by Baker (2007) showed that men take more chances when there are attractive women present. Two experiments within the same study provided evidence that "affective and motivational states associated with mating may play an important role in guiding risk decision-making processes" (Baker, 2007). Across several "risky" blackjack (card game) trials, men were more likely to make a riskier choice to take another card when they were motivated to pursue sexual interests, but only when they had viewed attractive female faces (actual female faces on a computer monitor) prior to playing. No relationship between mating motivation and risk taking was found with those faces rated as unattractive (Baker, 2007). This is not surprising considering human and animal mating strategies in males seem to gravitate around this type of showmanship in hopes of impressing a desirable mate.

Perhaps males will be stimulated to work more strenuously, or take more risks after viewing erotic images. The applicability of this finding to exercise is unknown. According to Bostwick and Bucci (2008), incentive salience circuitry components, such as the ventral tegmental area, nucleus accumbens, prefrontal cortex, and amygdala are areas of the brain that interpret motivated adaptive behaviors, which are directed to achieve biologically necessary aims such as food, water, sex, and shelter. When a stimulus is presented, the neural network that mediates the reward center determines the intensity of the behavioral response that the stimulus provokes (Berridge & Robinson, 2003; Hyman, 2005). Depending on how long these "risk taking" areas of the brain are activated, people viewing erotic videos in a gym may exhibit a motivational tendency to perform higher intensity workouts. If exercising with a stimulus in place also arouses the area of the brain associated with anticipation of reward (Knutson et al., 2008), this could translate to a longer exercise bout or increased exercise adherence. The erotic video images of scantily clad models may stimulate enhanced performance as discussed. Alternatively they may decrease performance by acting as a distractor.

Distraction

Depending on the task at hand, there are distractions that can enhance performance or deter it. Multitasking or attempting to do two or more tasks at the same time is a common and sometimes very inefficient way to complete a given task. Multitasking can make most people less effective at what they are trying to accomplish because they cannot devote the proper brain resources and mental focus when they keep switching tasks. For example, studying for a test and having the television on may make for a very difficult study session if the individual keeps thinking about what is on television. According to Razon et al. (2009), "several sensory modalities are required to affect perceived exertion and attention allocation while engaging in a demanding workload." Razon goes on to say that external stimuli may serve as mediating agents in diversion of attention from internal and painful stimuli, ultimately contributing to the pleasantness of the exercise experience and increasing participation. When exercising, people often listen to music, watch television, or both. Some distractions are sought out to decrease stress, improve mood, or divert the attention to something that will keep one's mind off an arduous task. Two distractions most common in the gym setting are television and music. Though neither are always "voluntary" distractions, they are hard to avoid in gym settings. Gyms may use this as a distraction because of entertainment value, but also because research shows that men take bigger financial risks in the aftermath of stimulation from erotic images (Knutson et al., 2008). If men are willing to spend more money when they step into the gym based on women (or images of them), there may be increased associated sales (i.e., juice bars, merchandise). Distractions are present in the gym and life in general, but can have an order of importance that is rooted in survival and reproduction.

Both increased arousal value of imagery and positive valence of evolutionarily relevant erotic stimuli have been suggested to play a role during 'motivated attention' (Bradley et al., 2003). Lang, Bradley, and Cuthbert (1997) theorized that these evolutionarily relevant stimuli are more capable than other types to trigger the appetitive or the defensive motivational system. In other words, the individual is putting an order of importance on the stimuli in their surroundings, first most likely being an immediate threat, such as a predator. If a predator is around while someone is performing a lower importance task such as taking a test, the threat of the hungry predator hunting them should take precedence over the other menial task and attention should be diverted likewise. An attractive female could be considered a positive evolutionary distraction. If a male ignored visual and sexual cues from a viable female, it would not be normative of the basic human drive to have sex. A sexually attractive mate or the visual cue that may lead to a sexual opportunity could be prioritized over other non-survival tasks because they are evolutionarily advantageous for humans. The desire for sex and the behavior to gain sexual access is innate in our species, and therefore difficult to not be distracted by it, even if it comes in the form of television.

Television

Television is a form of distraction and viewing is positively correlated in sedentary individuals with an increase in obesity and diseases such as type 2 diabetes. In contrast, what (if anything) happens to the performance of non-sedentary individuals who exercise in a gym setting while TV is watched? Russell et al. (2003) looked at mood enhancement from popular exercise distractions like television watching and reading compared to a control condition of just exercise in fifty three college-age students (32 males, 21 females). The subjects were assigned to one of three conditions: exercise while reading, exercise while watching television, or exercise alone. There was a non-significant overall exercise condition effect on mood across the three conditions. The authors suggested that it may be the enjoyable characteristics of distraction (such as watching a TV program that is entertaining) and not distraction itself that is important in the exercise mood-enhancement relationship. This study did provide a similar sample representative of the population we are currently examining, but it only examined mood, so it offers no clues as to what the differences would be in power output between conditions.

A recent study by Russell and Newton (2008) examined the short-term psychological effects of interactive video game technology and how it affected mood, perceived exertion, and physical output. Subjects (college students: 78 males, 90 females) were divided into three groups of one 30 min condition: (1) interactive video game cycle ergometer exercise, (2) regular cycle ergometer, or (3) a video game-only control condition. Subjects then exercised for 30 min where exercise output and perceived exertion was tracked. There was no difference in power output between conditions. RPE tended to be higher during the interactive video game condition but not significantly. One possible confounding variable with the validity of the RPE score was the necessary arm movement involved in the cycling game, so logically, there was more exertion than an immobile bike handle. Also, subjects were occupied with the game so it may have been more difficult to express an accurate level of exertion.

Annesi (2001) found no statistically significant differences between groups regarding distraction measures when he studied three different exercise entertainment modalities. The control condition contained no music or television, while the two experimental conditions contained either music alone or music and television simultaneously. The combined music and personal television group had significantly lower dropout rates than the other test conditions as well as higher attendance (Annesi, 2001). The combined entertainment group also completed significantly longer exercise sessions than the other groups, which could have led to their greater respective improvements in cardio respiratory fitness in comparison to the control and music alone group.

Music

There are many psychological and physiological effects of music. Gerra et al. (1998) showed that listening to techno music (no exercise involved) was associated with significant differences in heart rate, systolic blood pressure, and self-rated emotional state, but not in hormonal state, whereas classical music only improved emotional state. Gerra et al. (1998) stated that listening to this type of music (techno) "induces changes in neurotransmitters, peptides and hormonal reactions, related to mental state and emotional involvement." Hasan et al. (2008) found that the effect of music on RPE depended significantly on fitness level, but fitness did not matter when it came to performance enhancement. Hasan et al. (2008) suggested that listening to music during progressive exercise would positively affect performance and psychological state of the individual. Likewise, Seath and Thow (1995) found that pop music significantly reduced the perception of effort and was conducive to a more 'positive' experience during aerobic exercise.

Szabo et al. (1999) investigated the effects of slow and fast paced classical music on cycling performance and found that a slow to fast music progression increased work output relative to higher workload. They suggested that the attention capturing strength of the music distracted the subjects from their fatigue (Szabo et al., 1999).

Work by Potteiger et al. (2000) suggested that one modality of influence on RPE is music. Potteiger examined the effects of music on RPE while subjects exercised at

70% of their VO2peak on a cycle ergometer. The subjects were assigned to four exercise conditions: fast upbeat music, classical music, self-selected music, and no music. HR was similar in all conditions, but each type of music resulted in a reduced peripheral, central, and overall RPE when compared to no music (Potteiger et al., 2000). They concluded that music acts as an effective passive distracter during exercise and are associated with lower RPE. Exercise training is very important for health, and if subjects can work at a greater power output while at a lower RPE, they may exercise more intensely for longer periods of time, which should increase the effectiveness of said training. Music has even been demonstrated to reduce pain (Maslar, 1986), though it is not clear if music modifies pain perception or serves as a distraction from the pain experience.

According to Hasan, Bakhtiyar, and Azhdar (2008), "the same factors that can affect the perception of exertion may also affect the degree to which exercise can be considered tolerable or the manner in which it is enjoyed." Hasan et al. (2008) goes on to say that "using music to change the context in which physical work or exercise is performed may be a viable way of positively influencing an individual's disposition during exercise, thereby enhancing the enjoyment of the experience." Using music, an erotic video, or a combination of both may change the perception of "work," and therefore possibly lead to increased exercise adherence or a longer duration spent in the gym, leading to more of a benefit, though no research is available pertaining to erotic videos. Research has suggested that the effectiveness of music on the subject's performance may lie only within a submaximal state (Anil et al., 2004). In comparison to a submaximal exercise test, the performance of the Wingate test (maximal anaerobic test) showed no meaningful effects of music on the subject's performance in many studies (Copeland & Franks, 1991; Pujol & Langenfeld, 1999; Schwartz, Fernall, & Plowman, 1990).

Summary

As discussed, men are wired for competitive efforts, and primed for action by visual cues from the opposite sex. Erotic images have the capability to promote risk taking, tapping into the reward and risk center in the brain (Baker, 2007; Knutson et al., 2008). Research also indicates that men answer to an erotic stimulus with a release of hormones throughout the body (Carani et al., 1990; Hellhammer et al., 1985) though the behavioral response to the stimulus depends on its potency (Berridge & Robinson, 2003; Hyman, 2005). The presence of women increases power output in men during exercise, capitalizing on the male tendency to "show off" for the opposite sex, hinting at the potential for a similar response during exercise with erotic video images in place (Jung et al., 2008). It is important to know if using one type of video in a gym or training setting would help the individual exercising more so than a neutral or absent video image. Distractors such as music and television may divert attention from the pain experience of exercising, contributing to increased participation and pleasantness of the experience (Razon et al., 2009). It would be beneficial for athletes and gym users alike to have a more intense training experience, possibly even a less difficult one as related to perceived exertion if erotic videos can be manipulated to elicit a positive response in these populations.

Chapter 3

METHODS

This chapter describes in detail the methodology for this study. The following sections are detailed: a) subjects, b) research design, c) experimental procedures, and d) statistical analysis.

Subjects

Heterosexual college-age males (N = 30) served as subjects. All subjects were currently engaging in cardiovascular exercise and/or resistance training at least two times per week. Exclusion for participation was based on physical limitations identified by the Physical Activity Readiness Questionnaire (PAR-Q) (Appendix A), 24-hour history (Appendix B), and Debriefing Questionnaire (Appendix C). This study was approved by the Ithaca College Human Subject's Review Board and each subject gave their written informed consent (Appendix D).

Research Design

A within subjects repeated measures design was used in this study. Subjects were assigned to start with one of three treatments: no video image, neutral, and erotic. To ensure there was no order affect, conditions were randomized; all six possible orders were used. During each condition, subjects completed a submaximal rowing ergometer test followed by a maximal Wingate test. Upon completion of a trial, subjects had at least 48 hours of rest and then completed the procedure using another condition until all three were complete.

To eliminate subject bias, deception was used. Subjects were not informed of the significance of the video and instead were told that the study was examining the performance enhancing effects of a new beverage. Subjects drank Gatorade (178 ml) immediately before starting the rowing ergometer test, using a different flavor for each of the three test conditions. Subjects were told that the TV is there to simulate actual gym conditions and to watch TV as they would if they were in a gym exercising. For the two video conditions (i.e., CSPAN and Victoria's Secret Fashion Show), the television was turned on at the beginning of the 8-min rowing test and remained in the subject's line of sight until completion of the Wingate test. The TV was muted in both the neutral and erotic video conditions, and a prerecorded CD played the same music in the same order for each of the three conditions to control the effect of audio stimuli. Playing music better mimicked the common gym atmosphere where music and TV are played simultaneously (regardless of individual preference).

In the project's first week, each subject completed a rowing ergometer and Wingate test during a familiarization session. During the warm-up, the subject was taught how to use the Ratings of Perceived Exertion (RPE) scale, which lists levels of body fatigue on a 6-20 scale, with a 6 being light effort and 20 a maximal effort (Borg, 1998). No beverage was used during this session. The television was present during the familiarization session, but it was not on. The first test condition occurred at least 48 hours after the familiarization session. Subjects were emailed 24 h prior to each trial to remind them of their test date and how to prepare for the session (Appendix B).

All tests were conducted in the Exercise Physiology Laboratory. Immediately before each test, subjects completed a 24-hour history (Appendix B) to determine if they should be exercising that day depending on health risks or recent behaviors that might compromise data collection (e.g., caffeine consumption, nicotine). To avoid mid-test discussions, or distraction from the video, subjects were instructed not to interact, but only follow the researcher's directions until the 15 min trial was completed.

A debriefing occurred following the study. The subjects were informed as to the true nature of the study, and they also completed a brief attached questionnaire (Appendix C). Any questions were answered at this time.

Experimental Procedures

Rowing Test

All submaximal exercise testing was done on a Concept II indoor rower (Concept2, Inc., Morrisville, VT, USA). A Suunto (model t3, Suunto, Langley, BC, Canada) was used to record HR through the Concept II performance monitor (model PM4, Concept2, Inc. Morrisville, VT, USA). The rowing test is an 8-min submaximal aerobic test and requires the subject to row at a specified exertion to be kept constant throughout the test. Subjects were instructed to row at a RPE of 13, a moderate effort defined as "somewhat hard" on the RPE scale (Borg, 1998). For each trial, subjects completed a four minute two-stage RPE stabilization bout, which also served as warm-up for the 8-min submaximal test. To ensure a stable level of exertion, subjects began the warm-up by maintaining a RPE of 10-11 for 2 min then increased their RPE to 13 before commencing the test. Following 2 min, subjects were told to increase their intensity and row at a RPE = 13 for 2 min with verbal instructions and encouragement given when appropriate by the researcher. After a 4 min warm-up where RPE is stabilized, the 8-min test began and the subject was instructed to continue to row at a RPE = 13. To ensure a valid measurement, the subject was reminded to be as honest as he can when giving the measurement and that RPE will be measured at min 1, 4, and 8. Upon completion of the warm-up, the TV was turned on (for both video conditions only) and the 8-min rowing test commenced. There was no subject to researcher interaction (other than described above) until the test was over.

HR was recorded at min 1 through 8 along with the average HR for the 8 min. Power output was recorded at minutes 1-8, along with the average power output for the 8 min which was expressed in Watts (W). The resistance setting on the rowing ergometer was kept at five during all testing. The average HR and average power output for the 8-min test was recorded upon test completion.

Wingate Test

Following completion of rowing, subjects immediately moved to the cycle ergometer and completed a 30 s maximal Wingate anaerobic power test. The Wingate test required the subject to pedal as fast as possible for 30 s against a resistance that is equal to 7.5 g * kg^{-1} of body weight. Immediately before the test, the seat height was adjusted so there was a 10-15 degree bend in the knee. Even though the rowing test served as a warm-up, subjects were given two min of easy pedaling against a 1 kg resistance before the test began and the resistance was added to the wheel. During this two min spin, the subject was instructed to practice spinning the fly wheel up as quickly as possible three times. After spinning practice, the subject immediately performed the Wingate with maximal effort. Afterwards, the subject was offered water and completed a 2-min cool-down on the cycle.

A Monark cycle ergometer (Monark 834E Ergomedic, Vansbro, Sweden) linked to a computer with SMI Optosensor 2000, and SMI Power version 5.2.8 (Sports Medicine

Industries, Inc., St. Cloud, MN, USA) measured peak and mean power during the test. Verbal encouragement from researchers was not given during any Wingate test.

Statistical Analysis

The software package PASW version 17 was used to analyze all data. A two-way repeated measures ANOVA (3 x 3), was performed on HR, W, and RPE from the rowing test to determine differences between the three conditions and three measurement times. A one-way repeated measures ANOVA (three levels of condition) was performed on the Wingate PPO and MPO measures. An alpha level of 0.05 was used for all analyses.

Chapter 4

RESULTS

This study was conducted to investigate the effect of an erotic video on rowing and anaerobic power in college-aged heterosexual men (raw data are found in Appendix F). This chapter describes the changes in the following variables: (a) heart rate, (b) rating of perceived exertion, (c) power output, (d) peak power output, (e) mean power output, and (f) summary.

Thirty-one people volunteered to participate in this study. One subject was not included in the statistical analyses due to a disqualifying debriefing questionnaire answer. Subjects were men who were currently exercising at least twice per week with a mean age of 21.0 ± 1.4 years. Data for two subjects were omitted from the Wingate test analysis due to failure to reach maximal state (N = 28). Submaximal HR data (N = 25) for three subjects were omitted due to heart rate monitor malfunction. Also, two subjects used inconsistent technique during rowing invalidating their HR, W, and submaximal RPE data (N = 28). No subjects admitted to knowing the true purpose of the study when asked during the debriefing, therefore deception was effective.

Heart Rate

A two-way (3 x 3) repeated measures ANOVA was used to analyze HR from the rowing test to determine the differences between the three conditions (erotic, boring, and control) at the three measurement times (min 1, 4, and 8). Table 1 provides the ANOVA summary for HR. There was no significant interaction effect for the conditions x time analysis for HR. A significant time main effect (F = 80.99; $p = 0.000$) was found

Table 1
Heart Rate: 3 x 3 ANOVA Summary Table

Source	SS	*df*	MS	F	*p*
Time	367.2	1.5	2410.1	57.0	0.000*
Time*Condition	116.8	3.1	38.4	0.9	0.347
Condition	79.2	2.0	39.6	0.1	0.904
Error (Time)	4635.4	109.7	42.3		
Error (Condition)	28220.9	72.0	392.0		

*Significant ($p < 0.05$)

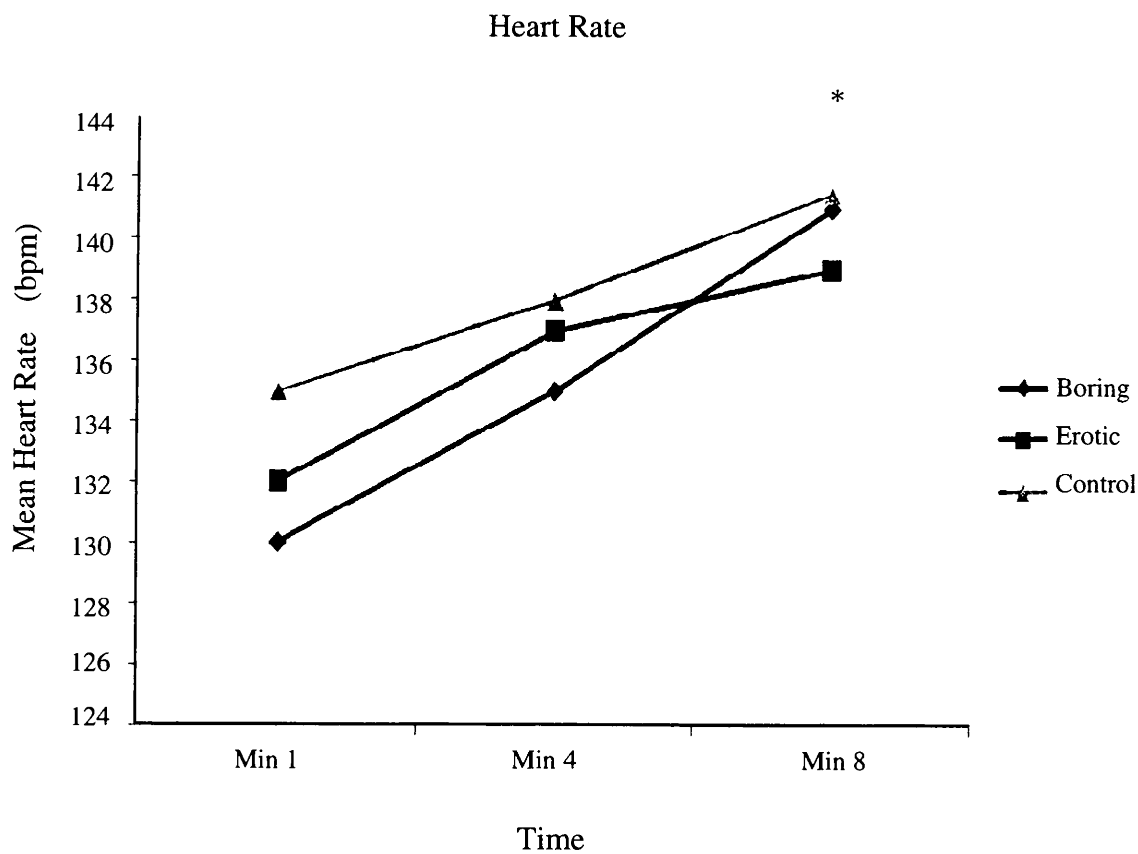

Figure 1
Average heart rate over time during submaximal rowing test.
*Significant time effect (p<0.05)

indicating that HR increased over the 8-min submaximal exercise session across all three conditions as shown in Figure 1. Post-hoc analysis using Bonferroni adjustment found significant differences between all three times ($p < 0.000$). This steady increase in HR over time was expected as HR drift is common and typically associated with rising body temperature. As can be seen in Table 1, there was no significant condition main effect for HR between the video conditions. Descriptive data for HR are found in Table 2.

Power Output

A two-way (3 x 3) repeated measures ANOVA was used to analyze power output from the submaximal rowing test to determine if any differences existed at the three measurement times. Table 3 provides the ANOVA summary for power output. There was no significant interaction indicating that the three conditions caused similar changes over time for power output completed during the 8 min of rowing. There was no significant time main effect indicating that the subjects maintained a relatively steady power output during the submaximal test. Additionally, there was no significant condition main effect for power output between the three conditions. The descriptive data for power output are found in Table 4.

Rating of Perceived Exertion

A two-way (3 x 3) repeated measures ANOVA was used to analyze RPE from the rowing test to determine if there were differences among the three conditions as well as among the three measurement times. Table 5 provides the ANOVA summary for RPE. There was no significant interaction for the conditions x time analysis for RPE. A significant time main effect ($F = 5.934$; $p = 0.004$) was found indicating that RPE

Table 2
Heart Rate: Descriptive Data

Source	Boring	Erotic	Control	Mean Time Across Groups
Min 1	129.9 (18.3)	131.8 (18.3)	133.9 (19.5)	131.9* (18.5)
Min 4	135.2 (19.5)	137.2 (20.7)	138.5 (21.2)	137.0* (20.3)
Min 8	142.0 (21.3)	141.0 (21.2)	142.3 (21.4)	141.8* (21.4)
Mean Condition Across Time	135.7 (18.9)	136.7 (19.6)	142.3 (20.8)	

Note: Heart rate in bpm with all values presented as mean ± S.D. *Significant ($p < 0.05$)

Table 3
Power Output: 3 x 3 ANOVA Summary Table

Source	SS	*df*	MS	F	*p*
Time	50.2	1.9	27.2	0.4	0.643
Time*Condition	80.9	4.0	20.2	0.3	0.838
Condition	324.4	2.0	162.2	0.1	0.947
Error (Time)	9717.6	149.8	64.9		
Error (Condition)	2240767.0	81.0	2972.4		

Table 4
Power Output: Descriptive Data

Source	Boring	Erotic	Control	Mean Time Across Groups
Min 1	117.0 (53.1)	118.5 (55.1)	122.9 (55.2)	119.4 (53.8)
Min 4	117.8 (55.0)	120.4 (54.1)	122.9 (54.7)	120.4 (54.0)
Min 8	118.5 (54.6)	120.7 (56.1)	122.0 (56.0)	120.4 (54.9)
Mean Condition Across Time	117.8 (54.2)	119.8 (54.4)	122.6 (54.5)	

Note: Power output expressed in Watts with all values presented as mean ± S.D.

Table 5
Rating of Perceived Exertion: 3 x 3 ANOVA Summary Table

Source	SS	*df*	MS	F	*p*
Time	1.4	1.9	0.7	5.9	0.004*
Time*Condition	0.8	3.8	0.2	1.7	0.152
Condition	0.2	2.0	0.0	0.2	0.813
Error (Time)	18.5	153.6	42.3		
Error (Condition)	4.7	81.0	0.1		

*Significant ($p < 0.05$)

changed over the 8-min submaximal exercise session for all three conditions. A Bonferroni post-hoc analysis revealed that RPE was greater at min 8 compared to min 1 ($p = 0.008$). There was no significant condition main effect between the video conditions. Descriptive data for RPE are in Table 6.

Mean Power Output

A one-way repeated measures ANOVA was used to analyze MPO from the maximal effort Wingate test to determine if any differences existed among the three conditions. Table 7 provides the ANOVA summary for MPO and shows that there are no significant differences among conditions. The descriptive data for MPO are found in Table 8.

Peak Power Output

A one-way repeated measures ANOVA was used to analyze PPO from the Wingate test to determine the differences between the three conditions. Table 9 provides the ANOVA summary for PPO and indicates there was no significant difference among conditions. The descriptive data for PPO are found in Table 8.

Summary

The results of these analyses indicate that there were no statistically significant differences in exercise performance among boring, erotic, and control conditions using submaximal aerobic and maximal anaerobic tests. There was a time main effect for HR and RPE, which increased over time as expected during submaximal exercise. However, W during rowing remained consistent over the 8-min test.

Table 6
Rating of Perceived Exertion: Descriptive Data

Source	Boring	Erotic	Control	Mean Time Across Groups
Min 1	13.0 (0.2)	13.0 (0.2)	12.9 (0.4)	13.0* (0.3)
Min 4	13.1 (0.4)	13.1 (0.5)	13.1 (0.3)	13.1 (0.4)
Min 8	13.1 (0.4)	13.0 (0.4)	13.3 (0.4)	13.2* (0.4)
Mean Condition Across Time	13.1 (0.3)	13.1 (0.4)	13.1 (0.4)	

Note: all values presented as mean ± S.D.
*Mean RPE at min 1 and min 8 are significantly different ($p < 0.05$)

Table 7
Mean Power Output: One-way ANOVA Summary Table

Source	SS	*df*	MS	F	*p*
Condition	4340.2	2.0	2170.1	0.1	0.87
Error	1262718.0	81.0	15589.1		

Table 8
Mean Power and Peak Power: Descriptive Data

Condition	Boring	Erotic	Control
MPO	671.5 (109.3)	674.1 (112.2)	687.9 (149.1)
PPO	923.6 (196.7)	929.6 (188.8)	893.4 (233.2)

Note: PPO = Peak Power Output
MPO = Mean Power Output
All values are expressed in Watts as mean ± S.D. (N = 28)

Table 9
Peak Power Output: One-way ANOVA Summary Table

Source	SS	*df*	MS	F	*p*
Condition	21052.6	2.0	10526.3	0.3	0.783
Error	3474986.0	81.0	42901.1		

Chapter 5

DISCUSSION

The purpose of this study was to examine whether an erotic video could affect exercise performance in college-aged heterosexual males. To that end, 30 males completed submaximal and maximal exercise tests while exposed to different types of video images. Findings indicated that erotic video viewing did not affect exercise performance.

It was hypothesized that an erotic video would enhance exercise performance. There was, however, no effect of erotic viewing on any of the dependent variables providing no evidence that erotic images affect exercise performance. In contrast to our findings, Knutson et al. (2008) found that erotic photos (of a man and woman) elicited a clear response in the area of the brain associated with risk-taking and anticipation of reward. Their subjects (i.e., heterosexual male college students) displayed risky financial decision making in the immediate aftermath of exposure to erotic images. Similarly, Baker (2007) showed that images of attractive female faces spawned a gambling related risk-taking response in men, perpetuating the theory that men are more prone to competitive and risky behaviors when a female stimulus is present.

No exercise was involved in either of these studies, but we speculated that an increase in risk-taking behavior might translate into better exercise performance. Jung et al. (2008) conducted a study that showed a male-specific response during an exercise test, providing evidence that men increased performance when a female researcher is present. One potential hormonal modulator for this behavior is testosterone, which is oft blamed for competitive behavior and encourages "assertive and status seeking behaviors" (Roney et al., 2007). Erotic images and brief interactions with women increase this hormonal response (Hellhammer at al., 1985; Roney et al., 2007; Roney et al., 2003; Stoleru et al., 1999) and it is precisely this behavioral corollary we attempted to observe with our image selection. None of these testosterone studies, however, examined exercise performance. The effect of combining erotic images and exercise was untested. Serum testosterone levels were not examined in the present study therefore it is different to determine if the video was potent enough to bring forth any physiological effect. The Victoria's Secret Fashion Show (2007) was selected to serve as a stimulus based on the ideal anthropometric measures of the models (Furnham et al., 2005; Henss 1995; Singh 1993). While arguably the most potent erotic stimulus with clothing, the fashion show images did not influence submaximal or maximal exercise performance.

Another aim of the study was to determine if the different videos provided various levels of distraction. For instance, it may be more distracting to watch the fashion show, which could result in higher workloads at the same perceived exertion. In contrast, the opposite may occur with the news images, possibly allowing the subject to be more aware of his exertion. Submaximal exercise performance has been manipulated by distracters such as music in the past, suggesting the possibility of such an effect for video (Anil et al., 2004; Hasan et al., 2008; Potteiger et al., 2000; Seath & Thow 1995; Szabo et al., 1999). Music was controlled (prerecorded CD) consistently throughout all video conditions for the following reasons: 1) it can serve as a distractor, 2) to add to a realistic test environment, and 3) to enhance the applicability of the findings to the average i-Pod (i.e., music) wielding college-aged male. Though music was incorporated consistently, the video images were varied and were the focal point of our research. Much like different genres of music have differing physiological effects on the listener (see Gerra et al., 1998), it was suspected that image-specific distraction effects might occur between the boring (i.e., news) and erotic videos. RPE scores, however, were not affected by the exciting or boring video, but instead remained very similar throughout the submaximal exercise. HR and W values were also not affected by image type. Additionally, both maximal exercise variables (Wingate MPO and PPO) were not affected by exposure to the erotic video. Research has suggested that the effectiveness of music on performance may be limited to a submaximal state, so it is reasonable to assume that having a video playing during an extremely difficult maximal test might not provide any benefit to performance (Anil et al., 2004, Copeland & Franks, 1991; Pujol & Langenfeld, 1999; Schwartz et al., 1990). Music decreases RPE effectively and also increases HR and W (Hasan et al., 2008; Potteiger et al., 2000; Seath & Thow 1995; Szabo et al., 1999). In the present study, television did not have those effects on performance.

Research related to television is mostly limited to obesity and mood-enhancement studies. Russell et al. (2003) looked at mood enhancement from common exercise distractions like television watching and reading compared to a control exercise condition, in college age students (N = 53). There were no significant effects, and unfortunately HR, W, and RPE measurements were not recorded, so it is difficult to fully compare these findings to the present study. Russell and Newton (2008) examined the short-term psychological effects of an interactive video game cycle ergometer compared to a normal cycle ergometer (N = 168). There were no significant effects found for RPE or power output, which provides additional evidence that an active distracter (i.e., interactive video game) still does not influence power and exertion.

The present study is the first to focus on the content of the video stimulus and its affect on both submaximal and maximal exercise bouts. Similar to the present results, Annesi (2001) found no significant differences in power output using the following distracters during a non-timed submaximal exercise session: 1) music alone, 2) music and television, and 3) no music or television. Annesi (2001) did note that the music and television group completed significantly longer exercise sessions than the other groups and had better adherence (greater attendance over a 14 week period). The submaximal exercise in the present study was limited to a short duration (8 min) and could be considered an unrealistically short endurance exercise workout. Due to this time constraint in the present design, it is extremely difficult to speculate what affect the images may have if exercise duration were unlimited. There has been no other video image (i.e., television) research that has looked at physiological or performance responses during an exercise bout.

Only anecdotal data from the present study hints at a preference for the erotic video over the other conditions. On completing their first testing session, many subjects in the erotic group requested the same video be played at the next session and were not pleased with the selection of random media instead. When exercise duration is the variable of interest, the effectiveness of a video may become related to the following questions: 1) How entertaining or stimulating is the video that the subject would want to continue to exercise despite fatigue? 2) How distracting is the video that the subject is diverted from the pain of exercise? Unfortunately, these questions were not addressed in the present study. Outside of the laboratory setting (e.g., gyms, competitive sports) there could be conditions that might improve performance based on rewards or stimuli related to sexual competition and showing off, but we have no evidence at this time to prove this. It is feasible that subjects in the present study may have exercised longer with the erotic stimulus, however, they were not given this opportunity in the close-ended 8-min test. An open ended test time may be dependent on interest in the video, so it would also be useful to consider rating videos based on pleasantness or distraction (i.e., entertainment) quality. Enjoyment of the exercise session is also critical for some individuals to adapt a consistent exercise regimen. Enjoyment should be examined in future studies to discover if a favorable TV image improves exercise duration or program adherence.

The presence of women or erotic images can influence men in a number of ways, but it appears there are limitations to the motivational impact on physiology or performance during exercise. The existence of clear and measurable responses from video images of attractive females remains questionable pertaining to exercise. Though no effect was found for submaximal or maximal tests, there are still unanswered questions and new directions for research. While it has been shown that males respond to having an actual female present during an exercise test (Jung et al., 2008), it would be interesting to explore the potential performance effects of brief interactions with women before an exercise session. Also, the content of video images should be further studied (e.g., aggressive versus calming; preferred versus non-preferred) while using other exercise variables such as submaximal exercise test duration.

Finally, other variables such as mood state and enjoyment of exercise should also be explored. In conclusion, erotic videos do not impact HR, RPE, or W during submaximal exercise (8 min duration) or power output during maximal exercise.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study examined if viewing an erotic video during a submaximal and maximal exercise bout can affect performance. Male (N = 31) college students, aged 18-25 years were recruited and participated in this study. All subjects were currently engaging in cardiovascular exercise and/or resistance training at least two times per week. After a familiarization, subjects reported to the lab on three separate occasions. Subjects completed a submaximal rowing ergometer test followed by a maximal Wingate test. Upon completion of the first trial, subjects rested at least 48 h and then completed the procedure using another condition until all three trials were complete. Subjects were told that the present study was examining the performance enhancing effects of a new beverage. Subjects drank Gatorade (178 ml) immediately before starting the rowing ergometer test. Subjects were told that the TV is there to simulate actual gym conditions and to watch TV as they would if they were in a gym exercising. For the two video conditions (i.e., CSPAN and Victoria's Secret Fashion Show), the television was turned on at the beginning of the 8-min rowing test and remained in the subject's line of sight until completion of the Wingate test. The TV was muted in both video conditions, and a prerecorded CD played the same music in the same order for each of the three conditions. Upon completion of all testing conditions, subjects were debriefed and asked to fill out a short questionnaire where their sexuality and sex drive were ascertained.

A two-way (3 x 3) ANOVA with repeated measures was used to analyze HR, W, and RPE for the submaximal rowing test. No significant interaction or main effects for condition were found, albeit a time main effect for both HR and RPE over the 8-min rowing test. Both HR and RPE increased over the 8-min rowing exercise as was expected due to cardiac drift. However, W remained steady over the 8-min row indicating that subjects pulled consistently throughout the test. This was also expected due to the test instructions of maintaining a RPE of approximately 13 throughout the submaximal rowing effort. A one-way repeated measures ANOVA was used to analyze MPO and PPO from the Wingate test. No significant main effects for condition were found for these power output measures.

The results of this study indicate that an erotic video does not affect exercise performance. There is, however, justification for further related research.

Conclusions

Results of this study lead to the following conclusions:

1. There is no difference in submaximal HR, W, or RPE among conditions when comparing erotic, boring, and no video during exercise.
2. An erotic video does not improve maximal or submaximal exercise performance in heterosexual men.
3. A boring video does not affect maximal or submaximal exercise performance in heterosexual men.

Recommendations

The following recommendations for further study are made:

1. Determine if subjects voluntarily perform submaximal exercise longer in presence of an erotic video.

2. Measure mood state or enjoyment of exercise session to see if an erotic video evokes a positive effect when compared to other types of videos.
3. Test the performance effects of a different "erotic" nature, (e.g., a brief interaction with a female before exercising).

REFERENCES

Anil, B., Ashutosh, S., & Vivek, M. (2004). Effects of passive distraction on treadmill exercise test performance in healthy males using music. *International Journal of Cardiology*, *97*, 305-306.

Annesi, J.J. (2001). Effects of music, television, and a combination entertainment system on distraction, exercise adherence, and physical outputs in adults. *Canadian Journal of Behavioral Science, 33*(3), 193-202.

Apicella, C.L., Dreber, A., Campbell, B., Gray, P.B., Hoffman, M., & Little, A.C. (2008). Testosterone and financial risk preferences. *Evolution and Human Behavior, 29*, 384-390.

Baker, M.D. (2007). The roles of sexual arousal, motivation, and situational context in risky behavior. (Masters thesis, Florida State University, 2007).

Barber, N. (1995). The evolutionary psychology of physical attractiveness: Sexual selection and human morphology. *Ethology and Sociobiology, 16*(5), 395-424.

Beach, F.A. (1976). Cross-species comparisons and the human heritage. *Archives of Sexual Behavior, 5*(5): 469-485.

Berridge, K.C., & Robinson, T.E. (2003). Parsing reward. *Trends in Neuroscience, 26*(9), 507-513.

Borg, G.A.V. (1998). *Borg's Rating of Perceived Exertion and Pain Scales*. Champaign, IL: Human Kinetics.

Bostwick, J.M., & Bucci, J.A. (2008). Internet sex addiction treated with naltrexone. *Mayo Clinic Proceedings, 83*(2), 226-230.

Bradley, M.M., Sabatinelli, D., Lang, P.J., Fitzsimmons, J.R., King, W., & Desai, P. (2003). Activation of the visual cortex in motivated attention. *Behavioral Neuroscience, 117*, 369-380.

Buunk, B.P., Dijkstra, P., Fetchenhauer, D., & Kenrick, D.T. (2002). Age and gender difference in mate selection criteria for various involvement levels. *Personal Relationships*, *9*(3), 271-278.

Buss, D.M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses testing in 37 cultures. *Behavioral and Brain Sciences, 12*, 1-49.

Carani, C., Bancroft, J., Del Rio, G., Granata, A.R., Facchinetti, F., Marrama, P. (1990). The endocrine effects of visual erotic stimuli in normal men. *Psychoneuroendocrinology, 15*(3), 207-216.

Clayson, D.E., & Klassen, M.L. (1989). Perception of attractiveness by obesity and hair color. *Perceptual and Motor Skills, 68*, 199-202.

Codispoti, M., Gerra, G., Montebarocci, O., Zaimovic, A., Raggi, M.A., & Baldaro, B. (2003). Emotional perception and neuroendocrine changes. *Psychophysiology, 40*(6), 863-868.

Copeland, B., & Franks, B. (1991). Effects of types and intensities of background music on treadmill endurance. *Journal of Sports Medicine and Physical Fitness, 31,* 100-103.

Darwin, C. (1871). *The Descent of Man and Selection in Relation to Sex.* Princeton, New Jersey: Princeton University Press.

Dixson, A. F. (1998). *Primate sexuality: Comparative studies of the prosimians, monkeys, apes and human beings*. Oxford University Press: New York.

Exton, N.G., Truong, T.C., Exton, M.S., Wingenfeld, S.A., Leygraf, N., Saller, B., et al. (2000). Neuroendocrine response to film-induced sexual arousal in men and women. *Psychoneuroendocrinology, 25*(2), 187-199.

Faurie, C., Pontier, D., & Raymond, M. (2004). Student athletes claim to have more sexual partners than other students. *Evolution and Human Behavior, 25,* 1–8.

Furnham, A., Hester, C., & Weir C., (1990). Sex differences in the preferences for specific female body shapes. *Journal of Sex Roles, 22,* 743-754.

Furnham, A., Petrides, V., & Constantinides, A. (2005). The effects of body mass index and waist-to-hip ratio on ratings of female attractiveness, fecundity, and health. *Personality and Individual Differences, 38*(8), 1823-1834.

Furnham, A., & Radley, S. (1989). Sex differences in the perception of male and female body shapes. *Personality and Individual Differences, 10*(6), 653-662.

Gerra, G., Zaimovic, A., Franchini, D., Palladino, M., Giucastro, G., Reali, N., et al. (1998). Neuroendocrine responses of healthy volunteers to 'techno-music': Relationships with personality traits and emotional state. *International Journal of Psychophysiology, 28*(1), 99-111.

Haselton, M.G., Mortezaie, M., Pillsworth, E.G., Bleske-Rechek, A., Frederick, D.A. (2007). Ovulatory shifts in human female ornamentation: Near ovulation, women dress to impress. *Hormones and Behavior, 51,* 40–45

Hellhammer, D.H., Hubert, W., & Schürmeyer, T. (1985). Changes in saliva testosterone after psychological stimulation in men. *Psychoneuroendocrinology, 10*(1): 77-81.

Henss, R. (1995). Waist-to-hip ratio and attractiveness. Replication and extension. *Personality and Individual Differences, 19*, 479-488.

Hyman, S.E. (2005). Addiction: A disease of learning and memory. *American Journal of Psychiatry, 162*(8), 1414-1422.

Kandeel, F.R., Koussa, V.K.T., & Swerdloff, R.S. (2001). Male sexual function and its disorders: Physiology, pathophysiology, clinical investigation, and treatment. *Endocrine Reviews, 22*(3), 342-388.

Knutson, B., Wimmer, G.E., Kuhnen, C.M., & Winkielman, P. (2008). Irrelevant image of attractive woman can make a man more willing to take big financial risks. *Neuroreport, 19*(5), 509-513.

Lang, P.J., Bradley, M.M., & Cuthbert, B.N. (1997). *Attention and orienting: Sensory and motivational processes.* Lawrence Erlbaum Associates, Mahwah, NJ, pp. 97-135.

Jung, C., Ferrari, M., Goebel, B., & Figulla, H.R. (2008). The patient's motivation during bicycle stress ECG test is dependent on the investigator's sex in male patients. *International Journal of Cardiology*, doi:10.1016/j.ijcard.2008.04.074

Loyau, A., Saint Jalme, M. Cagniant, C., & Sorci, G. (2005). Multiple sexual advertisements honesty reflect health status in peacocks (Pavo cristatus). *Behavioral Ecology and Sociobiology, 58*, 552-557.

Maslar, P.M. (1986). The effects of music on the reduction of pain: A review of the literature. *The Arts in Psychotherapy, 13*, 215-219.

Mazur, A. (1985). A biosocial model of status in face-to-face primate groups. *Social Forces, 64*, 377-402.

Mazur, A., & Booth, A. (1998). Testosterone and dominance in men. *Behavioral Brain Science, 21*, 353-397.

Nelson, R.J. (2005). *Introduction to Behavioral Endocrinology.* 3rd ed. Sunderland, MA: Sinauer.

Petrie, M. (1994). Improved growth and survival of offspring of peacocks with more elaborate trains. *Nature, 371*, 598-599.

Pfaff, D.W. (1999). *Drive: Neurobiological and Molecular Mechanisms of Sexual Motivation.* Massachusetts Institute of Technology Press, Cambridge, MA.

Potteiger, J., Schroeder, J., & Goff, K. (2000). Influence of music on rating of perceived exertion during 20 minutes of moderate intensity exercise. *Perceptual and Motor Skills, 91*(3), 848-854.

Pujol, T.J., & Langenfeld, M.E. (1999). Influence of music on Wingate anaerobic test performance. *Perceptual and Motor Skills, 88*, 292-296.

Razon, S., Basevitch, I., Land, W., Thompson, B., & Tenenbaum, G. (2009). Percepton of exertion and attention allocation as a function of visual and auditory conditions. *Psychology of Sport and Exercise, 10*, 636-643.

Redouté, J., Stoléru, S., Grégoire, M.C., Costes, N., Cinotti, L., Lavenne, F., et al. (2000). Brain processing of visual sexual stimuli in human males. *Archives of Sexual Behavior,11*(3), 162-177.

Reichert, T., & Lambiase, J. (2003). How to get kissably close: Examining how advertisers appeal to consumer's sexual needs and desires. *Sexuality & Culture, 7*(3), 120-136.

Roney, J.R., Lukaszewski, A.W., & Simmons, Z.L. (2007). Rapid endocrine responses of young men to social interactions with young women. *Hormones and Behavior, 52*(3), 326-333.

Roney, J.R., Mahler, S.V., & Maestripieri, D. (2003). Behavioral and hormonal responses of men to brief interactions with women. *Evolution and Human Behavior, 24*(6), 365-375.

Russell, W.D., & Newton, M. (2008). Short-term psychological effects of interactive video game technology exercise on mood and attention. *Educational Technology & Society, 11*(2), 294-308.

Russell, W., Pritschet, B., Frost, B., Emmett, J., Pelley, T., Black, J., et al. (2003). A comparison of post-exercise mood enhancement across common exercise distraction activities. *Journal of Sport Behavior, 26*(4), 368-383.

Saad, G., & Vongas, J.G. (2009). The effect of conspicuous consumption on men's testosterone levels. *Organizational Behavor and Human Decision Processes, 110*(2), 80-92.

Schwartz, S., Fernall, E., & Plowman, S. (1990). Effects of music on exercise performance. *Journal of Cardiopulmonary Rehabilitation, 10*, 312-316.

Seath, L., & Thow, M. (1995). The effect of music on the perception of effort and mood during aerobic type exercise. *Physiotherapy, 81*(10), 592-596.

Sharp, E.H., Coatsworth, J.D., Darling, N., Cumsille, P., & Ranieri, S. (2007). Gender differences in the self-defining activities and identity experiences of adolescents and emerging adults. *Journal of Adolescence, 30*, 251-269

Singh, D. (1993). Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology, 65*(2), 293-307.

Singh, D., & Luis, S. (1994). Ethnic and gender consensus for the effect of waist-to-hip ratio on judgment of women's attractiveness. *Human Nature, 6*(1), 51-65.

Sober, E. (2001). The two faces of fitness. In: R.S. Singh, C.B. Krimbas, D.B. Paul, & J. Beatty, J., (Eds.), *Thinking about evolution: Historical, philosophical, and political perspectives*, (309-321). Cambridge, UK: Cambridge University Press.

Stoléru, S., Grégoire, M.C., Gerard, D., Decety, J., Lafarge, E., Cinotti, L., et al. (1999). Neuroanatomical correlates of visually evoked sexual arousal in human males. *Archives of Sexual Behavior, 28*(1), 1-21.

Suay, F., Salvador, A., González-Bono, E., Sanchís, C., Martínez, M. S., Martínez-Sanchis, V. M., et al. (1999). Effects of competition and its outcome on serum testosterone, cortisol and prolactin. *Psychoneuroendocrinology, 24*(5), 551-566.

Szabo, A., Small, A., & Leigh, M. (1999). The effect of slow-and fast-rhythm classical music on progressive cycling to voluntary physical exhaustion. *Journal of Sports Medicine and Physical Fitness, 39*(3), 220-225.

Thornhill, R., & Gangestad, S.W. (1999). Facial attractiveness. *Trends in Cognitive Sciences, 3*(12), 452-460.

Tovée, M.J., Maisey, D.S., Emery, J.L., Cornelissen, P.L. (1999). Visual cues to female physical attractiveness. *Personality & Individual Differences, 266*(1415), 211-218.

Williams, J.M., & Anderson M.B. (1987). Influence of sex and gender roles on high school status system. *Adolescence, 22*(88), 755-765.

Wilson, J., Tripp, D., & Boland, F. (2005). The relative contributions of waist-to-hip ratio and body mass index to judgments of attractiveness. *Sexualities, Evolution & Gender, 7*(3), 245-267.

Wingfield, J.C., Hegner, R.E., Dufty, A.M., & Ball, G.F. (1990). The "challenge hypothesis": Theoretical implications for patterns of testosterone secretion, mating systems, breeding strategies. *American Naturalist, 136*, 829–846.

Young, L.J. (2000). Hormones, sex and libido: What's the connection? [Review of the book *Drive: Neurobiological and Molecular Mechanisms of Sexual Motivation*]. Retrieved from: *Endocrinology and Metabolism, 11*(7), 296-297.

Zaadstra, B.M., Seidell, J.C., Van Noord, P.A., Velde, E.R., Habbema, J.D., Vrieswijk, et al. (1993). Fat and female fecundity: Prospective study of effect of body fat distribution on conception rates. *British Medical Journal, 306*, 484-487.

APPENDICES

APPENDIX A
PAR - Q

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more tive is very safe for most people. However, some people should check with their doctor before they start becoming much more nically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO

YES	NO		
☐	☐	1.	Has your doctor ever said that you have a heart condition <u>and</u> that you should only do physical activity recommended by a doctor?
☐	☐	2.	Do you feel pain in your chest when you do physical activity?
☐	☐	3.	In the past month, have you had chest pain when you were not doing physical activity?
☐	☐	4.	Do you lose your balance because of dizziness or do you ever lose consciousness?
☐	☐	5.	Do you have a bone or joint problem that could be made worse by a change in your physical activity?
☐	☐	6.	Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
☐	☐	7.	Do you know of <u>any other reason</u> why you should not do physical activity?

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to <u>all</u> PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever — wait until you feel better; or
- if you are or may be pregnant — talk to your doctor before you start becoming more active.

Please note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

You are encouraged to copy the PAR-Q but only if you use the entire form

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction.

NAME ______________________________

SIGNATURE ______________________________ DATE ______________________

GNATURE OF PARENT ______________________________ WITNESS ______________________
or GUARDIAN (for participants under the age of majority)

Supported by: Health Canada Santé Canada

APPENDIX B

24-Hour History

Name______________________________ Date____________________

ID #______________________________

Present Health Status (please circle all that apply)

Body Ache   Sore Throat   Dizziness   Chest Pain   Nausea   Feel Fine

Diet

Have you consumed alcohol in the last 12 hours?	Yes	No
Have you used caffeine or nicotine in the last 3 hours?	Yes	No

Exercise

Have you performed any lower body exercise in the past 48 hours?	Yes	No
Have you performed any cardiovascular exercise in the past 24 hours?	Yes	No

Over the Counter / Prescription Drugs

Have you taken any over the counter drugs in the last 24 hours?	Yes	No
Have there been changes in any of your current prescription drugs since the last session?	Yes	No

Injury

Have you experienced any injuries since the last testing session?	Yes	No
Have there been any other changes since the last testing session that may compromise your performance on today's testing?	Yes	No

APPENDIX C

Debriefing Questionnaire

Subject ID#:_____________

Do you have a strong sex drive?	Yes	No
Are you heterosexual?	Yes	No
Are you attracted to both sexes?	Yes	No

APPENDIX D

Informed Consent Form

The Effects of a New Beverage on Performance in Normal Gym Conditions

<u>Purpose of Study</u>

The purpose of the study is to measure performance, HR, and power output using an 8 minute rowing test and a Wingate Test. We are simulating different gym conditions by allowing you to watch television when you exercise.

<u>Benefits of Study</u>

There are benefits for both you and the scientific research community from participating in this study. The research community can potentially benefit from this study by learning if there are performance benefits for this beverage that have not been researched yet. La Tourelle Resort & August Moon Spa has donated their services to be used as incentive for this study. By participating in this study, you will be entered in a drawing for a free hotel stay and $90 massage courtesy of LaTourelle Resort & August Moon Spa. Second place prize is a hotel stay.

<u>What You Will Be Asked to Do</u>

First, you will fill out a Physical Activity Readiness Questionnaire (PAR – Q) and be allowed to ask any questions you may have. It is possible that you may be excluded from exercising if health risks are identified in this questionnaire. Total participation time is about one hour.

You must be 18 – 25 years old and able to complete four rowing ergometer and four maximum 30 second cycling tests. All tests will be in the Exercise Physiology Laboratory (CHS 303). Before each test, you will be given written instructions on how to come prepared for it. In the experiment's first week, you will complete the rowing and a Wingate test in a familiarization session. The rowing test is a submaximal aerobic test and requires you to warm up on a rowing ergometer until you reach a Rating of Perceived Exertion (RPE) of 13. RPE describes the level of body fatigue you experience. Once you achieve this RPE, the 8 min test will begin and we will measure HR at minutes one, four, and eight, and work at the same intervals. Upon completion of this test you will perform a Wingate anaerobic power test by cycling on an exercise bike. This test requires you to pedal as fast as possible against a resistance that is equal to 7.5% of your body weight or 7.5 grams per kg. The test lasts 30 seconds. You will warm-up before the test by pedaling for 30 seconds against a light resistance. After the test is over, you will cool-down for 2 min. All testing sessions hereafter will be completed once at seven day intervals. Total participation time for the familiarization session is about 20 min.

In the first testing session, at least 48 hours later you will consume either 6 oz of plain Gatorade or 6 oz of the performance beverage diluted in Gatorade before the rowing test. The rowing test will be repeated as previously described after the familiarization session. Immediately following the rowing test, the Wingate test will be repeated as previously described. This phase of the project will take about 15 min.

The second testing session will be identical to the first, except you will crossover to either the placebo or control beverage group. This session will also take about 15 min.

In the third and final testing session you will complete another session as stated above. Following the Wingate test cool-down you will be dismissed and any questions you may have will be answered at this time. This phase will take about 15 min. Total participation time for the entire study is about one hour and five minutes.

Initials:___

APPENDIX D (Continued)

Informed Consent Form

Risks

As with all physical exertion there is always a risk for injury. Allowing you to participate only after the PAR-Q has been reviewed will minimize serious health risks for exercise. The risks associated with exercise testing and power testing include skeletal muscle injury, fatigue, and soreness. Muscle soreness may occur, but since you currently exercise at least twice a week, this should be minimized. Muscle soreness, if any, should only last a few days. There will be at least one researcher certified in CPR and First Aid present while you are being tested. These technicians will promptly provide standard first aid procedures in the event that you are injured.

For additional information or questions about the study

If you would like more information before, during, or after the study please feel free to contact Joey Durgin at (315)-408-4162 or email at jdurgin1@ithaca.edu

Withdrawal from the Study

Participation in this study is strictly voluntary; you may withdrawal at any time during the testing procedure. You will not be penalized for withdrawing and will still be eligible for extra credit. If you do withdrawal, I ask for prior notification if it is possible. If you complete all four sessions of the study your name will then go into a prize drawing.

How the Data will be Maintained in Confidence

Information from this study will be maintained in complete confidence. Only the primary investigators will have any access to the information. A subject identification number will be signed to you to help ensure confidentiality. Participants of the study will not be identified in any data summaries that are made available to other subjects or in any further publication derived from this study.

____
Print Name

____________________________ ____________________________
Signature Date

APPENDIX E

Pre-test Instructions

Test Date: ______________________________ Test Time: _________________________

You are scheduled to complete a maximum effort exercise test. Your performance depends upon the adherence of these instructions:

1. Do not perform heavy exercise in the 24 hours preceding the test.
2. Do not drink alcohol for 12 hours preceding the test.
3. Do not use stimulants such as caffeine (e.g. coffee) or nicotine (i.e. cigarettes) for three hours preceding the test
4. Do not eat for three hours preceding the test.
5. Do not eat any food that may cause you discomfort the day of the test.
6. Avoid over-the-counter medications for the 12 hours preceding the test. (However, cancel the appointment if you are ill and treat yourself accordingly; we can always reschedule)
7. Wear comfortable clothing and appropriate shoes during the test. (i.e. shorts, t-shirt, and sneakers are recommended)
8. Please, sustain your same lifestyle habits (eating, exercise, medication, etc.) between tests.

We thank you for your cooperation!

APPENDIX F

RAW DATA: ROWING AND WINGATE

ID #	Condition	HR 1	HR 4	HR 8	W 1	W 4	W 8	RPE 1	RPE 4	RPE 8
1	Boring	132	136	131	150	146	131	13	13	13
	Erotic	138	146	148	166	164	160	13	13	13
	Control	132	136	141	152	150	152	13	13	13
2	Boring	137	140	141	102	96	90	13	13	13
	Erotic	137	143	145	101	101	95	13	13	13
	Control	141	143	144	101	96	90	13	13	13
3	Boring	129	136	172	61	55	66	13	13	13
	Erotic	125	126	128	58	59	61	13	13	13
	Control	123	128	126	59	66	65	13	13	13
4	Boring	136	138	137	122	112	108	13	13	13
	Erotic	129	134	134	108	102	102	13	13	13
	Control	136	138	144	122	105	115	13	13	13
5	Boring	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Erotic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Control	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6	Boring	110	118	122	114	124	113	13	13	13
	Erotic	126	126	130	105	93	107	13	12	13
	Control	112	111	115	107	99	102	13	13	13
7	Boring	167	167	166	164	162	150	13	13	13
	Erotic	165	173	172	162	166	160	13	13	13
	Control	168	171	172	173	164	152	13	13	13
8	Boring	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Erotic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Control	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9	Boring	120	128	128	113	112	112	13	13	13
	Erotic	120	121	118	110	110	101	13	13	13
	Control	132	129	127	125	115	105	13	13	13
10	Boring	156	167	176	258	258	258	13	13	13
	Erotic	156	166	174	250	247	252	13	13	13
	Control	156	168	177	261	261	270	13	13	13
11	Boring	141	148	149	90	105	85	13	13	13
	Erotic	127	138	140	88	86	90	13	13	13
	Control	145	151	149	117	120	96	13	13	13

Note: HR (Heart Rate), W (Watts), and RPE (Rating of Perceived Exertion) 1, 4, and 8 represent times that were collected during the eight minute submaximal rowing test.

APPENDIX F (Continued)

RAW DATA: ROWING AND WINGATE

ID #	Condition	HR 1	HR 4	HR 8	W 1	W 4	W 8	RPE 1	RPE 4	RPE 8
12	Boring	n/a	n/a	n/a	82	72	83	13	13	14
	Erotic	n/a	n/a	n/a	89	115	110	13	13	13
	Control	n/a	n/a	n/a	82	72	83	13	13	14
13	Boring	n/a	n/a	n/a	77	76	74	13	13	13
	Erotic	n/a	n/a	n/a	74	83	71	13	13	13
	Control	n/a	n/a	n/a	64	71	65	13	13	13
14	Boring	115	128	131	104	125	132	13	13	13
	Erotic	126	128	128	134	134	134	13	13	13
	Control	132	139	137	146	146	150	13	13	13
15	Boring	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Erotic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Control	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16	Boring	111	103	161	105	118	125	13	13	13
	Erotic	140	146	156	104	107	117	13	13	13
	Control	139	147	159	113	124	129	13	13	13
17	Boring	132	139	132	113	120	96	13	14	13
	Erotic	143	143	145	136	136	120	14	14	13
	Control	155	156	157	164	144	138	13	14	13
18	Boring	n/a	n/a	n/a	114	115	124	13	13	13
	Erotic	n/a	n/a	n/a	96	110	92	13	13	13
	Control	n/a	n/a	n/a	113	122	96	13	13	13
19	Boring	137	146	149	195	207	203	13	13	13
	Erotic	140	149	156	212	215	223	13	13	13
	Control	134	145	152	191	195	210	13	13	13
20	Boring	123	125	128	59	56	59	13	14	13
	Erotic	111	119	118	58	58	59	13	14	13
	Control	112	109	109	59	57	49	14	13	14
21	Boring	126	120	134	92	74	86	13	14	14
	Erotic	125	122	126	93	83	85	13	12	12
	Control	115	131	130	110	131	101	12	13	14
22	Boring	136	137	136	95	101	95	13	13	13
	Erotic	131	135	138	89	92	95	13	13	13
	Control	138	132	138	104	93	96	13	13	13

Note: HR (Heart Rate), W (Watts), and RPE (Rating of Perceived Exertion) 1, 4, and 8 represent times that were collected during the eight minute submaximal rowing test.

APPENDIX F (Continued)

RAW DATA: ROWING AND WINGATE

ID #	Condition	HR 1	HR 4	HR 8	W 1	W 4	W 8	RPE 1	RPE 4	RPE 8
23	Boring	156	167	174	255	264	267	13	13	14
	Erotic	163	173	179	267	264	279	13	13	14
	Control	168	177	180	264	276	261	13	13	13
24	Boring	114	128	134	89	102	115	12	13	14
	Erotic	117	134	140	88	115	113	13	14	14
	Control	131	134	144	120	118	129	12	13	14
25	Boring	98	100	94	31	30	25	13	13	13
	Erotic	94	90	95	28	29	29	13	13	13
	Control	95	91	91	40	36	29	13	13	13
26	Boring	95	99	103	74	78	85	13	13	13
	Erotic	96	100	111	72	76	96	13	13	13
	Control	95	101	107	74	77	90	13	13	14
27	Boring	118	132	139	105	102	98	13	13	13
	Erotic	115	117	122	112	104	102	13	13	13
	Control	124	126	130	98	110	125	13	13	13
28	Boring	139	137	152	104	98	122	13	12	13
	Erotic	147	154	156	118	124	125	13	14	14
	Control	147	148	151	105	107	112	12	13	13
29	Boring	160	169	178	191	186	198	13	13	13
	Erotic	160	170	177	179	181	184	13	13	13
	Control	160	168	177	198	181	191	13	13	13
30	Boring	119	125	132	105	110	112	13	14	14
	Erotic	134	139	149	107	104	110	13	13	13
	Control	120	137	144	90	104	101	13	14	14
31	Boring	141	148	152	112	95	107	13	13	13
	Erotic	131	137	141	113	112	108	13	13	12
	Control	138	146	156	88	102	113	13	13	14

Note: HR (Heart Rate), W (Watts), and RPE (Rating of Perceived Exertion) 1, 4, and 8 represent times that were collected during the eight minute submaximal rowing test.

APPENDIX F (Continued)

RAW DATA: ROWING AND WINGATE

ID #	Condition	MPO	PPO
1	Boring	597	819
	Erotic	584	858
	Control	585	902
2	Boring	616	810
	Erotic	611	819
	Control	605	801
3	Boring	585	785
	Erotic	603	777
	Control	561	793
4	Boring	911	1327
	Erotic	929	1271
	Control	911	1299
5	Boring	n/a	n/a
	Erotic	n/a	n/a
	Control	n/a	n/a
6	Boring	835	1030
	Erotic	839	1013
	Control	796	1001
7	Boring	728	1020
	Erotic	742	1030
	Control	730	1035
8	Boring	442	706
	Erotic	463	728
	Control	455	680
9	Boring	n/a	n/a
	Erotic	n/a	n/a
	Control	n/a	n/a
10	Boring	784	931
	Erotic	770	947
	Control	796	980
11	Boring	564	698
	Erotic	530	678
	Control	550	692
12	Boring	n/a	n/a
	Erotic	n/a	n/a
	Control	n/a	n/a
13	Boring	734	841
	Erotic	763	907
	Control	758	907

MPO (Mean Power Output), and PPO (Peak Power Output) from Wingate test are expressed in Watts. 1, 4, and 8 represent times that were collected during the eight minute submaximal rowing test.

APPENDIX F (Continued)

RAW DATA: ROWING AND WINGATE

ID #	Condition	MPO	PPO
14	Boring	756	1023
	Erotic	804	1239
	Control	823	1223
15	Boring	811	1340
	Erotic	844	1236
	Control	1197	1109
16	Boring	658	927
	Erotic	670	897
	Control	655	940
17	Boring	626	818
	Erotic	634	791
	Control	635	836
18	Boring	779	1227
	Erotic	707	1169
	Control	812	1169
19	Boring	654	769
	Erotic	660	836
	Control	680	863
20	Boring	555	643
	Erotic	557	679
	Control	576	745
21	Boring	632	1133
	Erotic	619	1059
	Control	597	1053
22	Boring	652	912
	Erotic	637	951
	Control	631	902
23	Boring	714	950
	Erotic	734	995
	Control	725	978
24	Boring	702	917
	Erotic	677	842
	Control	687	858
25	Boring	485	598
	Erotic	479	583
	Control	473	587
26	Boring	623	848
	Erotic	634	893
	Control	636	883

MPO (Mean Power Output), and PPO (Peak Power Output) from Wingate test are expressed in Watts. 1, 4, and 8 represent times that were collected during the eight minute submaximal rowing test.

APPENDIX F (Continued)

RAW DATA: ROWING AND WINGATE

ID #	Condition	MPO	PPO
27	Boring	838	1172
	Erotic	782	1172
	Control	801	1137
28	Boring	707	1179
	Erotic	771	1230
	Control	775	1237
29	Boring	600	780
	Erotic	609	780
	Control	596	780
30	Boring	608	801
	Erotic	619	810
	Control	629	819
31	Boring	607	856
	Erotic	603	838
	Control	586	806

MPO (Mean Power Output), and PPO (Peak Power Output) from Wingate test are expressed in Watts. 1, 4, and 8 represent times that were collected during the eight minute submaximal rowing test.