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The effect of exercise experience on imagery use, efficacy beliefs, and body image among females.

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THE EFFECT OF EXERCISE EXPERIENCE ON IMAGERY USE, EFFICACY BELIEFS, AND BODY IMAGE AMONG FEMALES

by

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ABSTRACT

Given the prevalence of inactivity among Canadian women, it is imperative to examine sources which may influence exercise behaviour. Researchers have begun to examine the practical application of exercise imagery to improve involvement in physical activity (Giacobbi et al., 2003). Using the applied model of imagery use in exercise, the current study investigated the influence of exercise experience on imagery use, efficacy beliefs, and body image. Using a median split, female exercisers ($N = 300$) were grouped into less (< 6.2 years) or more (> 7 years) experienced. Results revealed significant differences between the groups for exercise imagery use, efficacy scores, and body image. Moreover, two efficacy beliefs were found to significantly mediate a relationship between imagery use and body image albeit, only among more experienced exercisers. Findings from the current study lend support to the hypothesized relationship in the applied model, and warrant more examination of the antecedent experience.

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Exercise Imagery

AH = Appearance/Health - images associated with becoming healthy and toning up
(e.g., "I imagine a fitter-me from exercising")

ET = Exercise Technique - images of body position and correct movements
(e.g., "I imagine the perfect exercise technique")

EF = Exercise Feelings - images regarding the emotions linked to exercise
(e.g., "I imagine reducing my stress from exercise")

ESE = Exercise Self-efficacy - images pertaining to ones cognitive outcomes
(e.g., "I imagine having the confidence to exercise")

ER = Exercise Routines - images of exercise routines (before and during exercise)
(e.g., "I imagine my entire workout routine")

Efficacy Beliefs

EE = Efficacy Expectancy – the confidence one has towards their exercise behaviours
(e.g., "I am confident I can engage in a variety of exercises")

OE = Outcome Expectancy – the belief one has toward their exercise behaviours
(e.g., "Engaging in exercise will improve my current health")

OV = Outcome Value – the value one places on their exercise behaviours
(e.g., "How important is it for you to be more fit?")

SPE = Self-presentational Efficacy – the belief one has toward making positive impressions on others through their exercise behaviours
(e.g., "How important is it that others see you as an exerciser?")

Body Image

AO = Appearance Orientation – level of importance one places on her appearance
(e.g., "It is important I always look good")

AE = Appearance Evaluation - one's feelings of physical attractiveness/unattractiveness and satisfaction/dissatisfaction with one's looks
(e.g., "I like my looks just the way they are")

FO = Fitness Orientation – individual's degree of investment in being physically fit or athletically competent
(e.g., "I work to improve my physical stamina")

FE = Fitness Evaluation – the feelings of being fit/unfit
(e.g., "I can easily learn new skills")

RESEARCH ARTICLE

Introduction

Despite the known benefits of exercise participation such as improvement in fitness, prevention of disease and illness, and maintenance of a healthy weight (Public Health Agency of Canada [PHAC], 2003), 51% of Canadian adults still do not meet the daily physical activity requirements (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2005). Moreover, the largest proportion of inactive Canadians are female, as 52% of adult women have failed to maintain sufficient activity levels (CFLRI, 2005). Given the low rate of exercise participation, particularly among women, it is imperative to further investigate the successful motivational strategies used by those who are currently active in attempts to motivate those who are inactive.

As the literature highlights, females are continually bombarded with images and social ideologies that promote a need for an ideal physique (Grogan, 2008); one which is toned and thin. Not surprisingly, the most frequent reasons for exercising reported by females include weight control, body tone, and attractiveness (Tiggemann & Williamson, 2000). Research further suggests women who engage in exercise experience positive adjustments in body image and self-esteem (Choi, 2000). Such evidence promotes the need to examine possible strategies to enhance exercise behaviour. According to Hall (1995), exercise imagery may be one such strategy to influence motivation for exercise participation. Research has shown that high-frequency exercisers (3 or more times per week) use imagery more often than low-frequency (2 or fewer times per week) exercisers (Gammage, Hall, & Martin Ginis, 2004), further contributing to the effective role of exercise imagery in enhancing exercise behaviour (Hall, 2001). In addition, Munroe-

Chandler and Gammage (2005) proposed certain functions of exercise imagery may serve as an effective tool to reduce body dissatisfaction and body anxiety. Knowledge of the role imagery use plays in reducing body dissatisfaction, improving body appreciation, and decreasing anxiety in exercise can assist in promoting physical activity in female populations and further contribute to this field of research.

Munroe-Chandler and Gammage (2005) proposed an applied model of imagery use in exercise to guide future research in this area (see Figure 1). The model posits that various antecedents contribute to the exercise imagery functions an individual employs, ultimately influencing one's exercise behavioural and cognitive outcomes. These imagery functions were first introduced in Paivio's (1985) analytic framework, which suggests imagery plays both a motivational and cognitive role in influencing behaviour. More specifically, Paivio identified four distinct functions or types of imagery, operating at either a general or specific level: motivational specific (MS; images of specific goals), motivational general (MG; images of affect and arousal levels), cognitive specific (CS; images of specific skills), and cognitive general (CG; images of strategies or routines). Further amendments to the framework resulted in two distinct functions of MG imagery, with MG-Arousal (MG-A; images associated with arousal and emotions), and MG-Mastery (MG-M; images associated with being in control, confident, and mentally tough) (Hall, Mack, Paivio, & Hausenblas, 1998). These five imagery functions are the key to the applied model of exercise imagery. Furthermore, Munroe-Chandler and Gammage suggested efficacy beliefs mediate the proposed relationships, while moderating factors influence the hypothesized outcomes. As the authors noted, the applied model aimed to incorporate a more diverse range of imagery functions previously identified within the

empirical literature (Hall et al., 1998; Paivio, 1985). Given the emergence of various precipitating factors influencing the effectiveness and consistency of imagery use (e.g., age, gender, activity level) (Gammage et al., 2004; Giacobbi, 2007), further examination of exercise imagery is required in order to provide specific intervention strategies.

To date, the majority of research examining exercise imagery has focused on three specific functions: appearance (MS), energy (MG-A), and technique (CS). Although research on exercise imagery does not employ the same terminology, the suggested exercise imagery functions are considered synonymous with previously established functions within the sport domain (Hall et al., 1995; Paivio, 1985) and in the applied model of imagery use in exercise (Munroe-Chandler & Gammage, 2005). With their development of the Exercise Imagery Questionnaire (EIQ), Hausenblas, Hall, Rodgers, and Munroe (1999) found exercisers used imagery most for appearance reasons (images associated with one's physique), followed by technique imagery (images associated with proper movement and execution), and energy imagery (images associated with one's arousal levels- energizing or relieving stress). Moreover, available empirical literature supports the influence of exercise imagery on exercise behaviour (Gammage et al., 2004; Giacobbi, 2007; Hausenblas & Symons Downs, 2002). Yet, despite the evident psychometric properties and frequent application of the EIQ, Munroe-Chandler and Gammage suggested this inventory may not encompass all of the relevant functions of exercise imagery. More specifically, the imagery functions of appearance, technique, and energy assessed in the EIQ only capture the MS, CS, and MG-A functions proposed by Paivio (1985). As such, both the CG and MG-M function are not represented, cautioning interpretation of future results (Munroe-Chandler & Gammage).

Further extension on available imagery literature resulted in the development of the Exercise Imagery Inventory (EII; Giacobbi, Hausenblas, & Penfield, 2005) and the more recent EII-Revised (EII-R; Giacobbi, Tuccitto, Buman, & Munroe-Chandler, in press) which assesses various themes that emerged from individual interviews with female exercisers (Giacobbi et al., 2003). The identified themes, which included exercise technique, aerobic routines, exercise context, appearance images, competitive outcomes, fitness/health outcomes, emotions/feelings associated with exercise, and exercise self-efficacy, were captured in four global functions (i.e., appearance/health, exercise feelings, exercise self-efficacy, and exercise technique). These four functions were more consistent with the previously identified motivational and cognitive functions of imagery (Hall et al., 1998; Munroe-Chandler & Gammage, 2005; Paivio, 1985). In particular, appearance/health related images assess MS imagery, exercise feeling images assess MG-A, exercise self-efficacy assess MG-M imagery, and exercise technique images assess CS imagery. Although the four function model proposed by Giacobbi et al. (2005) captured Paivio's (1985) framework more completely, development of the EII-R further ensured more congruency with previous literature (Hall et al., 1998; Paivio, 1985) with the incorporation of a fifth function of imagery, cognitive general (CG). As such, the EII-R fully captures the range of imagery functions evident among exercisers (Giacobbi et al., in press).

Previous literature has predominantly focused on the influence of several moderating factors (e.g., gender, age, exercise frequency, activity type) on the frequency of exercise imagery use (Gammage et al., 2004; Giacobbi, 2007; Munroe-Chandler, Kim, & Gammage, 2004). However, as Munroe-Chandler and Gammage (2005) outlined in

their applied model, various hypothesized antecedents (i.e., setting, exerciser experience, goals, and impression motivation) may additionally contribute to exercise imagery use, suggesting the need for research to further examine the identified antecedents. Munroe-Chandler and Gammage proposed that the experience in exercise (i.e., length of time one has been exercising) may influence the functions of imagery employed by an individual. Although different from the length of time one has been exercising, previous research has found that frequency of exercise (how often one exercises) impacts imagery use, such that high frequency exercisers use imagery more often than low frequency exercisers (Gammage et al., 2004). Similarly, Gammage, Hall, and Rodgers (2000) found individuals with more frequent exercise participation could be distinguished from individuals with less frequent exercise participation based on their imagery use. Such evidence highlights the potential for other variations in imagery use among exercisers. Moreover, individuals reporting more physical activity significantly utilized more appearance/health related (MS) images than their less active counterparts (Giacobbi, 2007). Due to the continued emergence of a relationship between exercise imagery use and frequency of exercise participation, it seems possible that exercisers' experience may impact imagery use. As suggested by Munroe-Chandler and Gammage, an experienced exerciser may employ the motivational functions of imagery (MS, MG-A, MG-M) more frequently as they may have mastered more tasks, and thus, the use of cognitive imagery (CS, CG) would be less pertinent.

Exercise imagery research has consistently found appearance-related images are the most frequently utilized among exercisers (e.g., Gammage et al., 2000; Hausenblas & Symons Downs, 2002; Wilson, Rodgers, Hall, & Gammage, 2003). Additionally, females

report using appearance imagery more frequently than males (Gammage et al., 2004) and only appearance imagery has significantly predicted exercise dependence symptoms among a female population (Hausenblas & Symons Downs, 2002). Given the predominance of female exercisers utilizing exercise imagery for appearance and weight reasons (Giacobbi et al., 2003), such images may be directly related to an individual's body image. As the applied model of imagery use in exercise suggests, one's imagery use and more specifically the imagery function an individual employs (e.g., motivational, cognitive) subsequently influences one's behavioural and cognitive outcomes. Munroe-Chandler and Gammage (2005) hypothesized the cognitive outcome of body image may be affected by various antecedents and imagery use, and further mediated by efficacy beliefs. Body image is viewed as a multidimensional construct regarding one's body, generally pertaining to one's appearance (Cash & Pruzinsky, 2002). Individuals conceptualize body image using evaluative beliefs and importance ratings (Cash & Szymanski, 1995). Despite available empirical evidence highlighting the prevalence of appearance related concerns in exercise participation, specific examination of body image is needed to substantiate its inclusion in the proposed model.

Consistent with the high rate of appearance related images employed by women (Gammage et al., 2004), females more frequently report exercising for appearance and weight related concerns (Markland & Hardy, 1993), and report motives for maintaining slimmer physiques and losing weight at a consistently higher rate than males (Silberstein, Striegel-Moore, Timko, & Rodin, 1988). Furthermore, research has suggested that females reporting frequent physical activity engagement may be more at risk of experiencing body image concerns, than non-exercisers (Tiggemann & Williamson,

2000). However, contrasting research posited that exercisers have a more positive reflection of their body image than non-exercisers (Furnham, Titman, & Sleeman, 1994; Hausenblas & Fallon, 2006). Given the mixed results of body image concerns and exercise pursuits, further investigation is warranted, and more specifically about the role imagery plays.

Females are constantly influenced by media images and social ideologies promoting pursuance of ideal body characteristics (Grogan, 2008). One explanation for females' engagement in exercise has been as associated with motives related to body image, such as weight control, body tone, and attractiveness (Tiggemann & Williamson, 2000). This is supported by studies in which body image has been noted as a strong motivator for exercise participation (McDonald & Thompson, 1992) and a primary reason individuals engage in exercise is to enhance or sustain a desired physical appearance (Leary, 1992). The continued pressure from Western culture for the female population to achieve a lean and toned physique has lead to increases in body image disturbances among women (Furnham et al., 1994).

Not surprisingly, body image concerns consistently emerge in exercise contexts given the focus on physical appearance and body shapes (Eklund & Crawford, 1994). Evidence of appearance-related concerns, particularly among a female population, emerged through qualitative analysis of imagery use (Giacobbi et al., 2003). Females reported using appearance-related images to create exercise motivation, which ultimately affected their body image concerns (Giacobbi et al., 2003). Despite these qualitative findings, empirically driven research establishing a relationship between exercise imagery use and cognitions about body image is lacking.

The applied model of exercise imagery further suggests a reciprocal relationship between efficacy beliefs and particular outcomes (i.e., behavioural and cognitive) (Munroe-Chandler & Gammage, 2005). More specifically, efficacy beliefs are hypothesized to influence body image cognitions (e.g., when a female exerciser increases her efficacy beliefs, she may experience improvements in body image cognitions from increased exercise behaviour, and these changes further contribute to increasing her efficacy beliefs). Bandura (1986) proposed efficacy involves an individual's judgment of his/her capabilities to plan and execute specific action sequences required to attain particular performance outcomes. Thus, the applied model suggests efficacy beliefs mediate the relationship between imagery functions and outcomes (Munroe-Chandler & Gammage). In accordance with Hall's (1995) suggestion, that exercise imagery may be an effective source for establishing self-efficacy, Munroe-Chandler and Gammage suggested by employing imagery (e.g., seeing how one wishes to look), an exerciser may improve her efficacy beliefs, which will enhance her motivation to attain particular outcomes (e.g., improvements to her body image). Specifically, the model posits efficacy expectancy (e.g., imaging oneself executing an exercise movement correctly may improve confidence to engage in the movement), outcome expectancy (e.g., imaging oneself completing an exercise program may assist in improving one's cardiovascular health), outcome value (e.g., imaging oneself playing with their children may improve the value placed on improving their health status), and self-presentational efficacy (e.g., imaging oneself portraying physical coordination during exercise may increase exercise behaviour, as positive impressions are made to others) mediates the association between imagery use and body image.

In an earlier study, Rodgers, Munroe, and Hall (2001-2002) determined the relationship between appearance imagery and two efficacy beliefs (i.e., coping and scheduling) significantly predicated behavioural intention, strengthening the mediation proposed in the applied model. Cumming (2008) found specific imagery functions (i.e., appearance/health and technique) can effectively enhance exercise behaviour and self-efficacy beliefs. As highlighted by Munroe-Chandler and Gammage (2005), such empirical evidence supports the mediational relationship between various efficacy beliefs, imagery use, and behavioural and cognitive outcomes. Moreover, investigation of female exercisers revealed those engaging in more frequent activity could be distinguished from those exercising less frequently by self-efficacy consistency (Rodgers & Gauvin, 1998). Such evidence further highlights a potential association between efficacy beliefs and an exerciser's experience, a relationship investigated in the current study.

There is a need to examine the hypothesized relationships identified in the applied model of imagery use in exercise (Munroe-Chandler & Gammage, 2005). As Kossert and Munroe-Chandler (2007) suggested, future research should aim to utilize the testable relationships proposed in the applied model of exercise imagery in an effort to establish a reliable framework. As such, the purpose of this study was to examine one suggested relationship in the applied model of imagery use in exercise: the role of a female exerciser's experience on her imagery use, efficacy beliefs, and body image. In addition, the secondary purpose of this study was to examine if self-efficacy functions as a mediator between imagery use and body image perceptions as suggested within the model. Baranowski, Anderson, and Carmack (1998) posited in order to effectively

contribute to interventions, more examination and influence of mediating variables is needed. Given the theoretically derived relationships proposed in the conceptual model (Munroe-Chandler & Gammage), it was hypothesized that female exercisers with more exercise experience would utilize the motivational functions of exercise imagery more frequently than their less experienced counterparts. Likewise, experienced female exercisers would report higher levels of efficacy beliefs than those with less experience. Given those with more experience were thought to exhibit higher efficacy beliefs, it was also hypothesized those female exercisers reporting higher levels of efficacy beliefs (i.e., more exercise experience) would evaluate their body image more positively. Finally, it was hypothesized self-efficacy would function as a mediator in accordance with the conditions outlined by Baron and Kenny (1986).

Method

Participants

Female participants (N = 300) from two mid-sized Ontario cities volunteered to participate in the study. The participants from various fitness facilities (i.e., co-ed/women's only, public/privatized) ranged in age from 17 to 70 years (M_{age} = 34.2 years), with experience in exercise extending from 1 month to 49 years (M = 10.5 years). The participants reported engaging in running (n = 86) and weight-related (n = 105) exercises most frequently. The sample consisted of 255 Caucasians, 9 African Americans, 4 Asians, and 32 reporting other racial or ethnic backgrounds. The demographic breakdown is representative of the communities where the sample was collected.

Measures

Demographics. Participants were asked to identify their age, ethnicity, and the types of exercise in which they engage (e.g., group fitness class, running, weights, etc.) as well as indicate their exercise experience (in months and/or years) (Appendix A). Using a median split, participants were classified into two distinct groups (more and less experienced) based on their responses to exercise experience.

Exercise imagery. Participants completed the EII-R (Giacobbi et al., in press), which assesses exercise imagery use using a five-factor model (Appendix B). The inventory identifies the existence of distinct imagery functions, including appearance/health imagery (e.g., "I imagine being toned from exercising"), exercise technique (e.g., "When I think about exercising, I imagine doing the required movements"), exercise feelings (e.g., "I imagine how I will feel after I exercise"), exercise self-efficacy (e.g., "I imagine having the confidence to exercise"), and exercise routines (e.g., "I imagine my entire workout routine") (Giacobbi et al., in press). The 22-item inventory is anchored on a 7-point Likert scale (1 = *never* and 7 = *often*). The five-factor model presented adequate fit indices (i.e., RMSEA of .05, CFI of .92, and SRMR of .05) and appropriate factor loadings from a confirmatory factor analysis (Giacobbi et al., in press). Each of the five subscales has demonstrated adequate scale reliability as evident by reported factor loadings and error variances: appearance/health (.86), exercise self-efficacy (.78), exercise technique (.83), exercise feelings (.76), and exercise routines (.70) (Giacobbi et al., in press). Moreover, the subscales were positively correlated with barriers self-efficacy and exercise behaviour (Giacobbi et al., in press).

Efficacy beliefs. In accordance with recommendations from Bandura (1986) and the applied model of exercise imagery (Munroe-Chandler & Gammage, 2005), questions assessing the hypothesized efficacy beliefs were developed specifically for this study (Appendix C). Bandura (2006) suggested that several recommendations must be addressed in order to effectively measure efficacy beliefs. Efficacy measurements must be specific to the particular domain of functioning assessed (i.e., domain specification), ensure a detailed assessment of the level, strength, and generality of efficacy beliefs is present (i.e., gradations of challenge), items should reflect ideas of what an individual believes they can accomplish, not their future intentions (i.e., content relevance), and a measurement tool should employ an appropriate scale length to measure ones efficacy (i.e., a 10-point response scale). The questionnaire included four items for each efficacy construct (i.e., efficacy expectancy, outcome expectancy, outcome value, and self-presentational efficacy). Participants rated their efficacy expectancy (e.g., "I am confident I can maintain my current level of exercise") using a level of confidence scale (0% = *not at all confident* and 100% = *completely confident*). Outcome expectancy (e.g., "Engaging in exercise will improve my current health") was assessed using a 5 point Likert scale (1 = *strongly disagree* and 5 = *strongly agree*). Finally, outcome value (e.g., "How important is it for you to be more fit?") and self-presentational efficacy (e.g., "How important is it that others see you as an exerciser?") constructs were assessed using a 5 point Likert scale (1 = *not at all important* and 5 = *extremely important*).

Body image. Participants completed the Multidimensional Body-Self Relations Questionnaire (MBSRQ; Cash, 2000), a measurement tool assessing various attitudinal dispositions of one's body-image (Appendix D). The MBSRQ is a 69 item inventory

measuring seven subscales rated on a 5-point Likert scale anchored at 1 (*definitely disagree*) and 5 (*definitely agree*). The current study only utilized four specific subscales of the MBSRQ: appearance evaluation, appearance orientation, fitness evaluation, and fitness orientation to assess self-attitudinal and cognitions about one's appearance and fitness behaviours (Cash, 2000). Similar to the current investigation, previous research examining body image cognitions have utilized the appearance orientation and evaluation subscales of the MBSRQ (Muth & Cash, 1997). In addition, given the focus of this study on exercise importance, the fitness orientation and evaluation subscales aimed to assess an exerciser's satisfaction and investment with her current fitness level (Brown et al., 1990). Furthermore, recent research has utilized various subscales of the MBSRQ specifically among female exercisers, reporting adequate reliability (Martin Ginis, Prapavessis, & Haase, 2008).

The seven items within the appearance evaluation subscale identify one's feelings of physical attractiveness/unattractiveness and satisfaction/dissatisfaction with one's looks. Individuals with higher scores on this scale reflect more positive and satisfied feelings with their appearance. The appearance orientation scale, comprised of 12 items, examines the level of importance one places on her appearance. Individuals with low scores reflect a minimal importance on looks, and do not take time to "look good". The three items comprising the fitness evaluation scale examines the feelings of being fit/unfit. Higher scorers see themselves as physically fit, and engage in activities to improve or maintain their fitness level. Finally, the fitness orientation scale is comprised of 13 items and reflects an individual's degree of investment in being physically fit or

athletically competent. Lower scorers do not value physical fitness and thus do not regularly incorporate activities into their daily living.

Procedure

Upon attaining approval from the University of Windsor Research Ethics Board (REB), participants were recruited from various fitness facilities (i.e., women's only/ co-ed and privatized/public) in southwestern and eastern Ontario (Appendix E). Fitness facilities were contacted to solicit the participation of female clients in a research study on exercise experience, imagery use, efficacy beliefs, and body image (Appendices F and G). Pending permission from the fitness facility contacts, consenting venues were visited at an agreed upon dates to recruit participants. Individuals fulfilling the demographic criteria (i.e., female, 17 years or older, and currently exercising) were provided with the purpose and procedure of the investigation. Participant consent was obtained prior to questionnaire distribution (Appendix H), and each participant was provided with a letter of information on the study procedures (Appendix I). Each female participant received a questionnaire packet consisting of the EII-R, Efficacy Belief Questionnaire, and MBSRQ to be completed while the investigator was present (Note: The questionnaires were counterbalanced). Participants were informed of their right to withdraw at any time, without consequence, and confidentiality of the responses was assured. Completion of the questionnaires took approximately 15 minutes. Participants were thanked and provided the opportunity to fill out a ballot for a chance to win one of four twenty-five dollar gift certificates to a local sporting goods store (Appendix J). The investigator was present during the questionnaire distribution and remained onsite until all packages were completed and inquiries were answered.

Data Analysis

Descriptive analyses were computed, including means, frequencies, and standard deviations of the demographic variables as well as scores on the EII-R, Efficacy Belief Questionnaire, and MBSRQ were calculated. Median calculation of an exercisers' experience was calculated to determine appropriate grouping structure (more vs. less experienced) for further statistical analysis. In addition, reliability of the inventories (EII-R, Efficacy Belief Questionnaire, and MBSRQ) was examined using Cronbach alpha coefficient tests. In accordance with the recommendation of Nunnally and Bernstein (1994), only subscales reporting alpha coefficients .70 or above were accepted as reliable. Furthermore, to make comparisons between scores on the various questionnaires (EII-R, Efficacy Belief, and MBSRQ), Pearson correlations were calculated.

To assess group (less and more) differences on imagery use, efficacy beliefs, and body image, multivariate analyses of variances (MANOVA) were conducted. The MANOVA utilized exercise experience (i.e., less or more experienced) as the independent variable, with the five EII-R functions, the four efficacy belief constructs, and the four body image constructs as the dependant variables. Follow-up univariate analyses were conducted.

In order to examine the mediational relationship between imagery use, efficacy beliefs, and body image perceptions, a series of multiple regression analyses were conducted utilizing the criteria established by Baron and Kenny (1986) among the two experience levels (i.e., less or more experienced).

Results

Preliminary Analyses

In accordance with recommendations from Tabachnick and Fidell (2001), all data were screened and cleaned prior to conducting further statistical analysis. Any missing data were treated with mean substitution, such that any missing value was replaced with the participant's averaged score of items within the specific subscale, rounded to the nearest Likert response (Tabachnick & Fidell). Furthermore, all data were analyzed using residual scatterplots to ensure it complied with the assumptions of regression (i.e., linearity, normality of residuals, and homoscedasicity; Tabachnick & Fidell) and were found to be satisfactory. Finally, Mahalanbois distance was employed during statistical analysis to control for any multivariate outliers (Ntoumanis, 2001).

Means and standard deviations of the demographic variables (i.e., age, experience level) as well as scores on the EII-R, Efficacy Belief Questionnaire, and MBSRQ are presented in Table 1. Median calculation (Mdn = 84 months) of an exerciser's experience was calculated to determine appropriate grouping structure (more vs. less experienced) for further statistical analysis. Participants in the less experience group (n = 144) ranged between 1 month to 6.17 years (M_{exp} = 2.95 years), while more experienced (n = 156) ranged from 7 to 49 years (M_{exp} = 17.45 years). In addition, reliability of the inventories was examined using Cronbach alpha coefficient tests (Nunnally & Berstein, 1994), and were found to be acceptable for all subscales of the Efficacy Belief Questionnaire, EII-R, and MBSRQ (see Table 1).

In order to assess evidence of multicollinearity between scores on the questionnaires (Efficacy Belief Questionnaire, EII-R, and MBSRQ), Pearson correlations

were calculated (see Table 2). All subscales reflected a low to moderate correlation ranging from $r = -.11$ to $r = .71$ ($p < .05$), thus highlighting each subscale is measuring a distinct concept and ensures the absence of multicollinearity (Tabachnick & Fidell, 2001).

Primary Analyses

Three MANOVAs were conducted to examine the differences of exercise experience (less vs. more) among the investigated constructs of imagery use, efficacy beliefs, and body image. Results highlighted a significant difference in exercise the functions of imagery employed between the two groups (Wilks' $\lambda = .93$, $F(5, 294) = 4.66$, $p < .05$, $\eta^2 = .07$). A follow-up univariate analysis revealed a significant difference between the two groups on the use of imagery for the functions of appearance/health ($F(1, 298) = 4.25$, $p < .05$, $\eta^2 = .01$) and exercise self-efficacy ($F(1, 298) = 10.10$, $p < .05$, $\eta^2 = .03$), with the less experienced exercisers reporting greater use than more experienced exercisers. Further significant differences were observed among efficacy beliefs scores between the two exercise experience groups (Wilks' $\lambda = .93$, $F(4, 295) = 5.42$, $p < .05$, $\eta^2 = .07$). Efficacy expectancy ($F(1, 298) = 16.5$, $p < .05$, $\eta^2 = .05$) was found to be lower among less experienced exercisers versus their more experienced counterparts. In addition, differences between the two groups were noted among body image (Wilks' $\lambda = .93$, $F(4, 295) = 4.99$, $p < .05$, $\eta^2 = .06$) with more experienced exercisers reporting higher scores. Specifically, appearance evaluation ($F(1, 298) = 8.52$, $p < .05$, $\eta^2 = .03$) and fitness orientation ($F(1, 298) = 16.72$, $p < .05$, $\eta^2 = .05$) subscales were scored significantly higher among more experienced exercisers than less experienced exercisers. Effect size estimates were determined with Cohen's (1988)

recommendations for analysis of variance with partial η^2 (η^2 = .01 is a small effect size, .06 is a medium effect size, and .14 is a large effect size).

Mediation

A series of multiple regression analyses were conducted to test for the presence of a mediational relationship between the measured variables (Baron & Kenny, 1986). Specifically, a variable functions as a mediator if it complies with the following conditions: 1) The predictor variable (i.e., exercise imagery) is significantly related to the outcome variable (i.e., body image); 2) The predictor variable is significantly related to the presumed mediator (i.e., efficacy beliefs); and 3) The mediator is significantly related to the outcome variable when regressed with the predictor variable. If these three conditions hold in the predicted direction, Baron and Kenny determined, in order for mediation to exist, the strength of the relationship between the predictor variable (exercise imagery) and the outcome variable (body image) is significantly reduced when regressed with the mediator (efficacy beliefs) than when regressed without it (Condition 4). Partial mediation exists when the relationship is reduced, with full mediation evident when the path between the predictor and outcome variable is eliminated. All variables were regressed using the aforementioned criteria to determine the existence of mediation, however only those representing significant relationships are reported.

Less Experienced Exercisers

Condition 1 - Influence of exercise imagery on body image. Employing body image as the dependent variable, the results highlighted functions of exercise imagery demonstrated a significant relationship among the less experienced exercisers. Specifically, the appearance/health function was significantly related to appearance

orientation, $\beta = .37$, $F(5, 138) = 4.99$, $p < .05$; Exercise self-efficacy function was related to appearance evaluation, $\beta = -.31$, $F(5, 138) = 3.30$, $p < .05$, and exercise technique function was related to appearance evaluation, $\beta = .35$, $F(5, 138) = 3.30$, $p < .05$.

Condition 2 - Influence of exercise imagery on efficacy beliefs. In accordance with the second condition of mediation, significant relationships emerged between the predictor variable (exercise imagery) and the presumed mediator (efficacy beliefs). Exercise technique demonstrated a significant relationship with efficacy expectancy, $\beta = .30$, $F(5, 138) = 2.87$, $p < .05$; Appearance/health was significantly related to outcome expectancy, $\beta = .47$, $F(5, 138) = 5.06$, $p < .05$, outcome value, $\beta = .39$, $F(5, 138) = 10.62$, $p < .05$, and self-presentational efficacy, $\beta = .19$, $F(5, 138) = 10.95$, $p < .05$. Exercise feelings demonstrated a significant relationship with outcome expectancy, $\beta = -.25$, $F(5, 138) = 5.06$, $p < .05$. In addition, exercise routines was found to be significantly related to self-presentational efficacy, $\beta = .29$, $F(5, 138) = 10.95$, $p < .05$.

Conditions 3 and 4 - Influence of exercise imagery and efficacy beliefs on body image. Insofar as the third condition (Baron & Kenny, 1986), no significant relationships were observed between the investigated variables. More specifically, the mediator variables (efficacy beliefs) were not significantly related to the outcome variable (body image) when regressed with the predictor variable (exercise imagery). Therefore, Baron and Kenny's final condition could not be considered, thus suggesting that efficacy beliefs do not mediate the relations between exercise imagery functions and body image cognitions among less experienced exercisers.

More Experienced Exercisers

Condition 1 - Influence of exercise imagery on body image. In accordance with Baron and Kenny's (1986) first condition, the functions of exercise imagery were regressed with the dependent variable, body image. Significant main effects were found whereby exercise self-efficacy was significantly related to fitness orientation, $\beta = .23$, $F(5, 150) = 3.78$, $p < .05$; Exercise technique was related to appearance evaluation, $\beta = .24$, $F(5, 150) = 3.46$, $p < .05$; and exercise routines was significantly related to fitness orientation, $\beta = .30$, $F(5, 150) = 4.37$, $p < .05$.

Condition 2 - Influence of exercise imagery on efficacy beliefs. Significant relationships emerged for Baron and Kenny's (1986) second condition, which examined the relationship between imagery functions and efficacy beliefs. Exercise routines demonstrated a significant effect with efficacy expectancy, $\beta = .27$, $F(5, 150) = 5.92$, $p < .05$, while the imagery function of exercise self-efficacy was also found to be significantly related to efficacy expectancy, $\beta = -.23$, $F(5, 150) = 5.92$, $p < .05$, and outcome value, $\beta = .40$, $F(5, 150) = 13.96$, $p < .05$. Appearance/health imagery was found to be significantly related to outcome expectancy, $\beta = .36$, $F(5, 150) = 6.15$, $p < .05$, outcome value, $\beta = .36$, $F(5, 150) = 4.68$, $p < .05$, and self-presentational efficacy, $\beta = .26$, $F(5, 150) = 6.60$, $p < .05$.

Conditions 3 and 4 - Influence of exercise imagery and efficacy beliefs on body image. Insofar as Baron and Kenny's (1986) third condition is concerned, efficacy expectancy was found to be related to fitness orientation when regressed with exercise routines, $\beta = .41$, $F(2, 153) = 27.10$, $p < .05$. Furthermore, outcome value was significantly related to appearance orientation when regressed with exercise self-efficacy,

$\beta = .19$, $F(2, 153) = 8.86$, $p < .05$. As such, the following combinations of variables satisfied the three outlined conditions: (a) exercise routines, efficacy expectancy, and fitness orientation and (b) exercise self-efficacy, outcome value, and appearance orientation.

Therefore, in order to satisfy Baron and Kenny's (1986) fourth condition, the strength of the relationship between the predictor variable and the outcome variable must be significantly reduced when the mediator is added to the model, signifying partial mediation. It was determined the effect of exercise routines on fitness orientation was less when regressed with efficacy expectancy, $\beta = .20$, $F(2, 153) = 27.10$, $p < .05$, than when regressed without it, $\beta = .34$, $F(1, 154) = 20.37$, $p < .05$. As well, the effect of exercise self-efficacy on appearance orientation was less when regressed with outcome value, $\beta = .18$, $F(2, 153) = 8.86$, $p < .05$, than when regressed without it, $\beta = .27$, $F(1, 154) = 12.54$, $p < .05$. In order to establish if the efficacy beliefs were significant mediators of the determined relationships, Aroian's modified Sobel's test (Baron & Kenny, 1986) was employed. According to Frazier, Tix, and Barron (2004), if the resultant z score of the mediated effect is greater than 1.96, the effect is significant at the .05 level. Results from Aroian's test indicated that the related z-scores were significantly different from zero for efficacy expectancy ($z = 2.39$, $p < .05$) and outcome value ($z = 2.39$, $p < .05$). As such, the observed results support the suggestion that the efficacy belief, efficacy expectancy serves to partially mediate the relations between exercise imagery, exhibited as exercise routines and body image cognitions, exhibited as fitness orientation. In addition, the efficacy belief, outcome value serves to partially mediate the relations between exercise

imagery, manifested as exercise self-efficacy, and body image cognitions, manifested as appearance orientation (see Figure 2).

Discussion

The aim of the present study was to examine the role of a female exerciser's experience on her imagery use, efficacy beliefs, and body image perceptions. Employing the applied model of imagery use in exercise (Munroe-Chandler & Gammage, 2005), various hypothesized relationships were examined within a female exercise population.

Previous literature has demonstrated a significant relationship between exercise frequency (how often one exercises) and imagery use (Gammage et al., 2000; Gammage et al., 2004; Giacobbi, 2007). Specifically, more frequent exercisers have been distinguished from their less frequent counterparts based on their imagery use, with more frequent exercisers employing imagery more often (Gammage et al., 2000; Gammage et al., 2004). Given that frequency has been consistently examined as a moderating variable, Munroe-Chandler and Gammage (2005) proposed that an exerciser's experience (i.e., how long one has been exercising) may also influence one's imagery use. As such, the present study hypothesized more experienced exercisers (M_{exp} = 17.45 years) would report using the motivational functions of imagery more than their less experienced counterparts (M_{exp} = 2.95 years). The results indicated that less experienced exercisers reported using the motivational functions of imagery (i.e., appearance/health (MS) and exercise self-efficacy (MG-M)) significantly more than their experienced counterparts, thus partially contrasting the original hypothesis. In addition, these findings are contrary to the suggestion proposed by Munroe-Chandler and Gammage, in which they hypothesized an experienced exerciser, may employ the motivational functions of

imagery more frequently given their mastery experiences with exercise tasks, and thus their requirement for the cognitive functions of imagery would be relied on less frequently. Given the results of the present study, one could argue that less experienced exercisers may employ the motivational functions of imagery, specifically appearance/health and exercise self-efficacy images, more frequently than the more experienced exercisers in an effort to increase their motivation to engage in exercise behaviour. This would follow Hall's (1995) suggestion that exercise imagery may be an effective strategy for enhancing motivation to exercise. Previous literature highlights that females report using appearance imagery more consistently than males (Gammage et al., 2000), and that females employ imagery for appearance and weight reasons (Giacobbi et al., 2003). As such, less experienced exercisers may rely on appearance/health related images, such as imaging becoming more fit, as a source of motivation to exercise.

Results from the current study further identified less experienced exercisers employed exercise self-efficacy related images, such as imaging having the confidence to exercise, more frequently than their more experienced counterparts, which may be attributed to their lack of experience with exercise behaviours. Rodgers and Gauvin (1998) found more frequent exercisers could be distinguished from less frequent exercisers by self-efficacy consistency. Specifically, less frequent exercisers reported lower self-efficacy beliefs than more frequent exercisers (Rodgers & Gauvin). More specific to exercise experience, Kossert (2008) found a lack of positive outcomes with exercise resulting from perceived inefficacy among non-exercisers. Therefore, given their lack of familiarity with exercise, females with less experience may utilize the exercise self-efficacy function more readily to increase their confidence to further pursue exercise

engagement and increase their adherence. As observed by Anton et al. (2005), exercisers with higher levels of past exercise involvement (i.e., experience) reported higher levels of exercise adherence when involved in high intensity conditions. Interestingly, Rodgers et al. found task self-efficacy was significantly related to behavioural intention for exercise (Rodgers, Hall, Blanchard, McAuley, & Munroe, 2002). As such, less experienced female exercisers may employ images pertaining to their self-efficacy for exercise (e.g., imaging successfully completing a difficult workout), which may contribute to their intention to further involvement in the associated behaviours. Furthermore, as noted by McAuley, Jerome, Elavsky, Marquez, and Ramsey (2003), mastery experiences was found to significantly influence exercise self-efficacy and individuals report more positive affective experiences pertaining to their exercise behaviour as their amount of activity increases (Lox, Burns, Treasure, & Wasley, 1999). Given less experienced exercisers have not engaged in exercise behaviours for as long as more experienced exercisers, their lack of self-efficacy beliefs and positive experiences may further encourage the use of motivational imagery, namely exercise self-efficacy and appearance/health.

Consistent with previous empirical literature noting a relationship between exercise and self-efficacy beliefs (McAuley, Bane, & Mihalko, 1995; Rodgers & Gauvin, 1998; Rodgers et al., 2001-2002), the current study found significant differences between the two experience levels and their reported efficacy beliefs. The mean data scores partially support the stated hypothesis as more experienced exercisers report higher efficacy beliefs, albeit only on efficacy expectancy and self-presentational efficacy, than the less experienced group. More specifically, less experienced exercisers reported lower

scores on efficacy expectancy than more experienced exercisers. Therefore, less experienced exercisers had lower confidence that they "...could exercise regularly" and "...could learn new exercise routines and skills" than more experienced exercisers. Given the construct of efficacy expectancy measures one's degree of confidence with engaging in exercise behaviours (Munroe-Chandler & Gammage, 2005), the lack of one's experience with various exercise engagement may contribute to lower efficacy beliefs. As previously noted, less frequent exercisers exhibit lower self-efficacy than more frequent exercisers (Rodgers & Gauvin), and avid exercisers report higher levels of self-efficacy (i.e., task, coping, and scheduling) in comparison to non-exercisers (Rodgers & Sullivan, 2001). Similar differences among exercisers were found in the current study with more experienced female exercisers reporting higher self-efficacy than less experienced exercisers. Although exercise experience and exercise frequency are not synonymous within empirical research or the applied model of imagery use in exercise, it is important to note an observable relationship between the two factors and associations with measured constructs.

In addition to the examination of experience on female exercisers' use of imagery and efficacy, further investigation of relationships proposed in the applied model of imagery use in exercise (Munroe-Chandler & Gammage, 2005) were undertaken in the current study. The influence of an exerciser's experience on body image cognitions was hypothesized to differ among the two experience groups. The results revealed the more experienced group significantly differed from the less experienced group on particular constructs of body image. Specifically, more experienced exercisers rated appearance evaluation higher than less experienced exercisers. Given higher scores on the appearance

evaluation scale reflect more positive and satisfied feelings with appearance (Cash, 2000), the results partially support the hypothesis. The current findings are similar to previous research suggesting exercisers have a more positive reflection of their body image than non-exercisers (Furham, Titman, & Sleeman, 1994; Hasenblaus & Fallon, 2006). In addition, more experienced exercisers reported significantly higher scores on the fitness orientation construct of body image (i.e., reflect more value on physical fitness and greater incorporation of physical activity into one's daily life; Cash, 2000) compared to less experienced exercisers. It can be suggested more experienced exercisers place a greater degree of importance and engage in more behaviours directed toward being physically fit, given their long-term engagement in exercise activity than their less experienced counterparts. Moreover, Brown, Cash, and Mikulka (1990) stated, "persons who value and attend to events in a given somatic domain are also likely to engage in maintenance and enhancement activities vis-á-vis that domain" (p. 141). Thus, more experienced exercisers place a stronger value on being physically active, and as such are more inclined to engage in appropriate behaviours (i.e., evaluate their body image more positively and consistently attend fitness facilities) than less experienced exercisers.

The current study also sought to examine whether efficacy beliefs mediated the relationship between one's imagery functions and the cognitive outcome of body image (Munroe-Chandler & Gammage, 2005). It was hypothesized efficacy beliefs would function as a mediator in accordance with the conditions outlined by Baron and Kenny (1986). Efficacy beliefs were found to function as a mediator between imagery use and body image, albeit only among more experienced exercisers, thus partially supporting the hypothesis. The efficacy belief, efficacy expectancy, partially mediated the relationship

between the imagery function of exercise routines, and the body image cognition, fitness orientation among more experienced exercisers. Particularly, the confidence a more experienced female exerciser has toward her ability to engage in exercise behaviour contributes to the relationship between the images she creates about her exercise routines and her values and behaviours pertaining to physical fitness.

Furthermore, the current findings for more experienced exercisers suggest the efficacy belief, outcome value, partially mediated the relationship between the imagery function, exercise self-efficacy, and the body image cognition, appearance orientation. As such, among more experienced female exercisers, the value placed on one's exercise behaviour contributes to the relationship between the images pertaining to one's confidence and the importance placed on her appearance. As suggested by Munroe-Chandler and Gammage (2005), an exerciser who engages in imagery may increase her efficacy beliefs, which will enhance her desire to attain particular outcomes, such as improving her body image. These mediational relationships have been supported in previous research, highlighting a consistent relationship between imagery use and efficacy beliefs (Cumming, 2008; Giacobbi et al., 2003; Rodgers et al., 2001-2002). Specifically, appearance/health and technique imagery have been shown to effectively enhance exercise behaviour and self-efficacy beliefs (Cumming, 2008).The current findings support the relationship between imagery use, efficacy beliefs, and behavioural intention to exercise given significant mediational relationships were only observed among the more experienced exercisers. Because more experienced exercisers reported more positive and satisfied feelings with appearance/being physically fit (i.e., appearance orientation, fitness orientation), and lower scores on the level of importance placed on

appearance (i.e., appearance evaluation), it is possible that sustained engagement in exercise behaviour positively influences a female exerciser's body image. Previous literature by Kossert (2008) found female exercisers employ appearance imagery in relation to relevant others, suggesting their social comparison methods are facilitative to their exercise motivation. Likewise, appearance imagery among non-exercising females is comprised of upward social comparisons to models and celebrities, which serves as a debilitative mechanism for exercise initiation (Kossert, 2008). As such, more experienced exercisers may employ more realistic appearance imagery and body image perceptions, which contribute to their efficacy beliefs and consistent adherence to exercise.

Kossert and Munroe-Chandler (2007) suggested future research should examine the testable relationships proposed with the applied model of imagery use in exercise in order to establish a reliable imagery framework. The findings from the present study served to further our knowledge of exercisers' imagery use as several hypothesized relationships were examined. Given the observed significant relationships between experience and imagery use, efficacy beliefs, and body image, the inclusion of experience as an antecedent within the applied model is warranted. Furthermore, results from the current study supported the proposal that efficacy beliefs function as a mediator between imagery use and the various behavioural or cognitive outcomes. However, due to the fact that significant mediation was only observed within the more experienced exercisers, and for one proposed cognitive outcome, additional research is necessary to further establish the inclusion of efficacy beliefs in the model and the influence of additional variables on the suggested mediational role.

Despite the novel investigation of variables in the current study, some limitations should be noted. First, the current study only examined current exercisers (i.e., less and more experienced) given the aim was to evaluate the antecedent of experience on proposed constructs within the applied model. As such, it is cautioned to avoid generalization of the results to a non-exercising population given their use of imagery may differ in addition to potential differences in their reported efficacy beliefs and body image perceptions compared to current exercisers. Moreover, given the current study was only conducted in Ontario, results observed may be limited to the demographic population assessed, cautioning generalization to other populations due to influential differences of ethnicity and geographical locations. In addition, the current study only assessed exercisers at established fitness facilities, thus females engaging in exercise outside of the fitness club were not included within the current study. The use of self-report measures may contribute to potential biases in responses, particularly given the investigation of body image perceptions, thus limiting the validity of potential findings. Finally, given the cross-sectional approach used to examine the proposed relationships within the applied model, directionality of the results cannot be inferred and may vary over time.

Given the recent development of the applied model of imagery use in exercise (Munroe-Chandler & Gammage, 2005), the proposed relationships and variables presented within warrant further investigation. The present study aimed to assess the influence of one antecedent, namely experience, on one's imagery use, efficacy beliefs, and body image cognitions. However, given that non-exercisers may benefit from the motivational and/or cognitive sources of imagery, further investigation of the

aforementioned constructs should be undertaken with this population. Hall (1995) suggested that exercise imagery may be a beneficial strategy to increase motivation for exercise. As such, assessment of the imagery functions non-exercisers may employ, if any, would further strengthen the applicability of the applied model and current findings. Given the infancy of empirical literature pertaining to the applied model, many hypothesized antecedents require further investigation in order to validate the associations within the model. Specifically, the influence of the antecedents: exercise settings, an individual's goals, and their self-presentational concerns (i.e., impression motivation) are merely proposed to influence the functions of imagery an individual employs. Furthermore, despite available empirical evidence justifying the inclusion of particular variables in the model proposed by Munroe-Chandler and Gammage (2005), many of the relationships are only hypothesized. Thus it is imperative future research test these relationships in an effort to establish a more consistent exercise imagery framework useful for developing assessment tools and individually tailored interventions. Finally, future studies should aim to extend the application of the applied model of imagery use in exercise to broad samples, including but not limited to males, adolescents, non-exercisers, and clinical populations. Given male body image concerns have notably increased within Western society (Luciano, 2001), and previous literature suggests male exercisers use appearance imagery less frequently than their female counterparts (Gammage et al., 2000), a logical future avenue of research should aim to evaluate the associations between exercise experience, imagery use, and body image cognitions within a male exercise population.

The present study lends applicability to various exercise behaviours and engagement. Specifically, because particular efficacy beliefs were found to mediate the relationship between imagery use and body image cognitions, it is suggested future exercise interventions aim to incorporate a more holistic program, including strategies to increase one's level of confidence for exercise. Furthermore, in accordance with the suggestion from Munroe-Chandler and Gammage (2005), the current findings identified differences among individual's imagery use. Future interventions with exercisers should tailor imagery to their desired outcomes and ensure moderating factors (i.e., age, gender) are taken into account. For example, when working with less experienced exercisers, more emphasis should be placed on developing exercise technique images given this function was utilized less frequently than more experienced exercisers. By further examining and validating the applied model of imagery use in exercise, more effective intervention programs can be developed which aim to increase current levels of physical activity. In addition, given the imagery function of appearance/health was the most frequently employed among both experience levels, future interventions may aim to shift this focus to employing other functions of imagery in an effort to decrease reliance on appearance motivation sources of exercise participation, and promote greater cultural appreciation for exercise behaviour and imagery use.

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Table 1

Means and Standard Deviations of Demographic Information, EII-R, Efficacy Belief Questionnaire, and MBSRQ Subscales

Variable	Less Experience (n = 144)		More Experience (n = 156)		Combined Sample (N = 300)		
	M	SD	M	SD	M	SD	α
Age	29.33	13.13	38.70	13.38	34.20	14.05	
Experience (in months)	35.38	22.79	209.35	113.68	125.84	120.53	
EII-R							
AH	5.81	1.12	5.52	1.39	5.66	1.28	.92
ET	4.45	1.59	4.53	1.66	4.49	1.62	.80
EF	5.17	1.38	5.09	1.44	5.27	1.42	.81
ESE	5.00	1.57	4.38	1.82	4.68	1.73	.78
ER	4.16	1.56	4.13	1.76	4.14	1.66	.84
SEQ							
EE	82.99	13.35	88.84	11.56	86.03	12.77	.82
OE	4.73	.43	4.71	.43	4.72	.43	.81
OV	4.32	.59	4.22	.69	4.27	.65	.75
SPE	3.68	.95	3.81	.92	3.75	.93	.84
MBSRQ							
AO	3.60	.69	3.54	.62	3.57	.65	.86

AE	3.30	.69	3.64	.69	3.43	.73	.82
FO	3.73	.56	4.00	.56	3.87	.58	.83
FE	3.68	.85	3.79	.74	3.77	.83	.74

Note. EII-R = Exercise Imagery Inventory-Revised; AH = Appearance/Health; ET = Exercise Technique; EF = Exercise Feelings; ESE = Exercise Self-efficacy; ER = Exercise Routines; SEQ = Self Efficacy Questionnaire; EE = Efficacy Expectancy; OE = Outcome Expectancy; OV = Outcome Value; SPE = Self-presentational Efficacy; MBSRQ = Multidimensional Body-Self Relations Questionnaire; AO = Appearance Orientation; AE = Appearance Evaluation; FO = Fitness Orientation; FE = Fitness Evaluation; M = Mean; SD = Standard Deviation. The EII-R is rated on a 7-point Likert scale anchored at 1 = *never* and 7 = *often*. The SEQ efficacy expectancy subscale is rated on a confidence scale ranging from 0% = *not at all confident* to 100% = *completely confident*. The SEQ outcome expectancy subscale is rated on a 5-point Likert scale anchored at 1 = *strongly disagree* and 5 = *strongly agree*. The SEQ outcome value and self-presentational efficacy is rated on a 5-point Likert scale anchored at 1 = *not at all important* and 5 = *extremely important*. The MBSRQ is rated on a 5-point Likert scale ranging from 1 = *definitely disagree* to 5 = *definitely agree*.

Table 2

Bivariate Correlations between Subscales of the EII-R, Efficacy Questionnaire, and MBSRQ

Subscale	1	2	3	4	5	6	7	8	9	10	11	12	13
1. AH	_	.54**	.60**	.61**	.55**	.15**	.37**	.47**	.36**	.31**	-.02	.16**	.10
2. ET		_	.52**	.59**	.71**	.29**	.20**	.33**	.41**	.17**	.17**	.28**	.11*
3. EF			_	.52**	.52**	.10	.16**	.27**	.25**	.18*	.07	.22**	.10
4. ESE				_	.62**	.10	.23**	.44**	.28**	.26**	-.05	.16**	.10
5. ER					_	.26**	.16**	.37**	.41**	.25**	.08	.31**	.16**
6. EE						_	.13*	.15*	.28**	-.07	.27**	.46**	.30**
7. OE							_	.44**	.09	.12*	-.08	.03	.09
8. OV								_	.38**	.31**	-.11	.20**	.13*
9. SPE									_	.27**	.18**	.50**	.28**
10. AO										_	-.06	.04	.01
11. AE											_	.37**	.22**
12. FO												_	.54**
13. FE													_

Note. AH = Appearance/Health; ET = Exercise Technique; EF = Exercise Feelings; ESE = Exercise Self-efficacy; ER = Exercise Routines; EE = Efficacy Expectancy; OE = Outcome Expectancy; OV = Outcome Value; SPE = Self-presentational Efficacy; AO = Appearance Orientation; AE = Appearance Evaluation; FO = Fitness Orientation; FE = Fitness Evaluation. * Significant at the $p < .05$ level; Significant at the ** $p < .01$

Figure Captions

Figure 1. An Applied Model of Imagery Use in Exercise (Munroe-Chandler & Gammage, 2005).

Note. * Indicates hypothesized relationships. CS, cognitive specific; CG, cognitive general; MS, motivational specific; MG-A, motivational general-arousal; MG-M, motivational general-mastery. From "Now See This: A New Version of Exercise Imagery," by K.J. Munroe-Chandler and K.L. Gammage, 2005, *Exercise and Sport Sciences Reviews, 33,* p. 204. Copyright © 2005 by the American College of Sports Medicine. Reprinted with permission.

Figure 2. Mediation results for more experienced exercisers

Adapted from "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," by R. M. Baron and D. A. Kenny, 1986, *Journal of Personality and Social Psychology, 51,* p.1176. Copyright © 1986 by the American Psychological Association, Inc.

Figure 1.

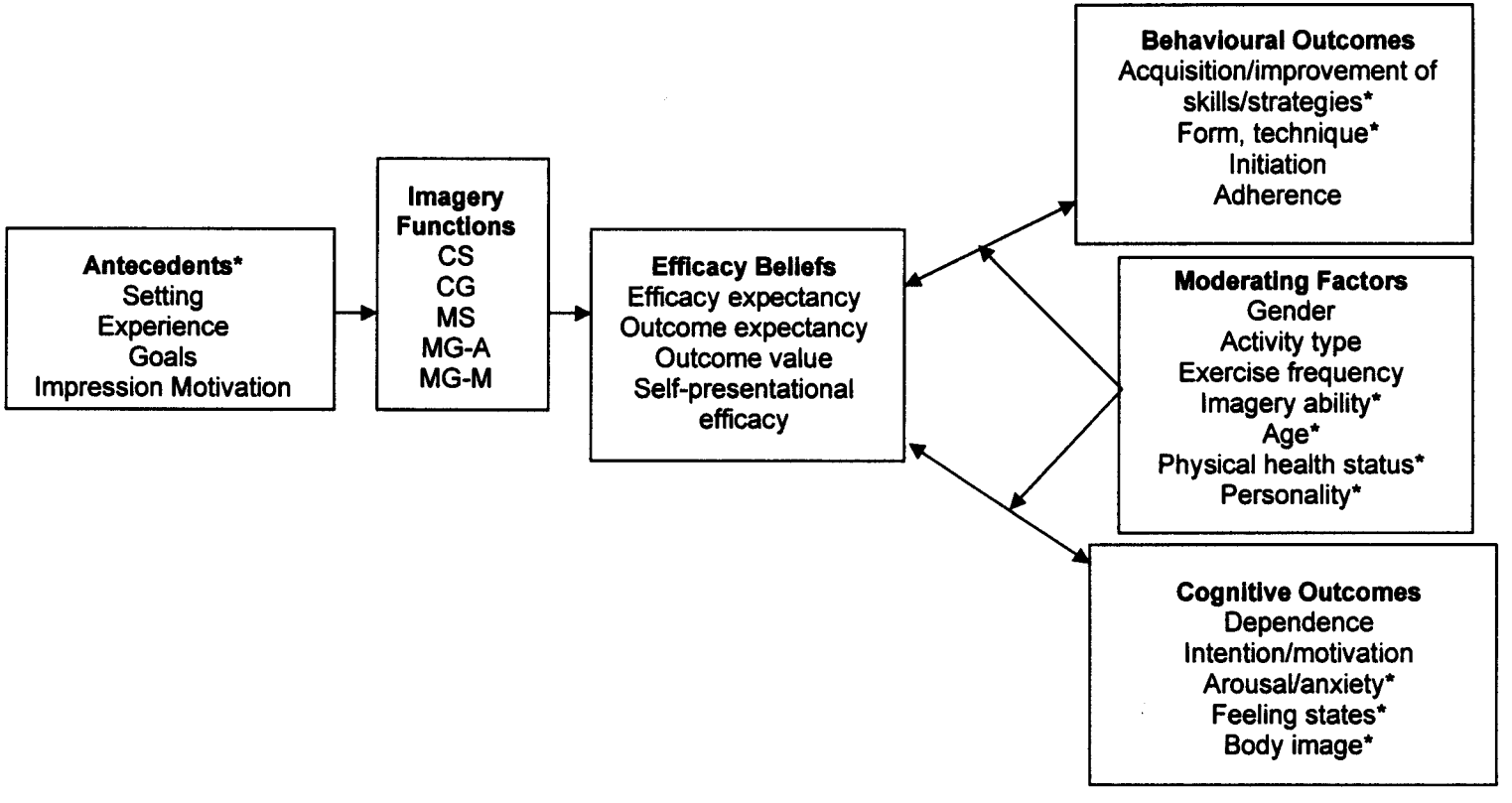
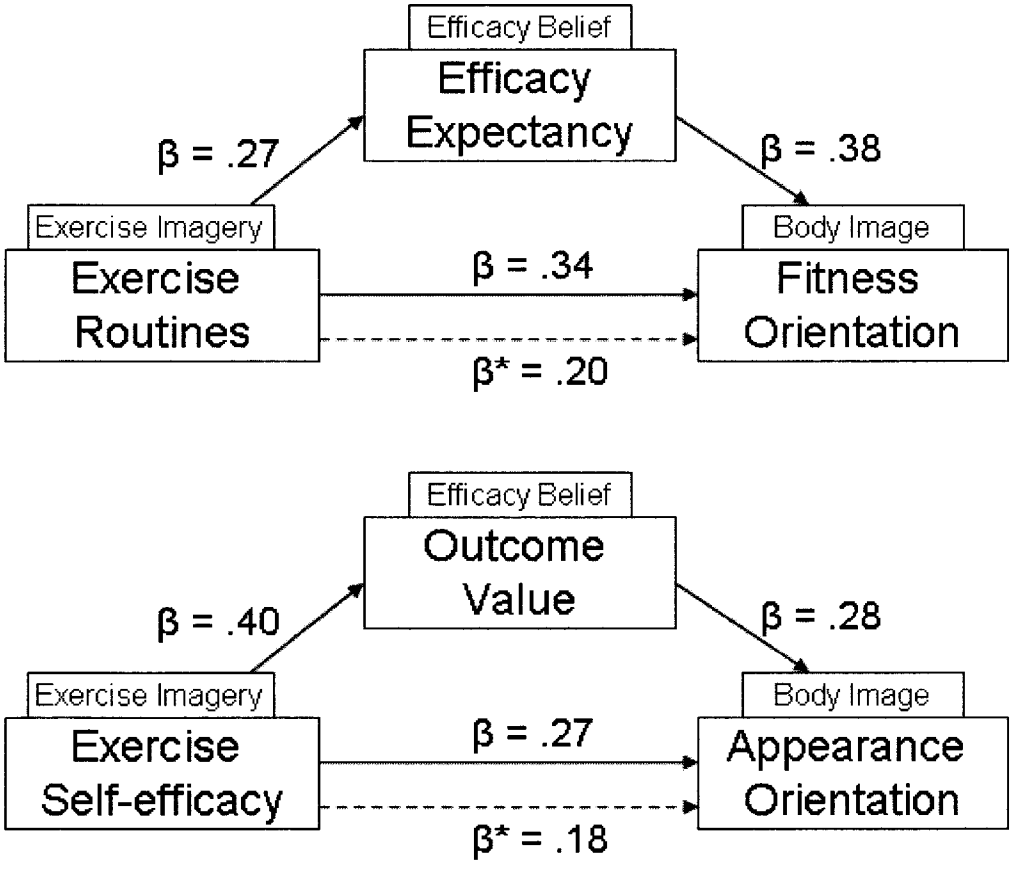

Antecedents*
Setting
Experience
Goals
Impression Motivation
Imagery Functions
CS
CG
MS
MG-A
MG-M
Efficacy Beliefs
Efficacy expectancy
Outcome expectancy
Outcome value
Self-presentational efficacy
Behavioural Outcomes
Acquisition/improvement of skills/strategies*
Form, technique*
Initiation
Adherence
Moderating Factors
Gender
Activity type
Exercise frequency
Imagery ability*
Age*
Physical health status*
Personality*
Cognitive Outcomes
Dependence
Intention/motivation
Arousal/anxiety*
Feeling states*
Body image*

Figure 2.



Note. β * = Evidence of significant partial mediation relationship

REVIEW OF LITERATURE

Introduction

Emerging research on imagery use (creating or recreating images in one's mind; Vealey & Greenleaf, 2001) highlights the beneficial application to exercise settings (Hausenblas, Hall, Rodgers, & Munroe, 1999). Hall (1995) originally proposed that exercise participants may utilize imagery as a source of motivation, similar to what has been found in sport. Despite the practical application of exercise imagery (e.g., correcting technique, increasing motivation, improving self-efficacy; Giacobbi, Hausenblas, Fallon, & Hall, 2003), and noted ability to improve involvement in physical activity (Giacobbi et al., 2003), many avenues have remained unexplored (Giacobbi, 2007). As suggested by Kossert and Munroe-Chandler (2007), investigations of exercise imagery must continually be driven by theoretical and empirical assumptions, a noted shortcoming evident within the literature. Given the individualistic nature of imagery use, further examination is needed to effectively understand the contributing factors associated with resultant exercise outcomes (e.g., cognitions, behaviours) and subsequently develop appropriate interventions aimed at improving physical activity.

Imagery

Hall (2001) suggested imagery is a universal mental skill such that any individual has the ability to create and apply imagery. Although predominantly studied in the sport domain, Hall (1995) suggested that imagery may be an effective mental skill to enhance exercise behavior. The notable benefits of imagery have been repeatedly researched and exemplified (Hall, 2001; Morris, Spittle, & Watts, 2005). Imagery has effectively contributed to improvement in sport performance (Blair, Hall, & Leyshon, 1993),

increased sport-specific motivation (Martin & Hall, 1995), enhanced exercise behaviour (Hausenblas, Hall, Rodgers, & Munroe, 1999), and controlled arousal levels (Giacobbi, Hausenblas, Fallon, & Hall, 2003). Despite congruence among the benefits associated with imagery, a consistent conceptualization of the definition has yet to be established within the sport psychology literature and associated fields (Morris et al., 2005). Recent definitions have attempted to integrate the multidimensional sensory experiences of imagery, as highlighted by Hardy, Jones, and Gould (1996) in which imagery is described as "a symbolic sensory experience that may occur in any sensory mode" (p. 28). Vealey and Greenleaf (2001) further aimed to define imagery as "using all the senses to re-create or create an experience in the mind" (p. 248). Despite the many definitions, a vast majority have failed to fully integrate and describe the complexities of the skill (Hall, 2001).

Imagery Theories and Models

Investigation of mental imagery and associated outcomes is reflected in the many proposed theories. While preliminary examination of mental imagery merely explored the cognitive relationship to performance (Hall, 2001), later theoretical explanations and models attempted to expand on evident shortcomings and develop a more holistic conceptualization of imagery. As such, further exploration on available imagery theories is limited to those providing sufficient contribution for extended research and direct application to the exercise domain.

Bioinformational theory. Originally developed for behaviour modification research, the bioinformational theory (Lang, 1977) examines imagery using a combination of psychophysiology and information processing theories. Bioinformational

theory suggested an image is comprised of distinct response propositions (physiological or overt behaviour), which are primarily controlled by stimuli propositions (external stimuli). More specifically, stimulus propositions describe the imaged scene while response propositions describe the behavioural response to the imaged scene. For example, imaging oneself running to a finish line (stimuli proposition) and picturing the flexion of your leg muscles to reach the target (response proposition). Lang argued the association between stimulus and response proposition is further strengthened through the use of imagery. The use of response propositions during imagery (e.g., emotions, feelings, physical symptoms) in experimental settings evoked greater behaviour adjustments (Lang). Despite affective responses in clinical psychology the transfer to sport and exercise domains remains inconclusive. Morris et al. (2005) recommended more research identifying the link between bioinformational theory and performance outcomes be conducted. Although slight improvement from previous theories in the field, Hall (2001) argued the bioinformational theory failed to identify the motivational functions provided by imagery.

Triple code model. Ahsen (1984) posited the image process involves three main facets; the image, psychophysiological response, and meaning generation. The image-somatic response-meaning (ISM) or triple code model developed by Ahsen aimed to elaborate on the somatic response linking the image and associated meaning. It is suggested the image, which mimics actual sensations, produces somatic bodily responses which effectively contributes to the meaning of the image. Ahsen further suggested personal experience is inevitably incorporated into imagery, highlighting the production of individualistic responses and meanings. For example, an exerciser may improve her

ability to finish a difficult program by imaging the feelings of confidence and satisfaction she will experience when finished. Another exerciser may focus on the technical skills involved in the difficult program to ensure her commitment to finishing. The notable difference between the two exercisers highlights the personal influence involved in the imagery experience, such that one image does not produce a universal effect on all subjects. Notwithstanding development external to a sport context, the proposed theory highlights the need to incorporate the meaning of an image to create effective imagery applications. However, as noted in the literature, the triple code model failed to elaborate on the cognitive effects of imagery, a practical function utilized for skill acquisition and learning strategies (Morris et al., 2005).

Preliminary imagery use has successfully contributed to improvements in cognitive motor performance (Paivio, 1985) and has further been extended to motivational and emotional components of sport performance, such as improving self-confidence (Strachan & Munroe-Chandler, 2006), and reducing anxiety (Page, Sime, & Nordell, 1999). Given the abundance of research highlighting the beneficial implications of imagery in sport, it is imperative to elaborate on prominent models which contribute to direct extension and application into exercise imagery research.

Analytic framework of imagery. Paivio (1985) purposed an analytic framework suggesting imagery can contribute to motivational and cognitive roles in mediating behaviour, each operating at either a general or specific level (Appendix K). The motivational function represents behavioural situations involving arousal, achievement, and intensity. More specifically, motivational specific (MS) imagery involves imagining specific goals or goal-orientated behaviour and motivational general (MG) imagery

involves images pertaining to affect and arousal levels. The cognitive function pertains directly to performance-related aspects, either cognitive specific (CS) imagery which is the rehearsal of specific skills, or cognitive general (CG) imagery, which includes images of routines or strategies of play.

Further refinement of Paivio's framework resulted in an amendment to the MG function of imagery including MG-Arousal (MG-A; images associated with arousal and emotion) and MG-Mastery (MG-M; images associated with being in control, mentally tough, and confident) (Hall, Mack, Paivio, & Hausenblas, 1998). These two distinct functions became evident during validation of the Sport Imagery Questionnaire (SIQ; Hall et al., 1998), a measure assessing the five functions of imagery use in sport performance. The SIQ is frequently utilized within sport psychology applications among adult athletes (Hall, Munroe-Chandler, Fishburne, & Hall, 2009).

Applied model of imagery use in sport. Despite expansion from previously proposed theories, Paivio's (1985) analytic framework was criticized for particular inadequacies. More specifically, Martin, Mortiz, and Hall (1999) argued some athletes report using imagery functions which are not accounted for by Paivio's framework. In addition, situational and personal variables influencing imagery were not included, ultimately restricting applicability of the framework in creating effective imagery strategies to influence particular outcomes. As such, an applied model of imagery use in sport (Appendix L) was developed to outline how an athlete can successfully use imagery to produce diverse cognitive, affective, and behavioural change among a variety of sport conditions (Martin et al., 1999).

As a result of an extensive literature review, four key constructs (sport situation, imagery function, outcome, and imagery ability) were included in the conceptual model to further guide imagery research within the sport context (Martin et al., 1999). The type of sport situation (e.g. training, competition, rehabilitation) in which an athlete is involved may affect the imagery functions employed. As such, the function of imagery utilized by an athlete (e.g., CS, CG, MS, MG-A, MG-M) is proposed to determine the resulting cognitive, affective, and behavioural outcomes (e.g., regulation of arousal and anxiety, modification of cognitions). Finally, the effect of imagery use on a proposed outcome is moderated by imagery ability (kinesthetic or visual). The proposed applied sport model provides an adequate framework to test future hypothesized relationships and as noted by Hall (2001) has direct applicability for both practitioners and researchers. However, the framework lacks a direct application to the exercise context, a limitation recently addressed by Munroe-Chandler and Gammage (2005).

Exercise Imagery

Considerable imagery research has been conducted within sport contexts, spanning various levels of competition (recreational to elite) (Munroe, Giacobbi, Hall, & Weinberg, 2000; Munroe-Chandler, Hall, Fishburne, & Strachan, 2007; Strachan & Munroe-Chandler, 2006; White & Hardy, 1998). The practicality of the mental skill and effective results on sport performance highlighted the transferability of imagery to other physical activity contexts, namely exercise. Hall (1995) initially suggested imagery may serve similar motivational functions, improvements to self-efficacy, and outcome expectancies in exercise as frequently reported in sport. Moreover, the continual

emergence of imagery research within exercise psychology (for a review, see Kossert & Munroe-Chandler, 2007) further extends the importance of Hall's (1995) suggestion.

Hall (1995) originally proposed a model of participation motivation for exercise, which highlighted a reciprocal relationship exists between imagery use, exercise behaviour, and particular outcomes. More specifically, using a social cognitive theory approach (Bandura, 1986) the model posited exercise participation is directly influenced by self-confidence (i.e., self-efficacy) and outcome expectancy. Although the model aimed to highlight the impact of excessive imagery use on fostering exercise addiction, the proposed model outlined specific testable predictions thus guiding future exercise imagery frameworks.

Despite the lack of a consistent operational definition of exercise imagery, conceptualization of the mental skill has emerged within the literature. Similar to the definition of imagery proposed by White and Hardy (1998) utilized within sport imagery research (Cumming, Hall, & Shambrook, 2004; Munroe-Chandler, Hall, & Fishburne, 2008; Short, Tentue, & Feltz, 2005), exercise imagery is conceptualized using a multidimensional sensory approach. Hausenblas et al. (1999) originally described exercise imagery as:

> ... mentally seeing yourself exercising. The image in your mind should approximate the actual physical activity as closely as possible. Imagery may include sensations like hearing the aerobic music and feeling yourself move through the exercises. Imagery can also be associated with emotions (e.g., getting psyched up or energized), staying focused (e.g., concentrating on aerobic class

and not being distracted), setting exercise plans/goals (e.g., imaging achieving the goal of losing weight), etc. (p. 173)

The above mentioned definition has repeatedly emerged when conceptualizing exercise imagery within the literature, albeit adjustments to terminology are evident (Giacobbi et al., 2003; Giacobbi, Hausenblas, & Penfield, 2005; Kim & Giacobbi, 2009).

Imagery research among exercise participants and subsequent development of assessments stemmed from Hausenblas et al.'s (1999) investigation of exercise imagery. Qualitative exploration revealed 75% of exercisers (N= 144) utilized exercise imagery, with a majority reporting use for motivational (e.g., imaging body image, feeling good about oneself) and cognitive purposes (e.g., strategies/techniques, goals). Indeed, a parallel association between sport and exercise imagery exists, as similar functions are utilized for reinforcing participation. Further investigation lead to the emergence of three explicit imagery functions specific to exercisers: labeled energy, appearance, and technique (Hausenblas et al.). Energy imagery involves images of relieving stress and sustaining activity engagement. Appearance imagery pertains to images associated with becoming healthy and toning up, while technique imagery involves images of body position and correct movements involved in exercise routines. In order to measure these three imagery functions in the exercise domain, Hausenblas et al. developed the Exercise Imagery Questionnaire (EIQ).

Further investigation using the multidimensional approach to exercise imagery highlighted the existence of energy, appearance, and technique imagery within numerous exercise samples. Research revealed appearance imagery is the most frequently employed function of imagery regardless of gender, activity type, or frequency of exercise, while

energy imagery is the least frequently utilized among various exercise participants (Gammage, Hall, & Rodgers, 2000; Hausenblas & Symons Downs, 2002). Further examination of the three imagery functions has been analyzed in specific populations, such as obligatory exercisers (Rodgers, Hall, Blanchard, & Munroe, 2001) and weight lifters (Munroe-Chandler, Kim, & Gammage, 2004). Although appearance imagery was the most frequently used function, only energy and technique imagery represented statistically significant relationships in both male and female obligatory exercisers (Rodgers et al., 2001). Munroe-Chandler et al. (2004) assessed the proposed motivational imagery functions, appearance and energy, and the cognitive function, technique imagery, in a population of dependent male weightlifters. Consistent with previous exercise imagery reports, the novel male population utilized appearance imagery most frequently, followed by technique and energy imagery (Munroe-Chandler et al., 2004).

Existence of variations in imagery use among high and low frequency exercisers (Gammage et al., 2004) further highlighted the sustained benefits associated with exercise imagery use. High frequency exercisers report stronger ability to generate desired images (e.g., being in shape, staying healthy, and fit) and consequently place greater importance on maintaining such images than low frequency exercisers (Gammage et al., 2004). Evidently, further pursuit of exercise imagery research is required, as additional beneficial associations and development of interventions for increasing exercise activity may result beyond the initially proposed three function model.

In spite of the continued support for examining the three main functions for exercise imagery (Gammage et al., 2000; Hausenblas et al., 1999; Hausenblas & Symons Downs, 2002; Rodgers et al., 2001; Wilson, Rodgers, Hall, & Gammage, 2003), recent

research has suggested a more comprehensive approach to examining exercise imagery (Giacobbi et al., 2005, Kossert & Munroe-Chandler, 2007; Munroe-Chandler & Gammage, 2005). Consistent with Paivio's analytic framework (1985), Giacobbi et al. (2005) further expanded upon the motivational and cognitive functions previously found in exercise imagery research in an effort to develop a more comprehensive assessment tool, the Exercise Imagery Inventory (EII). Through qualitative methodology and factor analysis procedures, a final version of the EII consisted of four distinct exercise imagery functions: appearance/health, exercise technique, exercise feelings, and exercise self-efficacy (Giacobbi et al., 2005). However, recent criticism regarding the lack of research encapsulating the range of imagery functions (i.e., the CG function) has further promoted revision to the exercise imagery model and the associated measurements of exercise imagery (Giacobbi, Tuccitto, Buman, & Munroe-Chandler, in press; Munroe-Chandler & Gammage, 2005).

Measurement of Exercise Imagery

Exercise Imagery Questionnaire. As previously mentioned, development of the Exercise Imagery Questionnaire (EIQ; Hausenblas et al., 1999) sparked the examination of imagery use among various exercise populations. Development of a preliminary Exercise Imagery Questionnaire –Aerobic Version (EIQ-AV) resulted from a three-phased study, where imagery use was examined among a predominately female population. Participants' responses were utilized to appropriately construct a questionnaire and establish consistent statistical properties (Hausenblas et al.). Responses obtained using an open-ended approach resulted in the development of a 23-item questionnaire, assessing various exercise imagery functions. Further amendments,

resulting from a principle components factor analysis, identified a distinct three-factor structure: Energy- "When I imagine exercising, it takes my mind off work"; Appearance- "I imagine becoming healthy by exercising"; and Technique- "I imagine form/body position. Confirmatory factor analysis and test-retest reliability were conducted on the EIQ-AV using two distinct university aged samples of volunteer exercisers. Adequate Cronbach alphas, ranging from .71 to .85 were reported for the three factors from both samples (Hausenblas et al.). Moreover, test-retest reliability of the EIQ-AV was reported as satisfactory (r= .88) resulting in a 9-item tool measuring imagery use on a nine point Likert scale, from 1 (*never engaging in this type of imagery*) and 9 (*always engaging in this type of imagery*). Although the EIQ-AV was originally developed for aerobics (Hausenblas et al.), further adaptations resulted to promote generalizabilty to other forms of exercise (Gammage et al., 2000; Rodgers et al., 2001). Despite continued use of the EIQ and acceptable psychometric properties, criticisms are apparent. Munroe-Chandler and Gammage (2005) highlighted the fact that the measured imagery factors, energy, appearance, and technique only corresponds to Paivio's (1985) MG-A, MS, and CS imagery functions, respectively. Thus, the CG and MG-M functions are not represented, and therefore do not reflect the multisensory complexities of imagery use.

Exercise Imagery Inventory. The Exercise Imagery Inventory (EII; Giacobbi et al., 2005) was developed in response to Hall's (1998) suggestion for a new tool to be developed using a wider range of exercisers, unlike the EIQ which was developed specifically using aerobic exercisers. Moreover, the emergence of eight primary functions of exercise imagery obtained from semi-structured interviews with aerobic and anaerobic female exercisers highlighted the need for a more representative methodological tool

(Giacobbi et al., 2003). As such, the development of the EII aimed to assess previously identified functions of exercise imagery, namely energy, appearance, and technique (Hausenblas et al., 1999), in addition to health-related images, the exercise context, and exercise self-efficacy images (Giacobbi et al., 2005). Using an extensive literature review, an initial version of the EII was comprised of 41 items rated on a seven point Likert scale from 1 (*rarely*) to 7 (*often*). Assessment among both young and old adults (Giacobbi et al., 2005) resulted in a four-factor model consisting of: appearance/health imagery, exercise self-efficacy, exercise feelings, and exercise technique. Acceptable reported Cronbach alphas ranged from .72 to .86, and resulted in a final 19-item version of the EII. Confirmatory factor analysis and convergent validity supported the EII four factor model. In addition, analysis revealed each EII subscale correlated with exercise behaviour and self-efficacy (Giacobbi et al., 2005).

Although Munroe-Chandler and Gammage (2005) acknowledged the EII four-factor model fits more appropriately with Paivio's (1985) model, the authors still recommended a need for more diversity in exercise imagery research. Notwithstanding the improvement in exercise imagery assessment, the EII only captures four functions evident within the analytic framework of imagery (appearance/health imagery (MS), exercise self-efficacy (MG-M), exercise feelings (MG-A), and exercise technique (CS); Hall et al., 1998; Paivio, 1985). Evidently the CG function has yet to be incorporated adequately into an assessment tool. Thus, as Munroe-Chandler and Gammage contend, the full range of imagery functions are not captured within exercise imagery research. Furthermore, as noted by Cumming (2008), it can only be assumed that the proposed

imagery scales are effectively measuring both the cognitive and motivational functions among exercisers, as the EII developers fail to comment on specific associations.

Exercise Imagery Inventory-Revised. In accordance with recommendations from Munroe-Chandler and Gammage (2005), the development of the Exercise Imagery Inventory-Revised (EII-R; Giacobbi, Tuccitto, Buman, & Munroe-Chandler, in press) aimed to incorporate a cognitive general scale, as evidence indicates regular exercisers use cognitive general functions of imagery (Giacobbi et al., 2003). As noted by Giacobbi et al. (in press) the lack of cognitive general items limits the applicability of exercise imagery research to examine Paivio's (1985) conceptual framework. Using a college-aged sample (M = 20.55 years), male and female exercisers from a variety of activities completed the EII-R, a 22-item inventory rated on a seven point Likert scale from 1 (*never*) to 7 (*often*). In addition to modifying the scale descriptors, the revised inventory aimed to incorporate three cognitive general items measuring images of exercise routines before and during exercise engagement. Evaluation of psychometric properties revealed a five-factor model reflects adequate fit and displayed acceptable reliability values (Giacobbi et al., in press). The authors suggested the EII-R aimed to further extend the applicability of the measurement tool and more appropriately comply with the fundamental aspects of mental imagery as suggested by Paivio (1985). In addition, the EII-R further established a relationship exists between exercise imagery and various constructs in the exercise field (i.e., barriers self-efficacy and exercise behaviour) (Giacobbi et al., in press).

Applied Model of Imagery Use in Exercise

Munroe-Chandler and Gammage (2005) attempted to expand on the noted shortcomings in the exercise imagery research by developing a more holistic conceptual model. The applied model aims to further strengthen the association between imagery use and exercise behaviour in an attempt to better serve as an intervention guide used to increase exercise behaviour. Expanding on previously utilized imagery frameworks (Hall, 1995; Hall et al., 1998; Martin et al., 1999; Paivio, 1985), the proposed model of exercise imagery incorporates distinct components influencing imagery use, which have been identified in the empirical literature. More specifically, proposed antecedents contribute to use of particular imagery functions, which consequently lead to specific cognitive and behavioural outcomes. Changes in efficacy beliefs mediate the hypothesized imagery-outcome relationship, while moderating factors (e.g., gender, age, imagery ability) can effectively contribute to all of the identified relationships (Munroe-Chandler & Gammage). Despite available empirical evidence justifying the inclusion of particular variables in the model proposed by Munroe-Chandler and Gammage, further examination is needed. The hypothesized relationships must be tested, thus enabling the development of a more effective exercise imagery assessment tool.

Antecedents. The applied model of exercise imagery is comprised of hypothesized antecedents, which are proposed to influence the specific imagery function an exerciser will employ. The four proposed antecedents include: the exercise setting, an exerciser's experience, an exerciser's goals, and impression motivation (i.e., self-presentational concerns). For example, the authors hypothesize that an exerciser's experience (the length of time one has been exercising) may directly impact the functions

of imagery utilized. In particular, a more experienced exerciser may rely on the motivational aspects of imagery more heavily, given that the cognitive functions are associated with learning techniques and routines, skills potentially already mastered by an experienced exerciser (Munroe-Chandler & Gammage, 2005).

Functions of imagery. The five functions of exercise imagery proposed in the model are consistent with the functions evident in the applied model for sport (Martin et al., 1999). As originally proposed by Paivio (1985) and further refined by Hall et al. (1998), the five functions reflect both the cognitive and motivational aspects of imagery. However, the applied model of imagery use in exercise translates the predominately sport-related imagery functions into an exercise context, corresponding with previously identified exercise imagery themes (Giacobbi et al., 2003). Accordingly, CS imagery represents images of exercise movement and specific skills consistent with an exercise environment, such as body position, specific steps, and direction of movement. CG imagery involves imaging strategies and routines, including aerobic step routines, coordination to music, or running routes. Similar to sport applications, MS imagery involves images of goals and required behaviours to achieve such goals (e.g., increasing one's level of fitness, improving strength, completing an exercise routine, or adhering to an exercise program). Furthermore, MG-A imagery reflects images of increasing motivation or reducing tension, while MG-M imagery involves images of coping in spite of challenges, maintaining focus, and being mentally tough throughout the exercise program. As noted by Munroe-Chandler and Gammage, the functions of imagery employed affect the behavioural and cognitive outcomes experienced by an exerciser. For example, a female runner may image herself staying confident and focused (MG-M)

while engaging in a difficult portion of a marathon. She may further picture herself with a consistent stride and correct body form (CS). The exemplified imagery use may result in improvements to her running technique (behavioural outcome) and overall motivation for future running engagement (cognitive outcome).

Efficacy beliefs. Munroe-Chandler and Gammage (2005) suggest that various forms of self-efficacy may, to some degree, mediate the relationship between imagery and associated behavioural and cognitive outcomes. The social cognitive theory proposed by Bandura (1986, 1997) suggested that efficacy beliefs shape thoughts, emotional reactions, and consequently behaviours. In essence, efficacy involves social, cognitive, and behavioural skills organized into appropriate actions, which effectively serve various purposes (Bandura, 1986). Thus, self-efficacy is conceptualized as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). The relationship between imagery and self-efficacy stemmed from the vicarious experience source of self-efficacy proposed by Bandura (1986, 1997). The influence of seeing or visualizing other individuals successfully completing an activity has the ability to improve self-perceptions of an observer to successfully master comparable tasks (Bandura, 1986). Indeed, the use of imagery may offer a source of self-efficacy information for an exerciser, which consequently influences her behavioural and cognitive outcomes (Munroe-Chandler & Gammage). It is suggested that imagery may specifically influence efficacy expectancy (e.g., imaging oneself executing an exercise movement correctly may improve confidence to engage in the movement), outcome expectancy (e.g., imaging oneself completing an exercise program may assist in improving one's cardiovascular health),

outcome value (e.g., picturing oneself playing with their children may improve the value placed on improving their health status), and self-presentational efficacy (e.g., seeing oneself portraying physical coordination during exercise may increase exercise behaviour, as positive impressions are made to others) (Munroe-Chandler & Gammage).

There is support in the literature for the influence of self-efficacy on exercise behaviour (McAuley, Bane, & Mihalko, 1995; Rodgers & Gauvin, 1998; Rodgers, Hall, Blanchard, McAuley, & Munroe, 2002; Strachan, Woodgate, Brawley, & Tse, 2005). In addition, empirical support for the influence of imagery on self-efficacy has recently emerged within exercise psychology (Cumming, 2008; Giacobbi et al., 2003; Rodgers, Munroe, & Hall, 2001-2002; Wesch, Milne, Burke, & Hall, 2006). Rodgers et al. (2001-2002) simultaneously investigated the role of imagery and self-efficacy in exercisers' behaviour and intention. They found self-efficacy significantly predicted behaviour and behavioural intention, while imagery (i.e., appearance imagery) contributed to predictions of behavioural intention (Rodgers et al., 2001-2002). Moreover, the authors (Rodgers et al., 2001-2002) noted that imagery only significantly predicted exercise intention not behaviour, further suggesting self-efficacy is a required mediator between imagery use and exercise outcomes.

Behavioural outcomes. The behavioural and cognitive outcomes presented in the model are reflective of the exercise imagery functions utilized and represent a mutual relationship with the proposed efficacy beliefs (Munroe-Chandler & Gammage, 2005). Specifically, the efficacy beliefs and behavioural and cognitive outcomes are characterized by a reciprocal relationship.

As evident within the model, specific behavioural outcomes may result from imagery use for exercise purposes. It is hypothesized the acquisition and improvement of skills and strategies, and the ability to achieve correct form/technique while exercising can be assisted with the use of imagery (Munroe-Chandler & Gammage, 2005). It is further suggested the CS and CG functions of imagery can be most readily applied to improving the aforementioned behavioural outcomes. As noted by Wilson et al. (2003), frequent exercise participation is likely accompanied by improvements in technical skills, and the use of technique imagery (i.e., cognitive function) may contribute to this improved exercise ability. Similarly, Giacobbi et al. (2003) found 9 of the 16 female exercisers they interviewed reported using technique-related images to improve their current exercise technique.

The applied model further suggested that imagery use may contribute to the initiation and adherence of exercise behaviour by acting as a motivator (Munroe-Chandler & Gammage, 2005). Previous investigation of imagery use among exercisers revealed more frequent exercisers reported using more imagery than less frequent exercisers (Gammage et al., 2000; Giacobbi et al., 2005; Hausenblas et al., 1999). Such results further strengthen the potential consequence of exercise adherence from frequent imagery use.

Cognitive outcomes. The applied model further proposed exercise imagery may serve a role in producing cognitive outcomes (Munroe-Chandler & Gammage, 2005). Continual emergence of a relationship between imagery use and exercise dependence supports the inclusion of dependence as a cognitive outcome. Rodgers et al. (2001) examined the use of particular imagery functions on the prediction of exercise

dependence. Results indicated the use of energy and technique imagery significantly predicted obligatory exercise in men and women (Rodgers et al., 2001). Hausenblas and Symons Downs (2002) further investigated the ability of exercise imagery to effectively predict exercise dependence. Although specific gender differences emerged, exercise imagery (namely, energy and appearance) significantly predicted exercise dependence symptoms. Further investigation of the influential role imagery plays in exercise dependence revealed a relationship among male weightlifters (Munroe-Chandler et al., 2004). Males reporting the most frequent imagery use correlated with the highest proportions of time spent engaging in weight lifting, and subsequently reported the highest levels of dependency (Munroe-Chandler et al., 2004). Indeed, an excessive use of imagery may contribute to the development of exercise addiction, as originally suggested by Hall (1995).

Exercise initiation and/or motivation outcomes have further been determined to correlate with imagery use. Through qualitative investigation, Giacobbi et al. (2003) found appearance-related exercise imagery to serve an important role in motivating exercise participation. Recent evidence among middle-aged adults determined health-related images further act as a potential source of motivation for exercise participation (Kim & Giacobbi, 2009). Thus, various functions of imagery contribute to persistent engagement in exercise pursuits among particular exercise populations.

The applied model of exercise imagery further proposed arousal/anxiety levels, feeling states, and body image are cognitions affected by imagery use. Munroe-Chandler and Gammage (2005) suggested exercise imagery may assist with arousal/anxiety control by increasing energy levels or decreasing anxiety levels during exercise engagement.

Preliminary investigation of exercise-related anxiety found a significant correlation between appearance imagery and social physique anxiety (Gammage et al., 2004). Exercisers who were highly concerned about others' evaluation of their body were more likely to image their appearance more often (Gammage et al., 2004) thus highlighting the influence of imagery on cognitions. Moreover, anecdotal report from exercisers revealed emotions/feelings associated with imagery use assist with increased arousal levels and reduced stress resulting from exercise (Giacobbi et al., 2003).

The proposed influence of exercise imagery on body image has been further suggested as a cognitive outcome of exercise. Munroe-Chandler and Gammage (2005) hypothesized MS imagery may serve as an effective tool to reduce body dissatisfaction and CS and CG functions may reduce body anxiety from the appreciation of the body's ability to perform specific movements. Due to the recent proposal of the applied model, specific examination of the influence of imagery on body image has yet to be explored. However, available research investigating bodily concerns and exercise participation highlights the inclusion of the body image cognition into the model (Hausenblas & Fallon, 2006). For example, Furnham, Titman, and Sleeman (1994) assessed the effect of exercise on female body shape perceptions and their personal body image satisfaction. Female exercisers had more positive perceptions of their own body and increased perceptions of a more muscular female physique (Furnham et al.).

Moderating factors. The applied model of exercise imagery proposed several moderating factors, which may influence the effectiveness of imagery as an intervention technique (Munroe-Chandler & Gammage, 2005). The impact of gender, activity type, and exercise frequency have been identified as factors affecting the role of imagery in

exercise (Gammage et al., 2000; Hausenblas et al., 1999). More recently, the influence of age on imagery use has been examined in exercise. Giacobbi (2007) determined interactions among age, activity level, and gender resulted in differences in imagery use, suggesting further research should aim to incorporate a larger variety of potential moderating factors. As further supported by Kim and Giacobbi (2009), the age of an identified exerciser may affect the content of one's images as evident with middle-aged adults using past images of themselves for appearance related imagery functions. The proposed moderating variables, which further include imagery ability, physical health status, and personality, have yet to be examined in an exercise context. However, Munroe-Chandler and Gammage (2005) suggest an individual with a lower health status may employ different functions of imagery than an experienced exerciser, as variations in antecedents will exist. Although the proposed list may not encompass all possible moderating factors associated with exercise, Munroe-Chandler and Gammage present a foundation for future research and highlight the individualistic approach required for imagery application.

Body Image

The applied model of imagery use in exercise (Munroe-Chandler & Gammage, 2005) identified various behavioural and cognitive outcomes of exercise behaviour influenced by antecedents, imagery use, efficacy beliefs, and moderating factors. Of particular interest to the current study is the cognitive outcome of body image, which requires further examination given the empirical results associated with exercise and its predominance in Western culture (Hausenblas & Fallon, 2006).

Body image is a multidimensional construct regarding one's body, generally pertaining to one's appearance (Cash & Pruzinsky, 2002). Body image refers to the cognitive, attitudinal, and behavioural dimensions of individuals' physical attributes (Muth & Cash, 1997). Cash and Szymanski (1995) identified two distinct modalities of body image: evaluation and investment. Body image evaluation pertains to an individual's evaluative beliefs and thoughts about his/her physical appearance, while body image investment refers to the behaviours in which one engages to manage his/her appearance (Cash & Szymanski). Exercise has been identified as a behaviour in which individuals engage to mediate their body image cognitions (Strelan, Mehaffey, & Tiggemann, 2003).

The noted benefits of exercise participation have yielded mixed results for altering body image perceptions. Research suggests the reasons for engaging in exercise (e.g., weight control, health reasons) will contribute to the level of one's body satisfaction, and thus one's body image (Strelan et al., 2003). For example, weight control, body tone, and attractiveness have previously been identified as potential reasons for which females engage in exercise (Tiggemann & Williamson, 2000). Much of the available literature regarding body image pertains to female populations, as women frequently report greater dissatisfaction with their bodies than men (Cash & Pruzinsky, 2002). Prichard and Tiggemann (2008) argued the motivations women have for exercise may significantly contribute to the development and maintenance of body image concerns. Women are frequently influenced by media images and Western culture ideologies suggesting the need for a thin physique (Grogan, 2008). Choi (2000) stated that exercise has the potential to promote more positive body image through physical

mastery experiences. However, the beauty outcomes of exercise must be de-emphasized as it may lead women to unrealistic expectations, eventually resulting in diminished engagement (Choi). Due to an increased prevalence, various theoretical explanations and frameworks have been proposed in an attempt to further understand the influences of body image. Prominent in body image research, the objectification theory (Frederickson & Roberts, 1997) may be an appropriate framework to examine the influential role of exercise imagery use on body image perceptions and subsequently, exercise behaviour.

Objectification theory. Fredrickson and Roberts (1997) proposed the objectification theory as a theoretical framework to understand the development of body image concerns. The theory suggests the structure of Western culture promotes the consistent evaluation and objectification of the female body (Fredrickson & Roberts). The posited objectification of the female body subsequently permeates into self-objectification, where individuals internalize an observer's perspective onto oneself. The developed self perspective may lead to self-consciousness in which continual monitoring of one's external appearance occurs. A potential behaviour to monitor appearance may be exercise, as recent evidence on self-objectification has been identified within exercise contexts. Strelan et al. (2003) found a strong positive correlation between self-objectification and exercising for appearance-related reasons existed among a female fitness population. Furthermore, participants high on self-objectification reported reduced body satisfaction, body esteem, and self-esteem (Strelan et al.). Self-objectification has been identified as a significant predictor of physical activity (Greenleaf, 2005) suggesting women engaging in exercise are motivated as a result of body image concerns. Objectification theory has further contributed to the identification of disordered eating

attitudes (Greenleaf & McGreer, 2006), body shame (Greenleaf, 2005), and decreased well being (Breines, Crocker, & Garcia, 2008) among female populations. Fredrickson and Roberts argued that the overwhelming pressure of the female body ideal predisposes women to engage in body correction techniques, such as diet and exercise, to alleviate their body-based shame. As such, it is important to further examine the objectification of body image among various exercisers. In addition, investigating the functions of imagery used by women who do not self-objectify may contribute to developing more effective intervention programs for sedentary individuals.

Body Image Measure

As asserted by Bane and McAuley (1998), the Multidimensional Body-Self Relations Questionnaire (MBSRQ; Cash, 2000) is considered the "most comprehensive and psychometrically studied cognitive assessment of body image" in an exercise domain (p. 301). The MBSRQ is a 69-item self-report tool which assesses attitudinal aspects of body image perceptions (Cash, 2000). The inventory is comprised of seven subscales reflecting three somatic domains: appearance, fitness, and health/illness divided among two dispositions: evaluation and orientation (Cash, 2000). Evaluation among exercise populations (Arbour & Martin Ginis, 2006; Martin Ginis, Prapavessis, & Haase, 2008) revealed adequate psychometric properties for specific MBSRQ subscales. All subscales have established acceptable internal consistency and stability (Cash, 2000). The MBSRQ has frequently been utilized for various body image investigations, however a lack of applicability to exercise imagery research exists. Moreover, although evidence of a relationship between exercise and body image concerns exists, highlighting further inclusion into the model, more research is warranted to investigate the hypothesized

outcome in relation to exercise imagery and further establish consistency among body image measurements in the imagery literature.

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Appendix A

Demographic Questionnaire

Age:_____
Ethnicity_____
Exercise experience (Please state how long you have engaged in exercise, months/years)
_____

List (3) most frequent exercise types you engage in (e.g. group fitness class, running, weights, etc.)1. _____ 2. _____ 3._____

Appendix B
Exercise Imagery Inventory-Revised
(EII-R; Giacobbi, Tuccitto, Buman, & Munroe-Chandler, in press)

The following questions deal with imagery and exercise participation. *Imagery* involves "*mentally*" seeing yourself exercising. The image in your mind should approximate the actual physical activity as closely as possible. Imagery may include sensations like hearing the aerobic music and feeling yourself move through the exercises. Imagery can also be associated with emotions (e.g., getting psyched up or energized), staying focused (concentrating on aerobic class and not being distracted), setting exercise plans (e.g., imaging achieving goal of losing weight), etc. Please answer the following questions with regard to how often you use mental imagery (rarely to often).

1	2	3	4	5	6	7
Never						Often

1. I imagine a "fitter-me" from exercising_____
2. I imagine my typical exercise routines_____
3. I imagine completing my workout_____
4. When I think about exercising, I imagine the perfect technique_____
5. I imagine being more relaxed from exercising_____
6. I imagine a "leaner-me" from exercising_____
7. I imagine having the confidence to exercise_____
8. When I think about exercising, I imagine my form and body position_____
9. I imagine my entire workout routine_____
10. I imagine how I will feel after I exercise_____
11. I imagine being toned from exercising_____
12. I imagine having the confidence to complete my workout_____
13. I imagine being healthier from exercising_____
14. I imagine losing weight from exercising_____
15. When I think about exercising, I imagine doing the required movements_____
16. I imagine the order I perform my exercise activities_____
17. I imagine becoming more fit_____
18. I imagine the perfect exercise technique_____
19. I imagine getting in better shape_____
20. I imagine reducing my stress from exercising_____
21. I imagine a "firmer-me" from exercising_____
22. I imagine feelings associated with exercising_____

Appendix C

Efficacy Belief Questionnaire

Think about your exercise program. Using any values from this scale (0 to 100%), please indicate how confident you are for each of the following:

0%	10	20	30	40	50%	60	70	80	90	100%
Not at all Confident					Somewhat Confident					Completely Confident

1. I am confident I could exercise regularly. _____
2. I am confident I can learn new exercise routines and skills. _____
3. I am confident I can maintain my current level of exercise. _____
4. I am confident I can engage in a variety of exercises _____

Using any values from the following scale (1-5) please indicate the extent to which you agree or disagree with each of the following:

1	2	3	4	5
Strongly Disagree				Strongly Agree

5. Engaging in exercise will increase my strength. _____
6. Engaging in exercise will improve my current health. _____
7. Engaging in exercise will help me to lose weight. _____
8. Engaging in exercise will increase my fitness level. _____

Using any values from the following scale (1-5) please indicate level of importance you place on each of the following questions.

1	2	3	4	5
not at all important				extremely important.

9. How important is it for you to be more fit. _____
10. How important is it for you to increase your exercise frequency. _____
11. How important is it for you to become healthier. _____
12. How important is it for you to improve your physique. _____

Using any values from the following scale (1-5) please indicate level of importance you place on each of the following questions.

1	2	3	4	5
not at all important				extremely important

13. How important is it that others see you as an exerciser._____
14. How important is it that you look fit._____
15. How important is it you see yourself as an exerciser._____
16. How important is it for others to see you as a fit person. _____

Appendix D

Multidimensional Body-Self Relations Questionnaire (MBSRQ; Cash, 2000)

The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally. Please read each question and circle the appropriate number to the right. Please answer all of the questions.

1 = Definitely Disagree
2 = Mostly Disagree
3 = Neither Agree nor Disagree
4 = Mostly Agree
5 = Definitely Agree

	Definitely Disagree	Mostly Disagree	Neither	Mostly Agree	Definitely Agree
1. Before going out in public, I always notice how I look.	1	2	3	4	5
2. I am careful to buy clothes that will make me look my best.	1	2	3	4	5
3. I would pass most physical-fitness tests.	1	2	3	4	5
4. It is important that I have superior physical strength.	1	2	3	4	5
5. My body is sexually appealing.	1	2	3	4	5
6. I am not involved in a regular exercise program.	1	2	3	4	5
7. I like my looks just the way they are.	1	2	3	4	5
8. I check my appearance in a mirror whenever I can.	1	2	3	4	5
9. Before going out, I usually spend a lot of time getting ready.	1	2	3	4	5
10. My physical endurance is good.	1	2	3	4	5
11. Participating in sports is unimportant to me.	1	2	3	4	5
12. I do not actively do things to keep physically fit.	1	2	3	4	5
13. Most people would consider me good-looking.	1	2	3	4	5
14. It is important that I always look good.	1	2	3	4	5
15. I use very few grooming products.	1	2	3	4	5

	Definitely Disagree	Mostly Disagree	Neither	Mostly Agree	Definitely Agree
16. I easily learn physical skills.	1	2	3	4	5
17. Being physically fit is not a strong priority in my life.	1	2	3	4	5
18. I do things to increase my physical strength.	1	2	3	4	5
19. I like the way I look without my clothes on.	1	2	3	4	5
20. I am self-conscious if my grooming isn't right.	1	2	3	4	5
21. I usually wear whatever is handy without caring how it looks.	1	2	3	4	5
22. I do poorly in physical sports or games.	1	2	3	4	5
23. I seldom think about my athletic skills.	1	2	3	4	5
24. I work to improve my physical stamina.	1	2	3	4	5
25. I like the way my clothes fit me.	1	2	3	4	5
26. I don't care what people think about my appearance.	1	2	3	4	5
27. I take special care with my hair grooming.	1	2	3	4	5
28. I dislike my physique.	1	2	3	4	5
29. I don't care to improve my abilities in physical activities.	1	2	3	4	5
30. I try to be physically active.	1	2	3	4	5
31. I am physically unattractive.	1	2	3	4	5
32. I never think about my appearance.	1	2	3	4	5
33. I am always trying to improve my physical appearance.	1	2	3	4	5
34. I am very well coordinated.	1	2	3	4	5
35. I play a sport regularly throughout the year.	1	2	3	4	5

Appendix E

Recruitment Poster

ARE YOU OVER 17 YEARS OLD?

ARE YOU AN EXERCISER?

WOULD YOU LIKE TO A CHANCE TO WIN ONE OF TWO $25 GIFT CERTIFICATE TO A LOCAL SPORTING GOODS STORE?

TAKE 10 MINUTES TO FILL OUT A QUESTIONNAIRE PACKET TO RECEIVE A BALLOT

ALL INFORMATION OBTAINED IS ANONYMOUS

THANK YOU FOR YOUR TIME

Lisa Cooke, M.H.K. Candidate
Krista Chandler, Associate Professor
University of Windsor, Department of Kinesiology,
(519) 253-3000, Ext. 4058

Appendix F

Fitness Facility Contact Letter

Dear [*insert contact*],

My name is Lisa Cooke and I am enrolled in a Masters of Human Kinetics at the University of Windsor under the supervision of Dr. Krista Chandler (chandler@uwindsor.ca).

I am currently investigating the influence of an exercisers' experience (the length of time one has been exercising) on their exercise imagery use and efficacy beliefs. The results obtained from this study will contribute to developing future imagery intervention programs aimed at increasing engagement in exercise specifically among women.

With your permission, I would visit the fitness facility at an appropriate date, to recruit female participants (17 years+). Participant consent and permission will be required prior to any questionnaire distribution. I will remain at the site to answer any questions and collect all completed questionnaires.

The results from this study will benefit future exercise interventions among exercising women and increase knowledge to the research community. Please view the attached letter of permission for more information. Please respond via email (cookel@uwindsor.ca), phone (1-519-253-3000 ext. 4058) or fax (1-519-973-7056) if you would be willing to allow research to be conducted in your facility.

Thank you,

Lisa Cooke

Masters Student in Human Kinetics
Department of Kinesiology
University of Windsor, 401 Sunset Ave.
Windsor, ON N9B 3P4
cookel@uwindsor.ca

Appendix G

Fitness Facility Letter of Consent

LETTER OF PERMISSION FOR CONDUCTING RESEARCH

The effect of exercise experience on imagery use and efficacy beliefs

PURPOSE OF THE STUDY

The purpose of this research project is to investigate the influence of an exercisers' experience (the length of time one has been exercising) on their exercise imagery use (pictures one creates in their mind) and efficacy beliefs (the confidence an individual has to complete a task). The results obtained from this study will contribute to developing future imagery intervention programs aimed at increasing engagement in exercise among women.

PROCEDURES

If you grant permission for your venue to be utilized in this study, an investigator will only approach participants according to your specifications (e.g., set up a booth in the lobby of the facility). The researcher will ask participants to complete a questionnaire packet, which will take 10 – 15 minutes to complete. The researcher will be present at all times to answer any questions.

POTENTIAL RISKS AND DISCOMFORTS

There are no anticipated risks associated with granting permission to utilize your fitness facility. Furthermore, there are no anticipated risks for the participants recruited from your facility.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Both the facility manager and recruited participants will gain a better understanding of the use of imagery during exercise which may lead to increased motivation for continued participation. An additional benefit includes displaying your fitness facility's interest in promoting academic research and positive relationship with the University of Windsor community.

CONFIDENTIALITY

Any information (i.e., ballots) that is obtained in connection with this study will remain confidential and will be disclosed only with the participant's permission. All other information obtained will be anonymous. Information obtained in completed questionnaires can only be viewed by the researcher (Lisa Cooke) and faculty advisor

(Dr. Krista Chandler). All completed questionnaires will be secured in a locked cabinet with access only available to the aforementioned individuals.

RIGHTS OF RESEARCH SUBJECTS

Participation in the study is voluntary. You (fitness facility contact) or the participants can choose to withdraw at any time without consequences of any kind. If you or the participants have any questions regarding the rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, Ext. 3948; E-mail: ethics@uwindsor.ca

SIGNATURE OF FACILITY CONTACT/LOCATION REPRESENTATIVE

I understand the information provided and purpose for the study, **the effect of exercise experience on imagery use and efficacy beliefs** as described herein. I permit the use of my facility for the recruitment of participants. I understand if I have the right to discontinue involvement in the study, and the researcher will no longer utilize my venue. I have been given a copy of this form.

_____ _____

Signature of Manager Telephone Number

Address: _____

_____ Date_____

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ Date_____

Signature of Investigator

Appendix H

Participant Consent Form

CONSENT TO PARTICIPATE IN RESEARCH

The effect of exercise experience on imagery use and efficacy beliefs

You are asked to participate in a research study conducted by Lisa Cooke under the supervision of Dr. Krista Chandler, from the Department of Kinesiology at the University of Windsor. Results obtained from this research study will contribute to the completion of a Masters degree in the faculty of Human Kinetics.

If you have any questions or concerns about the research, please feel to contact Dr. Krista Chandler at (519) 253-3000, ext. 2446 or via email at chandler@uwindsor.ca

PURPOSE OF THE STUDY

The purpose of this research project is to investigate the influence of an exercisers' experience (the length of time one has been exercising) on exercise imagery use (pictures one creates in their mind) and efficacy beliefs (the confidence an individual has to complete a task). The results obtained from this study will contribute to developing future imagery intervention programs aimed at increasing engagement in exercise among women.

PROCEDURES

If you volunteer to participate in this study, we would ask you to complete a questionnaire package which takes between 10 and 15 minutes to complete. Upon completion, return questionnaires to researcher who will address any questions.

POTENTIAL RISKS AND DISCOMFORTS

There are no anticipated risks associated with participation in this study.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

As a participant, you will gain a better understanding of imagery types used during exercise which may lead to increased motivation for further activity engagement. In addition, you will become more aware of the relationship between exercise participation and efficacy beliefs

PAYMENT FOR PARTICIPATION

Upon completion of the questionnaires, you will have the opportunity to fill out a ballot for a draw. The prize, one of two $25 gift cards to a local sporting goods store in Windsor, ON will be awarded to one participant upon completion of the research project.

CONFIDENTIALITY

Any information (i.e. ballot) that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. All questionnaire responses will remain anonymous. Information obtained in completed questionnaires can only be viewed by the researcher (Lisa Cooke) and faculty advisor (Dr. Krista Chandler). All completed questionnaires will be secured in a locked cabinet with access only available to the aforementioned individuals.

PARTICIPATION AND WITHDRAWAL

Participation in the study is voluntary. You can choose to withdraw at any time without consequences of any kind. You may also refuse to answer any questions, and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECT

If you wish to receive any additional information regarding this research project, please contact via email (cookel@uwindsor.ca or chandler@uwindsor.ca). The results from this questionnaire will be available on the REB study results website upon completion (www.uwindsor.ca/reb).

SUBSEQUENT USE OF DATA

This data will be used in subsequent studies.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

VERBAL CONSENT OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study **the effect of exercise experience on imagery use and efficacy beliefs** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

SIGNATURE OF INVESTIGATOR
These are the terms under which I will conduct research.

Signature of Investigator	Date

Telephone: (519) 253-3000 Ext: 4058
Email: cookel@uwindsor.ca

Appendix I

Participant Letter of Information

LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH

The effect of exercise experience on imagery use and efficacy beliefs

You are asked to participate in a research study conducted by Lisa Cooke under the supervision of Dr. Krista Chandler, from the Department of Kinesiology at the University of Windsor. Results obtained from this research study will contribute to the completion of a Masters degree in the faculty of Human Kinetics.

If you have any questions or concerns about the research, please feel to contact Dr. Krista Chandler at (519) 253-3000, ext. 2446 or via email at chandler@uwindsor.ca

PURPOSE OF THE STUDY

The purpose of this research project is to investigate the influence of an exercisers' experience (the length of time one has been exercising) on exercise imagery use (pictures one creates in their mind) and efficacy beliefs (the confidence an individual has to complete a task). The results obtained from this study will contribute to developing future imagery intervention programs aimed at increasing engagement in exercise among women.

PROCEDURES

If you volunteer to participate in this study, we would ask you to complete a questionnaire package which takes between 10 and 15 minutes to complete. Upon completion, return questionnaires to researcher who will address any questions.

POTENTIAL RISKS AND DISCOMFORTS

There are no anticipated risks associated with participation in this study.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

As a participant, you will gain a better understanding of imagery types used during exercise which may lead to increased motivation for further activity engagement. In addition, you will become more aware of the relationship between exercise participation and efficacy beliefs

PAYMENT FOR PARTICIPATION

Upon completion of the questionnaires, you will have the opportunity to fill out a ballot for a draw. The prize, one of two $25 gift cards to a local sporting goods store in Windsor, ON will be awarded to one participant upon completion of the research project.

CONFIDENTIALITY

Any information (i.e., ballot) that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. All questionnaire responses will remain anonymous. Information obtained in completed questionnaires can only be viewed by the researcher (Lisa Cooke) and faculty advisor (Dr. Krista Chandler). All completed questionnaires will be secured in a locked cabinet with access only available to the aforementioned individuals.

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Participation in the study is voluntary. You can choose to withdraw at any time without consequences of any kind. You may also refuse to answer any questions, and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

If you wish to receive any additional information regarding this research project, please contact via email (cookel@uwindsor.ca or chandler@uwindsor.ca). The results from this questionnaire will be available on the REB study results website upon completion (www.uwindsor.ca/reb).

SUBSEQUENT USE OF DATA

This data will be used in subsequent studies.

RIGHTS OF RESEARCH SUBJECTS

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SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____

Signature of Investigator Date

Telephone: (519) 253-3000 Ext: 4058

Appendix J

Sample Ballot

DRAW ENTRY

* If you would like to be included for a chance to win a $25 gift certificate to a local sporting goods store, please fill out this ballot. When you are done, submit your entry into the ballot box and submit your questionnaire packet into the separate questionnaire box.

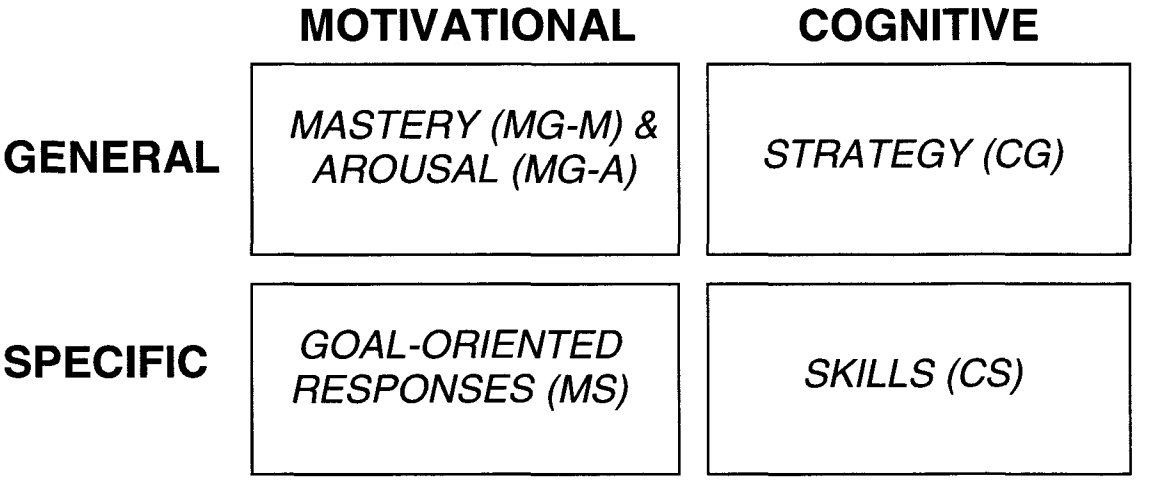
Name: _____

Phone Number: _____

Email: _____

Appendix K

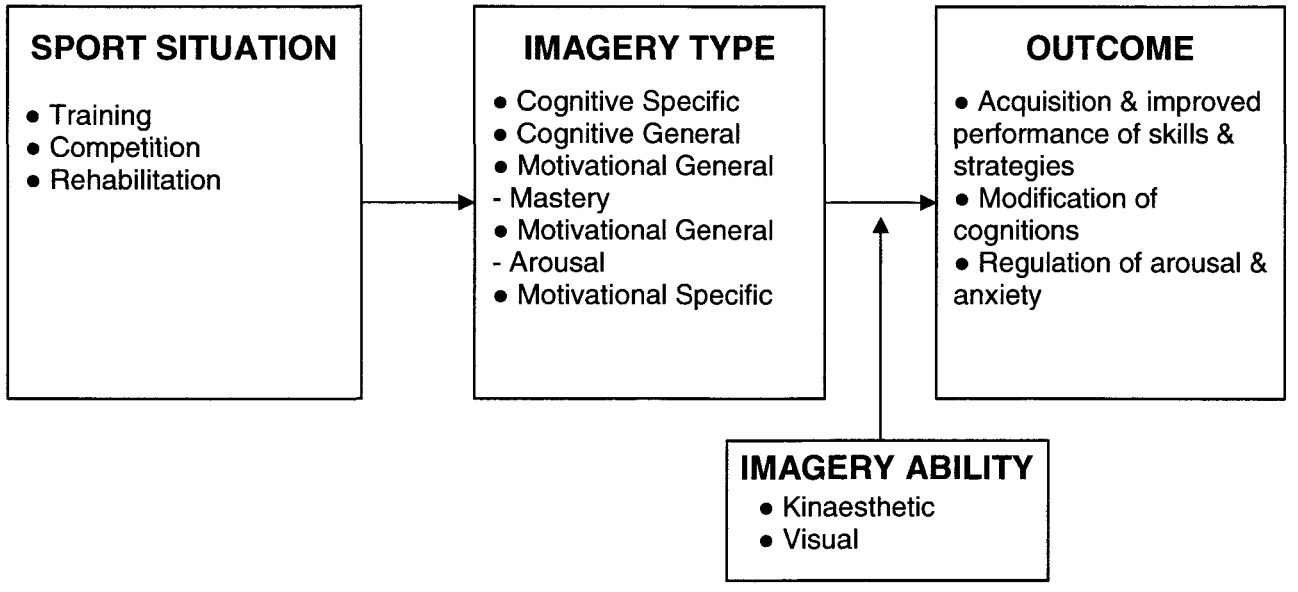
Analytic Framework of Imagery Effects (Hall, et al., 1998).



Adapted from "Imagery use by athletes: Development of the Sport Imagery Questionnaire," by C.R. Hall, D.E. Mack, A. Paivio, and H.A. Hausenblas, 1998, *International Journal of Sport Psychology, 29*, pp. 73-89.

Appendix L

An Applied Model of Imagery Use in Sport (Martin et al., 1999).



Adapted from "Imagery Use in Sport: A Literature Review and Applied Model," by K.A. Martin, S.E. Moritz, and C.R. Hall, *The Sport Psychologist, 13,* p. 248.

VITA AUCTORIS

NAME:	Lisa Marie Cooke
PLACE OF BIRTH:	Kingston, Ontario, Canada
YEAR OF BIRTH:	1986
EDUCATION:	University of Windsor, Windsor, Ontario 2008 – 2010, Master of Human Kinetics Queen's University, Kingston, Ontario 2004 – 2008, Bachelor of Physical Education, Honours with distinction Queen's University, Kingston, Ontario 2004 – 2008, Bachelor of Science, Biology Sydenham High School, Sydenham, Ontario 2000 – 2004