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Motivational Interviewing via Co-Active Life Coaching Intervention for Women Seeking a more Physically Active Lifestyle

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A thesis submitted in partial fulfillment of the requirements for the Master of Science degree in Health and Rehabilitation Sciences

MOTIVATIONAL INTERVIEWING VIA CO-ACTIVE LIFE COACHING INTERVENTION FOR WOMEN SEEKING A MORE PHYSICALLY ACTIVE LIFESTYLE

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by

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Abstract

The purpose of this 12-week pre-post design study was to assess the impact of Motivational Interviewing via Co-Active Life Coaching (MI-via-CALC) on task self-efficacy, barrier-specific self-efficacy, self-esteem, and 12-week study duration engagement in physical activity (PA) for 25 women between the ages of 30 and 55 years. Participants were assessed quantitatively using the previously validated McAuley Exercise-Specific Self-Efficacy Scale (EXSE), McAuley Barrier-Specific Self-Efficacy Scale (BARSE), Rosenberg Self-Esteem Scale (RSES), and International Physical Activity Questionnaire (IPAQ-SF) at pre-, mid-, and post-intervention. Four one-way repeated measures ANOVAs were completed for each scale, and positive differences in barrier-specific self-efficacy were detected between pre- and post intervention, and statistically significant differences in self-esteem between pre- and post-intervention were found. No statistically significant differences were found in participants' task self-efficacy scores and IPAQ scores, although scores in both increased by the end of the study. Participants Body Mass Index (BMI), waist, and hip circumferences were also quantitatively measured at pre- and post-intervention. Paired *t*-tests were completed for each measure, and statistically significant decreases in weight, waist, and hip circumferences were detected. MI-via-CALC is an encouraging approach for women who are seeking a more physically active lifestyle, and additional research on a larger scale is recommended.

Keywords: Co-Active life coaching, Motivational Interviewing, MI-via-CALC, Physical activity, women, self-efficacy, self-esteem

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Chapter I: Introduction and Literature Review

Purpose

The purpose of this thesis was to explore the evidence and research that examines the use of an MI-via-CALC cognitive behavioural intervention approach with a view to exploring potential changes in women's task self-efficacy, barrier-specific self-efficacy, self-esteem, and increase engagement in physical activity (PA) over a period of 12 weeks. A secondary focus of this thesis was to investigate the use of an MI-via-CALC intervention to discover potential changes in women's Body Mass Index (BMI), waist, and hip circumferences.

This chapter will examine the current state of physical inactivity for women in Canada, and establish the rationale for focusing on task self-efficacy and self-esteem for women in the age cohort of 30-55 years. Related literature is presented as context to form the basis for the need to study task self-efficacy, self-esteem, and PA for women. Research that illustrates the successful application of MI-via-CALC as a tool to facilitate cognitive behavioural interventions will be addressed, followed by an explanation about why this methodology is an optimal choice to apply to women who have low task self-efficacy, low self-esteem, and struggle to achieve PA in their lives.

Introduction

Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure, where as exercise is defined at physical activity that is structured, repeated and controlled (Canadian Society for Exercise Physiology [CSEP], 2014; World Health Organization [WHO], 2014). It has been reported that upwards of 52% of the adult female population in Canada do not engage in any moderate to vigorous PA, compared to 44% of males (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2009). PA participation has been

associated with maintaining health and improving quality of life (Health Canada, 2013; Kokkinos, 2012). In fact, regular PA has been associated with a 30-50% reduction in risk for cardiovascular events, obesity prevention, decreased bone loss and therefore potential decreased risk of osteoporosis, and a significant decrease in cognitive decline (Senter, Appelle, & Behera, 2013). Despite public awareness among Canadians about the importance of PA, PA rates have declined (Adamo, Langlois, Brett, & Colley, 2012). Concurrent with waning rates for PA, the percentage of Canadians classified as overweight or obese continues to rise, and recent statistics from 2012 have projected that the percentage of Canadians who are either overweight or obese comprise over half the population, at 52% (CFLRI, 2009; Clark, 2012; Statistics Canada, 2012). The implications of increased rates of obesity among Canadians are extensive. Aside from population health and welfare, there are escalating costs to the workforce, health care costs, and individual costs that can be attributed to obesity-related issues. These costs are evident through the increased obesity-related use of pharmaceuticals and hospital stays, and a decrease in productivity and lost income (Wyatt, Winters, & Dubbert, 2006). Most notable at an individual level is an increased risk for cardiovascular disease, type II diabetes and other chronic illnesses (Miller, Trost, & Brown, 2002).

As the number of cases of obesity in Canada continues to rise to epidemic proportions, a growing body of evidence has focused on physical inactivity as a correlate to obesity (Salmon, Tremblay, Marshall, & Hume, 2011; Starky, 2005; Thorp, Owen, Neuhaus, & Dunstan, 2011). One population that has been targeted recently in health promotion for its physical inactivity and body mass concerns are women between the ages of 30-55. The prevalence of women who meet the recommended amount of PA in order to avoid weight gain is 21.6% (Scheers, Philippaerts, & Lefevre, 2012). That being said, over three quarters of the female population are not achieving

sufficient levels of PA to avoid weight gain (Scheers et al., 2012). The Canadian Society for Exercise Physiology (CSEP; 2014) suggests that to achieve significant levels of PA, one must engage in moderate to vigorous PA for a minimum of 150-minutes per week, and that each bout of PA should be over 10-minutes in duration. In addition, the odds of engaging in sufficient PA levels are lowered as a woman advances in age (Scheers et al., 2012). Therefore, the older a woman gets, the more likely she is to be inactive and/or overweight.

Recent studies have addressed the concerns of PA in the female population. For example, studies have illustrated the alarming rates of physical inactivity as women age (White, Wojcicki, & McAuley, 2012). This is especially troublesome because women between the ages of 30-55 are the fastest growing segment of the population (Statistics Canada, 2012). As obesity rates increase in this age and gender cohort, physical inactivity in the largest segment in the population can have dire consequences for health care costs, overall quality of life, and future public health (White et al., 2012).

Given that physical inactivity levels are high among women and particularly high in the 30-55-age cohort (Statistics Canada, 2012), it is important to focus obesity and PA-related interventions on this age group, as these women make up a significant portion of the population. Further, it is imperative to focus on moderate to vigorous PA as PA encompasses a broader scope of activities that fit within the busy schedules of women, in addition to stimulating enough energy expenditure to facilitate health benefits. However, most PA interventions result in only slight increases in levels of activity (Ayotte, Margrett, & Hicks-Patrick, 2010). Often, the lack of focus on the psychological and social determinants of PA is cited as deficient in PA-related interventions (Ayotte et al., 2010). Therefore, in order for a PA-related intervention to achieve success and have sustained increases in PA participation, an intervention should include a focus

on the underlying psychological and social factors such as self-efficacy and self-esteem and how they are related to participation in PA.

Women and Self-Efficacy

Often, women encounter a number of obstacles to their participation in PA. The WHO (2014) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Although the term PA is sometimes erroneously interchanged with the concept of exercise, where exercise is defined as any physical activity that is planned, structured, and repetitive (CSEP, 2012). Both can be done to attain health gains. One prominent barrier to the participation in PA that women may face is low task self-efficacy (SE) (Cramp & Bray, 2011; McAuley & Mihalko, 1998). Self-efficacy has been frequently cited as a contributing factor of PA behaviour (Trost, Owen, Bauman, Sallis, & Brown, 2002). Self-efficacy as a construct itself refers to an individual's perception that he/she is capable of successfully performing behaviours given his/her skills and situations (Bandura; 1977; 1986; 1997). EXSE is an exercise-specific measure of self-efficacy that measures the confidence in one's ability to complete 30 plus minutes of moderately intense aerobic activity at varying frequencies (Cramp & Bray, 2011). These 30 plus minutes of moderately intense aerobic activity do not have to be in a structured environment, nor do they need to be planned or repetitive. The EXSE measures confidence in completing tasks in both PA behaviours in addition to exercise behaviours, and is therefore a broader approach to targeting PA-related self-efficacy in women. One study has found that women have low self-efficacy, and that self-efficacy is one factor that accounts for the variability of PA and PA behaviours (Ayotte et al., 2010). In addition, White and colleagues (2012) demonstrated that when women have higher levels of self-efficacy, there is concomitant greater participation in PA (McAuley & Blissmer, 2000).

In addition to SE, women encounter a number of perceived environmental and personal barriers, which may serve as barriers to their participation in PA (Ayotte et al., 2010). The perception that one has in his/her ability to overcome barriers to PA is referred to as barrier self-efficacy (Bandura, 1977). Given that women may encounter varying personal challenges such as a perceived lack of ability, health issues and being tired, the specific physical actions of PA may be challenging for them (Ayotte et al., 2010). Task self-efficacy refers to ones confidence in his/her ability to perform the components of a task (Bandura, 1977). For example, task efficacy would refer to a woman's confidence at throwing a ball efficiently and effectively. Where task self-efficacy is concerned, PA studies have shown that overweight women have lower task-specific self-efficacy because of their increased body size (Dallow & Anderson, 2003). Lastly, women may feel as though they cannot succeed at setting PA-specific goals. The confidence that one has in his/her ability to set goals is referred to as goal setting self-efficacy (Bandura, 1977). White et al. (2012) have found that women have lower goal setting self-efficacy at the outset of a PA-specific intervention, although it increases over time. This finding is very promising for PA-related interventions.

Social cognitive theory (SCT) and its implications for self-efficacy. The self-appraisal of one's ability to succeed is the main tenet of Bandura's Social Cognitive Theory (Bandura, 1977). One way to measure an ability to succeed is to measure one's competence in completing tasks as compared to gauging success from external stimuli. Self-Efficacy Theory is a conceptual, well-established theory that encompasses this self-competency measure (Bandura, 1997). Bandura's Self-Efficacy Theory is one part of the Social Cognitive Theory. The Social Cognitive Theory is, in turn, a dynamic cognitive behavioural theory that emphasizes the role of observational learning (Bandura, 1977). Specifically, this theory assumes that an individual's

actions and reactions to almost every situation are influenced by previous observations of others (Bandura, 1977). In addition, because self-efficacy is determined by people's appraisal of their ability to complete tasks based on comparisons to other experiences, it is the main observational component of SCT. For example, according to Bandura (1977), people with high self-efficacy are more likely to view challenging tasks as something they can master, rather than avoid (Bandura, 1977).

For the purpose of PA and women, Self-Efficacy Theory posits that people – in this instance women – who have higher self-efficacy are able to persist with exercise goals and behaviours, regardless of when perceived barriers interfere with their lives (Bandura, 1997). In addition, Bandura (1989) suggested that goal-setting behaviours are affected by one's perception of self-efficacy. This means that when people perceive their self-efficacy towards an activity as low, they will establish less-challenging goals to minimize the chances of failure (Bandura, 1989). In terms of PA, goals are directly linked to people's appraisal of their self-efficacy. Dawson and Brawley (2000) explained that when initiating an exercise program, both goal setting and self-efficacy significantly predicted exercise adherence. Therefore, women who have a goal of being physically active will be influenced directly by their appraisals of self-efficacy. Women between the ages of 30-55 typically hold the majority of the domestic responsibilities in addition to childcare and outside-the-home responsibilities (Bartley, Blanton, & Gillard, 2005). Collins dictionary (2014) defines domestic responsibilities as tasks such as cleaning and cooking; that need to be done regularly. Since these tasks need to be done regularly, and are not considered PA, they take up a large portion of a woman's day and can make PA participation difficult. Along with these responsibilities, women often cite perceived barriers to exercise that include poor health, symptoms of physical disabilities, lack of time, and environmental concerns

as reasons for low physical activity rates (Trost et al., 2002). Therefore, these women may be relatively low in barrier, task, and goal setting self-efficacy.

Literature on Women and Self-efficacy

Recent studies have demonstrated that having a higher level of self-efficacy is predictive of higher engagement in PA for women between the ages of 30-55 (Ayotte et al., 2010). Ayotte et al. (2010) illustrated that where exercise is concerned, women with higher self-regulated efficacy (SRE) – which is a measure of self-efficacy within the Self Efficacy Theory paradigm – were more successful in exercise persistence than women with lower SRE. According to Bandura (1977), SRE is related strongly to self-efficacy beliefs; this means that a woman can regulate her self-efficacy by adapting her feeling of self-efficacy to specific situations. In general, people with higher self-efficacy will perceive their SRE as higher. In relation to PA, this suggests that only women with high levels of self-efficacy would be successful in engaging in long term PA. However, Lind, Joens-Matre, & Ekkekakis (2005) suggested that self-efficacy decreases for women as they age. The importance of high levels of self-efficacy as a predictor for engagement in PA, coupled with the research that demonstrates that self-efficacy declines for women as they age, suggests that this population may need additional support and resources to increase their self-efficacy.

Gallagher, Jakicic, Napolitano, and Marcus (2006) demonstrated that when women felt that they could be successful in a program that may result in achieving weight loss they were more likely to be successful. Further, when these women were more active they achieved higher measures of self-efficacy. Gallagher and colleagues (2006) explained that when women reported higher levels of PA, they also had higher levels of self-efficacy, lower levels of perceived barriers, and were more likely to seek out social support. Notably, these PA gains did not need to take place in a formal exercise setting such as a gym (Gallagher et al., 2006). This may be

appealing to women who may not have the self-efficacy to engage in PA in formal exercise settings.

Silva et al. (2010) conducted a study in which 239 women were placed into a one-year intervention designed to promote autonomous regulation of PA and weight control. The importance of addressing both PA behaviours and psychosocial factors such as autonomous control are evident in the findings. After a one-year follow up, the participants cited fewer exercise barriers, and after a two-year follow up, a higher self-efficacy score correlated to continued weight loss. This demonstrates how self-efficacy and barrier-specific self-efficacy affects weight loss and PA. The researchers also suggested that for an intervention to achieve long-term success, the intervention must include the promotion of exercise intrinsic motivation and self-efficacy.

The concept of pairing self-efficacy measures with weight loss is further exemplified in a study conducted by Teixeira and colleagues (2002); in this study the researchers demonstrated that both low self-esteem and low levels of self efficacy contributed to only short-term weight loss and lower PA participation among women. Furthermore, the researchers illustrated the need for an intervention to address psychosocial measures such as self-esteem, in addition to self-efficacy to exercise. The researchers concluded that when women have higher self-esteem and higher levels of self-efficacy, they will be more successful in weight loss interventions (Teixeira et al., 2002). This demonstrates how closely self-esteem and self-efficacy can be related in behavioural change interventions such as those that target PA levels in middle-aged women.

Literature on Women and Self-Esteem

As Teixeira et al. (2002) demonstrated, health promoting behaviours are associated with long term PA engagement for women. If self-esteem and self-efficacy can be closely related, it would be beneficial to understand how self-esteem and self-efficacy relate to long-term PA engagement. White et al. (2012) explained that although self-efficacy is a strong predictor of PA participation, it is not the only social cognitive influence that predicts physical activity behaviours. White et al. (2012) explained that it is imperative to understand how self-efficacy and other social constructs such as self-esteem interrelate. Therefore, developing a better understanding of how different social constructs interrelate, and incorporating these social constructs into PA interventions will be more successful in achieving long term PA compliance and engagement.

Self-esteem is defined as the evaluation that an individual makes with regard to himself or herself, or is sometimes referred to as one's feelings of personal worthiness (Coopersmith, 1967). Sonstroem and Morgan (1989) found that when someone engages in PA, his/her perceived physical competencies will increase. This increase in physical competency, in turn, will lead to a greater feeling of general (global) self-esteem. However, Brown, Ford, Burton, Marshall, and Dobson (2005) illustrated that many women experience low self-esteem and depressive symptoms. Therefore, if the engagement in a PA can increase feelings of self-esteem then the application of a PA-intervention that focuses on increasing psychosocial factors such as self-esteem may result in mediating these low levels of self-esteem and depressive symptoms.

In a meta-analysis that examined the relationship among PA levels and their impact on depressive symptom outcomes in PA (Conn, 2010), the researcher found that PA interventions were associated with significant increases in mediating depressive symptoms in women with non-clinical depression. Although low self-esteem and depressive symptoms are not the same,

the researcher associated low levels of self-esteem with any participant exhibiting depressive symptoms. This meta-analysis demonstrates the effectiveness of PA interventions with respect to self-esteem for the general population. The application of a PA intervention to strictly the female population should yield the same results. In addition, in a review of mental and physical benefits of PA interventions, Penedo and Dahn (2005) illustrated that when women engage in PA, they display more desirable outcomes in mental health outcomes such as improved self-esteem. This further emphasizes the potential for PA interventions that address both PA and psychosocial constructs such as self-esteem.

Elavsky and McAuley (2005) examined the relationship between PA participation and self-esteem for adult women. In addition to lowering symptoms of menopause, regular participation of PA was associated with higher levels of self-esteem, and higher confidence to participate in PA (self-efficacy). Elaskly and McAuley (2005) also illustrated that few studies have been done to examine the mediators of physical activity and self esteem for middle-aged women. Determining how self-esteem and self-efficacy are connected to PA is necessary to understand how women can attain levels that will result in long-term engagement in PA.

It is evident that self-esteem and self-efficacy are important predictors of PA. It is also known that women between the ages of 30-55 tend to have lower levels of self-esteem and self-efficacy than women under the age of 30, and that these levels decline as they age. So, how can these two constructs be improved or increased? Given that research demonstrates that when women have higher exercise specific self-efficacy levels they are more able to manage the barriers that would hinder their participation in PA, it follows that research focusing on specific ways in which women can acquire the tools to increase or maintain their PA specific self-efficacy levels would be very important to this specific population. Packard et al. (2012)

demonstrated that higher levels of self-esteem correlate to engagement in PA. However, there is a lack of research on ways and means to increase self-esteem for women.

One potential and promising avenue to increase both self-esteem and self-efficacy for PA in women is to use a cognitive-behavioural approach. An example of such an approach is Motivational Interviewing (MI), a counselling style that works to strengthen a person's motivation to change.

Motivational Interviewing Intervention As A tool For Behaviour Change

Motivational Interviewing (MI) is an evidence-based behaviour change approach that focuses on strengthening a person's motivation to change (Miller & Rollnick, 2013). Specifically, Miller and Rollnick (2013) define MI as a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion. Specifically, MI explores and builds on an individual's readiness and willingness to change in order to facilitate that person's desired behavioural change(s). For MI to be successful, an individual has to be ready to change. MI is different than other behavioural change interventions in that it is not a coercive process; rather MI is a collaborative process that is aligned with the individual's values and concerns (Miller & Rollnick, 2013). When a client is ready, the collaborative process is an effective process to facilitate the behaviour change process.

The MI approach is centered on four different processes that one would encounter during practice (Miller & Rollnick, 2013). The processes of engaging, focusing, evoking, and planning form the four-step process and flow of the MI and work in following the spirit of the MI approach. These four processes can be sequential and recursive, and are not necessarily

uncovered in the same order for each client/counsellor collaboration. **Engaging** is when both parties come together to form a helpful connection or working relationship (Miller & Rollnick, 2013). This connection is crucial to the spirit of the MI relationship, and effective counselling cannot occur without a productive working relationship. **Focusing** is when a client and counsellor focus on a particular agenda, or establish the reason that the client came to talk (Miller & Rollnick, 2013). Focusing also maintains the flow or direction of the conversation and helps to establish change-goals and hopefully provide clarification and direction to address these change-goals. **Evoking** involves eliciting a client's own motivation to change, which is at the heart of the MI approach (Miller & Rollnick, 2013). This evoking-approach is important because it uses the client's own motivational voice to begin the behavioural change process. Once the client realizes his/her willingness to change, and begins to address how these changes are to occur, the process of planning occurs. **Planning** involves developing a specific plan of action and establishing a commitment to change (Miller & Rollnick, 2013). Within the MI model, the client and the counsellor work together to facilitate behavioural change. While engaging is usually the primary process utilized in MI sessions, over time, the interviewer may move in and out and/or revise the direction of one or more of the four processes; the four processes might be imaged as four steps, each one building on the others (see the Step Diagram in Figure 1 below). Lastly, MI relies on the client's autonomy to facilitate behavioural change (Miller & Rollnick, 2013); MI practitioners understand and recognize that clients have the power to change their behaviour. Rather than imposing a standpoint whereby the counsellor is seen as the authoritative figure, the spirit and principles and heart of MI encourage empowering the client so that the client can make the necessary behaviour change (Miller & Rollnick, 2013).

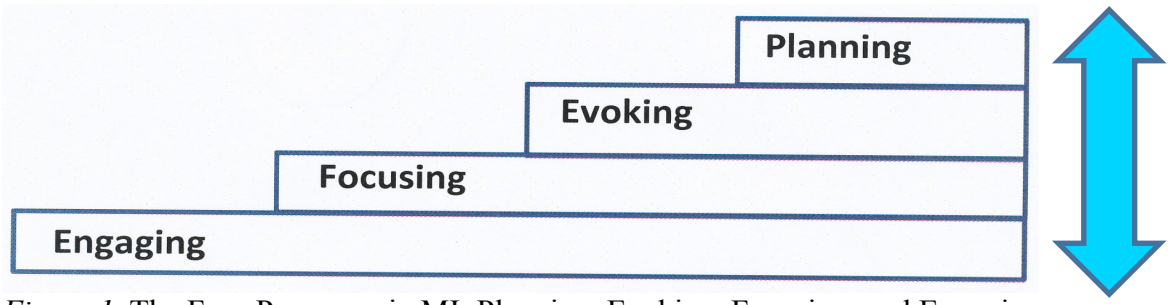

Figure 1. The Four Processes in MI: Planning, Evoking, Focusing, and Engaging.

Note. Adapted from Miller & Rollnick, 2013.

A motivation-centered approach to cognitive-behavioural interventions is gaining attention for its success in a variety of different research areas such as obesity prevention, diabetes, smoking cessation, and alcohol dependency (Miller, Zweben, DiClemente, & Rychtarik, 1992). However, MI interventions have also been criticized for not producing any significant results (Brodie & Inoue, 2005). Furthermore, detractors of MI suggest that there is a lack of fidelity, consistency of MI delivery, and lack of description and ambiguity in content of MI sessions (Hettema & Hendricks, 2010; Lai, Cahill, Qin, & Tang, 2010; Mantler, Irwin, Morrow, Hall, & Mandich, 2014). In addition, Miller and Rollnick (2013) caution against using a standard delivery of MI. Inconsistent delivery of MI is not optimal in a research study as it increases confounding variables and a researcher cannot make claims about the effectiveness of MI if the delivery is inconsistent. Lastly, Miller and Rollnick (2013) suggested that "[t]here is no minimum or sufficient 'dose' or training to guarantee competence in MI (Miller & Rollnick, 2013, p. 384)." This lack of standardization for training is not conducive for research studies because it is difficult to make claims on MI effectiveness if there is no standard training process. Thus, some researchers have connected the concept of MI with the tools used in Co-Active Life Coaching (hereafter referred to as MI-via-CALC) methodology (Mantler, Irwin, & Morrow,

2010; Mantler, Irwin, & Morrow, 2013; Newnham-Kanas, Irwin & Morrow, 2008; Newnham-Kanas, Irwin, & Morrow, 2010; Newnham-Kanas, Irwin & Morrow, 2011; Newnham-Kanas, Irwin, Morrow, & Battram, 2011; Pearson, Irwin & Morrow, 2013; Wiley, Irwin, & Morrow, 2011; Wiley, Irwin, & Morrow, 2012; van Zandvoort, Irwin, & Morrow, 2008; vanZandvoort, Irwin, & Morrow, 2009). The goal of applying a Co-Active Life Coaching skills and tools within the principles of MI is to provide an effective, powerful, standardized and clear set of actions in applying MI (Newnham-Kanas et al., 2010). Doing so means MI-via-CALC overcomes the stigma that MI principles are based on a spirit or way of being with the client and/or that MI is utilized in diverse ways (lack of standardization). Instead, MI-via-CALC points to the specific ways in which MI principles are applied.

The Principles of CALC

In CALC, the coach forms an alliance with the participant (Kimsey-House, Kimsey-House, Sandahl, & Whitworth, 2011). In this active collaboration between the coach and the participant, four essential cornerstones exist in order for active engagement to occur. Specifically, a co-active perspective asserts that: (a) people are naturally creative, resourceful, and whole (herein referred to as NCRW); (b) coaching must focus on the whole person; (c) the relationship must dance in the present moment (or be consciously in a state of mind that acknowledges the present); and (d) coaching will evoke transformation (Kimsey-House et al., 2011).

This relationship between the coach and the client exists only to serve the goals of the client. As Kimsey-House et al. (2011) have demonstrated, there exists three life and coaching-format principles: fulfillment, process, and balance. These principles interact, through coaching, to evoke an ‘ignited’ life, essentially meaning that one is capable of living a gratifying life.

Employing a methodology to help participants/clients who are struggling with engaging in PA to achieve a rewarding life is optimal because research has demonstrated that behaviour-based interventions that are aimed at weight loss and well-being are only successful in the short-term, and long-term benefits are usually not significant (Blaine, Rodman, & Newman, 2007). MI-via-CALC employs strategies such as forwarding the client into behavioural action and/or deepening their learning about their life situations. This cycle of action and learning over time leads to more sustained and effective change (Kimsey-House et al., 2011). This is particularly appropriate and important for women looking to engage in PA because MI-via-CALC can serve as a change agent whereby women can become empowered to make the changes and actions they need to in order to become successful in increasing their levels of PA. In efforts to assist researchers and other health professionals, the purpose of the present paper is to provide a detailed methodological account of this one-group, pre-post design pilot study with an aspiration of providing the groundwork for the development of prospective programs aimed at creating long-term PA engagement, increasing exercise-specific self-efficacy rates and self-esteem rates in this at-risk population.

MI-via-CALC

MI-via-CALC is a theoretically grounded, cognitive behavioural intervention approach to a health-related issue (Newnham-Kanas et al., 2010). Many of the processes, skills, strategies, and client-approaches of CALC are inherent in the spirit, processes, and skills of MI. Originally, CALC was used in the business world, and gained more widespread application, in part, because it focused on the client's agenda rather than employing a top-down, or directive approach (Whitworth et al., 1998). One of the hallmark components of this style of cognitive behavioural intervention is the premise that a client is the expert of his or her own life (Kimsey-House et al.,

2011). According to Kimsey-House et al. (2011), a client is not seen as broken and in need of fixing. Rather, since the client is the expert, he or she is the one who possesses, or has the ability to access, the answers to his or her question or concern or desire. Miller and Rollnick (2013) refer to the same 'absolute worth' of the individual recommending that the interviewer adopt an attitude of "non-possessive caring or unconditional positive regard" (p. 17). Therefore, the role of the coach is to help the client access these answers and work in partnership toward a client-centered goal. In relation to the field of health and wellness, Irwin and Morrow (2005) posited that MI-via-CALC is grounded in health behaviour theory, therefore making it a valid tool for putting theory into practice. Specifically, one health behaviour theory that CALC relates to is the Social Cognitive Theory (SCT; Bandura, 1981). One of the tenets of the SCT is that it focuses on reinforcement and personal expectations and how these influence behaviour (Parcel & Baranowski, 1981). As a coaching model, CALC focuses on a client's expectations and expectancies, and reinforcement and acknowledgement by his/her coach on the coaching process (McKenzie & Smeltzer, 2001). These relate to health promotion and behaviour change because these are crucial elements for a client's behaviour change process.

MI-via-CALC is an optimal approach to use in health promotion because CALC is a specific method that treats all aspects of a client's life through deepening his/her personal learning and/or forwarding him/her toward some action or lifestyle change (Kimsey-House et al., 2011; Newnham-Kanas et al., 2010). The WHO (2012) defines health promotion as "the process of enabling people to increase control over, and to improve, their health. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions" (para 1). MI-via-CALC is ideal for health promotion because it works to enable people via learning and/or action plans that are needed to make healthy behaviour changes. By extension, MI-via-

CALC might serve as an effective tool to facilitate behaviour change in women because an intervention that employs MI-via-CALC can heighten a participant's awareness about the reasons he/she is inactive by deepening a participant's personal learning and forwarding him/her to action – in this case PA.

Because CALC is so new in the field of health promotion, there have been a relatively low number of studies that employ its principles in their research. However, even though the numbers are low, the demonstrated effectiveness of utilizing MI-via-CALC is notable. For example, in a study involving people struggling with obesity, conducted by Newnham-Kanas and colleagues (2008), participants showed decreases in waist circumference in addition to increases in PA and positive changes in dietary intake after receiving coaching. Also, van Zandvoort, Irwin, and Morrow (2009) qualitatively assessed the effectiveness of CALC for working with female university students with obesity. The researchers' findings suggested that these women increased their self-acceptance in addition to making better choices with respect to diet and PA. Finally, Pearson, Irwin, Morrow, and Hall (2012) performed a study that compared MI-via-CALC to a validated obesity intervention (LEARN). In a 12-week intervention with 80 participants, Pearson et al. (2012) found that MI-via-CALC showed significant changes to self-esteem between weeks 6 and 12 of the intervention, and that these changes were independent of weight loss. This demonstrates the effectiveness of MI-via-CALC as an intervention tool for weight management, as it achieved results that were on par with LEARN-an existing, validated 'gold standard' intervention tool.

Participants who have undertaken an intervention that utilized MI-via-CALC have also reported improvements in their weight management (Newnham-Kanas et al., 2011). In a qualitative study that assessed participants' perceived utility of MI-via-CALC in terms of a

weight management intervention, participants reported increases in self-confidence, and new and effective ways of coping with life and emotional healing among other benefits (Newnham-Kanas et al., 2011). In the same study, the participants reported feeling empowered by the intervention, ultimately enabling them to make positive life changes that validated and supported their desire to live a healthier life in body and mind. In addition, after a 6-month follow-up focus group was conducted, the participants reiterated the positive aspects MI-via-CALC that were realized upon the completion of the study. This means that, in this case, the long-term effects of MI-via-CALC were positive. Finally, this study demonstrated that an intervention employing MI-via-CALC can be beneficial potentially for any population struggling with weight.

The potential for the health benefit applications of MI-via-CALC as a health related cognitive-behavioural tool is promising. These aforementioned studies demonstrated that when MI and CALC are used together, results can be very positive and future studies can benefit from employing this approach.

Rationale For MI-via-CALC and Women

The prevalence of physical inactivity in women is significant (CFRLI, 2009). With increasing obesity and concomitant co-morbidity rates in Canada, and given the rapid growth of the population is within the female age cohort of 30-55, it is evident that the development of approaches that target physical inactivity need to focus on this cohort. Women between the ages of 30-55 are important because their cohort is the fastest growing age cohort, in addition, women make up the majority of the population in general (Statistics Canada, 2011). The interventions that include women tend to focus on reduction of health-related issues such as coronary heart disease, diabetes, arthritis, and osteoporosis (Abramson, & Vaccarino, 2002; Hu et al., 2004; Hu et al., 2005; Sesso, Paffenbarger, Ha, & Lee, 1999). A low number of studies address the role of

self-efficacy and self-esteem in PA participation (McAuley, 1992; McAuley, Mihalko, & Bane, 1997; McAuley & Blissmer, 2000; Teychenne, Ball, & Salmon, 2008; White, Wojicicki, & McAuley, 2012). Evidently, knowing that higher self-esteem and higher exercise-specific self-efficacy results in more participation in PA, and knowing that women typically have lower self-esteem and lower exercise-specific self-efficacy, it is imperative to devise an approach that targets increasing exercise-specific self-efficacy.

MI-via-CALC is an appealing approach for increasing both self-esteem and PA specific self-efficacy in women because its roots are grounded in Social Cognitive Theory (Bandura 1977; Irwin & Morrow, 2005). It follows that women who have a higher exercise specific self-efficacy will likely be more successful in engaging in PA consistently over time.

Self-esteem, or the feeling of worthiness that a person places on herself, is also related to a woman's engagement in PA (Coppersmith, 1967). In a meta-analysis by Judge and Bono (2001), the researchers concluded that general self-evaluation traits, like self-esteem and self-efficacy are related and interconnected. So, when a woman has low self-esteem, she will likely also have low self-efficacy. This low level of self-esteem is likely counterproductive to a woman's engagement in PA. The problem is that often women typically have lower PA specific self-efficacy and low self-esteem than men (White et al., 2012). MI-via-CALC might be applied successfully to this population such that changes in health behaviour might be accompanied by concomitant increases in women's self-esteem and self-efficacy.

In a study conducted by Gorczynski, Irwin, and Morrow (2008), the researchers assessed the impact of CALC on youth between the ages of 12-14 years of age regarding PA participation, self efficacy, social support, and behavioural control; they found no consistent intervention effects. However, this intervention only included six coaching sessions. Additionally, women

may have an increased readiness to change (compared to the aforementioned youth group). Lastly, the inclusion criteria for the subjects in the study conducted by Gorczynski and colleagues (2008) were that they were inactive; in the current study the inclusion criteria for the participants were that they are currently inactive but seeking to become more active. This study used the principles of MI-via-CALC to align with the participants' stated desire to become more physically active to determine whether or not MI-via-CALC is an effective intervention to increase PA, self-efficacy, and self-esteem for women.

Chapter II: Methods

Study Intervention Defined

The purpose of this study was to determine the effectiveness of a personalized 12-week, telephone-based MI-via-CALC intervention on increasing: (a) self-reported PA participation; (b) task and barrier-specific self-efficacy; and (c) self-esteem for women between the ages of 30-55. Twenty-five participants were recruited and every participant received the same intervention. Each participant received one telephone MI-via-CALC session per week, and each person was also encouraged by the researcher to engage in physical activity at the onset of their enrollment. Given the success of previous MI-via-CALC studies for achieving behavioural change in areas such as smoking cessation and obesity, it was hypothesized that there would be a positive change in PA levels, task self-efficacy levels, self-esteem, and waist and hip circumferences.

The Co-Active Life Coaching Intervention

The coaches. Volunteer Certified Co-Active Professional Life Coaches (CPCCs) were recruited by the Project Coordinator via e-mail between October 2013 and May 2014. Coaches were recruited through the Coaches Training Institute's (CTI) e-mail database (2013; Appendix A); which is a closed-to-the-public database developed by the CTI. The database contains contact information about every CPCC. CPCC-certified coaches were recruited because these coaches are recognized by the International Coach Federation (ICF) for meeting the standards for international certification, and because they utilized the standards and methods of the CALC approach, and by extension, the MI-via-CALC process. Each coach had to agree to coach between two and three participants on a volunteer basis throughout the duration of the study. During recruitment, a total of 36 coaches were contacted from Canada. After a coach expressed interest in participating in the study, a phone consultation was arranged between the Project

Coordinator and the prospective coach to discuss his or her background information and interests that relate to this study, and to ensure their CPCC credentials were valid. In addition, the procedures for the study were outlined and the commitment level for a coach's participation was discussed. Each coach was advised that no other involvement in the study was required. The fewer the number of coaches was ideal so that potential confounding intervention variables were minimized. A projected caseload of two to three clients per coach was deemed to be optimal for this study, based upon previous MI-via-CALC research. After recruiting and screening all potential interested coaches, 14 coaches were enrolled in this study. One coach withdrew after the commencement of the study due to personal issues; the two participants that were assigned to this particular CPCC were re-assigned to a coach who was recruited one week after the commencement of the study.

Participants and recruitment. The study targeted female participants between the ages of 30-55 years old who were inactive and wished to increase their level of PA. Participant recruitment was done via posters placed in such venues as supermarkets, flyers posted in libraries, and commercial fitness facilities in London, Ontario (Appendix B); as well as social media tweets/posts, advertisements on Kijiji, and e-mail 'blasts' distributed via the Thames Valley District School Board and Waterloo Region District School Board (Appendix C). Advertisements through Kijiji and through both school boards were the most successful forms of recruitment, and a total of 65 women expressed interest. Once contact was made with potential participants, the Project Coordinator explained the study (Appendix D) and asked several questions to determine subject eligibility (Appendix E). Inclusion criteria for acceptance into the intervention included: (a) being a female between the ages of 30-55; (b) self-identifying as struggling to achieve moderate PA in their lives and seeking to become more physically active;

(c) did not have any existing health concerns that would preclude them from participating in moderate PA; (d) were English-speaking; and (e) had access to the internet so that they could assess online surveys. Each woman who was eligible received the intervention because this is a study that utilized this intervention on this specific population. In total, 35 of the 65 women who expressed interest in the study actually met the eligibility criteria. Common reasons for study exclusion were: (a) the participants were not between the ages of 30-55 years old (n = 2); (b) did not have ready or consistently available access to the internet (n = 2); (c) did not wish to make phone calls to a CPCC certified coach (n = 5); and (d) had a medical condition that precluded them from participating in moderate PA (n = 1). Once a participant was deemed eligible to participate in the study, and once she stated that she wanted to move forward with the intervention, a baseline assessment meeting was set up at a mutually convenient time for the participant. A total of 25 women enrolled in the intervention between May 2014 and June 2014. Ethical approval was obtained from the Research and Ethics board at Western University (Appendix F). Each participant signed a written consent form prior to commencing the intervention (Appendix G).

Design

A one-group, pre-post design study was utilized to enable comparisons between the baseline assessments and further assessment time periods (i.e. midpoint, or 6-week mark, and the final or 12-week assessment). Comparisons were made between anthropometric measures such as BMI (see next section for more details on this and other measures) and the psychosocial measures such as the McAuley Exercise Self-Efficacy Scale (McAuley, 1993), the McAuley Barrier Self-Efficacy Scale (McAuley, 1992), the Rosenberg Self-Esteem Scale (Rosenberg, 1965), and the International Physical Activity Questionnaire- Short Form (International Physical

Activity Questionnaire [IPAQ-SF], 2005). A sample size calculation was conducted using *Horatio*, a computer software program (C. Lee, 2013), and it was deemed that 20 participants were sufficient in detecting a hypothesized large effect ($r^2 = .25$) of a two-level independent variable 95% of the time assuming a within-subject correlation of .30.

Measures

Participants met with the Project Coordinator at the Health Promotion Lab at Western University to complete baseline assessments. To obtain demographic information, the participants were asked to complete a questionnaire at the initial meeting (e.g. name, age, contact information, ethnicity, highest level of completed education, employment status, income, and marital status; Appendix E). Since a goal of this intervention was to increase PA levels for the participants, each participant was asked to complete a Physical Activity Readiness Questionnaire (PAR-Q; CSEP, 2002) to determine if she was physically able to participate, and that she did not have any pre-existing health conditions that would preclude her from participation (Appendix H). All participants were deemed physically able to participate.

Waist and hip circumference. At baseline, participants were asked to have their waist and hip circumference recorded. This was be done by the researcher, using the same measuring tape to determine the circumference of each participant's waist, and was measured at one's natural waist (navel area). Hip circumference was measured at one's natural hip (largest part of the hip). Both measurements were taken in accordance with the guidelines set out by the Heart and Stroke Foundation (2010) for measuring waist and hip circumference, and was conducted to calculate waist to hip ratio. Waist to hip ratio was calculated because it is the largest predictor of morbidity and mortality (Heart and Stroke Foundation, 2010). The same measuring tape was used for each participant to ensure that the results were accurate among participants, and that there was no discrepancy between the results (Newnham-Kanas et al., 2008). This measure was repeated immediately post-intervention, at the 12th week.

Body mass index (BMI). At baseline, participants were asked to have their BMI calculated. Calculating one's BMI is an appropriate measure because it provides information about a person's body mass and measures it against a standard to which a participant can be compared (CDC, 2014). To calculate BMI, a participant's weight in kilograms was divided by height in meters squared (CDC, 2014). The BMI number was then compared to a chart that determined how body mass correlates to averages. For example, a BMI of 20-24.5 is considered as normal for both genders, for adults (CDC, 2014). BMI is a good indicator for body fatness as one's BMI number has a strong correlation to body fatness (CDC, 2014).

Previous research supports the use of BMI for measuring body fatness (Mei et al., 2002). The BMI is widely used and accepted as a valid and reliable tool for measuring body fatness. Mei et al. (2002) have validated the tool based on statistically significant correlation coefficients (p <0.05) and thus results from the BMI can be deemed as valid (Mei et al., 2002).

Self-efficacy. Participants completed the Exercise Self-Efficacy Scale (EXSE; McAuley, 1993; Appendix I). This particular scale was devised based on the recommendations from Bandura (1997). It is an 11-item scale that measures task self-efficacy by asking participants about their degree of confidence in performing certain tasks. The participants in this study were asked to assess their confidence in performing moderate PA for a duration of at least 30 minutes at frequencies of one through five times per week and then were asked to assess their confidence in performing moderately intense PA for 30-, 45- and 60-minute intervals, three times per week for a period of 6 weeks. Participants were provided with definitions of what moderate PA meant (not overly exhausting but you breathe harder than normal, feel tired, and begin to sweat) and were then asked to rank their degree of confidence about their ability to perform moderate PA on a scale of 10-100. A score of 100 meant that they were extremely confident in their ability, whereas a score of 10 meant that they were not confident at all in their ability. These 8 frequency increment items were intended to measure a participant's confidence in increasing their frequency of PA. Bandura suggests that participants are more apt to be more successful if they have specific outcome measures (namely increasing frequency of moderate PA bouts; Bandura, 1997). To score the EXSE, each participant's confidence score was summed and then divided by the total number of items on the scale (McAuley, 1993). Finally, an overall mean value for the whole groups EXSE score was calculated and used in analysis. Internal consistency coefficients were used to assess the reliability of the EXSE measure at the beginning, mid-point (6-week), and end of the intervention. Cronbach's alpha was used to assess the internal consistency (Cronbach, 1951).

For the EXSE (McAuley, 1993), the participants were asked to assess their confidence in performing PA for the next one to six weeks. Each portion of the EXSE was completed online

via Survey Monkey © (a survey-generating website). For example, participants were asked " I feel confident that I can continue to be physically active at moderate intensity for duration of 30 plus minutes three days of the week for the NEXT 6 WEEKS." These 6 weekly increments were intended to assess a participant's confidence level of increasing her duration of PA. An overall mean task self-efficacy value was calculated for each participant. To calculate overall mean for task self-efficacy, the researcher totalled the sum of the 11 items on the scale, and then divided the number by the number of responses (n = 11). The overall mean determination allowed for better analysis in terms of regression and assessing impact of their intervention because it allowed for the researcher to interpret the results better.

The purpose of the EXSE (McAuley, 1993) was to assess the impact on the MI-via-CALC intervention and task self-efficacy. This measurement tool was administered at baseline, mid-point (6 weeks), and immediately following the 12-week intervention. This measure has been determined to be predictive of exercise adherence (McAuley, 1993; McAuley & Jacobson, 1991). Previous researchers have utilized this measure on postnatal women to assess task self-efficacy levels, and have demonstrated that it has high internal consistency values (.94; Cramp, & Bray, 2011).

Barrier-specific self-efficacy scale (BARSE). Participants were asked to complete the Barrier-Specific Self-Efficacy Scale (BARSE; McAuley, 1992; Appendix J). This scale assessed participants' overall degree of confidence about performing a task in the presence of certain barriers. For the purpose of this study, the scale was used to assess the participant's degree of confidence in overcoming the 21 most cited barriers to PA for women (Cramp & Bray, 2011). Participants rated their degree of confidence using an 11-point scale, ranging from 0 (not confident at all) to 100 (very confident). The scores were then summed, and the overall mean for

each barrier was calculated. Each barrier listed as an item was totalled, and then averaged out to determine the mean strength at which each barrier was held. For analysis, an overall mean for each barrier was calculated. Internal consistency values were calculated at the beginning, midpoint (6-week), and at the study's end. Cronbach's alpha was used to assess the internal consistency of these values (Cronbach, 1951).

The purpose of the BARSE (McAuley, 1992) tool was to assess the effect of an MI-via-CALC intervention on barrier-specific self-efficacy over a 12 week study period. This tool was administered at baseline, mid-point (6 weeks), and immediately following the 12-week intervention. It was hypothesized that as participants progressed through the intervention period and process, their confidence at overcoming perceived barriers would increase. This measurement tool was simple to use, and has been demonstrated to be both valid and reliable as it has high internal consistency rates as determined through Cronbach's alpha (0.93); furthermore, the BARSE instrument has been validated through previous research in breast cancer survivors (Rogers, McAuley, Courneya, & Verhulst, 2008).

International physical activity questionnaire-short version (IPAQ-SF). Participants were asked to complete the International Physical Activity Questionnaire-Short Version (IPAQ-SF; Craig et al., 2003; Appendix K). The scale was intended to assess the amount of time performing multiple types of PA over a seven-day period (Craig et al., 2003; IPAQ, 2005). Participants answered questions that gauged the intensity of their PA, and participants provided an estimate of the duration of each bout of PA. The IPAQ (Craig et al., 2003) is a unique measurement tool in that it considers activities such as housework and yard work in addition to traditional PA forms as measurable activity items (Abu-Omar & Rutten, 2008).

Specifically, participants determined how many days they participated in vigorous, moderate and light PA. Once they estimated the duration in days, they then estimated how many hours and minutes per day they spent at each level (Craig et al., 2003). This measure was intended to provide a simple, easy to complete and reliable assessment of each participant's level of activity throughout the intervention.

To score the IPAQ, each activity was computed by weighing each of its energy requirements as MET-minutes (IPAQ, 2005). Median values and interquartile ranges were computed for each of the following activity levels: (a) walking (W); (b) moderately vigorous activity (M); and (c) vigorous activity (V). The numbers were then combined to derive a total activity score (IPAQ, 2005). Ainsworth and colleagues (2000) performed research that determined which MET scores correlated with which PA examples. For example, walking is 3.3 METs, moderate activity is 4.0 METs, and vigorous activity is 8.0 METs (Ainsworth et al., 2000). This intervention used the same examples of MET scores for the participants.

The tool was administered at baseline, and on a weekly basis, via Survey Monkey ©, to each participant. It was hypothesized that participants will be more active as they progress

through the intervention. This tool is both easy to use and research has shown it to be a reliable measure of PA and has a high internal consistency value as determined by Cronbach's alpha (0.95) (Chronbach, 1951; Craig et al., 2003; Rosenberg, Bull, Marshall, Sallis, & Bauman, 2008).

The Rosenberg self-esteem scale (RSES). Participants were asked to complete the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; Appendix L). This 10-item scale was intended to assess a participant's general self-esteem by measuring the participant's positive and negative feelings of herself (Rosenberg, 1965). Each question was measured on a four-point Likert scale; ranging from strongly disagree to strongly agree. This measure was administered at baseline, at the midpoint of the intervention and upon completion of the 12-week intervention.

To score the RSES, a pre-set numerical value was given for each question. For questions 2, 5, 6, 8, 9 the items are reversed scored. This means that if a participant answers "Strongly disagree" to an item, she was scored a 1, and if the participant answers "Strongly agree" she received a score of 3. All of the scores that were generated for the 10 items were then summed. A higher score meant that a participant has higher self-esteem (Rosenberg, 1965). Participants were encouraged by the Project Coordinator to be honest as they answered the questions on this survey in order to attempt to glean accurate responses and thereby meet standards of honesty demands. The RSES is easy to use, widely accepted as a reliable and valid tool to assess self-esteem for all populations (Cronbach's $\alpha > .77$; Blascovich & Tomaka, 1993; Rosenberg, 1989). It was hypothesized that participants' self-esteem would increase as the MI-via-CALC intervention progressed.

Procedures

Initial meeting. Once it was determined that a participant was eligible to participate, and she gave written consent to participate, an initial meeting was booked at a mutually convenient time in the health promotion laboratory at Western University. At this initial meeting, the Project Coordinator provided each participant with a detailed letter that explained the nature of the study, the eligibility requirements, the anonymity of participation, anonymity of each MI-via-CALC session, what voluntary participation meant for each participant, and confidentiality. Confidentiality meant that a participant's name would not be included in the study, and nothing that would identify the participant to others would be included. Once written consent was acquired, the participant was then asked to complete the PAR-Q and the demographic questionnaire. Then height, weight, waist and hip circumference were measured and recorded. The Project Coordinator then outlined and explained the four survey measurements that were previously mentioned. The Project Coordinator explained the steps that were needed to access each survey through the online survey generating website, Survey Monkey©. As a measure to ensure that every participant understood how to complete each survey, the Project Coordinator asked each participant to complete her baseline assessment measures for each survey at the lab. This also allowed for participants to ask any clarifying questions about any of the questions in the aforementioned surveys. Following the completion of the surveys, the participants were then redirected to the desk where the Project Coordinator provided each participant with Canada's Physical Activity Guide for Healthy Active Living so they knew what recommended PA examples looked like (Health Canada, 2012). The Project Coordinator then explained to each participant what differing levels of intensity of PA would look like and entertained any questions that she might have. The participants were then paired with a coach and were given their

individual coach's contact information. The Project Coordinator then instructed each participant to make contact with her coach within seven days of her initial meeting. Lastly, the Project Coordinator explained that the PA portion of the intervention was to be self-regulated PA and was to be done at the participant's home, fitness facility, or other facility that was available. Each participant could choose whatever form of PA she preferred; activity choices varied from activities such as (but were not limited to) yard work, housework, yoga, Pilates, and exercise classes amongst others. Requiring self-regulated PA ensured that each participant was given a chance to succeed at PA participation because she picked the activities that were better suited to her needs.

The coaching relationship. Participants were to receive 12, 30-45 minute coaching sessions with their CPCC certified coach. Coaches and participants were matched at the time of enrollment and matching was primarily based on time preference for coaching sessions and coach availability. All coaching sessions were done over the phone, for mutual convenience and for the purposes for standardized delivery of the intervention. During the initial meeting, the Project Coordinator explained the process of CALC to each participant. For example, the Project Coordinator explained that each coach must be certified with the CTI (as a CPCC), and each CPCC was recruited on a volunteer basis. In addition, the Project Coordinator explained that each coach was instructed that he/she must only use his/her CPCC tools, so that there was no discrepancy between the coaching methods delivered among clients. Once the background information about the coaching process was outlined, the Project Coordinator briefly explained the CALC relationship specifically, what it meant to enter into an alliance with a CPCC. The Project Coordinator then discussed issues of confidentiality, trust and authenticity, as these elements were crucial to the success of the coaching relationship (Kimsey-House et al., 2011).

As is congruent with the tenets and intentions of CALC, it was the responsibility of the client to contact the coach for each session. In addition, each coach and participant was given a tracking sheet to record the date and time of each conversation. The Project Coordinator then informed each participant that she would ask each coach to inform her of any missed appointments in order to ensure the 12 weeks of coaching.

Commencement of study. Once a participant was enrolled in the study and matched with a potential coach, the Project Coordinator contacted that coach and provided him/her with the name of their client so that when initial contact was made it would not be unexpected. In the interim, the Project Coordinator asked each participant to contact her once they have made initial contact with their coach and to notify her when their initial session would take place. The Project Coordinator then recorded the initial session dates so that adequate timelines for future assessments could be projected.

Follow-up assessments. The assessment tools that were administered at the initial meeting were carried out at two different time periods throughout the study (i.e. midpoint of study or 6 weeks; and final assessments or at 12 weeks). All of the surveys were administered at these two time periods; however, the BMI and waist and hip circumference were not recorded at the midpoint mark of the study, and the IPAQ-SF (IPAQ, 2005) was administered on a weekly basis. The IPAQ-SF (2005) was administered weekly because it was hypothesized that it would be easier for participants to recall PA over a 7-day period rather than anything longer. The BMI and waist and hip circumferences were only done at two time points because it was hypothesized that there would be little change at the six-week mark, and having little change could have been a negative influence on motivation to proceed with the rest of the intervention.

Chapter III: Anthropometric and Physical Activity Results

This chapter presents the anthropometric and PA results from the current study. Specifically, results from participants' weight, hip, and waist ratios are compared between the beginning and end of the intervention to determine if there were any changes. Lastly, results from participants' PA levels are presented and compared at weekly time-points to determine if there was a change in PA levels by the end of the intervention. There was no formal recording of participants' comments to the researcher; however, where the researcher felt intuitively that *ad hoc* comments might be relevant to qualify the findings, some comments were utilized to add interpretive value to the data presented.

Sixty-five women between the ages of 30-55 expressed interest in participating in this intervention. Of the 65, 25 participants were deemed eligible to participate in this study, and of those 25 women, 19 completed the 12-week intervention. Two participants withdrew from participation after the first week of the intervention for personal health reasons and four participants did not attend the baseline assessment, and therefore did not begin the intervention. However, demographic information was collected from all participants (n = 25). Therefore, data utilized for statistical analysis is based off of a sample size of 19 (except where otherwise stated). The mean age of participants was 47.14 years (range: 34-55 years); and 95.2% were Caucasian (n = 19). See Table 1 for a summary of the demographic information (Table 1 was complied using a sample size of 21).

Table 1

Participant Demographic Information (*n* = 21)

Participant Characteristic	N	%
Sex		
Female	21	100
Age		
30-35 years	2	9.52
36-40 years	6	28.7
41-45 years	3	14.28
46-50 years	9	42.85
51-55 years	1	4.76
Height		
5’0”-5”4”	10	47.6
5’5”-5’9”	10	47.6
6’0”+	1	4.8
Ethnicity		
Caucasian	20	95.2
Asian	1	4.8
Highest Completed Level of Education		
PhD	0	0
Master’s	1	4.8
University/College	18	85.71

High School	2	9.52

Data collection began at the start of May 2014. The onset of collection was determined when participants were matched with their respective coaches and made their initial contact with their coach. This initial contact was defined as the beginning of the intervention, and therefore starting dates varied among participants such that data collection began at differing points throughout the month of May 2014.

Body Mass Index

BMI is deemed to be an effective measure for assessing change in a participant's body mass because it provides a standard against which to compare based on weight status (CDC, 2014). Given that participants were between the ages of 30-55 years, and their height remained constant throughout the intervention, weight was the only measure that was compared. Weight was measured in both kilograms (kg) to determine BMI, and pounds (lb.) to make final comparisons. Weight was calculated and assessed in pounds because it was assumed by the researcher to be the more readily accepted form of measurement in the demographic area. Weight decreased throughout the study. The mean starting weight was 175.76 pounds and the mean final weight was 170.81 pounds as depicted in Table 2.

Table 2

Participants' Paired Weight Sample Statistics Over The Study Duration (*n* = 19)

		Mean	SD	P Value
Pair 1	Weight Start of Study (lbs)	175.764211	24.91	
	Weight End of Study (lbs)	170.810526	24.00	<0.05

The paired *t*-test calculations indicated that coaching did significantly decrease the participants weight post-intervention, [$t(18) = 4.246$, $p < .05$]. Some participants achieved marked weight losses. For example, participants 3 and 4 lost 16 pounds by the end of the study. Participant 12 lost 12 pounds, and participant 19 lost eight pounds. Participant 5 lost five pounds. There were some less dramatic weight losses. Participant 13's weight remained constant, while participants 10 and 16 lost one pound. Although these weight differentials seem negligible, the purpose of this study was to increase PA levels in addition to increasing participants' exercise-related self-efficacy and self-esteem. The women in the study were concerned about body weight, and therefore any loss might be perceived as promising and encouraging for participants. For example, participant 6 lost three pounds, and although that does not compute as a large weight loss, during her final assessment she stated that she "has never felt better in her skin," and "I feel like I've lost more weight than it shows." This demonstrates how positive PA-related changes can impact a woman. Even though she did not lose a large amount of weight, she was clearly positive and felt as though she achieved success.

Waist Circumference

This measurement was used to compare the difference and/or change in participants' waist circumference from the beginning to the end of the intervention. A standard measuring tape was used to measure each participant, as using the same measuring tape eliminated the chances of confounding variables. Paired *t*-testing was used to determine the change in waist circumference at the end of the study. Waist circumference decreased significantly [$t(18) = 5.548$, $p < .05$] decreased by the end of the study. The mean starting waist circumference was 35.105 inches and the mean final waist circumference was 33.61 inches as depicted in Table 3.

Table 3

Participants' Paired Waist Circumference Statistics Over The Study Duration (*n* = 19)

	Mean	SD	P Value
Waist Circumference Start of Study (in)	35.105263	3.24	
Waist Circumference End of Study (in)	33.605263	3.62	<0.05

The results of the paired *t*-test demonstrated that coaching did have a significant impact on participants' waist circumference, [$t(18) = 5.548$, $p < .05$]. Participant 1 had a loss of 4 inches by the end of the study. Participant 19 had a loss of three and a half inches, while participant 3 lost two and a half inches. Participants 4, 14, 16, and 18 all lost two inches. The remainder of the participants lost either half of one inch or remained constant. No participants gained in waist circumference by the end of the study. Changes in waist circumference resulted in positive feedback from participants. For example, participant 19 stated that she needed to buy new pants because her previous ones no longer fit.

Hip Circumference

Hip circumference was measured to compare the difference in circumference between the beginning and end of the intervention. As mentioned in the previous section, a standard measuring tape was used for all measurements. Results of the paired *t*-test showed that participants' hip circumferences significantly decreased throughout the study, [$t(18) = 6.302$, $p < .05$]. The mean starting hip circumference was 44.05 inches, and the finishing hip circumference was 42.42 inches as demonstrated in Table 4. As hip measurements are completed at the widest point of the hips (Heart and Stroke Foundation, 2010), the loss in hip circumference may have been attributed to a loss in the gluteal region for the women who participated in this study.

Table 4

Participants' Paired Hip Circumference Statistics Over The Study Duration (*n* = 19)

	Mean	SD	P Value
Hip Circumference Start of Study (in)	44.052632	3.97	
Hip Circumference End of Study (in)	42.421053	3.87	<0.05

Participant 1 lost a total of 4 inches by the end of the study, while participants 4, 13, 17, and 19 lost three inches, and participants 6 and 18 lost two inches. All other participants either lost one inch or remained the same. There were no participants that gained in inches for their hip circumference. The loss of inches for participants hip circumferences resulted in many positive reactions. For example, participant 13 stated that she felt better about her body.

Waist to Hip Ratio

Waist to hip ratio was then calculated to compare any differences in ratio over the study duration. Waist and hip ratio was calculated in accordance to guidelines presented by the Heart and Stroke Foundation (2010). Results from the paired *t*-test indicated that participants waist to hip ratio decreased significantly by the end of the study. The mean starting waist to hip ratio was 0.7995, and the mean finishing waist to hip ratio was 0.7948, as demonstrated in table 5.

In sum, the results demonstrate that the participants lost inches in their waist and hip circumferences, and improved their waist to hip ratio by the end of the study. Losing inches in these areas may be very motivating for these women and may have demonstrated the potential benefit of regular PA participation.

Table 5

Participants Waist To Hip Ratio Results Over The Study Duration (n=19)

	Mean	SD	P-Value
Waist to hip ratio Start of Study	0.7995	0.58	
Waist to hip ratio End of Study	0.7948	0.59	<0.05

Physical Activity

Participants were asked to complete a weekly assessment of their activity levels by answering questions from the IPAQ-SF (IPAQ, 2005). The IPAQ itself is presented in two different forms, either a long version or a short version (IPAQ, 2005). The short version (IPAQ-SF; IPAQ, 2005) was used in this intervention because it allowed participants to recall their PA in general terms and therefore encompassed a broader range of activities. The results of the IPAQ-SF were calculated by using a repeated-measures ANOVA. Mean averages of activity (measured in MET minutes) were calculated to measure the changes in activity levels throughout the study. The mean scores indicated that PA rates, in general decreased after the first week. However, PA rates then slightly increased until week seven. Following this, PA rates then decreased for two weeks. PA rates then increased for two weeks. Finally PA rates decreased by the end of week 11, and then increased at the final measurement. This fluctuation in PA rates among weeks demonstrated the variability of engagement in PA throughout the study. Mauchly's test showed that sphericity had been violated, $X^2 = 593.945$, $p < .05$. After correcting for the violation in sphericity (the condition where the variances of the differences between all combinations of the related groups are equal, in this case the variances were not; Field, 2013), the Greenhouse-Geiser correction was used to obtain a valid critical F value. The sphericity correction was estimated at $\varepsilon = 0.093$. Results from the omnibus F-test revealed that coaching did not produce a significant effect on activity levels throughout the intervention, [$F(1.121, 20.181) = 0.836$, $p < .05$]. Time point results for the participant's activity levels are presented in Table 5. Activity scores were calculated in MET minutes, and a MET-minute mean is presented for each time point.

Table 6

Participants' IPAQ Scores at Weekly Time Points Over The Study Duration (*n* = 19)

	Mean (MET minutes)	SD
IPAQ Time 1	9721.736842	32803.64
IPAQ Time 2	2186.926316	3164.95
IPAQ Time 3	2404.421053	2931.17
IPAQ Time 4	2670.263158	3542.06
IPAQ Time 5	2433.552632	2945.41
IPAQ Time 6	2470.736842	3225.27
IPAQ Time 7	3214.131579	3827.52
IPAQ Time 8	2902.763158	3662.98
IPAQ Time 9	2629.789474	2934.21
IPAQ Time 10	3225.210526	3967.81
IPAQ Time 11	2814.894737	3200.51
IPAQ Time 12	2533.552632	2333.64
IPAQ Final	2952.2368	2700.43

Figure 2 provides a visual representation of the previously aforementioned fluctuations in participants' IPAQ-SF scores.

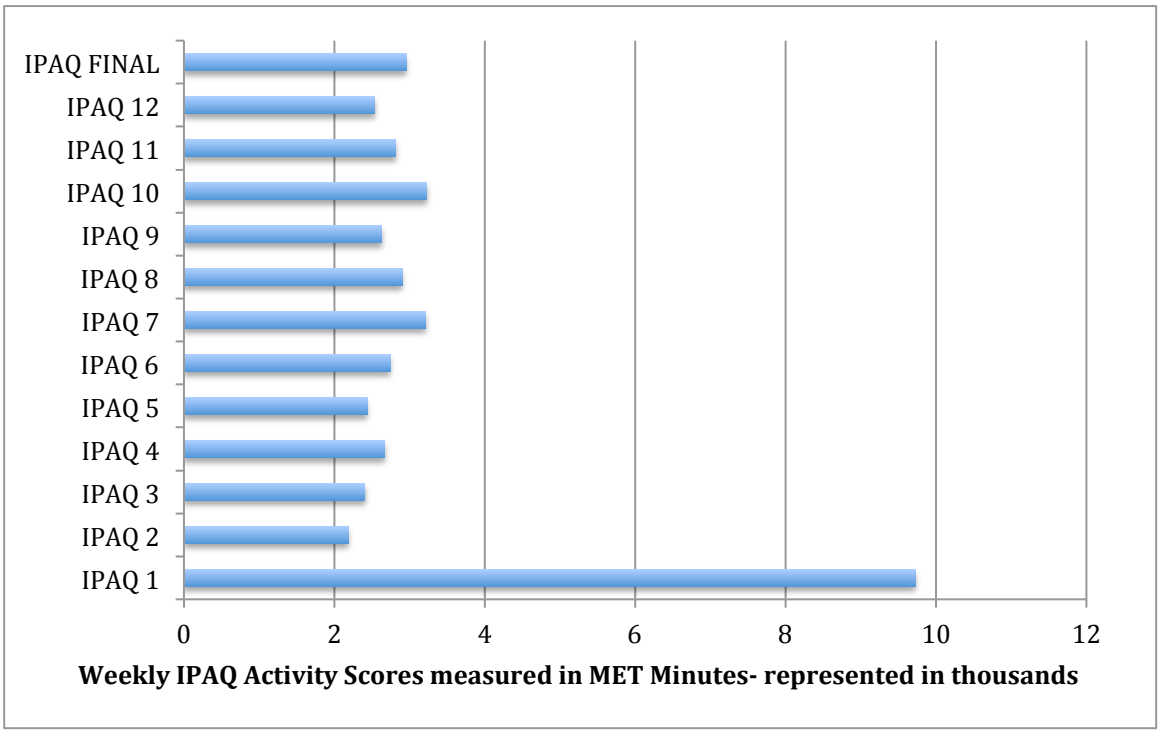

Figure 2. Fluctuations in participants' IPAQ-SF scores.

Even though the results demonstrated that activity levels decreased after the first week, the participants reported that they had positive experiences. Participant 18 stated that she had taken up cycling, and by the end of the intervention she had completed a 25km bike race that she felt she would not have been able to do at the beginning of the intervention. Participant 7 joined a walking club and by the end of the intervention she was walking on a nightly basis. In sum, the results indicated that coaching did not have a significant effect on participants' activity.

Chapter IV: Psychometric Results

This chapter presents the psychometric results from the current study. Specifically, results from participants' task self-efficacy, barrier-specific self-efficacy, and self-esteem scores are presented. These results are compared among three different time points, the baseline, mid-point and the end of the intervention to determine if there was a change in participants' scores by the end of the intervention.

Task Self-Efficacy

Task self-efficacy was measured using both the McAuley Exercise Self-Efficacy Scale (McAuley 1993) and the McAuley Barrier Specific Self-Efficacy Scale (McAuley 1992). The EXSE (McAuley, 1993) was used to determine participants' self-efficacy to exercise. When asked to rate their confidence in their ability to perform various intensities and durations of PA, participants' answers ranged from 0-100; where a score of zero represented no confidence and a score of 100 represented total confidence. Scores were then summed and a mean overall score for each of the three time periods was calculated. A repeated-measures ANOVA was used to determine if participants' scores had increased significantly as a result of the intervention. Mauchly's test indicated that sphericity had not been violated, $X^2 = 3.68$, $p = .16$. The results of the F-test show that coaching did not have a significant effect on the participants EXSE scores, [$F(2, 36) = 1.75$, $p = .18$]. The mean scores for the participants did increase slightly. The mean scores were 59.93 at baseline, 58.38 at midpoint of the intervention, and 68.03 at the final measurement. These results are presented in Table 6. *Post hoc* testing was not done as the results that were reported were not statistically significant.

Table 7

Descriptive Statistics for Participants' EXSE Scores Over The Study Duration (*n* = 19)

	Mean	SD	P -Value
EXSE Time 1	59.934211	20.71	
EXSE Time 2	58.383158	26.37	
EXSE Time 3	68.026316	24.78	0.18 (Not significant)

Barrier-Specific Exercise Self-Efficacy

The BARSE (McAuley, 1992) was used to determine if commonly cited PA barriers affected participants' self-efficacy to exercise. The participants were asked to rate their confidence in their ability to overcome barriers so that they could become more physically active. The scores were then summed and an overall mean was calculated for each of the three time periods. A repeated-measures ANOVA was used to determine if the intervention had a effect on participants' confidence to overcome barriers. Mauchly's test indicated that the assumption of sphericity had not been violated, $X^2 = 3.11$, $p = .21$. The results showed that the coaching intervention had an impact on the participants BARSE score, [$F(2, 36) = 3.26$, $p = .05$]. *Post hoc* testing did not reveal where a significant difference in BARSE scores existed based on time points, as provided in Appendix M. The mean average for baseline scores was 54.71, 59.21 for the midpoint score, and 65.7 for the final score. The mean averages and standard deviation are seen in Table 7.

Table 8

Descriptive Statistics for Participants' BARSE Scores Over The Study Duration (*n* = 19)

	Mean	SD	P-Value
BARSE Time 1	54.711989	13.80	
BARSE Time 2	59.210200	19.48	
BARSE Time 3	65.697526	20.62	< 0.05

Self-Esteem

Participants were asked to record their level of agreement to statements that were aimed at assessing their self-esteem. The RSES (Rosenberg, 1965) had 10 predetermined questions that addressed self-esteem. Participants recorded their answers on a 4-point Likert scale, and scores were allotted based on a reverse point system. For a detailed account of RSES scoring, please refer to the methods section. A repeated-measures ANOVA was used to determine if the intervention had an impact on participants' self-esteem. Mauchly's test revealed that the assumption of sphericity had not been violated, $X^2 = 5.73$, $p = 0.57$. The omnibus F-test determined that the intervention did have a significant effect on participants self-esteem levels, [$F(2, 36) = 8.11$, $p < .05$]. *Post hoc* testing showed that the RSES scores increased significantly between time point one and three ($p < .05$). *Post hoc* results are seen in Appendix M. Mean RSES scores were 19.0 at baseline, 21.6 at midpoint score, and 22.9 at participant's final score. RSES time point scores are presented in Table 8.

Table 9

Descriptive Statistics for Participants' RSES Scores Over The Study Duration (*n* = 19)

RSES Time	Mean	95% Confidence Interval		P-Value
		Lower Bound	Upper Bound	
1	19.000	16.705	21.295	
2	21.579	19.027	24.131	
3	22.895	20.776	25.013	<0.05

In sum, the results of the EXSE (McAuley, 1992), BARSE (McAuley, 1993), and RSES indicated that the intervention had an impact on participants' barrier-specific self-efficacy and self-esteem scores, and an increase in task self-efficacy although not a statistically significant one. Therefore, MI-via-CALC had an impact on increasing participants confidence in overcoming barriers that otherwise would have hindered PA participation, thereby concomitantly increasing participants' confidence in completing PA tasks.

Chapter V: Discussion

The main purpose of this study was to determine the effectiveness of an intervention using MI-via-CALC as a tool for increasing task self-efficacy and self-esteem. The parallel purpose was to determine if MI-via-CALC increased participation in PA and decreased BMI, hip, and waist circumferences.

A number of participants' task self-efficacy increased throughout the intervention. This result was not surprising to the researchers because these results were similar to those produced in a study conducted by Ayotte et al. (2010) and White et al. (2011). White et al. (2011) suggested that the higher a participant's self-efficacy, the more he/she would engage in PA. They found that as the participants' self-efficacy increased, they participated in more PA. The alliance formed between the coach and client might have resolved issues about a client's self-efficacy. Through coaching, it can be postulated that the client may come to understand how her lower self-efficacy might have prevented her previously from engaging in PA. A tenet of CALC is that coaches believe that all aspects of peoples' lives need to be addressed when coaching, because all aspects are interrelated. Therefore, coaches focus on coaching the whole person (Kimsey-House et al., 2011). CPCC coaches utilize a 'whole person' approach to coaching, and understand that all clients are intrinsically creative and resourceful. In this intervention the coaches might have helped their clients to clarify their thought processes and ultimately recognize that they were operating with low self-efficacy. Further studies need to be done to examine how self-efficacy levels can be maintained post-intervention, because previous research indicates that high self-efficacy correlates to long-term engagement in PA (White et al., 2011).

Trost et al. (2002) illustrated that women perceive a number of barriers that prevent them from engaging in PA. The feeling that one cannot overcome perceived barriers that prevent her

from being physically active is the marker of having low barrier-specific self-efficacy. Low barrier-specific self-efficacy has detrimental effects on PA engagement. When a participant has low barrier-specific self-efficacy, she is less likely to engage in PA (Trost et al., 2002). In the current study, participants' barrier-specific self-efficacy scores increased as a result of the intervention.

Since participants' scores on the BARSE increased, it can be suggested that these women became more adept at overcoming barriers that previously may have prevented them from being physically active. Coaching, as delivered though MI-via-CALC may have positively impacted participants' BARSE scores. Since these women may not have been adept at overcoming barriers at the onset of this intervention, and by the end of the study they had recorded that they were more confident in overcoming barriers; it can be postulated that coaching had a positive effect on participants' confidence levels at overcoming barriers.

In addition, previous research conducted by Gallagher et al. (2006) demonstrated that when women had higher task self-efficacy they were more confident in their ability to overcome all barriers that prevented their participation in PA. The combination of high task self-efficacy, and high barrier-specific self-efficacy resulted in more engagement in PA. As the current study demonstrates, the participants reported an increase in their confidence to overcome barriers, and reported a slight increase in their perceived ability to perform PA. It is evident that coaching was successful and evoked a transformation with participants' because there was a significant shift in participant's perceived abilities to overcome barriers, perform activities, and to become more physically active. Therefore, MI-via-CALC may have had an impact on increasing task self-efficacy, barrier-specific self-efficacy, and engagement in PA. These results are supported by

previous research conducted by Newnham-Kanas et al. (2011), where participant's self-efficacy scores increased significantly at the end of a CALC coaching intervention.

Even though barrier-specific self-efficacy increased throughout the intervention, the BARSE scale that was used to measure a participants' barrier-specific self-efficacy could be improved. The BARSE scale that was used in the current study encompassed 18 commonly cited barriers that prevent PA engagement. Although this list was comprehensive, it may have been too exhaustive. In a study conducted by Cramp and Bray (2011), the researchers only identified the top 5 barriers that mothers cited as barriers to PA. In future studies, it may be beneficial to modify the scale so that participants can truly gauge their confidence levels for overcoming barriers that affected them. This may garner more accurate scores if the BARSE were more tailored to the study sample.

Participants' self-esteem scores increased significantly throughout the intervention. These results are congruent with research conducted by Sonstroem and Morgan (1989) wherein the researchers concluded that as PA participation increases, a participant's feelings of competency and general self-esteem also increased. As participants increased their engagement in PA, they started feeling better about themselves, which, in turn, increased long-term engagement in PA. This is what this current intervention determined as well.

A probable reason that self-esteem levels increased can be attributed to the coaching that participants received. Previous research that utilized MI-via-CALC as a tool for behaviour change had also positively affected participants' self-esteem (Newnham-Kanas et al., 2008; Newnham-Kanas et al., 2011; Newnham-Kanas et al., 2011; Pearson et al., 2012; Pearson et al., 2013; van Zandvoort et al., 2008). Together with the findings from previous research, and the results from this current intervention, MI-via-CALC can be deemed to be an effective tool for

increasing self-esteem. From other studies, it has been determined that participants who have low self-esteem engaged in a lot of negative self-talk and negative thoughts about themselves (Brown, Ford, Burton, Marshall, & Dobson, 2005). It can be postulated that coaching can assist participants to shift their perspective about their negative thoughts and self-talk. For example, balance coaching, one of the three principles of CALC, is a technique where a coach works with the client to shift her perspective. When a participant suffers from low self-esteem, the coach can assist the client in confronting negative self-talk, also referred to as one's inner critic, so that she might shift to a perspective that results in more positive self-talk. With respect to this intervention, balance coaching can assist participants to tap into their inner resources and enhance their already existing skill-set so that ideally they can look at their negative talk in a different light. This is related to PA engagement because Bandura (1977) suggested that when people view their competency level as low, they may set less challenging goals to minimize the risk of failure. This can be applied to PA and self-esteem because a low feeling of competency can be ultimately a negative feeling about one's self. Coaching, as delivered by MI-via-CALC, could challenge the negative self-talk that may have previously prevented a participant from engaging in PA. When a participant engages in positive self-talk, she may develop increased feelings of competency that may allow her to set more challenging goals that may eventually enable her to engage in long-term PA. As the results from the current intervention indicated, participants' self-esteem scores increased significantly, thus demonstrating that MI-via-CALC can have a positive impact on participants' self-esteem.

One of the main objectives of the current study was to determine if an intervention using MI-via-CALC as a tool to facilitate behaviour change would increase a participants' engagement in PA. Taking weekly IPAQ-SF measures assessed engagement in PA. The results indicated that

participation decreased significantly after the baseline assessment. Although activity levels decreased by 7534.81 MET minutes between the participants baseline and first week time points, social desirability bias (van de Mortel, 2008) can be attributed to much of the inflated baseline scores. For example, one participant recalled that she was vigorously active for 4 hours a day, 5 days of the week. Although not impossible, this activity score may have been grossly overestimated and would have affected the results. Over time, the scores became much more reasonable and varied only slightly between weeks. This indicated that when participants became more knowledgeable about the intensity and duration of their activities they became much more adept at recording it accurately.

Additionally, the results indicated that PA engagement remained relatively constant throughout the intervention. Given that many of the participants had been struggling previously with PA engagement, the fluctuations in IPAQ-SF scores were expected. It is interesting to note that some participants engaged in PA while undergoing very life-changing events, thus signifying the potential for long-term success of using MI-via-CALC as a tool for behaviour change. For example, one participant left an abusive relationship between weeks two and three. She was living in a shelter and was struggling to overcome the emotional turbulence that she felt in her life. She mentioned that coaching allowed her to work through her stress and emotions. Notably, her engagement in PA did decrease slightly during this time period, although she managed to remain active throughout the study. By the end of the intervention, this participant felt better about herself and felt empowered to take her life into her own hands. This suggests how powerful and effective coaching can be for supporting clients, assisting them to focus on next steps, and concomitantly make healthy behavior changes.

Furthermore, one participant broke her wrist between weeks four and five. She had begun

cycling as her method of engagement in PA, and this injury was detrimental to her ability to cycle. Instead of giving up, this participant took up power walking while her wrist healed. This particular woman indicated that her coach helped her understand that her injury did not need to prevent her from being active. Rather than giving up, she shifted her perspective and focused to what she was able to do. Historically, she expressed that she would have given up rather than trying something different. This positive shift in behaviour signified that coaching helped this participant to overcome a stressful life-event. Providing support to the participant when shifting perspectives allowed the participant to focus on the present and not dwell on past behaviours and/or on the injury as an absolute barrier to PA. It is possible that these shifts in perspective might produce long-term engagement in PA because participants might learn to employ these techniques if and when they suffer any other setbacks to PA participation.

One future recommendation for assessing participants' activity levels is to use a different measurement tool. Although the IPAQ-SF is widely used and accepted as a valid and reliable scale, it may be beneficial to use something less ambiguous (Craig et al., 2003; Rosenberg et al., 2008). The IPAQ-SF was beneficial because it allowed participants to record a variety of different activities; however, the general nature of the questions may have led to ambiguity and therefore inaccurate recordings. During the study, some participants mentioned that they were not sure how to record certain activities as they felt as though some activities could fit into more than one answer. For example, one participant stated that she engaged in power walking as her method of PA. The problem existed when she went to record her activity for the week. Would power walking fall under the question that asked how long a participant engaged in moderate PA; or would it fall under the question that asked how long did a participant engage in walking at intervals of more than 10 minutes at a time? Both answers were technically correct, but can

cause confusion and potential inaccuracies in recording and concomitantly in interpreting results. If participants were given a list of activities to refer to, perhaps it would have allowed them to make better representations of their PA levels. Additionally, the long form of the IPAQ could have been used because it allowed for more comprehensive recordings of activity levels. Lastly, participants could have recalled their activity on a bi-weekly basis or at three different time-points rather than a weekly assessment. This might have allowed for more accurate representations, as participants may have been more meticulous about recalling their activities if they knew exactly under which category each of their activities fell under. Due to the ambiguity of reporting engagement in PA, it is not surprising that these results fluctuated throughout the study. Using a different measurement tool in future studies may eliminate some of these issues and concerns that the current study participants and researchers faced.

Although the focus of the current study centered on engagement in PA and psychosocial factors associated with the engagement in PA, weight, waist circumference, and hip circumferences and waist to hip ratio were also assessed as secondary outcome measures of the impact of MI-via-CALC. Weight remained constant or decreased among participants throughout this intervention. Sixteen participants achieved weight loss, while three participants' weight remained constant. This result was surprising and promising. As previous research has indicated, half of the adult female population is inactive (CFLRI, 2009). In addition, half of the adult female population is either overweight or obese (CFRLI 2009; Clark, 2012; Statistics Canada, 2011). The Heart and Stroke Foundation (2010) suggests that where someone carries their weight is just as important as how many pounds they have. One way to determine where fat stores are deposited on one's body is to calculate waist to hip ratio. Carrying excess weight in the waist area has been associated with high blood pressure, high cholesterol, type-2 diabetes, heart

disease and stroke (Heart and Stroke Foundation, 2010). So, applying any measure that impacts a participants likelihood of any weight reduction in the waist area may reduce chances of acquiring any of the aforementioned overweight-related conditions. In addition, the Heart and Stroke Foundation (2010) suggests that a waist circumference greater than 35 inches is correlated with an increased risk for overweight-related diseases. The participants in the current study started the intervention with a mean waist circumference of 35.11 inches, and finished the intervention with a waist circumference of 33.61. The data and findings presented indicate that participants went from a waist circumference that is defined as a risk factor for overweight-related diseases, to waist circumference that is defined as acceptable. These results are very positive in terms of utilizing an MI-via-CALC intervention as a cognitive behavioural tool for long-term engagement in PA and weight management for larger populations because the potential for positively impacting an important risk factor was so strongly evident in this current study.

One factor that could have affected weight loss is that this particular intervention took place during the spring and summer of 2014. A number of participants used this as a motivating factor because the nicer weather was conducive to a greater number of choices for PA. However, a number of women also reported that engaging in PA during the summer months was challenging. One woman expressed that she struggled with her activity levels and diet because she was exposed to more food and alcohol during barbeques and other events that typically occur more often during the summer season. Another woman reported that she struggled with achieving moderate engagement in PA while on vacation. Given that a number of women expressed a challenge in maintaining a proper diet and regular engagement in PA, it is very promising to see that weight remained constant or decreased. One participant recalled that she was upset about not achieving her daily five-kilometer walk. When she expressed this to her

coach, her coach helped her facilitate a shift in perspective and asked the client to focus on the present. She asked this participant to celebrate the fact that she had walked three kilometers. This particular participant shared that this perspective shift allowed her to focus on her present achievements, which helped her to continue on her path to healthy behaviour changes. Balance coaching, it was assumed, enabled this participant to celebrate this achievement, rather than focus on the goal (five-kilometers) that she did not achieve. The previous story demonstrated how coaching assisted this participant in keeping focused on the present and the positive changes that occurred, which, in turn, could have impacted her weight by enabling her to keep on her path to healthy behaviour change.

As previously mentioned, participants' waist and hip circumferences decreased throughout the current intervention. This was a promising finding as Statistics Canada (2011) noted that half of the female population is overweight or obese. This intervention demonstrated the potential success of a personalized cognitive behavioural intervention to reduce BMI, waist, and hip circumferences. This result is similar to previous research conducted by Pearson et al., (2012) and van Zandvoort et al. (2009), whereby the researchers concluded that personalized CALC interventions can produce significant reductions in BMI.

In this study it was interesting to see how participants' anthropometric measures changed after 12 weeks. One possible explanation for these results may have been that participants lost weight and inches because they initiated PA engagement. A number of participants mentioned at baseline that they had not been active in years. In fact, one participant stated that she had not been regularly active in over a decade. The initiation of regular PA can therefore produce very beneficial results for anthropometric measures. Even though regular engagement in PA potentially resulted in anthropometric losses, one limitation of this intervention was that self-

directed PA lacks standardization and is hard to measure or quantify results. By way of explanation, each participant was able to pick whatever PA best suited her individual needs and there was no prescriptive PA. In addition there was no prescriptive time requirement for PA; the researcher only outlined the Physical Activity Guideline recommended amount of PA to achieve long-term benefits (30 plus minutes of moderate to vigorous activity most days of the week) (CSEP, 2014). But this amount was suggested and not required. So, participants could have engaged in different frequencies and durations of PA, and that makes it difficult to interpret results. Ultimately, some participants may have committed to engaging in longer durations or higher intensities of PA. Because there was so much variation in type of PA, intensity of PA, frequency of PA, and duration of PA, the health outcomes and anthropometric changes for each participant resulted from very different experiences. The varied experiences among participants are therefore an interpretive limitation of the current study and need to be addressed for future research.

Conversely, the benefits of self-directed PA and variety in activity choices presented in this intervention might be perceived to be a very positive finding compared to the inconsistent results found in the IPAQ-SF scores. It was more important for the researcher that participants felt empowered to make healthy behavior choices than to have a prescriptive PA regimen to follow. These results were consistent with previous research conducted by Taxeira et al. (2002), where the researchers found that autonomous regulation of PA produced long-term engagement in PA, and sustained weight loss. Therefore, the self-directed nature of activity in the current study is promising for long-term engagement in PA.

Although not a finding *per se*, 10 out of the 21 participants who began the intervention were teachers. This amounted to 47.6% of the study population. Upon reviewing current

literature on teachers and PA, there was no research that demonstrated that teachers are more likely to be physically active, or that they had lower self-efficacy levels or lower self-esteem. A possible explanation for the higher percentage of teachers in the current study may be that these teachers may have an increased readiness to change. Currently, the Ontario Ministry of Education utilizes an initiative whereby all schoolteachers are encouraged to engage in 20 quality minutes of PA on a daily basis (QDPA; Ontario Ministry of Education, 2014). Given that teachers are responsible for initiating PA for school children, the benefits of personal engagement in PA may be more apparent, therefore making teachers more likely to seek out a PA intervention. Due to this, the researcher would like to investigate the link between teachers and PA in further detail in future studies.

Limitations and Future Implications

Several limitations were apparent in the current study. Exploring these limitations and outlining possible suggestions for future research must be considered. The first limitation of this study was the number of coaches that were used in the current study. Even though all coaches were CPCC coaches, and therefore very likely to coach in the same format, the researcher suggests that the more coaches that were used increased the likelihood of variability for coaching delivery. Even though every measure was taken to reduce the number of coaches and thus minimize the likelihood for variability, coaches were recruited on a volunteer basis and therefore it was unlikely that coaches would take on a large number of clients. Ideally, two or three coaches would have been optimal, but that meant that each coach would have been providing *pro bono* coaching sessions to seven participants. This was not feasible for coaches. In addition to any possible lack of consistency in coaching delivery, there was also a lack of consistency in terms of client participation. One of the benefits of MI-via-CALC delivery is that clients can

schedule coaching sessions when it is convenient for him/her. However, this proved to be a limitation in the current study. Participants were urged to make consecutive weekly phone calls, but this did not occur for 30% of the participants; these participants stated that their busy schedules compromised their ability to make regular phone calls. All participants completed 12 phone calls to their coach.

Another limitation with respect to scheduling and study participation was that some participants stated that their coaches had scheduling issues that prevented them from delivering regular coaching sessions. For example, one participant expressed that her coach was unable to make a phone call for three weeks. This lack of regularity in coaching delivery is a limitation to standardization of the intervention, and unfortunately resulted in issues with the timing of the study. Coaching schedules ultimately led to a number of participants finishing their intervention much later than others, even though all participants started at the same time. In fact, there was a six-week variation in end dates, where the first participants to finish were done at the end of July 2014, and the final participant was done at the end of August 2014. It is felt that this did not impact the study results as participants still expressed satisfaction with the coaching process, and still completed the requirements for the study. This served as a limitation in the current study because it impacted the overall rigor of the study. When recruiting participants for a 12- week intervention, participants would expect that the intervention would take 12 consecutive weeks. When scheduling conflicts arose and affected the end date for the intervention, the participants were asked to commit to more than the 12 consecutive weeks to which they had originally agreed. Although the participants expressed satisfaction with the coaching process itself, the issue of committing to a longer time period was not as positive to some participants. Additionally, when the study requirements were that participants needed to complete PA

measures in addition to weekly coaching sessions, and the coaching sessions did not occur on a weekly basis, confusion about when to report PA measures existed. For example, when a participant could not schedule a coaching session for two weeks, the dilemma was, should she report her activities for those two weeks despite not receiving coaching, or does she only report activities when she received coaching? It was decided that participants would record their weekly PA measures despite any coaching inconsistency so that there would be consecutive weekly recording for PA measures. This limitation is something that needs to be addressed for future research studies of the same nature. One suggestion for future research studies is that project coordinators be more stringent in selecting coaches that are able to commit to an uninterrupted timeline. Specifically, if a research study is 12 weeks in duration, the coaches would need to be able to commit to coaching for 12 weeks in a row. In addition, the Project Coordinator would have to set the same stringent timeline with the participants as well. Although results were not impacted between participants who finished in 12 weeks or those who finished later, 12 consecutive weeks might ensure more consistency in the number of weeks to complete the process, and produce a consistent start and end date.

Furthermore, with respect to the consistency of coaching delivery, a limitation of this study is the reliability of the coaching delivery itself. The Project Coordinator explained that each coach must only use his/her CPCC-certified coaching tools. This was done to ensure that all participants would receive a consistent MI-via-CALC intervention. However, each coaching session was confidential and so there was no reliable way to assess whether or not coaches adhered to the CPCC coaching process, even though it was assumed by the researcher that this was the case. Therefore, the Project Coordinator needed to rely on the trustworthiness of each coach. This limitation proves to be troublesome for future recommendations as well. Although

research studies strive for rigor, reliability and validity, the inherent nature of the coaching process is mostly undisclosed and unrevealed unless the participants discuss it. And yet, the confidentiality of coaching sessions is crucial for participant comfort. Participants may not trust the alliance between themselves and their coaches if they felt as though the conversations were being recorded and/or measured. While debriefing participants at the end of the intervention, it was obvious that most participants felt comfortable and trusted their coach. In relation to the study itself, participants' psychosocial measures improved throughout the intervention, and therefore it can be assumed that the coaching process and the concomitant coach/client relationship were effective and important.

The nature of the measures used in this study was also a limitation. Every psychosocial measure that was used in the current study, namely the EXSE (McAuley, 1993), BARSE (McAuley, 1992), and RSES (Rosenberg, 1965) were all subject to self-report methods. Therefore the researcher needed to trust that participants provided authentic and honest responses. Although there would be no reason to fabricate answers, other than to provide the socially desirable response, when using self-reported measures this is a risk that can occur. Ultimately this is a limitation of the current study and future research will need to examine the use of other potential measurement tools and/or take more stringent steps to solidify honesty demands for participants.

Although this is not a limitation to the current study, the participant demographics were very homogeneous. Despite 95% of participants being Caucasian, this fact does not affect the quality of the results obtained, but merely posits questions for future recruitment strategies. It would be interesting to focus more on diversifying the ethnicity of the population for future research. By diversifying the population, the researcher might be able to assess the impact of an

MI-via-CALC intervention for participants of varying ethnicities.

Additionally, a limitation for the current study is that it did not assess the long-term impact of this intervention for participants. Participants in this study struggled to achieve regular PA in their lives, and all succeeded in achieving some level of regular PA throughout this intervention. Understanding the long-term effects of an MI-via-CALC intervention for long-term engagement in PA is important for assessing the effectiveness of this type of intervention for behaviour change. Although the current study lacked any long-term measurement of participants' anthropometric and psychosocial changes, this was done for valid and practical reasons. Therefore, the researcher will be mindful to assess longer-term impacts of an intervention that utilizes MI-via-CALC as a tool for behaviour change.

In addition, 42.85% of the study population was between the ages of 46-50. Although this is not a limitation to the study design itself, future studies should try to diversify the participation with respect to participants' ages. It would be interesting to see how results vary with different segments of the female population. Also, future research needs to focus on identifying why only 9.52% of the study population was between 30-34 years of age. Examining why younger women of this age cohort did not express interest in a PA-focused study is imperative so that future studies can target these women more effectively. Previous research indicates that more than half of the female population is overweight or obese (Health Canada, 2011), and therefore it can be inferred that all women would benefit from this type of intervention; especially women in a younger age cohort. The researcher suggests that younger women would reap more benefits from long-term engagement in PA if they initiated regular participation in PA at a younger age, as they would have more years in their lives to establish a healthy lifestyle. The researcher posits that perhaps the younger women in this age cohort did not possess the readiness to change that

would be needed to be involved in this intervention (Prochaska & DiClemente, 1983). Also, perhaps younger women did not have the time to commit to such a research study. Both readiness to change, and time to commit to engagement in PA for younger women are issues that would benefit from further research. Future research should examine long-term participation in PA for all age ranges with MI-via-CALC as an intervention. Examining long-term participation will help to assess the effectiveness of MI-via-CALC as an intervention that results in long-term behaviour change.

As with all scientific research, it is important to review the study design and make recommendations for future studies. One example of changes that can be made for future research is to enlarge the scope for participation in order to be able to garner generalizable results and conclusions. The current study produced promising results for the 19 participants that completed the intervention. However, 19 participants is not representative of the entire age-cohort that was studied. Because the intention of a pilot study is to address the feasibility for future studies, the current study demonstrated the potential for future studies on a larger scale and with great rigor. The researcher hypothesizes that studies involving more participants would be successful in increasing task self-efficacy, barrier-specific self-efficacy, self-esteem, and PA in addition to achieving positive changes to BMI, waist, and hip circumferences.

Lastly, the evidence-based results of this study provide a solid framework to integrate MI-via-CALC in a health promotion framework. Many participants expressed that they would have continued their coaching on a permanent basis. However, coaching can be costly and therefore unattainable for some participants. In addition, MI-via-CALC is not covered under any public or private insurance plan. So, the cost of each session is solely the responsibility of the client. This proves to be a problem and a deterrent for many individuals. If private health

insurance companies started compensating costs for MI-via-CALC, more people could benefit from utilizing this as a tool for health behaviour change. Future studies should be conducted in an attempt to further solidify the effectiveness and viability of MI-via-CALC as a health behaviour tool. Ultimately, the more evidence-based research that can be presented to demonstrate the effectiveness of MI-via-CALC as a health behaviour tool, the more likely it is that people will seek out MI-via-CALC or comparable coaching or MI to assist them with healthy behaviour changes.

Conclusions

The current study proved to be promising in terms of the statistically significant results for two of the quantitative measures (the BARSE and the RSES) and the positive findings from the remaining quantitative measures (EXSE Scale and IPAQ-SF) demonstrates the beneficial nature of an MI-via-CALC intervention for women who seek a more physically active lifestyle. The findings from this study established a basis to suggest that an MI-via-CALC intervention can have a positive impact on women's task self-efficacy, barrier-specific self-efficacy, self-esteem, and engagement in PA, in addition to having a positive impact on women's BMI, waist, and hip circumferences.

In the future, research should be employed on a larger scale, with a broader scope of participants with varied age-cohorts, and longer-term research studies, in order to provide more conclusive evidence to support the utility of MI-via-CALC for women struggling to integrate regular participation of PA in their lives. Ideally, the evidence-based results and recommendations from this study should be used to integrate MI-via-CALC in a health promotion framework. A health promotion framework is based on three mechanisms – self-care, mutual aid, and healthy environments (Health Canada, 2004). MI-via-CALC can serve as a

mechanism that allows women to employ self-care strategies that are congruent with the health promotion framework. In addition, mutual aid is when people attempt to deal with their health concerns by working together, often referred to as social supports (Health Canada, 2014). MI-via-CALC should be seen as mutual aid that should be accessible to all Canadians. Women should be able to access coaching as part of their health insurance plans, so that all women can adopt practices that will preserve their health.

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Appendix A – Email Script For Recruitment of Coaches

Email Script for Recruitment

Subject Line: Coaching For Women seeking a more physically active lifestyle study! Invitation to participate in research

Dear Coach,

You are being invited to participate in a study that we, Andrea MacDonald and Dr. Don Morrow from Western University, are conducting. Briefly, the study involves working over-the-phone with clients that are women from the London area, who are seeking a more physically active lifestyle. You will work with a client for up to 12 one-on-one coaching sessions. The coaching sessions will occur at a time that is mutually convenient for you and your client. I will have 20 participants in total, meaning I will need coaches to work with 5-10 students. I will need coaches as of late September to early October and will need a commitment for the entire duration of the 12-week study.

Unfortunately, I will not be able to provide any compensation to the coaches, so you would be taking on clients as pro-bono cases.

There are several benefits to coaching for this study, including the participants may decide to continue on with coaching after the study which would then become between you and the participant. Additionally, participants may further your name to friends and family, thus expanding your client base.

My involvement in the coaching is limited to 1) I would require notification if a participant misses a coaching session. Other than that I have no involvement in the coaching sessions.

If you are currently a Certified Professional Co-Active Coach (CPCC) and would like the opportunity to volunteer your services, then the researchers would be interested in your participation. As a participant you will have several check-in phone calls with the researcher, and will complete an interview with the researchers once the study is over – in person or over-the-phone – in order to provide insight and feedback regarding the effects of the coaching sessions in relation to stress.

I am looking for the fewest number of coaches possible to coach the 20 participants. If you would like more information on this study or would like to receive a letter of information about this study please contact the researcher at the contact information given below.

Thank you very much for your consideration.

--

Andrea MacDonald
BPHE, BEd
MSc student, Health & Rehabilitation Sciences - Health Promotion
Western University
London, Ontario, Canada
email
--****

Appendix B – Participant Recruitment Flyer

Western

Are you a woman who wants to be more physically active?

Do you want a coach to help you along your way?

Dr. Don Morrow, in the Faculty of Health Sciences at Western University, is seeking participants for a life coaching and physical activity study for women between the ages of 30-55. Full-time, English-speaking women between the ages of 30-55, who are seeking a more physically active lifestyle are eligible to take part in this study.

If you meet the criteria, please contact Andrea MacDonald at **email**

Appendix C – Email Script For Participants

Email Script for Recruitment

Subject Line: Physical activity for working mom study! Invitation to participate in research

You are being invited to participate in a study that we, Andrea MacDonald and Dr. Don Morrow, are conducting. Briefly, the study involves working over-the-phone with a certified professional Co-Active Life Coach (CPCC) for up to 12 one-on-one coaching sessions. The coaching sessions will occur at a time that is mutually convenient for you and your coach. The study will last for 12 weeks. If you are currently seeking a more physically active lifestyle; and would like the opportunity to work with a coach, then the researchers would be interested in your participation. As a participant you will complete several questionnaires in addition to the coaching sessions. If you would like more information on this study or would like to receive a letter of information about this study please contact the researcher at the contact information given below.

Thank you very much for your consideration.

--
Andrea MacDonald
BPHE, BEd
MSc Candidate, Health & Rehabilitation Sciences - Health Promotion
Western University
London, Ontario, Canada
email

Appendix D – Letter of Information – Paper And Online Version

Project Title: Motivational Interviewing via Co-Active Life Coaching Intervention for women seeking a more physically active lifestyle

Principal Investigator:
Dr. Don Morrow, Health and Rehabilitation Sciences, Western University
Co-investigator:
Andrea MacDonald, Health and Rehabilitation Sciences MSc Candidate (Health Promotion)

Letter of Information

1. **Invitation to Participate**

   You are invited to participate in a research study that is looking at the effects of Motivational Interviewing via co-Active life coaching on increasing physical activity specific self-efficacy and self-esteem for women. You are a woman who wants to increase your physical activity. Motivational Interviewing via Co-Active Life Coaching is a well-researched approach to health related issues. This approach uses a combination of Motivational Interviewing and Co-Active Life Coaching. Coaching is when a trained person helps you through a problem or issue in your life that is bothering you. In this study, we will be looking at the participants desire to increase their physical activity, which means any bodily movement that is meant to improve health and wellness.

   Purpose of the Letter
   The purpose of this letter is to provide you with the information that is necessary for you to make an informed decision about participating in our research study.

2. **Purpose of this Study**

   The primary purpose of this one-group, pre-post design pilot study is to look at the impact of an Motivational Interviewing-via-Co-Active Life Coaching (MI-via-CALC) study on self-esteem and physical activity (PA)-specific self-efficacy levels with women. It is thought that through using an MI-via-CALC approach on a population that usually has low rates of physical activity, women may increase their self-esteem and self-efficacy and also gain the skills they need to start a more physically active lifestyle.

3. **Inclusion Criteria**

Individuals who are aged 30-55; must not meet Health Canada's recommendation of 150+ minutes of moderate to vigorous physical activity per week; are not currently in another physical activity intervention; do not have any health concerns that would preclude them from participating in physical activity; English-speaking, and are ones who have access to the internet are eligible to participate in this study.

4. Exclusion Criteria

Individuals who are under 30 and over 55 years of age, who do not speak English as their first language, who have health concerns that would exclude them from participating in physical activity; who are participating in another research study and who do not have access to the internet are not eligible to participate in this study.

5. Study Procedures

If you agree to participate in this study, you will be asked to complete a number of questionnaire and are asked to take part in 12 Motivational Interviewing via Co-Active Life Coaching sessions. The questionnaires that you will be asked to complete are the Physical Activity Readiness Questionnaire (PAR-Q), to make sure that you are able to participate in physical activity, plus the McAuley Exercise Self-Efficacy Scale (EXSE), the McAuley Barrier-Specific Self-Efficacy scale (BARSE), the international physical activity (IPAQ) and the Rosenberg Self-Esteem scare (RSES) at the beginning, middle, and end of the study and at a 3 month follow up. It is thought that the entire task will take 20-30 minutes, and you will be asked to do these 4 times over the 12 week study. The questionnaires will be done online, through a program called Survey Monkey©.
In addition, you will be asked to take part in 12, weekly coaching sessions that will be around 30-35 minutes long. These will take place in the participant's house over the phone with a certified co-Active life coach. Twenty participants will be included in this study.

6. Possible Risks and Harms

The risks of participating in this study are that you may talk about emotional and psychological issues that you may not have been ready to talk about. If you need to talk to someone after, the researchers will give you names of counselors in the London area.

7. Possible Benefits

The possible benefits from participating in this study are that you may increase your physical activity levels, your physical activity-specific self-efficacy and self-esteem may increase, and you may feel like your overall well-being increased.

8. Compensation

You will not receive money or gifts for being in this research.

9. Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or simply withdraw from the study at any time without consequences.

10. Confidentiality

All information obtained and data collected will remain confidential and only the researchers can see it. If the results of this study are published, you name will not be printed with it. If you choose to leave the study, your information will be taken out and destroyed from our database. While we will do our best to protect your information there is no guarantee that we will be able to do so. Representatives of the Western University Health Sciences Research Ethics Board may contact you or need access to your study-related records to monitor the conduct of the research.

11. Contacts for Further Information

If you require any further information regarding this research project or your participation in the study you may contact Andrea MacDonald, xxx-xxx-xxxx, **email**, or Dr. Don Morrow, **email**

If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Research Ethics (519) 661-3036, email: **email**.

12. Publication

If the results of the study are published, your name will not be used. If you would like to receive a copy of any potential study results, please contact Andrea MacDonald, **email**

13. Consent

Your signature on the written consent form that follows this letter will give us your consent to participate in this study.

This letter is yours to keep for future reference.

Appendix E – Demographic Questionnaire For Participants

Demographic Information

Name: _____
Age: _____
Contact Information: _____
Race: _____
Income level: _____
Highest level of education completed: _____
Occupation: _____
Marital status: _____
ID for survey monkey: _____

Weight (lbs): _____
Height (inches): _____
Hip circumferences (inches): _____
Waist circumference (inches): _____

Coach: _____
Phone number: _____
e-mail: _____

Appendix F – University of Western Ontario Health Sciences Research Ethics Board of Approval

Western Research

Research Ethics

Western University Health Science Research Ethics Board
HSREB Amendment Approval Notice

Principal Investigator: Dr. Donald Morrow
Department & Institution: Health Sciences\Kinesiology,Western University

HSREB File Number: 104354
Study Title: Motivational Interviewing via Co-Active Life Coaching Intervention for women seeking a more physically active lifestyle
Sponsor:

HSREB Amendment Approval Date: October 01, 2014
HSREB Expiry Date: August 31, 2014

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Revised Study End Date	We are looking to extend the end date of the study to August 30, 2014. Approval has been granted for May 1, 2014 to August 31, 2014.	2014/10/01

The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the amendment to the above named study, as of the HSREB Amendment Approval Date noted above.

HSREB approval for this study remains valid until the HSREB Expiry Date noted above, conditional to timely submission and acceptance of HSREB Continuing Ethics Review. If an Updated Approval Notice is required prior to the HSREB Expiry Date, the Principal Investigator is responsible for completing and submitting an HSREB Updated Approval Form in a timely fashion.

The Western University HSREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use Guideline for Good Clinical Practice Practices (ICH E6 R1), the Ontario Personal Health Information Protection Act (PHIPA, 2004), Part 4 of the Natural Health Product Regulations, Health Canada Medical Device Regulations and Part C, Division 5, of the Food and Drug Regulations of Health Canada.

Members of the HSREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Appendix G – Consent Form – Paper And Online Version

Consent Form

Project Title: Motivational Interviewing via Co-Active life coaching for women seeking a more physically active lifestyle

Study Investigator's Name:

Primary Investigator: Dr. Don Morrow

Co-Investigator: Andrea MacDonald

I have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Participant's Name (please print):_____

Participant's Signature: _____

Date: _____

RESEARCHERS NAME (PLEASE PRINT): _____

RESEARCHERS SIGNATURE: _____

DATE: _____

Appendix H – Physical Activity Readiness Questionnaire (PAR-Q) For Participants – Paper Version

PAR-Q

PAR Q

1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?

   [ ] Yes [ ]No

2. Do you feel pain in your chest when you do physical activity?

   [ ] Yes [ ]No

3. In the past month, have you had chest pain when you were not doing physical activity?

   [ ] Yes [ ]No

4. Do you lose your balance because of dizziness or do you ever lose consciousness?

   [ ] Yes [ ]No

5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?

   [ ] Yes [ ]No

6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?

   [ ] Yes [ ]No

7. Do you know of any other reason why you should not do physical activity?

   [ ] Yes [ ]No

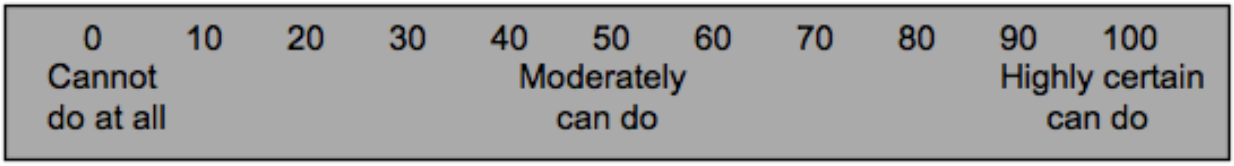
Note. If a participant answers YES to any one of the questions above they will need to talk with their doctor by phone or in person BEFORE becoming much more physically active.

Appendix I – McAuley Exercise Self-Efficacy Scale – Paper Version

EXERCISE SELF-EFFICACY

Please rate how certain you are that you can exercise at the levels described below over the next **4 weeks**. The word "confident" refers to the belief that you have in yourself that you can do something well.

Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:



*We would like to know how confident you are in your ability to participate in **moderate** and **vigorous** exercise over the next **4 weeks**.*

At a **moderate** intensity, you're working hard enough to raise your heart rate and break a sweat. One way to tell if you're working at a moderate intensity is if you can still talk but you can't sing the words to a song. Examples of MODERATE exercise include brisk walking/jogging, swimming, and cycling.

When engaged in **vigorous** activities (e.g., running), you're breathing hard and fast, and your heart rate has gone up quite a bit. If you're working at this level, you won't be able to say more than a few words without pausing for a breath. Examples of VIGOROUS exercise include running, spinning class, and swimming laps moderately fast to fast.

Over the next 4 weeks, I am confident that I can complete…	**Confidence** (0 - 100%)
at least **30 minutes** of moderate exercise **ONCE** a week?	
at least **30 minutes** of moderate exercise **TWICE** a week?	
at least **30 minutes** of moderate exercise **THREE** times a week?	
at least **30 minutes** of moderate exercise **FOUR** times a week?	
at least **30 minutes** of moderate exercise **FIVE** times a week?	
30 minutes of exercise at a **moderate** intensity **3 times** per week	
45 minutes of exercise at a **moderate** intensity **3 times** per week	

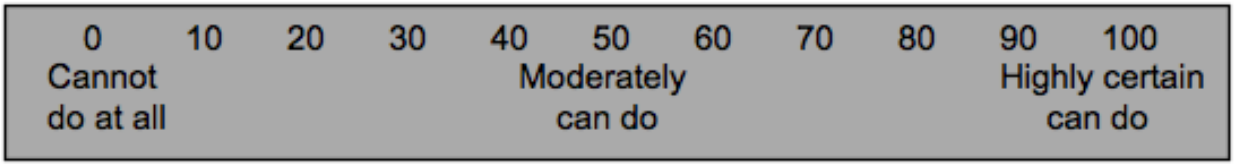
Over the next 4 weeks, I am confident that I can complete…	**Confidence** (0 - 100%)
60 minutes of exercise at a **moderate** intensity **3 times** per week	

Appendix J – McAuley Barrier-Specific Self-Efficacy Scale – Paper Version

OVERCOMING OBSTACLES

A number of situations are described below that can make it hard to stick to an exercise routine. Please rate how confident you are that you can get yourself to follow your prescribed exercise program under each of the following conditions.

Rate your degree of confidence by recording a number from 0 to 100 *using the scale given below:*



Over the next 4 weeks, I am confident that I can exercise…	**Confidence** (0 - 100%)
When I am feeling tired	
During or after experiencing personal problems	
When I am feeling depressed	
When I am feeling anxious or stressed	
During bad weather	
When I am sore from the last time I exercised	
When on vacation	
When there are competing interests (like my favorite TV show)	
When I have a lot of work to do	
When I haven't reached my exercise goals	
When I don’t receive support from family or friends	
After recovering from an illness that caused me to stop exercising	
When I do not have someone to exercise with	
After a vacation	
When I did not get enough sleep the night before	

Over the next 4 weeks, I am confident that I can exercise…	**Confidence** (0 - 100%)
When my schedule is hectic	
When I am not motivated to exercise	
When my child(ren) are fussy	
When my child(ren) are sick	
When I do not have childcare	
When my exercise program is not enjoyable	

Have you encountered any other obstacles to exercising?

Yes _____ No _____

If you responded "Yes", please list up to 5 other obstacles that you have encountered. Beside each obstacle, indicate how confident you are that you can exercise (0 - 100%) when you come across this obstacle over the next **6 weeks**.

Appendix K – International Physical Activity Questionnaire Short-Form – Paper Version

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

   _____ **days per week**

   ☐ No vigorous physical activities → ***Skip to question 3***

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

   _____ **hours per day**

   _____ **minutes per day**

   ☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

   _____ **days per week**

   ☐

No moderate physical activities → ***Skip to question 5***

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

☐ No walking → ***Skip to question 7***

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ minutes per day

☐ Don’t know/Not sure

Appendix L – Rosenberg Self-Esteem Scale – Paper Version

ROSENBERG SELF-ESTEEM SCALE

The scale is a 10-item Likert scale with items answered on a four point scale--from strongly agree to strongly disagree. The original sample for which the scale was developed consisted of over 5,000 High School Juniors and Seniors from 10 randomly selected schools in New York State.

Instructions: Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle ***SA***; if you agree with the statement, circle ***A***; if you disagree, circle ***D***; and, if you strongly disagree, circle ***SD.***

1. On the whole, I am satisfied with myself.	***SA***	***A***	***D***	***SD***
2.* At times, I think I am no good at all.	***SA***	***A***	***D***	***SD***
3. I feel that I have a number of good qualities	***SA***	***A***	***D***	***SD***
4. I am able to do things as well as most other people	***SA***	***A***	***D***	***SD***
5.* I feel I do not have much to be proud of	***SA***	***A***	***D***	***SD***
6.* I certainly feel useless at times	***SA***	***A***	***D***	***SD***
7. I feel that I'm a person of worth, at least equal to others	***SA***	***A***	***D***	***SD***
8.* I wish I could have more respect for myself	***SA***	***A***	***D***	***SD***
9.* All in all, I am inclined to feel that I'm a failure	***SA***	***A***	***D***	***SD***
10. I take a positive attitude toward myself	***SA***	***A***	***D***	***SD***

Scoring:

1. For questions 1, 3, 4, 7, and 10 score SA=3, A=2, D=1, and SD=0
   Your Total_____

2. For questions 2, 5, 6, 8, and 9 score SA=0, A=1, D=2, and SD=3
   Your Total_____

Grand Total_____

Appendix M – Barrier-Specific Exercise Self-Efficacy Scale & Rosenberg Self-Esteem Scale – Descriptive Statistics

(I) BARSE Time	(J) BARSE Time	Mean Difference (I-J)	Std. Error	Sig.a	95% Confidence Interval for Differences	
					Lower Bound	Upper Bound
1	2	-4.498	4.419	.967	-16.161	7.165
	3	-10.986	4.983	.122	-24.137	2.166
2	1	4.498	4.419	.967	-7.165	16.161
	3	-6.487	3.418	.221	-15.507	2.532
3	1	10.986	4.983	.122	-2.166	24.137
	2	6.487	3.418	.221	-2.532	15.507

(I) RSES Time	(J) RSES Time	Mean Difference (I-J)	Std. Error	Sig.b	95% Confidence Interval for Differences	
					Lower Bound	Upper Bound
1	2	-2.579	1.205	.139	-5.759	.601
	3	-3.895	.939	.002	-6.374	-1.416
2	1	2.579	1.205	.139	-.601	5.759
	3	-1.316	.753	.293	-3.304	.672
3	1	3.895*	.939	.002	1.416	6.374
	2	1.316	.753	.293	-.672	3.304

Curriculum Vitae

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Post-secondary Education and Degrees	University of Toronto Toronto, Ontario, Canada 2000-2005 BPHE Ontario Institute For Studies in Education Toronto, Ontario, Canada 2005-2006, BEd The University of Western Ontario London, Ontario, Canada 2012-2014 MSc
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Presentations	**Goddard, A.,** Slade, S., & Zendo, S. (October, 2012). *Narrative Inquiry.* Qualitative Research Methods Course, The University of Western Ontario, London, Ontario, Canada. **Goddard, A**., Bhatti, N., & Martinyiuk, O. (November, 2012). *eHealth: Obesity and Child Development.* Current Topics in Health Promotion Course, The University of Western Ontario, London, Ontario, Canada. **Goddard, A.** (February, 2013*). An MI-via-CALC Intervention to increase self-efficacy and self-esteem for women suffering with depression.* Current Topics in Child and Youth Health Course, The University of Western Ontario, London, Ontario, Canada.