USING THE TRANSTHEORETICAL MODEL TO GUIDE ADULTS WITH TYPE 2 DIABETES AS THEY CHANGE THEIR BEHAVIOR TO ADOPT AND ADHERE TO A MORE ACTIVE LIFESTYLE

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Education
Department of Curriculum, Learning and Teaching
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ABSTRACT

Physical activity or exercise is recognized and recommended as part of the treatment protocol for persons with Type 2 diabetes in diabetes education programs. Unfortunately, participants in these programs seldom receive adequate direction or strategies necessary to develop a commitment to regular activity and thus, are subject to high relapse and attrition rates. As a result, the quality of life they might enjoy is sacrificed.

Therefore, the purpose for conducting this qualitative study was to design, implement and examine the impact of a strategy oriented education intervention on adults with Type 2 diabetes using the transtheoretical model of behavior change in conjunction with the empowerment ideology and Pratt’s relational construct of andragogy. Based on this premise, the specific intent of the intervention was to guide adults with Type 2 diabetes from preparation into the action stage of behavior change to incorporate physical activity into their lifestyle using a pedometer for feedback as part of their diabetes self-management routine.

The contemporary research paradigm using a case study approach was used to frame the examination of the strategy oriented education intervention and its effects on the behavior change process of adults with Type 2 diabetes. From a methodological viewpoint, this approach proved to be instrumental in allowing me as the practitioner researcher to: 1)
explore in great detail each experience, including my own, individually and collectively; 2) develop a comprehensive understanding of the behavior change process and the impact of teaching and empowering adults as adult learners; and 3) the effect a change in physical activity might have on the perception of quality of life, well-being, and/or health status of those with Type 2 diabetes.

The evolution of a behavior change/health promotion using andragogy in relation model guided me in this study to help four individuals with Type 2 diabetes improve their activity level an average of 2127 steps per day as well as improve a number of their health related measures. Concurrently, the same individuals reported a positive change in their quality of life; thus, suggesting the inclusion of physical activity in their daily routine had a positive impact and was a welcome addition to their diabetes self-management strategies.
ACKNOWLEDGEMENTS

Accomplishing my Doctor of Education has been quite a journey. Amidst the four years completing my course work and thesis requirements, I’ve had two beautiful Valentine babies, worked full-time, tried to find time for myself, tried to find time to spend with my husband, taken up hockey, experienced Greece, enjoyed the company of other OISE students, celebrated the completion of my comprehensives, mourned the loss of Pat, welcomed the new millennium with the Hip in concert, purchased a new home complete with apple orchard and stream, and basked in the glory of my thirty-fifth birthday over nachos and beer. I’m exhausted but very satisfied.

“My boys”—Steve, Kellen and Tanner—were gracious enough to give me the space I needed to finish my journey. I love them for that. They also taught me patience, diligence and kept me balanced. When I needed a lift their smiles rejuvenated me and strengthened my spirit. Thanks for your love and support! My appreciation is also gratefully extended to family and friends, particularly my mom who offered her resources generously.

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To my thesis committee I would like to acknowledge the guidance, support and counsel you offered to me. Collectively, you challenged and inspired me to attain a higher level of academic excellence. I believe the results of my doctoral work speak to your steadfastness.

And finally, thanks to Fanshawe College for recognizing the merits of my research with a College Council Research and Development grant and the Canadian Diabetes Association for honoring the outcomes of my research with the Diabetes Educator Section Educational Resource Grant Award.

In quietness and in confidence, was my strength.
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CHAPTER ONE: INTRODUCTION TO THE STUDY

Purpose of the study:

As part of the treatment protocol, adults with Type 2 diabetes are typically directed by medical professionals and diabetes educators to manage their disease using a combination of diet, medication and physical activity. Information provided on diet and medication in diabetes education programs is usually abundant; however, 75% of the time adults with Type 2 diabetes do not receive the direction or detail required to initiate, adopt or adhere to a lifestyle that incorporates physical activity.

Research studies conducted to probe these findings are typically outcome focussed and assessed quantitatively (Glasgow and Osteen, 1992; McLeod, 1998). Little information is known about the actual practices of the researched, how they interact with their environment, or why some persons with Type 2 diabetes are able to overcome perceived barriers to exercise or recover from relapse while others are not. Current research suggests more emphasis be placed on outcomes that reflect issues of health status, well-being and quality of life in relation to diabetes self-management practices to learn more about how people change, to better understand diabetes education program results and provide more concrete evidence-based guidelines for future diabetes education interventions (Campbell, Redman, Moffitt, and Sanson-Sidher, 1996; McLeod, 1998).

Diabetes education programs are also hindered by educators/health promoters who too often deliver the materials pedagogically thus removing the adults with Type 2 diabetes from the process of learning and diminishing their sense of ownership for that learning.
Consequently, a cycle of dependency is established; whereby, it becomes “easier to be
looked after than to suffer the pain of becoming independent” (Raeburn and Rootman, 1998,
p. 66). If this pattern is to be broken, individuals with Type 2 diabetes must be empowered
to have “more consistent, reliable access to the decision-making processes and the skills and
knowledge essential to effect change” (World Health Organization [WHO], 1999, p. 4).

One avenue to pursue this directive is through better health promotion which is
increasingly being touted as the essential element for improved health development (WHO,
1999). Herrick, Stone and Mettler (1997) define health promotion as “an art and a science
directed at improving lifestyles that foster optimal health, balanced across the physical,
social, emotional, spiritual and intellectual dimensions of life” (p. 49). Others view health
promotion as “a process of enabling people to increase control over, and to improve, their
health” (WHO, 1999, p. 4). It is “something carried out by and with the people, not on or to
people” while improving “the ability of individuals to take action” (WHO, 1999, p. 6).
Health promotion encompasses the individual, organizations, the community and the
environment at all levels of governance.

Raeburn and Rootman (1998) use the concept of health promotion interchangeably
with an “empowerment ideology” housed within a people-centered health promotion
framework. Simply put, they place people at the forefront and posture the empowerment
ideology around personal control and self-determination of health and health related issues
(Raeburn and Rootman, 1998). It focuses on the individual yet has the potential to shape the
masses, is incremental, progressive, and multifaceted. Raeburn and Rootman contend it is an
ideology that takes a bottom up approach “that starts with people and works backwards to tell
officials what social policies and programs are necessary” (Raeburn and Rootman, 1998, p. 69). Implementation of it recognizes

that in those cases where new competencies need to be learned, they are best learned in a context of living life rather than in artificial programs, where everyone, including the person learning, knows that it is really the expert who is in charge. (Raeburn and Rootman, 1998, p. 69)

Because of these characteristics, the empowerment ideology was incorporated in this study to compliment Pratt’s construct of andragogy and the transtheoretical model of behavior change utilized in the design of this behavior change intervention. Pratt’s construct accepts adult learners’ self-directedness and its obverse—dependency—to embrace both andragogical and pedagogical approaches for effective instructor-learner relationships. While the transtheoretical model is a dynamic model of intentional behavior change consistent with aspects of many learning and social/cognitive theories of behavior change in which change is viewed as a process (Armstrong, Sallis, Hovell, and Hofstetter, 1993).

And so, my purpose for conducting this qualitative study was to design, implement and examine the impact of a strategy oriented education intervention on adults with Type 2 diabetes using the transtheoretical model of behavior change in conjunction with the empowerment ideology and Pratt’s relational construct of andragogy. Based on this premise, the specific intent of the intervention was to guide adults with Type 2 diabetes from preparation into the action stage of behavior change to incorporate physical activity into their lifestyle as part of their diabetes self-management routine. Participation in a pilot study (1998) prompted me to design the study in this way to: 1) more effectively explore individual experiences; 2) develop a comprehensive understanding of the behavior change process and the impact of teaching adults as adult learners; and 3) the effect a change in physical activity might have on the perception of quality of life, well-being, and/or health
status of those with Type 2 diabetes. To achieve these goals, I elected to use a case study approach. I also made a conscious decision to ensure the research process was participant friendly, community based and collaborative to facilitate integration and implementation of future strategy oriented education interventions.

Introduction and background to the problem:

Exercise is widely recognized and prescribed as a critical component in the management of Type 2 diabetes (Meltzer et al., 1998; Tsiani and Giacca, 1998; American Diabetes Association [ADA], 1998; Wallberg-Henriksson, 1992; Blair, Kohl, Gordon, and Paffenbarger cited in Armstrong et al., 1993). The benefits of exercise include decreased risk of cardiovascular disease, healthy lipoprotein profiles, decreased body fat, increased insulin sensitivity, improved cardiovascular fitness and well-being and decreased blood pressure (Meltzer et al., 1998). In addition, exercise is associated with decreased anxiety, improved mood, improved self-esteem and enhanced quality of life (Swift, Armstrong, Beerman, Campbell, and Pond-Smith, 1995) and may also improve glycemic control and reduce the need for medications in people with Type 2 diabetes (Meltzer et al., 1998).

However, only 25% of those with Type 2 diabetes reported receiving specific guidelines for exercise adherence—typified by a prescriptive (frequency, intensity, and duration) “one program fits all” approach (Krug, Haire-Joshu, and Heady, 1991; Berkowitz, 1998; Glasgow et al., 1989). Armstrong et al. (1993) affirm in their study how “counterproductive it is to consider individuals who do not engage in vigorous exercise as a homogeneous group in both research and clinical interventions” (p. 400). The diabetic population also reported that little, if any information regarding self-management behavior change strategies to increase exercise compliance was provided as well. The consequences
of this void resulted “in a greater number of failed attempts to exercise, increased guilt, and
increased barriers to resuming exercise” (Krug et al., 1991, p. 187). Pham, Fortin, and
Thibaudeau (1996) concur with these findings. In their study the results showed the mean
(60%) for adherence to exercise as being significantly lower than the mean for adherence to
the medical aspects of treatment (98% for medication; 83% for diet) for Type 2 diabetics.
Furthermore, exercise was not necessarily perceived as being necessary for controlling Type
2 diabetes; it was more often considered only a leisure activity. Lack of information and
follow-up were cited as partial explanations for the participants’ difficulty in following their
prescribed exercise regimens (Pham et al., 1996) while others suggest obtrusive (e.g., use of
a worksite exercise facility) or self-reporting measures of exercise participation may limit
participant success (Herrick et al. 1997; Armstrong et al., 1993). Other research conducted
by Ary, Toobert, Wilson, and Glasgow (1986) reported persons with Type 2 diabetes
identified more barriers to exercise than to the other aspects of the diabetes self-care regimen.
While Polly (1992) found exercise was underemphasized by healthcare professionals and
persons with Type 2 diabetes “because of the relative complexity of dietary and metabolic
control components of the diabetes regimen” (Swift et al., 1995, p. 533).

Swift et al. (1995) examined attitudes and beliefs about exercise among 83 persons
with Type 2 diabetes. The authors of the study concluded that diabetes control was selected
most often as the reason for initiating exercise (51%) and the reason for continuing to
exercise (46%) by the participants; thus, suggesting a high prevalence of perceived
importance of exercise by this group. Yet, 75% of the participants acknowledged having
stopped exercising at some point due to their negative attitudes associated with exercise.
“Physical discomfort from exercise, fear of reactions from low blood sugar, being too
overweight to exercise and lack of family support for exercise” (Swift et al., 1995, p. 539) were perceived as barriers to exercise adherence. Moreover, research by Armstrong et al. (1993) found the factors that influence exercise adherence “appear to be different” (p. 391) than those that influence exercise adoption which is limiting since few studies on exercise adherence focus on exercise adoption. Thus, persons with Type 2 diabetes not only lack the strategies for overcoming the perceived barriers to exercise and the support necessary for exercise compliance, they also lack information necessary to adopt a physically active lifestyle.

Education intervention concerning adoption and long term adherence to exercise specific to the needs of persons with Type 2 diabetes is thus long overdue. However, the development and implementation of a strategy oriented intervention must be guided by sound theoretical constructs that take into consideration who, what and how the intervention is to be delivered if it is to offer some respite for the lapses evidenced in the current versions of diabetes self-management programs (Dishman, Sallis and Orenstein, 1985; Sallis and Hovell, 1990; Sonstroem, 1988 cited in Armstrong et al., 1993). For instance, the first thing to consider is that it is no longer necessary for individuals to “exercise” exclusively to derive health benefits. Instead a broader, more “gentle” approach which “recognizes the joys, and values, and benefits of all kinds of activities” (Canadian Society for Exercise Physiology [CSEP], 1997, p. 1-6) based on a dose-response relationship has recently been endorsed (CSEP, 1997). Reed, Velicer, Prochaska, Rossi and Marcus (1997) refer to this new approach as “lifestyle exercise” with a criterion of 30 minutes of accumulated bouts most days of the week—interpreted as 5 days a week—thus, equaling 150 minutes a week of physical activity. Results of the Reed et al. study (1997) also indicate lifestyle exercise as
being easier to accomplish than vigorous exercise (20 minutes 3 times a week equal to 60 minutes a week); thereby, removing some of the barriers to exercise participation. In any event, WHO (1999)

confirms that regular physical activity, in its broadest sense, provides people of all ages, male and female, with substantial physical, social and mental health gains and general well-being. Physical activity offers "the best buy in public health". It provides a low cost, easily accessible approach to better health, disease prevention and health gain for all people. Much of the health gain by physical activity can be produced by activities that are moderate in amount and intensity, simple to perform, and carry minimal risk to health. (p. 1)

Second, consideration of andragogical learning principles should be reflected in a strategy oriented education intervention. Pratt's (1988) model of andragogy as a relational construct provides this direction. In his model, he emphasizes the importance of "variations in learner dependency with respect to specific situations" and "the analysis of the type of teacher-learner relationships best suited to those variations" (Pratt, 1988, p. 164). He suggests that adult educators ought to acknowledge states of dependency of a learner on a teacher as potentially legitimate "because, like self-directedness, dependency is a situational attribute and the product of a specific person-situation interaction" (Pratt, 1988, p. 170) capable of being changed with an appropriate mix of direction and support.

A study by Falkenberg, Elwing, Göransson, Hellstrand, and Riis (1986) in which a problem oriented participatory education approach was taken with Type 2 diabetic adults affirms the importance of a diabetes treatment program that is adjusted to the individual adult diabetic patient's problems and needs. For example, ensuring the patients' views were never ignored, and the patients were actively involved and part of a "therapeutic dialogue" was stressed in this study and resulted in a "substantial increase in knowledge and transient improvement in metabolic control" (Falkenberg et al., 1986, p. 163).
Kieffer’s work (1984) on citizen empowerment also clearly illustrates the strength of participant participation in grass-roots community action programs. In his study, fifteen participants were actively involved in programs “citizen–initiated, pragmatically oriented and community based” (Raeburn and Rootman, 1998, p. 70) over a four year period. What evolved through a definitive developmental process were individuals with enhanced skills, competency, “a whole new range of values, self-concepts, sense of self-worth” (Raeburn and Rootman, 1998, p. 72) and a sense of personal empowerment which they previously lacked. The transformation enabled them to move “their sense of self as helpless [patient] to acceptance of self as assertive and efficacious [adult]” (Raeburn and Rootman, 1998, p. 73)—something adults with Type 2 diabetes need to empower themselves and enhance their adoption and adherence to physical activity.

Third, the level of cognitive functioning or impairment to the extent that some participants of an educational intervention program might be limited in their ability to process information and benefit from this approach should also be considered (Glasgow and Osteen, 1992). Too often (in 90% of the published literature), the only patient characteristics assessed or reported with any regularity are demographic and medical (Glasgow and Osteen, 1992). Results of the McNeil, Salisbury, Baumgardner, and Wheeler (1984) study compound the situation further when you consider that more than half of diabetes program participants were not able to read and understand educational materials written at the fifth grade level; yet, “most printed materials, often the primary source of diabetes education, were written at the ninth grade level or above” (cited in McCabe, Tysinger, Kreger, and Curwin, 1989, p. 1290). The implications are obvious, if patients cannot read or understand the educational materials that play such an important role in patient education, “those materials constitute a
health hazard to the patient and a liability to the health professional” (McCabe et al., 1989, p. 1290).

Fourth, more attention should also be assigned to process or mediating variables, specifically changes in self-efficacy or problem solving/coping skills (self-assessment skills that “may be taught or enhanced with devices such as the pedometer or techniques like keeping an activity log or journal” writing have been suggested (Reed et al., 1997, p. 58)), as compared to improvements in knowledge only, to empower the participants and provide prudent relapse prevention techniques and strategies (Glasgow and Osteen, 1992). The need for change is simple. “Imparting knowledge and expecting to see corresponding changes in attitudes and overt behavior are incomplete at best” (Glasgow and Osteen, 1992, p. 1426). Knowledge either is not or is only weakly associated with other outcomes unlike coping skills or self-efficacy—variables currently assumed to be critical mediators of behavior change (Glasgow and Osteen, 1992). Furthermore, little research is available that confirms if the skills in the conventional education driven diabetes self-management programs even contribute to an improved health status. What is known, however, is that interventions with an educational focus rather than a behavioral and motivational focus (Marcus et al., 1992) do not yield a strong increase in the proportion of individuals interested in initiating or adhering to a lifestyle of physical activity. Too often it is because the recipients of these programs remain disempowered participants lacking control and self-determination for the learning outcomes and their own health. Only,

when [they] empower themselves to overcome these barriers, [will] they begin to take charge of their lives, regardless of the current forces that discourage positive health changes. Empowered people do not blame individuals or environmental realities for health conditions but focus on producing constructive change through dialogue and collaboration. (Hahn and Payne, 1999, p. 4)
A model of health behavior change that has recently investigated its constructs—the stages of change, the processes of change and the decisional balance—across 12 problem behaviors, including exercise acquisition, offers an alternative approach to view adoption and long term adherence to exercise through intervention programs. The model is known as the transtheoretical model "which emerged from a comparative analysis of leading theories of psychotherapy and behavior change" (Prochaska and Velicer, 1997c, p. 38). The significance of the transtheoretical model as the basis for a strategy oriented intervention stems from its simplicity, internal validity, highly predictably patterns and generalizability across a variety of populations despite differing dimensions of gender, socioeconomic status, age and minority status (Prochaska et al., 1994, p. 44). Moreover, the transtheoretical model "systematically integrates more than 300 theories of psychotherapy" (Prochaska and Velicer, 1997c, p. 38) within the stage dimension of change; thus, providing a more comprehensive approach to behavior change (Prochaska et al., 1994). The robust commonalities in how people modify their behavior as evidenced by their cyclical pattern of movement through the specific stages of change, the common set of processes of change used, and the systematic integration of the stages of change and processes of change also offers a window of insight into understanding how people intentionally change their behaviors (Prochaska, DiClemente, and Norcross, 1992).

However to date, relatively few studies have utilized the transtheoretical model of behavior change as the basis for a strategy oriented education intervention to improve exercise adoption and adherence (e.g., Marcus, Simkin, Rossi and Pinto, 1996; Marcus et al., 1992), preliminary evidence suggests researchers consider its merits (Armstrong et al., 1993). The primary reason for this suggestion is that when applied to exercise behavior, the
transtheoretical model “facilitates a shift away from a reliance on predictive models and towards the use of process models to understand exercise adoption and maintenance” (Marcus et al., 1992). A six week stage-matched community-based intervention consisting of self-help materials, a resource manual and organized physical activity opportunities is one example of an intervention based on the transtheoretical model. In this study, 30% of those in the contemplation stage at baseline and over 60% of those in the preparation stage at baseline were in the action stage of exercise adoption after the six-week intervention (Marcus et al., 1992). The percentage of people taking action was strongly related to their stage of adoption at baseline. The preliminary premise of this study was that “a process-oriented approach targeted to individuals’ specific stage of change would accelerate progress towards action and maintenance for exercise” (Marcus et al., 1992, p. 425). The results supported this assumption and warranted continued investigation in the development of individualized, stage specific interventions for exercise adoption and adherence.

A second study conducted by Cardinal and Sachs (1993) also attempted “to influence physical activity and exercise behavior using the stages of change model (an earlier version of the transtheoretical model) as a theoretical basis for comparing the effectiveness of various forms of postal exercise programs” (cited in Buxton, Wyse, and Mercer, 1996, p. 250). In this case, 113 female clerical employees were classified into their initial stage of exercise behavior change and then randomly assigned to one of three interventions: 1) lifestyle exercise program; 2) structured exercise program; and 3) no exercise program (controls). The first two groups received stage specific materials. After one month, results revealed that the lifestyle exercise program subjects exercised significantly more than the controls and that
significantly more subjects progressed (28.7%) rather than relapsed (9.3%) in terms of their stage of exercise behavior change post-intervention (Buxton et al., 1996).

The conclusion of a review by Buxton et al. (1996) which cites the Cardinal and Sachs (1993) research suggests the dissemination of written materials in process-oriented interventions be tailored to the stage an individual is in to facilitate the progression of those individuals through the stages of change. Efficient self-change, after all, is dependent on doing the right things (processes) at the right time (stages) as determined by Prochaska et al. (1992). Interventions that are planned as stage or category specific based on the stage of an individual’s readiness for change minimizes a mismatched stage effect and facilitates a shift away by researchers from a reliance on predictive models “even after controlling for differences in age, gender, and self-efficacy” (Armstrong et al., 1993, p. 397). Consequently, the design and delivery of future exercise interventions should be guided by these parameters; thereby, enhancing cost-effectiveness, particularly for health promotion and health education resources (Buxton et al., 1996).

Lastly, the development and implementation of a strategy oriented education intervention concerning adoption and long term adherence to exercise specific to the needs of persons with Type 2 diabetes should reflect “the health status, well-being or quality of life of the client, rather than focusing only on the knowledge and physiological outcomes” (Campbell et al., 1996, p. 385). For too long, the value of qualitative outcomes has been overlooked and disregarded as part of the treatment goals and self-care regimens.

Pilot study:

In the fall of 1998, an 8-week theory-based program known as the First Step Program was piloted (refer to Appendix B) by Catrine Tudor-Locke, a PhD candidate from the
Department of Health Studies and Gerontology, University of Waterloo. This pilot was funded by the Canadian Diabetes Association (CDA). The intent of the study was to incrementally increase habitual activity levels of sedentary individuals with Type 2 diabetes using two distinct phases to reflect the processes of adoption and maintenance. The primary outcome for this intervention was increased physical activity defined as steps/day and measured by individual pedometers although secondary outcomes and extraneous factors (e.g., Bouchard 3 day record, resting blood pressure, resting heart rate, exercise self-efficacy questions, self-paced step test, 24 hour dietary recall, blood glucose values, waist to hip ratio) were evaluated as well. The methodology was primarily quantitative although some interview and focus group data with involved participants was qualitatively analyzed to explore factors related to exercise adoption and maintenance within the daily exercise paradigm.

Participants were randomized into two study groups—a control group and an intervention group. The control group maintained their usual daily routine for four months without any further direction at which time they took part in the intervention process. Participants in the intervention group attended four weekly group meetings to promote individual goal-setting and self-monitoring using a pedometer worn at the waist to encourage daily activity. Each of the 2-hour sessions was video-taped. Participants were asked to return a calendar recording their daily pedometer values (steps/day). During the second month, participants continued to use their pedometer to monitor their activity. They received two motivational phone calls during this period (first and third week following group meetings). Following that, the pedometers were returned and participants were encouraged to continue with their daily activity. At two and four months after the beginning of the study,
participants in the intervention were invited to share their experiences in focussed group discussions.

All participants completed questionnaires regarding general background characteristics and habitual activity, intention to exercise and exercise confidence. They also underwent a simple physical assessment consisting of a self-paced stepping test, heart rate and blood pressure measurements and body composition measurements.

I participated in the pilot study as a facilitator/health promoter in the four weekly education and counseling sessions. I was responsible for creating and delivering much of the educational materials although the principal investigator provided some direction to insure the content corresponded with the parameters of the study. The resource material was developed based on stages of change and self-efficacy theory. Acute and long-term (over four months) changes in exercise self-efficacy, stage of change, records of foot strikes each day, and adherence to foot strike goals were used to evaluate the effectiveness of the resource material. I also participated in the focus group discussions and provided some evaluative feedback to the principal investigator.

The results of the pilot were promising as individuals in this study accumulated an extra 22.6 minutes of walking a day. However, as an educator I was prompted by my experience in the pilot study, and Tudor-Locke’s literature review (1998b) and preliminary research to investigate a number of issues in more detail using a case study approach. McLeod’s (1998) article “Research in Diabetes Education: Where have we been and where do we need to go?” offered a forum from which to structure my thinking, my questions, my investigation. Consequently, I drew my statement of the problem and the specific questions to be explored from the “identifiable areas or “gaps” that had not been studied or that
required further study” in McLeod’s (1998) article. In particular, the gaps I was most interested in pursuing pertained to the educational process, types of interventions and the effects of the interventions on diabetes management, alternative approaches to education, and theories that reflect issues of goal-setting, decision-making, and problem solving. And so from here, my study evolved.

Statement of the problem:

Physical activity or exercise is recognized and recommended as part of the treatment protocol for persons with Type 2 diabetes in diabetes education programs. Unfortunately, participants in these programs seldom develop a commitment to regular activity and thus, are subject to high relapse and attrition rates. As a result, the quality of life they might enjoy is sacrificed. Therefore, the purpose of this qualitative research was to use the transtheoretical model to guide a strategy oriented education intervention program and examine how this program might enable adults with Type 2 diabetes to change their behavior to adopt and adhere to a more active lifestyle. The three fundamental issues addressed in this research were:

1. To examine the emergent characteristics of a strategy oriented education intervention for adults with Type 2 diabetes who are contemplating changing their behavior to adopt and adhere to a more active lifestyle using the transtheoretical model of behavior change;

2. To evaluate the extent to which a strategy oriented education intervention program designed specifically for adult learners will influence activity levels between the preparation and action stage of behavior change; and
3. To examine the effect a strategy oriented education intervention program has on the development of diabetes self-management strategies and the perceptions of quality of life, well-being, and/or health status of adults with Type 2 diabetes.

Definitions:

- Physical Activity: any bodily movement produced by skeletal muscles that results in energy expenditure (Caspersen, Powell, and Christenson, 1985)
- Transtheoretical model: an integrative and comprehensive model of behavior change with core constructs including stages of change and processes of change (Prochaska et al., 1994)
- Stages of change: the first major dimension of the transtheoretical model; a model of change with five stages—precontemplation, contemplation, preparation, action and maintenance—presented in a spiral pattern with a temporal dimension; used to help explain the relative contributions of client and intervention variables, to understand the underlying structure of behavior change and when the particular shifts in attitudes, intentions and behaviors occur (Prochaska et al., 1992)
- Processes of change: the second major dimension of the transtheoretical model that enable us to understand how the shifts in the stages of change occur; the change processes are covert and overt activities and experiences that individuals engage in when they attempt to modify problem behaviors (e.g., altering thoughts and feelings, assessing environmental impact, assessing personal impact, recognizing alternatives, rewards, recognizing barriers, substituting, increasing commitment); each process is a broad category encompassing multiple techniques, methods and
interventions traditionally associated with disparate theoretical orientations

(Prochaska et al., 1992)

- Andragogical practice: should acknowledge and accept of its learners both self-directedness and its obverse, dependency; shaped by specific, context-bound and limited situations (Pratt, 1988).

Overview of the thesis:

There are five remaining chapters in this study. They have been organized to build upon each other and to lend flow to the material.

The first chapter following this introduction is a review of the literature that begins by introducing and examining the merits of the transtheoretical model of behavior change and the essential elements of the model. Following that, the question “Are all adults adult learners?” is explored using Pratt’s relational construct of andragogy to illuminate effective teacher-adult learner practices. The third section of the literature review probes the basic pathophysiology and health implications of Type 2 diabetes to disseminate how this condition might be influenced by physical activity with respect to reduced morbidity and mortality. Chapter 2 concludes by amalgamating the materials in the chapter to explain how the strategy oriented education intervention was designed and what specific considerations were taken into account.

Chapter 3 discusses methodology and ensuing issues associated with the specifics of this study such as rationale for the research design, objectivity as a practitioner researcher, case study analysis, intervention format, sample selection, data analysis, reliability and validity issues and limitations of the study.
Chapter 4 begins by introducing the reader to five within case studies—four participant and one researcher/facilitator analyses. The case studies explore and describe in detail pre-intervention, active intervention and post-intervention experiences as recorded through various mediums including participant journal writings, researcher journal writings, interview responses, assessment results, informal communications, activity calendars, manual materials and questionnaire responses. Each case will conclude with a brief summary and individual analysis. The last section will analyze the five cases contemporaneously as a means to draw out patterns, and develop conceptual categories to interpret and theorize about the research results.

Chapter 5 completes the study with a synopsis of the research experience, a list of recommendations, and suggestions regarding future research endeavors in this area.
CHAPTER TWO: REVIEW OF THE LITERATURE

Overview of the literature:

Individuals told to include physical activity in their lifestyle as part of their diabetes self-care regimen are often unsuccessful. After all, incorporating physical activity requires more than just best intentions especially for those who are and have been hypokinetic. What is required is a more comprehensive approach that integrates such theoretical constructs as behavioral, cognitive, experiential, humanistic, psychoanalytic and self-efficacy to enhance adoption and adherence. The transtheoretical model of behavior change has evolved from this need. It offers an alternative theory based approach and as such has been incorporated into various behavior change interventions including *The Canadian Physical Activity, Fitness and Lifestyle* (CPAFLA) manual (1997) just recently published and released by the Canadian Society of Exercise Physiology (CSEP).

As an educator who utilizes the content of this manual, my familiarity and the subsequent ease of application and appeal using this behavior change model for fitness and physical activity acquisition is what prompted me to research and ultimately incorporate this model within the strategy oriented education intervention. Participating in the pilot study in the fall of 1998 also provided the incentive to incorporate the transtheoretical model into the construct of my research since elements of the model were not employed or emphasized (e.g., processes of change, stage specific materials) in the study as the literature might suggest.

My purpose in this chapter will be to introduce the transtheoretical model of behavior change and the essential characteristics of the model, as well as provide a rationale and considerations for the inclusion of this behavior change model within the design of this
intervention. Following that, the question “Are all adults adult learners?” will be explored using Pratt’s relational construct of andragogy to illuminate effective teacher-adult learner practices. The third section of the literature review will probe the basic pathophysiology and health implications of Type 2 diabetes to disseminate how this condition might be influenced by physical activity with respect to reduced morbidity and mortality. Chapter 2 will conclude by amalgamating the materials in the chapter to explain what considerations were taken into account as the strategy oriented education intervention was designed and implemented.

**The transtheoretical model of behavior change:**

This strategy oriented education intervention was designed to enhance self-care management for individuals with Type 2 diabetes. Increased physical activity housed within the transtheoretical model of behavior change provided the basis from which the intervention was delivered. Physical activity was selected as the treatment strategy because it was: 1) non-invasive; 2) an inexpensive treatment modality; 3) research has found it to increase the insulin sensitivity response; and 4) physical activity and adherence has been investigated, applied and tested using the transtheoretical model of behavior change (Prochaska et al., 1992; Cardinal, 1997; Herrick et al., 1997; Marcus, Pinto, Simkin, Audrain, and Taylor, 1994; Armstrong et al., 1993; Marcus, Selby, Niaura, and Rossi, 1992; Buxton et al., 1996; Marcus et al., 1996; Marcus et al., 1992; Prochaska et al., 1994; Marcus, King, Clark, Pinto, and Bock, 1996; and Reed et al., 1997; refer to Table 1). The transtheoretical model of behavior change has not, however, been applied to an activity intervention for adults with Type 2 diabetes. This is a new undertaking, yet one that is welcomed by Prochaska and Velicer (1997a) who suggest this model should not be viewed as a closed model.
Table 1: A summary of the stages of exercise behavior change studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Constructs examined</th>
<th>Population</th>
<th>Mean age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booth et al.</td>
<td>Beliefs about the benefits of exercise</td>
<td>4404 Australian adults</td>
<td>20+</td>
</tr>
<tr>
<td>Buxton et al.</td>
<td>Exercise self-efficacy, 7 day physical activity recall, predicted VO₂ peak and physical self perceptions</td>
<td>182 British university employees</td>
<td>36.2</td>
</tr>
<tr>
<td>Buxton et al.</td>
<td>Exercise self-efficacy, 7 day physical activity recall, predicted VO₂ peak and physical self perceptions</td>
<td>168 and 143 young British females</td>
<td>16.9; 17.7</td>
</tr>
<tr>
<td>Buxton et al.</td>
<td>Exercise self-efficacy, 7 day physical activity recall, predicted VO₂ peak and physical self perceptions</td>
<td>291 British higher education employees</td>
<td>42.3</td>
</tr>
<tr>
<td>Cardinal</td>
<td>Physical activity recall, weekly leisure time activity (METS), predicted VO₂ peak and percentage body fat</td>
<td>80 North American adults</td>
<td>21.1</td>
</tr>
<tr>
<td>Gorely and Gordon</td>
<td>Exercise self-efficacy and decision making processes</td>
<td>583 Australian adults</td>
<td>50-65</td>
</tr>
<tr>
<td>Gorely et al.</td>
<td>Processes of change</td>
<td>583 Australian adults</td>
<td>20-50</td>
</tr>
<tr>
<td>Hills</td>
<td>Processes of change and self report physical activity recall</td>
<td>800 medical center employees</td>
<td>-</td>
</tr>
<tr>
<td>Lee</td>
<td>Attitudes/knowledge about exercise and self report physical activity recall</td>
<td>286 Australian adults females</td>
<td>56.5</td>
</tr>
<tr>
<td>Marcus and Owen</td>
<td>Exercise self-efficacy and decision making processes</td>
<td>1093 North American adults and 801 Australian adults</td>
<td>41 42</td>
</tr>
<tr>
<td>Authors</td>
<td>Research Question</td>
<td>Sample Size</td>
<td>Results</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Marcus et al.</td>
<td>Decision making processes</td>
<td>778 North American adults</td>
<td>41.5</td>
</tr>
<tr>
<td>Marcus et al.</td>
<td>Exercise self efficacy</td>
<td>1063 government employees and 429 hospital employees</td>
<td>41</td>
</tr>
<tr>
<td>Marcus and Simkin</td>
<td>Self report physical activity recall</td>
<td>235 North American adults</td>
<td>40.6</td>
</tr>
<tr>
<td>Mutrie and Caddell</td>
<td>Exercise self efficacy</td>
<td>180 British insurance company employees</td>
<td>-</td>
</tr>
<tr>
<td>Naylor and McKenna</td>
<td>Exercise self efficacy and behavioral preferences for exercise</td>
<td>2622 British undergraduate students</td>
<td>20.1</td>
</tr>
<tr>
<td>Naylor et al.</td>
<td>Decision balance and self report physical activity</td>
<td>677 British undergraduate students</td>
<td>-</td>
</tr>
<tr>
<td>Willis et al.</td>
<td>Exercise self efficacy and orientations towards exercise</td>
<td>254 North American undergraduate students</td>
<td>-</td>
</tr>
<tr>
<td>Wyse et al.</td>
<td>CHD risk factors, self report physical activity</td>
<td>161 British university employees</td>
<td>39.9</td>
</tr>
<tr>
<td>Wyse et al.</td>
<td>Self report physical activity and exercise recall</td>
<td>244 young adults</td>
<td>17.9</td>
</tr>
<tr>
<td>Wyse et al.</td>
<td>Self report physical activity and exercise, exercise and self efficacy, predicted VO2 peak and physical self perceptions</td>
<td>244 young adults</td>
<td>17.9</td>
</tr>
</tbody>
</table>

(Buxton et al., 1996, p. 243)

Instead, the authors suggest that future research should explore the transtheoretical model in “a variety of directions” to “conceptualize change in the health promotion area and the types of novel interventions that [may] result from this perspective” (Prochaska and Velicer, 1997a, p. 6). And so, this research set out to use the transtheoretical model as a guide to determine the essential characteristics of a strategy oriented education intervention for adults.
with Type 2 diabetes interested in changing their behavior to adopt and adhere to a more active lifestyle.

The transtheoretical model “emerged from a comparative analysis of leading theories of psychotherapy and behavior change” (Prochaska and Velicer, 1997c, p. 38) to better understand “how people intentionally change their behavior with and without psychotherapy” (Prochaska et al., 1992, p. 1102). Over time, it became a comprehensive model that integrated a number of major theories into one to account for all of the complexities associated with behavior change (Prochaska and Velicer, 1997c, p. 41). The key concepts of the model include the stages of change, processes of stage, decision balance, self-efficacy, and temptation. In recent years, studies using the transtheoretical model to investigate exercise acquisition have resulted in valid measures of the stages of change, decision balance, and self-efficacy (Herrick et al., 1997).

Using a temporal dimension, the transtheoretical model entails “a cyclical pattern of movement through specific stages of change [precontemplation, contemplation, preparation, action and maintenance]” and “a systematic integration of the stages and processes of change” (Prochaska et al., 1992, p. 1110). From a health promotion perspective this means:

1) matching the most relevant independent variables and the most appropriate dependent variables to particular stages of change; 2) designing health promotion interventions that meet the needs of the individual at each stage of change; 3) maximizing impacts on entire populations at risk by employing proactive recruitment and stage-matched, interactive, and individualized interventions; and 5) emphasizing the importance of integrating health promotion programs across multiple channels (e.g., homes, worksites, schools, physicians’ offices, and communities). (Prochaska and Velicer, 1997a, p. 6)

As a health promoter, the transtheoretical model also recognizes the dynamic nature of behavior change and the possibility or likelihood that individuals may regress or relapse. In addition, it provides “a theoretical framework for studying the acquisition of ‘positive’
behaviors such as exercise" (Buxton et al., 1996, p. 240) as compared to models that have only guided the cessation of negative behaviors.

Stages of change

The transtheoretical model construes change as an integration of processes involving movement through a series of stages that encompass both behavior and behavioral intention. Stages are both dynamic and stable that can last over long periods of time or change relatively quickly. “Stage is by far the most frequently recognized and applied component” (Reed et al., 1997) of the transtheoretical model. The stages of change include precontemplation, contemplation, preparation, action and maintenance.

Precontemplation is the stage at which individuals are not thinking about changing their behavior at least not in the next six months—the “I won’t” stage. This resistance to change may be because they know little about the consequences of their behavior or they have become demoralized thinking about their abilities to change. Either way, precontemplators tend to “avoid reading, talking or thinking about their high risk behaviors” (Prochaska and Velicer, 1997c, p. 39).

Contemplation is the second stage and is marked as the period of time in which individuals are seriously thinking about changing their behavior in the next six months. This is referred to as the “I might” stage. “Serious consideration of problem resolution is the central element” (Prochaska et al., 1992, p. 1104) to this stage. They know the benefits of changing as well as the costs which often “produces profound ambivalence that can keep people stuck in this stage for long periods of time” (Prochaska and Velicer, 1997c, p. 39).

Preparation is the third or “I will” stage whereby people are intending to take action sometime in the next month. Typically, they have unsuccessfully taken some action in the
last year but have planned a course of action (e.g., bought a self-help book, joined a fitness facility, joined a smoking cessation group) for their future behavior change. “Although they have made some reductions in their problem behaviors, individuals in the preparation stage have not yet reached a criterion for effective action (Prochaska et al., 1992, p. 1104).

The fourth stage is the action stage or “I am” stage. Individuals in this stage have made an overt change in their behavior and have “successfully altered it for a period of from one day to six months” (Prochaska et al., 1992, p. 1104). It is the busiest of all five stages and requires considerable commitment of time and energy. Because this stage tends to be most visible individuals in this stage receive the greatest external recognition; however, observers including professionals, must be careful not “to erroneously equate action with change” (Prochaska et al., 1992, p. 1104). To measure change, individuals must modify the target behavior to an acceptable criterion which varies from one behavior to another (e.g., only total abstinence counts for smoking while cutting back to 30% fat calories appears to be an acceptable guideline for dietary changes).

The final stage of change is known as maintenance. This is the stage in which people work “to prevent relapse and consolidate the gains attained during action” (Prochaska et al., 1992, p. 1104). The maintenance stage or “I have” stage “is a continuation, not an absence, of change” (Prochaska et al., 1992, p. 1104) that lasts from six months to five years. Five years of continuous abstinence seems to be the “magic number” when the risk of relapse drops to 7% as compared to twelve months of continuous abstinence from smoking, for example, which showed a relapse rate of 43% (Prochaska and Velicer, 1997c, p. 39). Increasing levels of confidence and changes in temptation and self-efficacy work to support the chosen behavior change throughout this stage.
Notwithstanding, relapse tends to be "the rule when action is taken for most health behavior problems" (Prochaska and Velicer, 1997c, p. 39) rather than the exception. And the vast majority return to contemplation or preparation from the action or maintenance stages. However, as Samuelson (1997) notes relapse within the transtheoretical model does not denote failure. The reason for this is because Prochaska et al. (1992) conceptualized and modified the stages of change to reflect a spiral pattern rather than a linear progression. In doing so, the researchers acknowledged the dynamics of recycling; thus, allowing relapsers to deal with their embarrassment and guilt and to learn from the relapse rather than becoming demoralized and resisting future behavior change attempts.

Processes of change

The processes of change are the second major dimension of the transtheoretical model. They are the overt and covert cognitive, affective and behavioral activities that people use to progress through the stages of change. They help us to understand how shifts in attitudes, intentions and behaviors occur as individuals attempt to modify their behavior. "Each process is a broad category encompassing multiple techniques, methods, and interventions traditionally associated with disparate theoretical orientations" (Prochaska et al., 1992, p. 1107).

Within the transtheoretical model, there are ten processes of change that have received the most theoretical and empirical support across such behaviors as smoking, diet, cocaine use, sun exposure and exercise. These processes are referred to as consciousness raising, dramatic relief, self-evaluation, environmental evaluation, self-liberation, social liberation, counterconditioning, stimulus control, helping relationships and reinforcement management (refer to Table 2). Processes can be categorized according to their higher order
either as experiential processes or behavioral processes. Typically experiential processes encompass more internal experiences like consciousness raising, dramatic relief and self-evaluation; whereas, behavioral processes include more overt activities such as helping relationships, reinforcement management, and stimulus control (Prochaska and Velicer, 1997).

Depending on the desired behavior change, the frequency with which various change processes are used varies as does “the absolute frequency of the use of change processes across problems” (Prochaska et al., 1992, p. 1107). In part, this may be explained due to the systematic relationships that exist between stage and processes of change—processes from “very different theories need to be emphasized at different stages of change” (Prochaska and Velicer, 1997c, p. 43). For instance, in a study of exercise behavior conducted by Marcus et al. (in press)

precontemplators were found to use each of the 10 processes of change substantially less than subjects in the other stages of change. Individuals in the preparation stage used the behavioral process more frequently than individuals in the contemplation stage. Use of the experiential processes did not differ between these two stages of change. Individuals in the action stage used both the experiential and the behavioral processes more frequently than those in the preparation stage. There was a decrease in the use of the experiential processes, but not the behavioral processes for individuals in the maintenance stage as compared to those in the action stage. (cited in Marcus et al., 1992, p. 425)

The complexity of integrating the processes across five stages of change is thought to contribute to the variability which is why Prochaska and Velicer (1997c) clearly feel further research is needed in this area. In fact, they report “the processes of change are the least studied aspect of the model” (Prochaska and Velicer, 1997a, p. 6) and more research focussed on the whole model is required.

Decision balance
Prochaska et al. (1994) constructed the decisional balance using Janis and Mann’s (1977) decision making model as a reference. The original decision making model was reconfigured to include two decisional balance measures as compared to eight factors posited by Janis and Mann (1977)—namely, the pros and cons of the behavior in question (Prochaska et al., 1994). “Pros represent the perceived positive aspects, or facilitators of behavior change while cons represent the perceived negative aspects or the barriers to change” (Herrick et al., 1997, p. 50).

When applied, this decision making process was found to be highly related to current and future likelihood of an individual to participate in a health behavior change (Marcus et al., 1994) as evidenced by his or her position in the stages of change. In other words, the list of pros and cons became an excellent indicator from which to view an individual’s progress (Herrick et al., 1997). For instance, in the precontemplation stage, individuals judge the pros of the problem behavior to outweigh the cons. In the action and maintenance stages, the opposite pattern occurs, with the cons judged as outweighing the pros. The crossover appears to occur around the contemplation or preparation stages, depending upon the health behavior examined (Herrick et al., 1997). Prochaska et al. (1994) recommend “a systemic approach for changing the pros and cons so that progress from precontemplation to action is facilitated” (p. 44). Specifically, their research suggests interventions should target increasing the pros of changing before worrying about changing the cons of changing. In so doing, they found further progress would be made through the stages of change.

Self-efficacy

An individual’s belief in his or her own ability to motivate him or herself and regulate his or her own behavior has a profound effect on behavior change. Believing one can
Table 2: Titles, definitions, and representative interventions of the processes of change

<table>
<thead>
<tr>
<th>Processes of change</th>
<th>Description of processes of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consciousness raising</td>
<td>Increasing information about self and problem: observations, confrontations, interpretations and bibliotherapy</td>
</tr>
<tr>
<td>Dramatic relief</td>
<td>Experiencing and expressing feelings about one's problems and solutions: psychodrama, grieving losses, role playing</td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>Assessing how one feels and thinks about oneself with respect to a problem: value clarification, imagery, corrective emotional experience</td>
</tr>
<tr>
<td>Environmental evaluation</td>
<td>Assessing how one's problems affects physical environment: empathy training, documentaries</td>
</tr>
<tr>
<td>Self-liberation</td>
<td>Choosing and commitment to act or belief in ability to change: decision-making therapy, New Year's resolutions, commitment enhancing techniques</td>
</tr>
<tr>
<td>Social liberation</td>
<td>Increasing alternatives for nonproblem behaviors available in society: advocating for rights of repressed, empowering, policy interventions</td>
</tr>
<tr>
<td>Counterconditioning</td>
<td>Substituting alternatives for problem behaviors: relaxation, desensitization, assertion, positive self-statements</td>
</tr>
<tr>
<td>Stimulus control</td>
<td>Avoiding or countering stimuli that elicit problem behaviors: restructuring one's environment, avoiding high risk cues, fading techniques</td>
</tr>
<tr>
<td>Helping relationships</td>
<td>Being open and trusting about problems with someone who cares: therapeutic alliance, social support, self-help groups</td>
</tr>
<tr>
<td>Reinforcement management</td>
<td>Rewarding one's self or being rewarded by others for making changes: contingency contracts, overt and covert reinforcement, self-reward</td>
</tr>
</tbody>
</table>

(Prochaska et al., 1992, p. 1108)

succeed is like having confidence in one’s ability to perform a given behavior and this generally relates “strongly to one’s actual ability to perform that behavior” (Bandura, 1977 cited in Marcus, Selby, Niaura, and Rossi, 1992, p. 61). This is known as self-efficacy.

Bandura maintains “individuals with high confidence in their ability or efficacy expectations for a given task will be more likely to engage in that situation-specific task” (Herrick et al., 1997, p. 50). Research studies using Bandura’s self-efficacy theory concur
and have found self-efficacy beliefs closely connected to the performance of many health behaviors, including exercise (Marcus et al., 1994). For example, self-efficacy beliefs were so closely related to the stages of change that "this construct was integrated from Bandura's self-efficacy theory" (Prochaska and Velicer, 1997c, p. 40) into the transtheoretical model. Explicitly, exercise specific self-efficacy scores showed precontemplators as having the lowest scores, contemplators averaged significantly higher scores than did precontemplators and those in maintenance scored the highest (Marcus et al., 1994; Herrick et al., 1997; and Armstrong et al., 1993).

**Introduction to Adults as Learners:**

For some time, mainstream theoretical constructs of adult education have espoused rhetoric that would lead one to believe that all adults are adult learners—a fairly homogeneous group who by virtue of being an adult are intrinsically motivated, self-directing and autonomous learners. Yet my experience teaching adults has proven otherwise and I have resolved that all adults are not all adult learners.

Daniel Pratt's (1988) theory of adult learners as a relational construct narrows the "gap" between the traditional views of adults and adult learning and as such provided a more appealing base from which to deliver this strategy oriented education intervention. Pratt's model, for example, recognizes the importance of situational, learner and teacher diversity among adult learners. It also emphasizes learner dependency and support as two important variables to consider when examining how the implementation of curriculum and the learning experiences should be selected, organized and employed for the most effective instruction. Pratt's model helped me pragmatically to explore how to give adults control of
their own learning while lending support to the concept of empowerment in a people-centered health promotion context.

Introduction

My involvement in adult education has evolved progressively over the last eleven years as a professor in the community college system. In that time, I have witnessed a dramatic increase in the number of adults returning to the traditional classroom and have become acutely aware of the need to make the transition from being a teacher-centered to a learner-centered educator.

To facilitate the transition, I began to amass reading materials to delve further into the essentials of adult education. After completing a partial review of the literature, I was prompted, in essence, to make a change—a paradigm shift. I entered the world of andragogy and began to rethink my approach, my methodology, and my expectations of adult learners to reflect the slew of principles, special considerations, theories, implications, and learning barriers outlined in the literature pertaining to the self-directed nature of adult learning. Unfortunately, in the process of rethinking my approach to adult education I also made several assumptions. As it came to pass, I discovered that some of my assumptions were misleading and not always in the best interest of all of the adult learners.

Unearthing Pratt’s work helped immensely. His work (1993) highlighted the point “that adult educators need to examine the philosophical assumptions underlying andragogy in order to clarify the underlying values and beliefs and...central concept of [adult] learning” (p. 87). He along with Imel (1995) contended that many myths related to teaching adults emerged from an uncritical acceptance of the theory of andragogy. They purported that the
underlying assumptions have remained largely untested through any form of formal research. My experience supported Pratt’s position and so I chose to explore it further.

Definitions

Prior to critical examination of Pratt’s position, a number of terms require clarification to better enable the issue of adult learning to be contextualized within the broader spectrum of a strategy oriented education intervention. Thus, it would be most appropriate to begin by defining what an adult is. Fundamentally, an adult is described as an individual who has reached the maturity level where a personal assumption of responsibility for self and sometimes others takes place. In much of the adult education literature, the age of 25 is used as a criterion although many people have some difficulty putting an age limit on it. (Hiemstra, 1994, p. 2)

Rogers (1996) concurs and argues that “no single age can define an adult even within one society, let alone on a comparative basis” (p. 34). What he does add to this definition however, are three characteristics—full development, perspective and autonomy—that he claims are inherent within the concept of adulthood. He concludes that adults continue to strive to become more mature, more ‘balanced’ and more responsible as they move through their life cycle.

Andragogy is the art and science of helping adults learn. Knowles and Associates explain “andragogy as: (a) a set of assumptions about adults as learners, and (b) a series of recommendations for the planning, management and evaluation of adult learning” (1984).

In turn, these assumptions are based on two presuppositions: first, that intrinsic to adulthood is a sense of self-directedness; and second that, in congruence with this self-directedness, andragogical practice is a collaborative venture which involves the learner in most or all instructional functions. (Knowles, 1980, 1984; cited in Pratt, 1988, p. 160)
Adult learners are typified in the literature as having characteristics that set them apart from the traditional non-adult learner (Knowles, 1980; Cross, 1981; Cook, 1993; Brookfield, 1986; Hiemstra, 1991; and Imel, 1995). In particular, adult learners are characterized as having a rich reservoir of experience to serve as a resource for learning, they frequently have a life-, task-, or problem-centered orientation to learning as opposed to a subject-matter orientation, they are generally motivated to learn because of internal or intrinsic forces and they tend to be self-directing (Imel, 1994).

Discussion: “Are all adults adult learners?”

The implications for instruction based on these assumed characteristics of all adult learners are what generates “the gap” alluded to in the question, “Are all adults adult learners?” When reviewing the literature in this area, most material presented on adult education presents a fairly homogeneous “idealized view of adulthood that offers a utopic image of adult learners as “self-directing organisms with initiative, intention, choices, freedom, energy and responsibility” (Tough, 1979, p. 5). Long (1990), however, suggests the truth about adult learners rests somewhere between the adage that all adult learners are super learners (as described above) and that adult learners are less capable than younger learners (p. 23). Regardless, the predisposition to focus on the central tendencies of adult learners as a single group and to assume that only limited variability exists among adult learners reveals the shortcomings in our understanding and awareness of adult learners. After all, “physiologically, psychologically and sociologically adults are more diverse than children....Therefore, it is erroneous to speak of “the adult learner” as if there is a generic adult that can represent all adults” (Long, 1990, p. 25). To remedy the situation, more
attention must be given to the differences that exist among the adult learners in an andragogical environment.

To date, research that has focussed on the teaching-learning transactions of adult learning has provided various theories or models to explain how and why adults learn. Cross (1981), for instance, generated the characteristics of adults as learners conceptual framework which provided a means for thinking about the ever-changing adult in terms of developmental stages. Knox’s (1980) proficiency theory “provided a parsimonious explanation of teaching and learning for adults in all its variety...as well as generalizations that are especially important for adults with various characteristics, such as learning ability, age and experience” (Knox, 1980, p. 382, cited in Hiemstra, 1993, p. 5). Daniel Pratt’s model examines the issue of learner control from an andragogical perspective.

It is this model of andragogy that is of particular interest because of the author’s position to acknowledge and accept adult learners’ self-directedness and its obverse, dependency; both as phenomenological expressions of a specific, context-bound, and limited situation (Pratt, 1988). Concisely, the conceptual framework of Pratt’s model recognizes and embraces both andragogical and pedagogical approaches for effective teacher-adult learner relationships unlike some adult learning theories that posit an explicit andragogical-pedagogical dichotomy. Instead, Pratt recognizes the importance “of informed intentional choice: self-directed learners have to decide, first, if they value having control and, second, if they will do anything to either establish or relinquish that control” (Pratt, 1988, p. 170).

When working with adult learners Pratt suggests that “both the line of descent from andragogy to learner control, and in particular the association of self-directedness with control, need to be questioned” (1988, p. 161). If these distinctions are not considered, then
Pratt contends the differences between adults as learners will be minimized, and unfortunately, present andragogy as a prescription for teaching that disregards situational, learner and teacher variables (Pratt, 1988). Variations in learner dependency with respect to specific situations and analysis of the teacher-learner relationships best suited to those variations are of utmost importance in Pratt’s model of andragogy as a relational construct.

In the context of curricular studies, when adult educators want to develop qualities built around adult oriented methodologies to enhance their adult students’ cognitive and affective processes without giving appropriate consideration to the adult learner’s needs, skills, and experience; the situation; and the teacher-student relationship the gap between the learner and the learning begins. For example, the expectation that all adult learners will respond to a given situation “with intellectual curiosity and development exhibited by further demonstrations of self-directedness regarding learning” (Fisher, 1998, p. 1) is false. Shores study (1985) confirms this claim. While conducting intensive interviews with nurses involved in continuing education, Shores found that not all learners were driven by their “adultness” and corresponding self-directedness but by their sense of purpose for taking the program which was to prepare for a certificate exam and their prior knowledge relative to the content to be learned (cited in Pratt, 1988, p. 163). Given that adult learners come to educational situations with varying degrees of prior experience, and an impermanent state of being dependent on the learner’s commitment to specific goals and self-confidence in one’s ability to achieve those goals (Pratt, 1988), it also seems unrealistic to assume that the internal force of self-directed learning compels all adult learners to assimilate, synthesize, and internalize new information for critical self-reflection and change with every learning opportunity. Consequently, situational variables—those conditions that cannot be considered
personal, psychological attributes of the learner or teacher—such as expressed purpose and relevancy of goals must be considered when selecting appropriate teaching strategies if the learning is to be meaningful for the adult learner.

Learner variables should also influence the approach taken when working with adult learners. "To arrive at a realistic balance between recognition of individual idiosyncratic characteristics and identification of those normative characteristics that allow us to consider adult learners as a group" (Long, 1990, p. 26) typifies the approach taken by most adult educators to engage in the collaborative planning, management, and evaluation of education espoused as an andragogical practice. However, Pratt cautions that individual psychological attributes such as self-efficacy, cognitive style, levels of moral reasoning, locus of control, and learning style must be given more attention since they affect learners' ability or desire to enter into collaboration (Pratt, 1988).

Variation among adult educators is the last variable of Pratt's model. The contention here is that "experience, training, personality, confidence, personal philosophy, and preferred ways of working may all enter into a teacher's decision-making and affect a decision to use collaborative methods" (Pratt, 1988, p. 164). The significance of this variable is that teacher effectiveness is linked inadvertently with the instructional process which reflects the learner differences and situational factors.

Thusly, the premise of Pratt's construct of andragogy is to view the andragogical presuppositions of self-directedness and collaboration within "the light of three interacting sets of variables which they in part define, and by which they are in part defined: situational, learner, and teacher variables" (Pratt, 1988, p. 162). In doing so, andragogy and pedagogy
can better be compared and understood to reflect the variations in learner dependency and the type of teacher-learner relationships best suited to the situational variations.

Dependency of a learner on a teacher, for example, should be viewed as temporal and situational, capable of being changed through an appropriate mix of direction and support. Thus, adults should not be expected to be self-directed at all tasks. Instead, self-direction should be considered "a situational attribute of learners, not a general trait of adulthood" (Pratt, 1988, p. 165) influenced by the learners’ feelings of competence, commitment and confidence.

Direction and support also act upon an adult learner’s dependency. When adult learners lack the necessary knowledge or skills to make informed choices—when they are unable to be self-directed—they need more direction relative to their level of competency. Hence, the adult learners become dependent on others such as teachers or external agencies who are better informed. Consequently, the teacher must direct, exercise some control and offer appropriate support to the learner. If there is a lack of commitment to the goals or a lack of confidence in one’s ability to accomplish the goals, the level of support required increases; otherwise, a committed and confident adult learner is relatively self-supporting.

The connection of dependency to direction and support delineates two educational situations hallmarked as andragogical and pedagogical practice. Figure 1 provides a framework for two andragogical and pedagogical relationships whereby the level of support and direction required directly impact the level of dependency. In this light, quadrants 1 and 2 represent the pedagogical relationships while quadrants 3 and 4 represent the andragogical relationships.
Quadrant 1 represents situations of temporary high learner dependency. Adult learners in this quadrant require more of a pedagogical approach because they tend to lack competence and either commitment or confidence to pursue their educational goals. In response to this situation, “the teacher must offer sufficient support and direction to ensure the learner succeeds in each learning trial, yet must provide tasks difficult enough to make learning meaningful” (Pratt, 1988, p. 168). Often there is a mismatch between what is needed and what is provided.

Quadrant 2 represents situations of medium to high learner dependency. Learners in this quadrant come to educational situations motivated and confident in their ability to learn with minimal need for support. What the learners of this quadrant require is direction—clear goals, tasks, structure and evaluation. This quadrant still represents a pedagogical relationship although learners are more informed and moving to a less dependent position given appropriate encouragement and support. Quadrant 3 represents learners who need support but are reasonably self-directing which marks the shift from pedagogical to andragogical relationships. “An appropriate relationship here is one that visibly allows shared authority for directing learning, to the extent that the relationship has the potential to be genuinely collaborative for there is a common base of knowledge and experience that can foster collaboration” (Pratt, 1988, p. 169).

Quadrant 4 is marked by learners who are at least moderately capable of providing their own direction and support. “This form of andragogical relationship recognizes learners can direct and support their own learning” (Pratt, 1988, p. 169) with the learner being situationally self-directed and self-supporting. Educators are there to help the learner reflect on both the specific learning goals and on the process of learning itself to foster growth in
Figure 1: Pratt’s model of andragogy in relation
reflection and in self-reflection.

This last stage most closely resembles other research models of adult learning although the transformative or the emancipatory stage as outlined by Mezirow in his book entitled *Transformative dimensions of adult learning* (1991) most closely resembles the self-reflective nature of quadrant 4. However, there are differences that distinguish Mezirow’s model from Pratt’s model. For example, Mezirow states that emancipatory learning is unique to adulthood whereas Pratt has not made that assumption nor restricted its application to a set of characteristics or assumptions regarding adulthood. Secondly, Pratt has framed his model around a set of variables that he considers to be momentary, situationally specific, and therefore changeable unlike Mezirow’s work that contextualizes adult learning into three exclusive hierarchial categories. The third difference is critical from a pragmatic perspective. Unlike Mezirow, Pratt encourages adult educators to acknowledge states of dependency as potentially legitimate during adulthood and therefore embrace both andragogical and pedagogical practices within the adult learning domain. Mezirow, on the other hand, differentiates andragogy from pedagogy within the adult learning domain and admits that not all adult learning is transformative in nature but contends that teaching adults is different than others.

Conclusion

After a brief introduction to Pratt’s relational construct of andragogy, it would appear that not all adults are adult learners all of the time or even some of the time. This analysis would suggest that individual psychological differences are largely impermanent and that an adult’s state of dependency is situationally specific and; therefore, changeable allowing movement between quadrants, to and from dependency to self-directedness and
collaboration. Consequently, the key to effective educator-adult learner relationships and the implementation of curriculum such as in the strategy oriented education intervention is a balance of good teaching practices that enshroud both andragogy and pedagogy. Pratt’s model provides a framework from which educators of adult learners can decide the most effective combination; something which has been lacking to date in diabetes education programs.

**Type 2 Diabetes:**

For the purposes of this study, a basic understanding of the pathophysiology and the health implications of Type 2 diabetes is necessary. The expectation is not that one need be an expert in diabetes or the management of diabetes but rather understand how this condition might be influenced by physical activity with respect to reduced morbidity and mortality particularly macrovascular complications. The American Diabetes Association (ADA) released a similar statement in its 1998 clinical practice recommendations at which it was noted that health care teams [involved in diabetes education] would benefit from working with individuals who have knowledge and training in exercise physiology.

Type 2 diabetes is a condition in which sugar levels in the blood are abnormally high because of reduced tissue sensitivity to insulin known as insulin resistance and defective insulin secretion caused by beta-cell failure (Goldberg, 1998). It is unknown whether the effects of insulin resistance lead to a deterioration of beta-cell function or whether individuals inherit or acquire insulin secretory defects independent of an insulin resistant state (Goldberg, 1998). Nonetheless, the body lacks the ability to convert the consumed carbohydrates into biological energy needed by all of the body’s cells (The Journal of American Medical Association [JAMA] Patient Page, 1999) causing a fall in peripheral
glucose uptake—predominantly in skeletal muscle—and an increase in hepatic glucose production (Goldberg, 1998). Regulation of blood glucose levels and carbohydrate metabolism is primarily a function of the pancreas.

Individuals with Type 1 diabetes also lack the ability to regulate blood glucose levels. However, individuals with Type 1 diabetes (insulin-dependent) require exogenous insulin therapy to regulate insulin secretion (Tsiani and Giacca, 1998) as compared to Type 2 diabetics (non-insulin-dependent) who most often are able to treat their diabetes with proper diet, weight control, hypoglycemic agent treatment and exercise. Of the 12 to 15 million persons with diabetes mellitus in the United States at least 90% to 95% have Type 2 diabetes. Unfortunately, half of those with Type 2 diabetes remain undiagnosed (Dagogo-Jack and Santiago, 1997) and 10 to 20% of those individuals newly diagnosed show evidence of tissue complications and increased prevalence of macrovascular complications because they have been hyperglycemic for 5 to 10 years without knowing (Goldberg, 1998).

Poor glycemic control is most notably responsible for the enhancement of macrovascular complications (e.g., large-vessel atherosclerosis) (Stern, 1999; and Goldberg, 1998) although other serious conditions that may occur include stroke, blindness, end-stage renal disease, nerve damage, and amputations (JAMA, 1999). JAMA (1999) reports that diabetes is the sixth leading cause of death and that heart disease is the leading cause of diabetes-related deaths which “account for the largest share of morbidity, mortality and health care expenditures” (Stern, 1999, p.1). Goldberg (1998) notes that “the cost of diabetes in the United States has quadrupled over the past decade and reached $105 billion in 1995, exceeding that of cancer and heart disease” (p. 805).
In Canada, a study on the cost of obesity conducted by Birmingham, Muller, Palepu, Spinelli, and Anis (1999) claimed that $423.2 million was spent on Type 2 diabetes in 1997. Type 2 diabetes was specifically identified as one of three of the largest and most costly obesity-related comorbidities. The other two were hypertension and coronary artery disease. Using a population attributable fraction (PAF), estimates in the Birmingham et al. (1999) study indicate that more than 20% of all cases of Type 2 diabetes in Canada were attributable to obesity (p. 8). The Surgeon General’s Report on Physical Activity and Health states “it is becoming increasingly clear that the epidemic of Type 2 diabetes sweeping the globe is associated with an increasing prevalence of obesity and decreasing levels of activity” (ADA, 1999, p. 8). The CDA report confirms this finding with 80% of the people diagnosed with Type 2 diabetes as overweight. A high waist-to-hip ratio, hypertension, hypertriglyceridemia and low high-density lipoprotein levels in addition to age, family history and ethnicity have also been identified as markers of risk for the development of Type 2 diabetes (Goldberg, 1998).

Type 2 diabetes and physical activity

The good news is that an active lifestyle may be “a therapeutic tool in a variety of patients with, or at risk for diabetes” (ADA, 1999, p. 1). The Canadian Medical Association (CMA) as well as Berkowitz (1998) and Tsiani and Giacca (1999) affirms an active lifestyle promotes cardiovascular fitness and well-being, increased insulin sensitivity, lower blood pressure and a healthy lipoprotein profile in all people with diabetes. A consistent, stepwise increase in physical activity may also improve glycemic control and reduce the need for medications in people with type 2 diabetes. (Meltzer et al., 1998, p. S14)

Berkowitz (1998) explains that exercise decreases the body’s need for or improves its ability to use insulin which for a person with diabetes means there may be less of a need for
medication or a change in self-care practices may be warranted. Chronic exercise improves insulin sensitivity and glucose tolerance which is mediated through changes in body composition and the additive effects of daily exercise (Berkowitz, 1998).

The term exercise, however, requires further examination and clarification particularly as it was interpreted and applied in this study. First, too often the literature uses the terms “exercise” and “physical activity” synonymously even though they have different meanings and applications. Exercise is more hard-core, both as a function and in one’s perception of it as an activity. Secondly, an exercise program is generally more prescriptive; whereby, frequency, intensity, and duration are considered important measures of success. Physical activity, on the other hand, is defined as any bodily movement produced by skeletal muscles that results in energy expenditure (Casperson et al., 1985). When applied, it sounds less threatening than having to exercise, and it is, which was an important variable to consider when preparing to deal with individuals known for high exercise relapse.

Thus, for the purposes of this study physical activity took the form of stepping. The parameters of the stepping program adhered to the physical activity/exercise guidelines as dictated by the CMA and ADA although the program was not designed to be prescriptive in nature. A stepwise increase in physical activity was integrated into the participants’ lifestyles over the course of a four week intervention using pedometers for feedback. Intensity levels were monitored informally using the “just audible breathing” (JAB) technique (refer to Appendix E)—analogous to 60 to 90% of maximum heart rate (Goode, Mertens, Shaiman, and Mertens, 1998) and talk test. Participants were encouraged to step daily to achieve daily activity goals to exceed and improve upon their baseline number of steps. Total number of
steps for the week, daily averages and number of days daily activity goals were achieved were measures used to assess change in physical activity levels.

The design of a strategy oriented education intervention:

This study used the transtheoretical model of behavior change to design the strategy oriented education intervention because the dynamic nature of behavior change was recognized; thus, allowing for transitions in adoption and maintenance of behavior. In particular, this model did not see behavior change “as an all-or-nothing phenomenon” (Marcus, Selby, Niaura, and Rossi, 1992, p. 60) but rather as a process that was less predictive. It was better able to view “the amount of progress people made with their behavior change as a result of intervention is a function of the stage they [were] in at the start of treatment (Marcus, Selby, Niaura, and Rossi, 1992, p. 60). Consequently, intervention materials and strategies were designed to be stage-matched, individualized, and personalized.

This model did not assume that behavior change was “simply a matter of applying a formulaic mixture of motivation, facts, education, action and willpower” or “that once motivated the facts would logically result in change” (Samuelson, 1997, p. 13). This model recognized that the vast majority of people are not in the action stage which is significant since “action-oriented programs are likely to underserve, misserve or not serve the majority of the target population” (Prochaska et al., 1992, p. 1105). Instead, this model supported the process of change at every stage; thereby, recognizing the inherent importance of progression as identified by Prochaska et al. (1992)—“If clients progress from one stage to the next during the first month of [intervention], they can double their chances of taking action during the initial six months of the program” (p. 1106).
And finally, the transtheoretical model supported comprehensive strategies to shift attention away from the medical model and “expand the universe of success to include such measurements of increased awareness, participation in education programs, attempts to change lifestyle, use of fitness facilities, and inquiries made to health professionals” (Samuelson, 1997, p. 14). Consequently, more individuals interested and ready for lifestyle changes who have higher efficacy, self-esteem and enthusiastic support from supporting organizations will be better able to feed into the system and receive appropriate support (Samuelson, 1997).

Considerations

As the strategy oriented education intervention evolved, the transtheoretical model was not embraced in isolation. Instead, it was viewed in conjunction with the empowerment ideology and the relational construct of andragogy as outlined by Pratt (1988) since Pratt’s acknowledgement and acceptance of adult learners’ self-directedness and its obverse, dependency in specific, context-bound and limited situations seemed to compliment not contravene the constructs of the transtheoretical model. Furthermore, since few diabetes self-management programs have embodied anything but a pedagogical approach inclusion of Pratt’s model of andragogy reaffirms the importance of diabetes treatment programs that are adjusted to the individual adult diabetic client’s problems and needs not the facilitator of the intervention.

Thus, collectively there were a number of considerations made as the strategy oriented education intervention was designed and implemented. The following is a list of the specific features:
- Preliminary screening using physical activity readiness, self-assessment and stages of change questionnaires will be administered prior to the onset of the intervention;
- Preliminary assessments will be conducted to determine individualized baselines so that intervention strategies can be tailored to meet specific needs;
- Stage-matched, individualized and personalized intervention components will be created targeting those individuals in the contemplation/preparation stage of change (e.g., participant manual included weekly themes, decisional balance worksheet, SMART goal-setting, rewards and strategies, time management when in the preparation stage and troubleshooting situations, relapse planning, long-term goal-setting, reinforcement management when in the action stage);
- Four weekly two hour intervention sessions will be scheduled following completion of the preliminary screening and assessments;
- Individual contact outside of the intervention session will be provided by the facilitator and intervention cohorts during the intervention sessions and throughout the three months following the intervention to enhance and sustain motivation;
- Provision of both information and skills necessary to guide self-change efforts including group walks, use of the pedometer, precautions for walking, intensity levels, and recording and tabulating activity calendar results will be included;
- Multiple channels of intervention delivery (e.g., written materials, group discussion, email, consciousness raising sessions, journal writing, evaluations) will be used in accordance with Pratt’s approaches for effective facilitator-adult learner relationships;
- Recognition of the situational, learner and facilitator variables will be considered repeatedly to best address each participant's state of dependency and path to self-directedness;

- Population-tailored materials (e.g., appropriate reading level), physical activity and diabetes information and web related sites for future reference will be provided;

- Journal writing and self-evaluations will be completed by the facilitator at the end of each weekly intervention to reflect on the quality, impact and appropriateness of the intervention materials; and

- Three interviews will be conducted (pre-intervention, mid-intervention (at four weeks) and post-intervention (four months)) at which time several clusters of questions regarding personal data, content, teaching format, expectations, behavior change issues, outcome expectations, intervention strategies and processes of change will be addressed.
CHAPTER THREE: THE METHODOLOGY

The methodology — the rationale for the research design:

Selection of a specific conceptual and methodological approach, that may or may not reflect the complexities and the individuality of those who constitute the inquiry, depends on the nature of the research question. One of two competing research perspectives, namely the traditional or contemporary paradigms, house the various conceptual and methodological approaches. In its most simplistic form, the traditional research paradigm is “essentially devoid of person and context, reflecting an objective, logical-deductive view of knowledge” (Cole and Knowles, 1993, p. 475); whereas, the contemporary research paradigm “respects, listens to, and gives attention to how the research act and process fits with the everyday lived experiences—it is more subjective, personal and professionally intrusive” (Cole and Knowles, 1993, p. 477).

The purpose of this section is not to argue the superiority of one paradigm over the other, but to show how the underlying assumptions and intended purposes of the contemporary research paradigm in comparison to the traditional research paradigm was more appropriate to frame my examination of the strategy oriented education intervention and its effects on adults with Type 2 diabetes as they attempted to change their behavior to adopt and adhere to a more active lifestyle. Triangulation using some traditional assessment techniques was also included. Practitioner research—“a name given to the implementation of action research in educational settings” (Jacobson, 1998, p. 125) shaped the conceptual and methodological approach from which the issues of personal experience and objectivity
were assessed given the myriad of research issues that influenced my selection of this research format.

Introduction

"Research is central to the development of any field of study. It is the means by which a discipline expands its knowledge base; and in applied fields, it informs and enhances practice" (Merriam and Simpson, 1995, p. 1). It is used to discover reality structured from human experience—a pathway to knowledge. Leedy (1993) suggests that "the selection of either paradigm rests upon a bedrock axiom: The nature of the data and the problem for research indicate the research methodology" (p. 139). Merriam and Simpson (1995) maintain it is also important to consider the state of knowledge, that is, will the research process involve testing a well-developed theory, clarifying or refocusing tentative theories, or developing a new theory (p. 26). Moreover, research paradigms "should be judged not in terms of some external, meta-standard but in terms of an internal standard: their adequacy. Adequacy, then, becomes the measure of worth" (Briton, 1996, p. 82).

My selection of the contemporary research paradigm rests on this notion. Like Eisner (1985), I seriously question the adequacy of traditional research to inform practice or bring about reform efforts as is needed in existing diabetes education programs. By excluding the concerns and insights of those who are best informed about the everyday experience of being a diabetic (Gitlin et al., 1992) we learn little about the actual exercise practices of these persons (Krug et al., 1991). Krug et al. (1991) made a similar observation and recommended further research be conducted to address methods that would increase long-term adherence to exercise with particular attention paid to the special needs and problems related to exercise in persons with Type 2 diabetes. Prochaska et al. (1992) reported that although hundreds of
psychotherapy outcome studies have demonstrated people can successfully change or modify problem behaviors with and without the help of professional treatment, these outcome studies have taught us relatively little about how people change. As well, research by Campbell et al. (1996) states more focus should be placed on the value of outcomes that reflect the health status, well-being or quality of life of the individual with Type 2 diabetes, rather than focussing only on knowledge and physiological outcomes. Thus, for one to delve into the complexity of these research issues both the personal and professional ways of knowing for both myself and the persons with Type 2 diabetes must be considered amid a complex array of historical, political, societal, local community, and personal circumstances (Cole and Knowles, 1993).

The general foundational paradigm shift has moved “traditional approaches to educational research, broadly characterized as ahistorical, acontextual, and apersonal,” to the side “to make room for alternative approaches in which the intensity of human actions and their meanings are centrally located” (Cole and Knowles, 1993, p. 477).

The primary emphasis on probing for meanings reflects a different set of values: responsiveness to human contexts, acknowledging the richness of human experience, and allowing theory to follow from observation, rather than the converse. (Jacobson, 1998, p. 126)

Consequently, utilization of this research approach to focus more on qualitative issues would then meet the recommendation put forth by Swift et al. (1995) to examine why some persons with Type 2 diabetes are able to overcome perceived barriers to exercise while others are not able to do so. It would also facilitate further research initiated by Buxton et al. (1996) who looked at the applicability of the stages of change model to exercise behavior and noted how limited information was on the process of how best to motivate or to move individuals from
one stage of change to another. Thusly, the contemporary paradigm offers a relevant approach to research and evaluation involving human action—in this case behavior change.

Practitioner research casts its ideological roots in the contemporary paradigm, drawing from a wide range of interdisciplinary influences such as hermeneutics, postmodern philosophy and critical analysis (Sumara and Carson, 1997, p. xiii). As the name implies, it seeks to improve 'our own practice.' "It is a lived practice that requires the researcher to not only investigate the subject at hand but, as well, provide some account of the way in which the investigation both shapes and is shaped by the investigator" (Sumara and Carson, 1997, p. xiii). In doing so, it envelopes the personal.

Consequently, a shift in the hierarchial relationship between the researcher and the researched has also occurred; thereby, creating greater reciprocity and equity between the researcher and researched. "Participants are viewed as legitimate and equal partners in the creation of new knowledge" (Gitlin, et al., 1992, p. 20). Campbell et al. (1996) agree and contend further investigation of less intensive educational approaches that are based on behavioral strategies to encourage client empowerment are important to be able to provide more concrete evidence-based guidelines for future diabetes education programs.

Collaboration after all provides a framework for shared, purposeful endeavor (Nixon, 1987, p. 6). It "opens up lines of communication...that, if done in a spirit of collegiality and responsibility, provides educators with new perspectives on their work" (Oja and Smulyan, 1989, p. 15). Enhanced lines of dialogue and shared personal experiences offer diverse views of teaching and have the potential to improve practice. A review by Glasgow and Osteen (1992) put forward to include: 1) characteristics of clients who do well in a diabetes education program versus those who do not; 2) barriers to participation experienced by non-
participants; and 3) barriers to follow-through on educational recommendations experienced by participants provides outcome measures to better understand the program results in future research projects.

Consequently, the contemporary perspective enabled me to “view my teaching as inquiry and inquiry as development” (Cole and Knowles, 1993, p. 475). In so doing, I was able to build on the recommendations emanating from previous research and investigate issues that interested me related to how people change, my role in the behavior change process and how that change impacts quality of life, health status or well-being. Developing an understanding of how these issues are influenced in relation to interventions of behavior change seems paramount and using a contemporary research paradigm facilitated my inquiry.

Case study analysis

The case study design was “employed to gain an in-depth understanding of the [issues] and meaning for those involved” as well as to explore the “process rather than outcomes [only], and context rather than a specific variable” (Merriam, 1998, p. 19).

Case study analysis was also selected because I had little control over the situational variables associated with the participants. Merriam (1998) recommends in these situations that case study be used. As a practitioner researcher, case study analysis allowed me to get “as close as possible to the subject of interest...partly by means of direct observation in natural settings, partly by access to subjective factors” (thoughts, feelings and desires) (Bromley, 1986; cited in Merriam, 1998, p. 32). Interviews, observations recorded as journal notes, and document analysis of activity calendars, journals, evaluations and correspondence were the three methods of data collection used in this study and given the uniqueness of this
study this approach revealed more about the thoughts, feelings, experiences of the participants we would not otherwise have had access to.

Using these techniques of case study data collection allowed me to focus on process as well which permitted me to: 1) describe the context and characteristics of the participants of the study, 2) discover the extent to which the intervention had been implemented, 3) provide immediate feedback of a formative type, and 4) discover or confirm the process by which the intervention had the effect that it did—otherwise known as causal explanation (Reichardt and Cook, 1979; cited in Merriam, 1998).

The overall intent of this research project was to use the descriptive data to develop conceptual categories, and to illustrate, support and challenge theoretical assumptions held prior to the data gathering. My goal was to gather as much information about the issues as possible with the intent of analyzing, interpreting and theorizing about the phenomenon. This type of case study is known as interpretive. The model of analysis is inductive. For the purposes of this study, each set of data were analyzed as a within case study—each a comprehensive case in and of itself (Merriam, 1998). Once the analysis of each case was completed a cross-case analysis was used to establish patterns and build abstractions across the cases. In doing so, the researcher's goal was to "build a general explanation that fit each of the individual cases, even though the cases varied in their details" (Yin, 1994, p. 112).

The strengths of case study analysis are many as long as it best suits the nature of the research problem and the questions being asked. In this instance, I believe the case study offers:

- a means of investigating complex social units consisting of multiple variables of potential importance in understanding the phenomenon. Anchored in real-life situations, the case study results in a rich and holistic account of a phenomenon. If offers insights and illuminates meanings that expand its readers' experiences. These
insights can be construed as tentative hypotheses that help structure future research. Because of its strengths, case study is a particularly appealing design for applied fields of study such as education. Case study has proven particularly useful for studying educational innovations, for evaluating programs and for informing policy. (Merriam, 1998, p. 41)

However, there are limitations to this research design as well. For as much as it may provide rich descriptive data, case study analysis is expensive and time consuming. A worthy case study may also be too lengthy, too detailed or too involved for its intended audience. It may oversimplify or exaggerate a situation leading the reader to erroneous conclusions. Issues of sensitivity, integrity and ethics on the part of the investigator can also bias reports; thereby, casting doubt on issues of reliability, validity, and generalizability (Merriam, 1998).

Thus, a good case study must extol a number of explicit characteristics to minimize these limitations. First, one must derive a theoretical framework from which to design the research problem. Once that is established, purposeful sampling of a known population or criterion-based selection of people or sites to be studied is necessary. Deciding what information will be needed to address the problem and how best to obtain that information is next. Thus, conducting effective interviews, using observation as a research tool, delineating what to observe, the relationship between observer and observed and the means for recording observations, in addition to examining various types of documents become important when attempting to understand the case in its totality. "The intensive, holistic description and analysis characteristics of a case study mandates both breadth and depth of data collection" (Merriam, 1998, p. 134). Analysis of the data occurs simultaneously and involves the process of making meaning out of the data collected. Researchers need to trust themselves as the instruments of analysis. "Data analysis is a complex process that involves moving back and forth between concrete bits of data and abstract concepts, between inductive and

Finally, assessing issues of validity, reliability and ethics using a case study approach employs a different set of evaluative criteria as compared to those used in traditional research. For instance, involving participants in all phases of the research, clarifying researcher biases and assumptions and theory underlying the study, triangulating data, and checking interpretations with individuals interviewed or observed are a few examples of how researchers can “contribute results that are believable and trustworthy” (Merriam, 1998, p. 218). And if done correctly, “well-done case studies can add nuance and subtlety to the ideal-typical perspective of theory” allowing the reader to “not simply assimilate the case being described into a theoretical ideal type; rather the reader should have an opportunity to enrich his or her understanding of an ideal type by accommodating the novelty of the particular case” (Donmoyer, 1990, p. 196). Merriam (1988) concludes that one should use a case study to understand an issue in depth not to determine what is generally true of the many; thereby, allowing for generalizability of meaning rather than fact.

Strategy oriented education intervention format

This study was conducted at an Ontario College of Applied Arts and Technology (CAAT). The intervention format consisted of: 1) four weekly group meetings that were held during the first month of the study; 2) individualized goal setting and self-monitoring using an Accusplit Alliance 120 (SW-200) pedometer for feedback; 3) one progress meeting at the end of the second month—instead of two progress phone calls (as determined by the intervention participants)—at which time the participants also decided they would resume meeting once a week to walk for 30 minutes on their lunch breaks; 4) informal email correspondence throughout the 3 months of unsupervised activity instead of telephone
follow-ups; and 5) activity calendars and journals. The content of the weekly meetings was designed using the transtheoretical model to guide and support the desired behavior change, provide direction using the appropriate processes of change, assist with the decision balance, identify behavior change strategies, increase self-efficacy and offer social support for daily activity. Weekly goals were progressively increased based on individual self-efficacy and goal achievement. Participants were also asked to share their weekly pedometer goals and progress, thus observing and learning from the experience of others in the intervention.

The sample selection

_Inclusion criteria/practitioner as researcher:_

As a researcher interested in my own practice, I included myself in the sample selection. In so doing, I recognized the necessity of being not only the investigator but also the instrument and treatment of my own research. The criteria for my inclusion was a need to study myself as an educator—to be self-evaluative of my own teaching—as a means to improve the quality of my actions in context and enhance collaboration with the adult participants.

_Inclusion criteria/participant:_

- Completed Physical Activity Readiness Questionnaire (PAR-Q) (refer to Appendix F) without any “yes” responses or Physical Activity Readiness Medical Examination (PARmed-X) with family physician’s authorization to participate in the intervention (refer to Appendix G)
- Completed informed consent form (refer to Appendix D)
- Diagnosed with Type 2 diabetes

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- Sedentary/low activity level (defined as not currently enrolled in a formal exercise program and/or not accumulating 30 minutes or more of moderate physical activity more than two days per week) as identified as contemplators in the stages of change questionnaire (refer to Appendix 1).

*Exclusion criteria/participant:*

- Individuals who answered “yes” to any of the PAR-Q questions and did not receive activity clearance from their family physician on the PARmed-X form
- Individuals older than 69 years of age or younger than 30 years of age
- Individuals who identified themselves as precontemplators on the stages of change questionnaire

*Recruitment:*

Research participants were recruited through an advertisement (refer to Appendix A) placed in a newsletter (February, 1999) sent to all individuals currently registered with the local diabetes association and an internal newsletter (March 12, 1999) distributed biweekly to all employees of the Community College. Interested participants were asked to respond to me by phone no later than March 26, 1999. There were no responses from the ad placed in the newsletter, four college employees responded by the specified timeline to become study participants, and one additional college employee responded but after the preliminary assessments had already started so was put on a wait list for the next intervention. Two of the four participants required activity clearance from their family physician using the PARmed-X form before they were allowed to proceed with the preliminary assessment items.
Preliminary screening of interested individuals was based on the current industry standards as recommended by the Canadian Society of Exercise Physiology (CSEP) and supported by the Fitness Program of Health Canada. Those individuals who completed the PAR-Q with any positive responses were required to have their family physician complete the PARmed-X authorizing activity clearance. The PARmed-X is a physical activity checklist that includes a conveyance/referral form. An information letter accompanied the PARmed-X explaining the purposes of the intervention. Family physicians were responsible for exclusion of those individuals for whom exercise was contraindicated.

Design:

The quasi-experimental design is a research methodology that does not attempt to control for extraneous variables, but instead investigates cause-and-effect relationships by manipulating an independent variable (McMillan and Schumacher, 1993). In this study, the independent variable was a specific behavior—level of physical activity—which was influenced using the transtheoretical model of behavior change in the strategy oriented education intervention. Specific changes in 1) total number of steps and average weekly steps taken over the four month intervention as recorded on the activity calendars; 2) preliminary assessment and repeat measures; and 3) glycemic control using copies of the subjects’ habitual records were analyzed using Microsoft Excel.

To investigate the specific changes in total number of steps and average weekly steps taken over the four month intervention, a single subject experimental research design was used which allowed me to assess the impact of the behavior change intervention on the physical activity levels of the four participants. More definitively, I was able to test the hypothesis that a strategy oriented education intervention based on the transtheoretical model
of behavior change and a pedometer could improve the physical activity level of adults with Type 2 diabetes—was there a predictable cause-effect relationship?—(Neuman and McCormick, 1995).

Using a reversal or ABA format, five days of baseline data were collected pre-intervention when the participants each wore a pedometer that was taped shut to restrict them from viewing their results. Five day stepping totals were averaged to determine a baseline and provide a reliable picture of "normal" without the effects of the intervention. Then the participants were introduced to the intervention and data were collected daily for four weeks. Following that, the intervention was withdrawn and measures were taken for another twelve weeks to determine if the responses of the participants would go back to baseline.

Self-reported pedometer readings, which provided objective feedback on a daily basis to the participants, were recorded on weekly activity calendars and used to assess response patterns over the sixteen weeks of the study. Participants served as their own controls throughout the study although measures of resting heart rate, resting blood pressure, waist girth, weight and height were assessed by me pre-intervention, week five and week sixteen using standardized measurement procedures as defined by CPAFLA.

All data were graphed and visually assessed for each subject while measures of effect size were determined using Cohen’s (1977, p. 26; cited in Wilcox, 1996, p. 157) guidelines for normal distributions. Normal distribution was assessed for each case study and in all instances the data were found to be within three standard deviations of the weekly intervention mean satisfying the criteria for normal distribution. Small, medium, and large effect sizes that corresponded to differences equal to .2, .5, and .8, respectively (Wilcox,
1996) were used which proved especially useful in this small sample by providing a measure of importance.

Typically, effect size measures the extent to which two groups or two measures differ (Wilcox, 1996). Effect size can be calculated using various measures such as the difference between mean values or the difference between median values depending on what perspective you are after. Because I was interested in analyzing the data of four within case studies to assess individual progress over time (Suen, 1990)—not the usual situation for effect size calculations—I was advised to measure the difference between baseline mean and the weekly intervention mean for each individual using the following formula:

$$\Delta = \frac{\mu_1 - \mu_2}{\sigma}$$

Standard deviation was determined using the square root of the variance. The variance value was calculated using the sample data of each case study (Page and Patton, 1991). Baseline mean was the equivalent of the five day pre-intervention average and the weekly intervention mean was the equivalent of the average of the sixteen weekly stepping averages (refer to Table 3).

Prior to the start of the strategy oriented education intervention, participants underwent several preliminary assessments which included measurement of weight, height, resting blood pressure, resting heart rate, and waist girth. Weight and height were measured to calculate body mass index (kg/m²). Measures of resting blood pressure and heart rate were included because retrospective epidemiological data and animal studies indicate that physical training reduces atherosclerotic vascular disease as evidenced by reductions in blood pressure and improvements in lipid profiles, both of which may contribute to the reduction
Table 3: Data for calculating effect size

<table>
<thead>
<tr>
<th>Case study</th>
<th>Weeks (N)</th>
<th>Weekly intervention mean (μ1)</th>
<th>Baseline mean (μ2)</th>
<th>Standard deviation (σ)</th>
<th>Effect size (Δ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane</td>
<td>16</td>
<td>9245</td>
<td>6708</td>
<td>2108</td>
<td>1.2</td>
</tr>
<tr>
<td>Brian</td>
<td>16</td>
<td>5996</td>
<td>5778</td>
<td>1597</td>
<td>.14</td>
</tr>
<tr>
<td>Peter</td>
<td>16</td>
<td>13610</td>
<td>11770</td>
<td>2445</td>
<td>.75</td>
</tr>
<tr>
<td>Joan</td>
<td>16</td>
<td>11436</td>
<td>7523</td>
<td>2959</td>
<td>1.3</td>
</tr>
</tbody>
</table>

of risk for coronary heart disease (Tsiani and Giacca, 1999, p. 44). Waist girth was selected as an assessment item because it was one of the simplest and best anthropometric correlates of visceral adipose tissue accumulation (Despres, 1998, p. 1). “Furthermore, longitudinal studies have revealed that waist circumference changes can detect increases in visceral adipose tissue accumulation over the years even in the absence of any change in body weight or total body fat mass” which is significant given that “individuals with excess visceral adipose tissue accumulation are characterized by insulin resistance, compensatory hyperinsulinemia and glucose intolerance, all of which are metabolic alterations” typified by Type 2 diabetics (Despres, 1998, p. 1). Also worthy of mention is Despres’s comment that “the waist circumference appears as a relevant and useful tool to assess the success of therapeutic approaches aimed at the treatment of visceral obesity and related metabolic complications” (1998, p. 1).

The assessment protocol adhered to the guidelines deemed appropriate for use by Professional Fitness and Lifestyle Consultants (PFLCs) (CPAFLA, 1997). The assessments were conducted solely by the principal researcher who has approximately twelve years experience conducting fitness assessments to ensure conformity with assessment protocol.
and reliability in repeat measures. Other baseline data collected included a self-reported date of diagnosis, age, level of physical activity using the Stages of Change questionnaire for exercise because of its demonstrated reliability and validity as well as being significantly related to instruments measuring self-efficacy and decision making (Marcus et al., 1996), previous diabetes education, current glycemic control and diabetes treatment regimen. Part of the preliminary assessment also included collecting baseline data on the number of steps taken over a five day period of normal activity patterns. To do this, study participants wore the pedometer attached to their waistband. The suggested five days included 3 mid-week days and a weekend to reflect almost all aspects of the participants’ weekly activity pattern. The pedometers were taped shut throughout this five day period so that participants were not able to view or adjust their number of accumulated steps. The five day total was then averaged and used as a reference from which to individualize goal setting during the first week of the intervention program.

Once the preliminary assessments were complete, participants were asked to complete a pre-intervention interview (refer to Appendix L). Interviews were conducted by me on an individual basis and typically took 1.5 to 2 hours to complete. A second interview (refer to Appendix M) was conducted within one week after the completion of the four week intervention. A final interview (refer to Appendix N) was conducted approximately four months from the start of the strategy oriented intervention. The final interview took the form of a group interview. Three of the four study participants participated in the group interview, the fourth was on vacation and unable to attend. To complete the interview process with the fourth participant, I provided a copy of the audio tape and the transcribed notes of the final interview for her to review. Then I suggested she add comments to the transcribed notes.
wherever she felt she needed to clarify, reinforce, or add to the group’s responses which she did. Following that, I offered to review the transcribed notes along with her comments when we met to complete the final assessment.

All interviews were conducted by the principal investigator, recorded on audio tape and all sections were transcribed by an external agency for purposes of analysis and comparison. Transcription was typically complete within three weeks of the interviews at which time participants were given a copy of their responses and asked to review.

Anonymity was guaranteed by the following: 1) participants were never identified by name; 2) all interviews were coded for later reference; 3) specific identifying information was removed from the written reports, for example, place of employment, details of medical condition; 4) the raw data will be stored in a secured archive for two years and will then be destroyed; and 5) individual access to personal data during this two year period will require written authorization by the principal investigator and written consent from the interested participant. Participants were able to refuse to answer any questions or questionnaires and were given permission to withdraw at any point in the research process (refer to Appendix C). A copy of each transcribed interview was made available for the participants to review, edit and respond to. Changes and revisions were then made to the original transcription.

The first set of interview questions was designed based on a review of the literature, my experiences and the results of the fall pilot study. There were five distinct categories of questions: personal data, andragogical issues, stages of change issues, intervention strategies/process of change and outcome expectations and issues. The format for the first and subsequent interviews was semi-structured with ample opportunity provided for spontaneous dialogue/sharing by the interviewees. Participants were made aware that their
comments, ideas or issues might be pursued in subsequent interviews although adherence to similar themes of questions would occur throughout the interview process. For instance, in the second and third interview, one section of questions was personalized to reflect on an individual’s journal comments, intervention experiences, and feelings.

Prior to each interview, participants received a copy of the interview questions at least one day in advance to allow them time to mull over their thoughts and formulate responses. In addition, a short questionnaire based on Pratt’s relational construct of andragogy was administered at each of the interviews to compare individual responses to issues of support and dependency. Assessments were always conducted at the end of the interviews because the results for blood pressure and heart rate were more indicative of resting values—participants had sat restfully for 60 to 90 minutes.

Prior to the start of the study, participants were asked if they would be willing to keep a journal to document their feelings, perspectives, and experiences as they moved through the intervention process. All participants agreed to do this and all four allowed me to collect and analyze their journals twice throughout the study: once prior to the second interview, and again prior to the final interview. Journals were fully transcribed by me, analyzed for their content and details collected from reading the journal stories were used to help design second and final interview questions. Completed intervention tools, facilitator’s journals, intervention evaluations, stages of change questionnaires and participant evaluations were collected and analyzed using content analysis techniques. This form of analysis was used as a practical way to indirectly uncover behaviors and implicit beliefs and make them explicit—open for further investigation (Rothe, 1994, p. 101). For instance, words or
descriptions or responses from both the “researched” and “researchers” were categorized, coded and/or counted.

Other data, including quantitative data such as average steps/day recorded via the pedometer, repeat measures of the preliminary assessment items, and glycemic control using copies of the subjects’ habitual records, collected weekly were utilized for purposes of triangulation.

**Issues of reliability and validity:**

To address the issues associated with reliability and validity using a case study method, I chose to reference Rothe’s (1994) book, *Qualitative research: A practical guide*. In so doing, I aligned my thinking with Rothe who noted that “as researchers, we must acknowledge that there exist at least several, if not infinite numbers of orders of realities, each with their own special separate styles of existence” (1994, p. 121). What this means in relation to issues of reliability and validity is significant. For instance, when attempting to validate or “gain accurate and true impressions of the phenomenon being studied” (Rothe, 1994, p. 122) qualitative researchers should really address “the key question, “Do the people we researched build concepts and constructs of their daily lives out of the same data that we gathered, and do the same general themes emerge?”” (Rothe, 1994, 123). To scrutinize problems commonly associated with validity Rothe suggests three approaches: 1) during interviews the interviewer can clarify original responses if unclear by asking follow-up questions; 2) the researcher can focus on a response given by one individual and ask others for their interpretation as a means to discover “the generalized meaning or idiosyncrasy of an answer”; and 3) “researchers can provide the subjects with copies of data analysis and interpretation” which provide participant validation (Rothe, 1994, 124).
Reliability, on the other hand, is viewed dichotomously. Some qualitative researchers see reliability issues as "an irrelevant feature because people’s realities differ, situations constantly change and researchers’ perspectives on the topic of study are never alike" (Rothe, 1994, 124). For others, reliability is the extent to which other researchers make similar observations assuming training, rapport and understanding of the field setting are homogeneous. Either way, Rothe contends that "there is a greater chance for data verification in qualitative research than there is with any other research approach" (1994, p. 126) because the methods utilized can be tailored to the respondents and the data collected are more likely to be accurate, complete and in-depth than that found with other forms of inquiry.

Accordingly, the results of this study were validated and checked for reliability in a number of ways. First, I will discuss issues associated with validation. Baseline data to determine average number of steps taken over a five day period was collected prior to the start of the intervention. The SW-200 pedometer was selected after having been tested for accuracy with other indicators of physical activity prior to the 1998 pilot study. It was also simple to use and user-friendly. Stride length, in particular, was not measured on this device. Battery life in the pedometer was presumed to influence validity; however, I surmised that because of the participants’ heavy reliance on the pedometer, minor deviations in stepping response would be detected and corrected early; thus, minimizing issues of validity.

Participants were not privy to baseline data until after the steps were recorded to reduce the likelihood of altering ‘normal’ activity patterns. The five day period of baseline stepping included three weekdays and one weekend to accurately depict a week’s worth of normal activity in five days. Unfortunately, data on the accuracy of the SW-200 pedometer
is currently under investigation by Dr. David Bassett, University of Tennessee and not available at this time. Baseline data was then used as a reference point to compare to the sixteen weekly stepping averages and the overall intervention stepping averages. My experience and knowledge as a CSEP qualified appraiser using standardized CSEP protocol ensured accuracy and validity in the collection of the secondary data measures.

Diet, insulin use, and other health habits were considered extraneous variables regulated and controlled by medical personnel and thus not measured or changed in this study. My investigation was focused on one independent variable or behavior change and that was increased activity levels. There was no attempt to diagnose the participants' disease or its interplay with increased activity levels despite evidence that activity can improve insulin sensitivity and glucose tolerance (Berkowitz, 1998). Furthermore, I felt it was ethically inappropriate to ask participants who normally did not measure their blood glucose levels on a daily basis, particularly those individuals who were non-insulin dependent, to monitor their sugars more frequently than normal because of the additional expense and if improved control of blood glucose levels was not part of their outcome expectation. Participants were encouraged to pursue specific diabetes related questions with their doctors.

Participant evaluations were collected throughout the study, their input and insights were recorded and reflected on, and participants reviewed and critiqued collected data and analyses at various stages in the research project. All agreed to review their final case study analyses. The recording and reporting that took place, for example, on the activity calendars was taken without question. In fact, I was assured by the participants in the final interview that telling me anything but the truth was only harming themselves... "I want to know exactly what my body is doing with my insulin, my exercise and my diet... A person does
not have anything to gain [by falsifying statements], they have more to lose as opposed to gain.” To check for validity, it was affirmed that I could “use the readings I was getting. They reflect more of an honest response because we are up and down all over the place. If they were very, very consistent, always within the range, then I [should], as [the] facilitator…question [the results].” I believe the responses I received from the participants were also very accurate because: 1) the interview questions were viewed by them prior to the actual interview; 2) the interviews were structured both individually and as a group; 3) triangulation occurred using a variety of sources including journals, intervention evaluations, goal setting worksheets, activity calendars; 4) there was equal representation from both genders; 5) we developed a good rapport in an informal, non-hierarchical environment; and 6) as co-workers within the same institution with the same disease they were supportive and sympathetic to each other’s needs and concerns. However, perhaps the strongest evidence to support the validity of this study was the response I received from one of the respondents during the final group interview. At that time, I was told that “a year would be a better measuring stick for a program like this….My suggestion to you is to reevaluate this particular team perhaps in a year from now….Why don’t we just keep going and doing this?”

With respect to issues of reliability, I believe a number of things occurred throughout this study to insure that this parameter was met. First, the CPAFLA protocol was included for its known repeatability using standardized, properly calibrated equipment. The group walks were specifically structured with respect to time and monitored throughout the first four weeks of the intervention to assess and correct participant use of the pedometer. Thus said, the timed walks were then used instrumentally as reference points for weekly goal
setting throughout the first four weeks of the intervention and for comparative purposes when participants completed the study on their own.

The SW-200 pedometer was used. It recorded only the number of steps taken so no additional calibration was required, and participants were instructed on how to use properly and where best to wear the pedometer. The average stepping results of the four participants within this study indicated that 7000 steps on the pedometer was roughly equivalent to one hour of stepping. The results of a pilot study by Tudor-Locke, Myers, and Rodger (1999b) reported similar findings in that approximately 30 minutes of continuous walking at a brisk pace yielded 4000 steps. Somewhere between 12000-15000 average steps per day, depending on the individual and their personal circumstance, a point of saturation occurred. The “saturation point” denoted the need to increase intensity of stepping rather than volume of stepping because of personal limitations and the time required to achieve the weekly goal.

The strategy oriented education intervention that took place in the first four weeks of the study was accompanied by the *Step by Step* participant manual (refer to Appendix J). The manual was structured using four different modules to address various issues and stages of behavior change; however, interpretation and discussion of the content of the manual was participant driven. Because of this variable, each session and each discussion in this study varied as would future interventions with a different study cohort and facilitator despite using the curriculum found in the *Step by Step* manual. Furthermore, I believe the role of the facilitator is to reflect on and respond to the learning needs of the study cohort and specific individuals rather than trying to repeat previous teaching experiences. In this study, it was my intention to put to practice Pratt’s model of relational learning to accommodate the various levels of dependency, self-confidence, and direction required by each of the adult
participants. No doubt the quality of my interface as the facilitator with each of the participants also had a significant impact on the responsiveness of the participants. For example, three of the four participants said they needed my support and guidance, one participant did not. Future interventions could elicit entirely different responses. Higher participant to facilitator ratios could change the dynamics of the group. Different personalities within the group cohort or work cohorts versus community-based cohorts could also bring diverse responses.

In what season the intervention is offered is also likely to influence the behavior change process as evidenced by the weekly variations in stepping that took place during the summer months of this intervention. For instance, deviation from established routines because of vacation or excessive summer heat had a negative impact on the volume of stepping in this study, which might have been avoided if this intervention had been offered during the fall or winter. Variation in the starting point within the stages of change model could alter the intervention as well, as could individual dependency on a variety of processes of change within the same intervention. Therefore, being able to respond to and meet the specific needs of each participant equally thus requires inequality. For example, in this study one individual required more assistance and subsequently more time from me as compared to the others to understand and apply the principles of SMART goal setting. By providing her with this additional support and direction, I created an unequal learning environment that I felt was necessary to proceed with the behavior change process. In terms of reliability, I suggest that my reality might differ from other researchers were they in the same circumstance, the situation is likely to change in the next intervention and teaching perspectives vary; thus, influencing the extent to which similar observations about the same
situation might be made. Finally, demographic variables, pre-intervention activity levels, length of diabetes, type of diabetes, past experiences, and treatment protocol are all relative attributes, common to people with Type 2 diabetes yet influential in determining individual outcomes. Thus, data verification in this qualitative study has been tailored to the study respondents and collected in such a way to best reflect individual experiences as described in the single case studies and analyzed in the cross-case analysis.
CHAPTER FOUR: CASE STUDY AND CROSS-CASE ANALYSIS

Introduction to case study analyses:

In this chapter, five individual case studies are described and analyzed followed by a cross-case analysis. The first four case studies reflect details pertaining to the participants of the study while the fifth case study was written from the facilitator’s perspective. The first four case studies follow a similar format with six distinct sections—pre-intervention, active intervention (week 1–4), post-intervention (denoted as week 5 and beyond), end of study, results and summation. The case studies are descriptive by nature based on materials drawn from several interviews, completed intervention tools and questionnaires, personal journal writing, and a number of quantitative measures.

The results section highlights changes in a number of quantitative measures for each case study. A brief introduction has been included to explain the method of calculation.

Results:

When I began to review the quantitative data, I felt I needed a reference point for each case study beyond the five day baseline average number of steps. I didn’t feel the number of steps alone was enough from an application and program perspective to be entirely useful. Thus, I decided to utilize the timed walks included as part of the four week active intervention to determine the number of minutes spent stepping each day.

To determine a value in minutes spent walking per day, I took each timed walk and calculated the number of steps taken in one minute. Then I averaged the four timed walk values to create a new reference point of steps per minute. From there, I then compared the steps per minute value with the five day average baseline to determine the total amount of
time spent walking per day prior to the start of the intervention. This pre-intervention time then became a reference point for weekly comparisons such that I could compare changes in total number of steps, average number of steps per week and average time spent stepping per week.

The one drawback to using this calculation was the comparison made of the pre-intervention average with the intervention baseline created as a result of using the timed walks from the active portion of the intervention. The timed walks were done collectively with the potential for the participants to be extrinsically motivated as compared to the pre-intervention baseline that was done individually without prejudice. To examine whether or not the group walks did have an influence or not I took the results of the first timed walk and compared that to the change in the overall average amount of time spent stepping after 16 weeks. Then I added the extra steps to the pre-intervention baseline and compared that number to the overall daily average. If the numbers were similar I assumed that intensity had not changed significantly and thus, it was fair to compare the pre-intervention average with the intervention average created as a result of using the timed walks. If the numbers were significantly different, I assumed intensity had changed as evidenced by an increased number of steps taken in the same amount of time.

The other measurement that I reviewed carefully and referenced with caution was the glycemic values. Case study 102 was the only participant to measure his blood sugars on a regular basis. The other participants had more of a sporadic, random pattern to their measurement schedule, measuring two, sometimes three, sometimes four times per week. Consequently, validity and usefulness of the glycemic values is questioned.
One other tool that was included but used cautiously because it lacked previous validation or reliability measures was a self-assessment survey for adult participants (refer to Appendix K). It was based on Pratt's relational construct of andragogy to measure changes in individual responses to issues of support and dependency. There were six questions in the survey that focused on: 1) skills needed to make daily activity part of one's lifestyle; 2) confidence in one's ability to make decisions to meet daily activity goals; 3) commitment to achieve daily activity goals; 4) the need for monitoring of progress, guided practice and continuous feedback; 5) organization of life needs to accommodate one's daily activity; and 6) confidence in one's abilities as part of the preparation for the group sessions. When surveyed, the participants were asked to reflect on specific segments of the future when answering each question. For instance, prior to the start of the intervention when the participants completed the first survey, I suggested they consider the pending active portion of the intervention; at the end of the active portion consider the post-intervention; and at the end of the study consider the next six months. The results of the survey responses have been included in table format to reflect changes in individual learning needs.

Following the results section of each case study, a short summation was provided to draw details of the study to a close.

The fifth and final case study was exclusively descriptive and self-reflective as taken from my personal journal. The perspective offered in this case study was meant to illuminate my experience as the facilitator responsible for the instruction, delivery and guidance offered to the adult participants of the strategy oriented education intervention.
The concluding cross-case analysis used inductive reasoning to identify patterns and themes common among the case studies to illustrate, support and challenge theoretical assumptions. In addition, the cross-case analysis investigated the real-life phenomenon of the participants' behavior change in an attempt to understand more clearly the importance of multiple variables. In so doing, these insights may help structure future research necessary for studying educational innovations and evaluating ongoing strategy oriented education interventions.

**Case study 101**

**Pre-intervention**

**Personal history**

The pseudonym for case study 101 will be Jane. Jane has never participated in a diabetes research study before and in fact took extra time at the onset to review the research details before committing to the study. I took that as a good sign because to me it meant she was taking her participation in the study seriously.

Jane is a 45-year-old Caucasian woman who works as a clerical support person at a community college. She is a mother of two adult children, a grandmother and currently resides with her mother in a rural setting. Jane finished grade 12. While caring for her children she worked part-time at several jobs before securing her current position.

Jane was diagnosed with Type 2 diabetes in 1989. Originally, she managed her diabetes with diet only and then after three years she was required to manage her diabetes with medication (2 different types of medication—7 pills a day) and a “strict eating plan that is very hard to do (laughter).” Jane measures her sugars “once a day if I am being good.”
Jane indicated there is a family history of diabetes. Currently, Jane still thinks that the diabetes is controlling her. She says it [the diabetes] is always on her mind as she struggles to decide what to eat or not eat and what to do or not to do and “then it just gets to you after a while and you say to hell with it (laughter).”

Despite feeling this way, Jane does think however, that the quality of her life has improved since being diagnosed even though she is not extremely satisfied with her well-being and/or health status presently. Jane attributes feeling this way because of the side effects of the oral medication she has to take. She said she would feel better if she were to lose some weight although she is conscious of the fact that she does not lose weight easily.

Jane speaks from experience. Prior to being diagnosed with diabetes Jane attended Weight Watchers for six to eight months with her mother and lost 54 pounds. She said she felt better when she weighed less although the weight has since returned. She has also tried “all the fad type things [diets]” and has had little long term success. She reports that the weight went on really quickly after the birth of her daughters. “It didn’t matter what I did…” my daughters and my mother are the same way. Her mother is currently attending Weight Watchers again and Jane hopes that they can encourage each other with their respective programs. Jane liked the structure of Weight Watchers—“knowing you had to be there once a week and get weighed in.” She also liked the competition of trying to lose more weight than her mom for their weekly weigh ins. She said if her mother lost more weight than she did “it would make her feel even more determined the next time.”

In addition to dieting, Jane also participated in aquafit classes last winter that were held at a local community center as another way of trying to lose weight. She enjoyed them and tried to “go sometimes three times a week;” however, she did not attend on a regular
basis—"I really don’t like to be regimented….Like you have to do this, this, and this, I guess (laughter) it is like the diet.” She also tried exercising to Richard Simmons tapes which she would do for maybe a month or six weeks and then tire of doing as well. Jane notes “most things I don’t procrastinate with except for this [exercise], I just kind of I guess ignore it. Ignore it and it will go away.”

Jane indicated that getting started with exercise is difficult but she enjoys it once she starts—“I like the feeling when you are done exercising….I just feel peppier and bouncier kind of”—and if she starts with someone she enjoys like a buddy. She finds that a buddy encourages her and she tends to stick with it more that is until problems scheduling time to exercise with the buddy occur and then “it [exercise] tends to fade away.”

Currently, Jane has been trying to take a short walk of ten minutes or so every night. In reality she figures she walks maybe four times a week at a relatively low intensity. So low in fact, that she does not think she can hear her respiration increase or see any change in her facial color. Jane clearly stated she does not like to sweat. She also does not like “all of the hubbub of changing and showering and all that sort of stuff after [exercising], having to carry that extra bag around and everything else that goes with it….Just the structure of it all too.”

Jane believes she is more active now having developed Type 2 diabetes. She attributes this to a change in her job where she is on her feet a lot—back and forth between two places—as well as “doing the exercise thing sporadically more now that I used to.” She believes she is most active at work and in the summer when she has a lot of things to do outdoors like yard stuff. Her four and five year old granddaughters also keep her busy especially if she takes them with her to the trailer on weekends. When asked to estimate how
many steps she thought she would take on a daily basis, Jane had no idea but guessed 5000 which was not that far off her baseline of 6708 steps.

At the time of being diagnosed with Type 2 diabetes, Jane’s physician suggested physical activity (walking specifically) be used as a management technique indicating the more active she was the “easier it [the diabetes] would be to control.” Unfortunately, this information is all Jane recalls receiving from her doctor with respect to activity guidelines. She notes a diabetes workshop offered through the Lawson Diabetes Center seven years ago provided little else on this topic. More recently, her doctor asked if she had been active but again offered “nothing much more than that.” During our interview, Jane said she would like to know “what is the best kind of exercise to do.”

Stage of change

Jane placed herself in the preparation stage of change and was quite anxious to get started “because [she] wanted to see some results” especially with the onset of summer fast approaching. Yet, Jane admitted that if the research study had not presented itself when it did she would likely “just roll along the way it was.”

Andragogical issues

As an adult participant, Jane reports feeling “more negative about some of the things” she has experienced in the most recent workshops and/or courses she has attended. Clearly, she does not like being lectured to or having to role play although she appreciates “handouts that kind of thing, something that you can review later,” to reinforce certain points, and group discussions. Jane learns best by doing immediately otherwise she will “tune out or lose interest or get bored.” She also feels “more comfortable in a smaller group.”
Citing Pratt's work with respect to relational constructs, Jane's confidence level coming into the behavior change intervention was eight out of ten. In other words, she felt quite confident that she was going to be able to change her behavior to become more active. Jane also had a high level of commitment to this study as indicated by the statement, "I can do four months no problem" and her score of eight out of 10 although she thought she might need a little push every now and then. In fact, she anticipated the first month would go rather smoothly but "after that, [would need a push] probably once a week (laughter)." In terms of support, she thought moral support from "probably the other people in the program" and me would help as well as receiving some feedback like a change in blood sugar or weight, knowing how everyone else was doing in the group or just feeling different.

**Intervention strategies/processes of change**

As previously mentioned, Jane has had prior experience with a variety of weight loss programs and reportedly "they [the diets and weight loss programs] all worked but not for long." Her greatest success was achieved through the Weight Watchers Program because her weight loss there lasted the longest. She attributes her success to the weekly weigh-ins, the support experienced as a result of attending the sessions with her mother, and the daily food diary.

When asked why Jane thought she was being asked to write in a journal as part of this study, she replied that she thought the journal would allow her to "look back and say okay I did this and this and I do feel better--my blood has come down. I think that will reinforce it [my behavior change]." I also asked Jane to identify things that motivate her. She answered, "sometimes nothing (laughter)." When I probed further, she responded that she needs to enjoy what she chooses to do in order to be and remain motivated. Chocolate is a favorite
reward. Yet Jane also indicated when she sees her daughters going through different things, she thinks back to when she went through the same kinds of things and that spurs her to "think well maybe that is why I do this."

Outcome issues

As we began the research study, Jane said she was comfortable committing to the four month time line even if it took until the end of July to finish. She also indicated that she had no preconceived notions or expectations as to what was going to happen throughout the intervention. However, she did wonder if the intervention would be "mixed men and women... and if it [the intervention] was going to be a structured kind of thing.... Like are you going to say like I want you to walk three miles tonight?" Beyond that, Jane had not given much thought to her personal preparation and the impending behavior change. When asked to think about the personal characteristics that might help her get through this experience she said she knew she "needed to do something just for my own benefit to extend my life... I know I have to do something more." Jane hoped that through her participation in this study she would insure "more control of the diabetes" and was prepared to work hard at achieving this goal.

Active Intervention (week 1-4)

Prior to starting the active portion of the intervention, I noted that Jane was the only participant I had not met before. She was the most difficult to interview—very succinct at times and maybe a little shy. I found her to be the least sure of her success compared to the other members of the group despite having a strong determination to give it [the intervention] a try. I was hopeful that Jane would see some definitive body composition changes as a
result of her participation in this study yet cautious given her history and previous experiences with weight management programs.

On Monday, April 12, 1999 Jane attended the first intervention session. She was a little quiet at first and a little reluctant to volunteer any answers to the posed questions but did eventually as the group relaxed. She laughed and conversed freely especially after the walk. I think Brian's humor also helped lighten the mood. As noted in my journal of Jane, Jane’s baseline was just over 6000 steps a day. Even though not really active, her numbers still exceeded most of the fall pilot participants. By the end of the session, her new weekly goal was 3000 more steps per day—wow. I couldn't help but think this was too much all at once but I didn’t comment. I reasoned she needed to figure this out for herself.

On her weekly goal setting worksheet, Jane considered this a “low goal” and was 100% confident she could achieve the increase. In my own journal I wrote,

I did not want to dissuade any one from their first goal... we would wait and see how they did next week. I also mentioned that I was intentionally not giving them a lot of direction at this point because they knew better than anyone what their life demands were and how committed they were to this behavior change.

Some of my concerns were abated when Jane

...realized that [her new goal] would require about 30 minutes more of walking a day. She referred to the numbers and her calculations from the 10 minute walk so a useful tool for the participants.

During the discussion portion of the first session

Jane was empathetic when Peter was asking a number of questions during the completion of the Decision Balance sheet as well as the consciousness raising session. She reassured him that even after 10 years she still didn’t feel she was in total control of her diabetes and that yes, she still fought the urges to have that piece of chocolate cake.

She seemed to have little difficulty completing the Decision Balance sheet and was willing to share her costs and gains. The most important gain was to feel better.
When I reviewed Jane’s first journal entry dated April 13, 1999—the day after the first intervention, she had revisited the “gain/losses idea.” In her journal, she listed her gains “as having more muscle tone, using sugar better, confidence, self-esteem while her losses were limited to freedom.” Having said that, Jane marked ‘freedom’ with a ‘?’ and the comment “(dumb, I know).”

Following that Jane did extremely well. The next day she took over 13000 steps (her goal was 10000). In her journal she wrote that she was going to buy some stars (gold) to place on her activity calendar for each day she achieved her weekly goal. Unfortunately, her next entry dated April 18, 1999 notes she was “struggling!...Made half of days targeted.” Despite this realization, Jane determined her overall steps were above her target when averaged over the week and so was prepared to increase her weekly goal again from 10000 to 12000 steps per day at the next meeting. She wrote, “Hope I haven’t bit off too much.”

After the second intervention, I wrote

Jane was much more involved in the group session tonight—much more relaxed and willing to share information and ideas. Jane has been using star stickers to mark her activity calendar. She eagerly offered to share her stickers with Brian and Peter and towards the end of the session was almost insistent that Brian put some on his calendar.

She achieved her daily activity goal 5 days of the week. Sunday was a wipe out although Saturday was excellent. She accumulated over 15000 steps gardening and simply “putzing” outdoors. Peter had a similar pattern so I introduced to the group the idea that you could stock pile some of your steps on high days to off-set low stepping on other days. They liked this idea and when we looked at Jane’s results this way, she almost achieved her daily activity goal 7 days of the week rather than only 5.

She said she checked her pedometer frequently throughout the day because she was curious to know how many steps she had taken. Her highest steps throughout the week were on the Tuesday following our first intervention Monday night. I think she was motivated to get started. Brian had a similar pattern. Jane said she tried to take a walk on her lunch breaks a few times during the week. I don’t know if she has
established a pattern yet but she is certainly experimenting. I think the spring/summer weather will help since she likes to be outside.

During the consciousness raising portion of the session, we discussed previous behavior changes. Jane had a hard time coming up with an example. I thought that perhaps she might discuss some of her weight loss attempts but she did not go there. She seemed to relate to several of Amy’s comments about journal writing and the process of behavior change. From what Jane said she bores quickly. She needs to stay motivated and that will be key for her to continue her success in this program. I think that the moral support she is receiving from this group is really important. It sounds as if her family is supportive but that they, too, face their own struggles. This group session is good for her.

The other interesting pattern I will watch for is how long Jane maintains her stepping. I keep saying this is a lifestyle behavior change. I hope this sinks in. Perhaps I should consider letting the participants buy the pedometers from me at the end of the study rather than having them return them at the end of the 4 months. I will ask.

I got the sense that sharing my story about nail biting was a good thing for Jane. I think it helped her and the group see that we all have behavior changes we struggle with and that depending on the place and time, the strategies we use to deal with the behavior change needs to vary accordingly. Whatever we believe and conceive, we can achieve. It’s just that we’re likely to live life along the way and that typically means a relapse or two. How we deal with the relapse is the critical issue.

Jane continued to progress in the second week of the intervention and although just shy of her daily activity goal some days would give herself “a star because [she] was so close and couldn’t go a step further…. Will keep on trying!!” Half way through the week, a note in her journal indicated she would be back to her normal job the following week which she felt “should help [her] daily steps.” Nonetheless, she was able to finish the week “feeling pretty good about making [her] goal of 12000.” Jane also wrote that reading the transcription from the first interview was “good to see in black and white.” She stated it reminded her of the goals she set prior to the start of the intervention which, in turn, prompted her to think about her feelings and the changes she was experiencing as a result of stepping more.
On Monday, April 26, 1999 we met for our third session. In my journal of Jane I wrote that Jane was alive tonight. She told us she was feeling better. She said she was waking up in the morning feeling less lethargic. She said she even noticed a small change in her sugar levels as a result of walking more. Jane explained her strategy was to wear her pedometer on her shoe. She thought it was more accurate. I couldn’t confirm this notion but thought if it was worn there consistently there shouldn’t be any problem. If anything, I hoped that by wearing it on her shoe more people would ask her about it.

And in fact, one of her co-workers saw it that week and asked why she was wearing it. She explained and he promptly asked if she would like to go for a walk. And they did. Awesome.

On the third night of the strategy oriented education intervention, a 30 minute walk was scheduled—a progressive increase from the 10 minute walk the first night and 20 minute walk the second night. When we left the Fitness Center, we initially tried to keep up with Peter but soon realized after about 5 minutes he was walking faster than the rest of us were prepared to go. In fact, I think Jane was a little winded trying to keep up. This was not her pace. When we checked her exercise HR (heart rate) at the end of our walk she was at 22 beats in 10 seconds (132 bpm). This put her at 75% of her predicted max HR intensity. Too much for her to do on her own. I think she complied this time because she was part of the group and didn’t want to be left behind. I told her and Brian to not even worry about intensity changes at all for a while. Focus on duration.

Later on in the evening after we’d finished our walk, I revisited the theme for the week which reflected on behavior change as a process that required individuals to make intelligent choices. In doing so, I asked the participants to think about where they might be in 6 months in relation to their activity patterns.

Jane indicated she had thought about joining the Fitness Center. She was very uncertain when she said it although she had obviously been thinking about it.
It was then I realized how important bringing them into the Fitness Center environment, letting them get a feel for the atmosphere, and showing them how to use the treadmills as a group would be. I decided then I would try to take them later on in the evening so that there would be fewer participants working out which might make the experience a little less threatening. The rest of the evening

I kept telling the group that they didn’t need to change into exercise gear to use the treadmills—go as they are—but just keep the treadmills in mind as an option in case there is bad weather. I explained it was an alternative way to get their steps in. Jane seemed to like the idea of watching TV.

This week Jane met her daily activity goal 3 times. She had another great day on Sunday when she accumulated over 13000 steps. Sunday was a beautiful day while Saturday was gloomy. Weather seems to be a variable for Jane. She was outside again on Sunday doing yard work.

When Jane returned her transcript the night of the third intervention she commented that by having read over her notes she was reminded of her commitment and her goals. I thought that that was an important point given that they were her words. She said them. She owned them. And given that it was about the mid-week of the second intervention it was appropriate timing since it coincided with the third week’s theme which was about making intelligent choices. The first two weeks provided a good foundation to think and feel and now the participants seemed ready to make some educated decisions.

I believe a few notes on Jane’s weekly goal setting worksheet speaks to this point. As part of her strategic planning, Jane realized she needed to complete 4000 steps by lunch, 4000 more by the afternoon and evening if she wanted to reach her goal of 12000 for the day. It seemed her experiences from week one and two were enabling her to make educated decisions which was particularly important given Jane’s movement between jobs. I wrote,

Jane said that when the students leave next week, she will likely spend more time in her other position which requires a lot of sitting. She will act as a cashier. She didn’t like this and thought that she would have to rethink her stepping patterns.

Jane increased her daily activity goals slightly this week since she only achieved her daily activity goal 3 times from last week. I think that was probably good planning
on her part. She needs success to keep her motivated. Yet, her daily activity goal was almost double that of her baseline—a great improvement. I had everyone review this information and share it as a group.

Jane was using her activity calendar to record her sugar readings as well. I thought that this was a marvelous idea. That way everything was on one form. I agreed to modify the calendar to fit this new information as long as it didn’t make it too clustered.

As we approached the final night of intervention, I was encouraged to read Jane’s journal entries. She wrote “another good day,” “six straight stars!! Yeh,” “went for a long walk – just to get over 8000. Was a quiet day, weather was beautiful,” and “up and down the lane way in the evening just to get in some steps. Was quiet day again. It is almost time for bed and I am just over 8000. I had about 3 days that were well over my 12000 so I should surpass total amount of steps for the week.” However, on the Sunday night prior to our last meeting Jane wrote, “I still wonder how much this will help in the long run, with weight and inches and sugar. It keeps running through my head – NO PAIN NO GAIN. This seems relatively easy.” I was struck by her honesty and the bluntness of her words. When I collected myself three thoughts immediately registered. First, I made a mental note to follow up on this comment in the next interview with Jane—what did she really mean?; second, I realized the importance and the implications—such as the relative ease—of incorporating physical activity in comparison to exercise/fitness into one’s lifestyle; and third, I, too, wondered if Jane would see some change in her weight, waist circumference, resting heart rate and/or resting blood pressure at her next assessment. I hoped we would to give her the positive feedback she was seeking although I questioned whether the increase in stepping and the duration of the program was enough to bring about the physiological changes she was after.
On Monday, May 3, 1999 Jane was the first person to arrive for our last meeting.

Jane did really well her last week. She achieved her goal 5 days of the week. She was quite pleased with herself. You could tell by the smile on her face. Her low days were Saturday and Sunday. I believe she said she was off cash this week which obviously made a difference [in her results].

Jane was walking quite consistently in the evening now. I think, like the others, work was more of a dilemma in terms of finding a pattern that worked. Peter probably had the best handle on it. Jane and I walked together tonight. We opted for a slower pace tonight given that we were going to walk around the block. I think it was a comfortable pace although we did sweat a little. It was a rather warm evening. We finished the distance in exactly 30 minutes. She accumulated 6000 steps in that walk—more than the others. They wanted to know what she did differently. She attributed it to wearing her pedometer on her shoes. She insisted it was more accurate there. She thought we were going to walk 40 minutes tonight. Were they disappointed? After the walk outside, we went into the Fitness Center to try out the treadmills. I think Jane was curious to go in since she had expressed an interest in the center at last week’s meeting. She tried the treadmill but was not at all certain. She clipped herself in and walked with a slight tilt forward to make sure that she stayed on. She also had quite a grip on the hand rail in front of her. At least she did it and when I asked her if she was OK she eagerly replied that she was.

You could tell from her body language and some of her comments she was a little reluctant that tonight was the final meeting. I think she was cautious and perhaps a little concerned about her ability to continue on her own. This perhaps stemmed from previous experience and yet she was quite adamant that because she had had success thus far in the program, this experience would carry her forward. It was Jane’s hint about meeting again that raised some discussion within the group about relapse planning. As it turned out Brian suggested that I visit all of them in the next two weeks at least to see how they were doing and then we could go from there. I don’t think Jane was comfortable with only two phone calls.

In terms of relapse, Jane had several concerns. They were: hot weather, vacation time, going at this walking alone, and job responsibilities. She really had great difficulty finding the opportunity to get up and move when she was on cash. I believe Jane said she would walk in the evenings if the temperatures climbed and that if the weather was really inclement she would consider using the treadmill in the club. I think the demonstration helped ease a little of the awkwardness/uncertainty she may have been feeling. I think her confidence level in preparation for the next 3 months was about 7 or 8—not as high as before.

Jane was spending a bit more time setting her new weekly goals. This week she added another 1000 steps to her goal—probably because she did so well this past week.
None of the relapse scenarios presented any serious concerns for Jane. In fact, all of the participants were quite matter of fact about what they would do—simply start again. The only discussion that stemmed from the relapse scenarios was the amount of time of the relapse. Peter and Jane felt that the longer the time of the relapse the more difficult it would be to get at it again. I think that Jane clicked with the weekly theme this week. I get a real sense that she was thinking a lot about her stepping. She was still curious to know where she was at and yet I believe she could reference her time and her steps quite well. She seemed to know how many steps she would like to have before she left work at the end of the day.

At the end of our last session, I confirmed dates for the post-intervention interviews and second assessments. Jane and I planned to meet in one week—May 10. In the week following, Jane had a few good days interspersed with a few days where she thought she “didn’t seem to be doing as well…step wise or eating wise.” On May 9, 1999 she wrote, “Blew it yesterday. Barely made 5000 steps yesterday but my blood sugar wasn’t too bad (7.3). Will try harder today to get some walking in but it is Mother’s Day so it may be tricky.” In the end, Jane finished the day with “almost 11000 [steps]—did major evening walking to bring up my numbers.”

Post-intervention (week 5-16)

When Jane and I met one week after the last group session, Jane had not had an opportunity to review the questions prior to the interview. We decided to proceed anyway since the format and the categories of questions were very similar to the last interview.

Outcome expectations

I began the interview by asking if the intervention had met Jane’s expectations and she answered a concise “yes.” She explained how she had become more aware of the activity level in her day and that the pedometer did not allow her to think “oh, I have been busy enough….I’m just going to take it easy.” Instead she would think “I have got to do
5000 more [steps]" and off she would go. She attributes this feeling to the fact that the 
process was "relatively painless...this hasn't been unpleasant especially this time of year. It 
has been very nice to go out and walk and see mother nature at her best." Jane said she really 
hadn't found anything about the experience that didn't appeal to her. "I have quite enjoyed it 
[the behavior change] actually....It really hasn't been too hard to do at all....It is much easier 
to do [than aerobics]." In comparison, she said she had always thought "about being more 
physically active, more like the gym type setting...I find it unpleasant."

Jane liked that there were other people involved in the behavior change process. Like 
Weight Watchers, she said having to report at weekly meetings and talk about what she'd 
done over the past week was important although with this intervention she didn't feel she 
could quit because she was involved "with people she knew more." She found this 
significant because she really didn't want to slack off with the others involved—"it is not just 
yourself." She admits she could not have achieved the same success if she had done this 
behavior change on her own.

The others involved in this intervention were Jane's work cohorts. She knew all of 
them prior to the start of the intervention which she felt proved to be an advantage. The 
advantage Jane was referring to had to do with moral support, for example, "Brian would 
drop in every now and then and [ask] how far have you gone today, and [then] compare 
notes." She did not feel uncomfortable at any time throughout the intervention with this 
arrangement.

Moving from the preparation stage of change to the action stage of change made Jane 
feel "up" although she noted when she initially wore the pedometer, she still had some self 
doubt. Five weeks later, she reached what she felt was her maximum number of daily steps
(13000-14000 more than double her baseline) and planned to adjust her speed rather than increase her volume anymore as part of her long term physical activity goals.

Behavior change issues

Jane’s desire to increase her activity levels was viewed as a means that “could only improve” her quality of life, well-being, health status and/or diabetes management. In this case, she specifically listed improvements as “lower blood sugar levels and weight, and just feeling better.”

In an effort to make these changes a reality, Jane recounted how her legs (calves) were a little sore the day after she completed the first thirty minute walk “when we went all the way around [the city block].” Walking in the gym did not yield the same feeling. Outside she also found she sweat a bit and her breathing was “just slightly—not much” harder; otherwise, there were no other negatives, “things just felt good.”

Wearing the pedometer was also a significant factor influencing Jane’s behavior change. Because it was measurable, “in black and white right in front of you and you couldn’t change it for the better or worse,” the pedometer helped Jane “do a bit more and know that [she had] done quite a bit” to feel good about. Unfortunately, Jane said her pedometer fell off half a dozen times in the first five weeks. She attributes this to wearing it on her shoe which she felt provided a more accurate reading than when worn on the waist. She told me “it just depends on what kind of shoes you have on. Some it fits on really well and others it kind of works itself off.” She said without the pedometer continuing an active lifestyle would be “hard to judge” because “walking is an easy thing to do.” Jane indicated she would like to keep the pedometer when the study was over.
Jane’s motivation also improved as the intervention progressed which, in turn, facilitated her continued behavior change. Hearing how others in the group were progressing provided important feedback, particularly those who were doing extremely well. For instance, Peter’s success made “him a goal (laughter)” and Jane hoped to catch up with him. Knowing that walking was not an overwhelming task and finding out through weekly progressions that one could “just do it” had a snowball effect. Feeling different, like being able to walk faster, having lower blood sugar levels (“not an awful lot”), “waking up less lethargic in the morning, and feeling peppier” also provided the additional incentive to continue.

However, as we approached the second assessment, I will admit I was concerned Jane’s motivation would be stifled if her second assessment results did not differ significantly from the first. When asked what Jane hoped to see she remarked “I would like to see that I have lost two pounds and that I have lost some on my waist.” Fortunately, she realized four weeks “wasn’t all that long” and if she didn’t see any changes despite being “ticked off” she would still continue with her behavior change. After conducting the assessment, I wrote in my journal on Jane:

I cannot explain how happy I was for Jane the day we completed her second assessment. During the interview she explained how she would feel if there were not any changes to her results—she would be disappointed and I was concerned that it might influence her motivation. So when we retested and I didn’t look at her previous results in case it biased me we were both extremely pleased to see the changes. Everything came down. I felt like crying or at least hugging her. I didn’t but I kept telling her how proud I was of her success. She walked out on a cloud.

When I checked Jane’s personal journal later, she wrote about the assessment as well.

Improvement in blood pressure, heart, weight (2kg) and waist girth (5 cm). This was even better than I had hoped! Hanging in!!
Content issues

When I asked about content, most of the issues mentioned focused on the manual and how the manual was used throughout the intervention. Through this line of questioning, I found out from Jane that writing her thoughts down (e.g., journal, decision balance, weekly goal setting worksheet) helped because she could 1) reflect on them which she did once or twice a week, 2) reread ideas she had forgotten and 3) it reinforced her learning. She did not find any topics that were not really helpful although she would like to have met for six-two hour sessions instead of four to “repeat what we were doing....Just go on a little longer.” She thought it took “three weeks to start a new habit—double it more me (laughter),” she said. She thought the weekly themes, introductory quotes and weekly messages were good although none stood out more than the other. She found the decision balance worksheet difficult to start but easy to complete once explained. Some clarification was suggested with respect to the category labels: ‘gains to self,’ ‘gains to others,’ losses to self,’ and ‘losses to others.’ Jane found the two information articles contained within the manual to be “not too much” and she recommended that they be included again. She also suggested the list of websites provided by Brian be kept since she had gone online and accessed some of the information already. She liked the weekly goal setting worksheets and having to complete them each week despite being “too gung ho and blowing it the first week.” From this experience, she said she realized the importance of setting her own goals, ones that were realistic, and the importance of not having someone else do this for her which she initially expected me to do. She also thought the weekly goal setting worksheets were important for people to commit to and having them in print helped to reinforce that commitment. With respect to SMART goal setting, Jane did not recall what the acronym stood for but clearly
understood what was realistic for her. Through her own trial and error, she determined “1000 [steps was] plenty to go up over a week” in comparison to the 3000 additional steps she added to her baseline the first week. The group walks were enjoyable but difficult to keep pace with especially when held outside. She said she felt a bit of pressure to keep up when she lagged behind. She found the walks progressive enough although she thought the last week’s walk could have been forty minutes long instead of thirty. The walks helped the time pass quickly.

The treadmill demonstration was useful and it tempted her to consider using the treadmills on “really crummy days—winter.” She also said “going to the Fitness Center to see how things worked made it feel “not so overwhelming.” The activity calendar was Jane’s favorite tool. She used it to record her sugar levels on as well which I thought was a great idea. Jane enjoyed the group discussions particularly hearing different ideas from other people. She thought there was an adequate allocation of time given to both the participants and the facilitator. In terms of timing, Jane felt scheduling of the education intervention was an important consideration. Starting the intervention immediately after work before individuals left for home was most convenient as was opting for a spring session. Jane did not think a fall session would be as well received—“it would be more of a struggle”—I assume because of the weather conditions.

Jane concluded that the intervention had helped her start and since she had progressed and “stuck with it for four weeks” she knew she could keep going. “I’m sure I can” was how she left the discussion.

Andragogical issues
In the pre-intervention interview, Jane articulated the need to learn by doing. She thought this intervention had provided that opportunity. She cited the example of the first timed walk in which we recorded the number of steps taken in ten minutes. She said this experience provided a point of reference—"[I] did 1500 steps in ten minutes….I have to do 3000 more…well that is not long I can do that, that’s twenty minutes." Jane also commented that learning in this intervention was different than previous diabetes education experiences because she was “more involved now” meaning that in previous experiences “they [the nurses and dieticians] basically stood up and said this is what you should do.” The previous learning environment was also described as a “classroom basically” with fifteen or twenty people; consequently, there was little opportunity for dialogue or sharing. Jane thought someone with a physical education background or a teacher rather than a nurse might be a more appropriate person to deliver future activity interventions.

With respect to Jane’s confidence, there was a gradual improvement over the four weeks of the active portion of the intervention. She noted that although she over estimated what she thought she could do at times, she discovered that “it [walking] wasn’t that hard.” In preparation for the three months of independent walking, Jane thought she would have days when she would be most confident and other days when she would likely give herself a four or five on a confidence scale of one to ten. She felt her average confidence score would be seven.

She was however, more committed to walking and gave herself a score of eight on a scale of one to ten when thinking ahead to the three months of continued independent activity. She felt the participant manual and the experiences from the four weekly meetings would help to refresh her when she “started to drag her heels.” Because walking is
easy—"you don't have to go anywhere special to do it or change your clothes and pack a bag...you just get up and walk...I don't have to set aside an hour every night to do this...five minutes here and there" Jane felt the simplicity and convenience would also help her adhere to the behavior change. Consequently, she didn't think boredom would be as much of an issue either.

In terms of reorganizing her lifestyle to fit in the behavior change, Jane commented that she was trying to walk ten or fifteen minutes every lunch hour and every night which wasn't too difficult in the spring and summer because the weather was most enjoyable. She had some reservations though when thinking ahead to the cold and rainy weather. Jane thought a monthly get together following the group sessions and continued journal writing would be the biggest help for her to continue with her behavior change. She also noted that having her mother walk with her (most of the time), since her mother had resumed participation in the Weight Watchers Program, helped her to "just keep going around the house and up and down the laneway."

Jane also realized that despite the ease with which she had fit walking into her lifestyle, she should not get over zealous and try to participate in other aerobic type exercises in addition to the walking. Like the 3000 extra steps she set as a goal for herself the first week of the intervention, she acknowledged that her enthusiasm "wears out too quickly" and the feelings of being 'gung ho' fade within the first month. To go at this behavior change a little slower; thus, became an acceptable approach—one that she determined without my immediate intervention.

Following the second interview, I was left to rely on Jane's personal journal writing, the monthly meetings and any informal conversations we may have had as a means to
monitor Jane's progression. For the most part, Jane's journals were the most informative when looking for strategies, techniques and processes of change used while in the action stage of change. The following are examples of excerpts taken from her journal writings as she completed the final three months of the study on her own:

*May 11/99 (Tuesday)
Broke my pedometer last night. Call about getting another one. Stuck the old one in my pocket, but only got 6000.

*May 12/99 (Wednesday)
Another bad day. 6588 step. Very busy at work, but on cash. Took a long walk tonight and jogged a bit in the middle of my walk. It is getting easier to go a little further jogging.

*May 18/99 (Tuesday)
No problem meeting my steps the last three days. Lowered back down to 13000 (-500). Going to review the Thinking Module tonight and The Feeling.

*May 24/99 (Monday)
Sick 19th not so great on the 20th. This week was a real washout—GET BACK ON TRACK.

Last three weeks haven't been good! Lowered down to 12000 – Will hit this goal the rest of the week – Took my blood meter with me to the trailer but forgot the lancets.

*May 29/99 (Saturday)
I can't believe I left home without putting the meter on! Moved the girls today. Did major stepping.

*June 1/99
New month. TRY HARDER. I know I can do it. 12000 per day!!

*June 4/99
Not a good day!

*June 6/99
Sunday, very hot. Didn't spend much time outside during the day. Went for a walk in the evening.

*June 7/99
So close to my goal but didn't make it, 838 short. Very hot at lunch so I walked the halls.
*June 8/99
RECORD almost 19000. Long walk at lunch with the group. Hopefully even if the weekend is a problem, this will be enough extra to carry over. Kept up with Peter for the first half!

*June 21/99
Forgot again to put the meter on. I have a new granddaughter today. All day at the hospital.

*June 22/99
Hit it today. Jogging on the spot before bed to get over 12000.

*June 23/99
Struggled to get close.

*June 25/99
Two great days.

*June 26/99
Saturday, just wasn’t walking enough, but I had a nice swim.

*July 4/99
On vacation last week – didn’t do a lot of walking. This week coming up I have lowered my goal to 11000. But I will make my target everyday!

*July 7/99
Forgot the meter.

*July 8/99
3 days out of four!

*July 12/99
Made 4 days of the six. I wore meter. Improvement over last week – keep it up! Only 2 weeks left – haven’t met goal of 10 lbs I am sure or 5.0 reading. Will keep level at 11000 again this week.

*July 20/99
Only did 4903 but spent about 3 hours painting lattice. Golfing Wednesday that should really add up!

*July 21/99
On vacation for two weeks! Struggling. My meter quit while I was golfing. Over 8000 in the earlier afternoon. Will let Tracy know. The end of the four months is here. I didn’t make the goals I set but there is an improvement in all Tracy’s
measurements. I guess that will do for now and I shall do my best to keep up the
good work.

End of study

On July 29, 1999 the final group interview was scheduled and Jane,
unfortunately, was on vacation at the time and unable to attend the interview with the three
other study participants. To complete the interview process, I provided a copy of the audio
tape and the transcribed notes of the final interview for Jane to review. Then I suggested
she add comments to the transcribed notes wherever she felt she needed to clarify,
reinforce, or add to the group’s responses which she did. Following that, I offered to
review the transcribed notes along with her comments when we met to complete the final
assessment. She did not feel that was necessary and so we simply took her measurements
on August 29, 1999.

When I reviewed the transcribed group interview, Jane for the most part affirmed the
group’s responses. Only on one or two occasions did she delineate her position as different
from the rest; however, what she did offer was interesting nonetheless. Firstly, Jane would
have preferred the intervention be six weeks instead of four to allow for further discussion
of generic issues associated with being diabetic. Although the intervention did not change
her perception of an active lifestyle, Jane said it helped her scrutinize whether she really
wanted to participate or not. When she decided she did, Jane said her ability to self direct
improved over the course of the intervention as she realized the need to lower her weekly
goals to values that were more realistic for her. Hearing of others progress and knowing
the number of minutes spent walking per day in addition to the total number of steps taken
per day also helped Jane stay motivated. Her competitive instinct fed her need for “the personal challenge” which also roused her progress.

Jane was empowered to make and sustain this behavior change for a number of other reasons as well. Because the intervention was part of a study specifically targeting adults with Type 2 diabetes, Jane was interested and committed. The immediate feedback from the pedometer along with some guidance from me and encouragement from her cohorts enabled her to make the behavior change in such a way that did not feel overwhelming—“It’s just something I felt I could do,” “the program was easy enough and the time commitment minimal enough.” Feeling better as a result of increasing her activity also helped empower Jane although her change in behavior had not become a springboard for other lifestyle changes at the time. Jane concluded by suggesting a meeting in one year to review each other’s progress.

Results of case study 101

In this case, Jane started with a pre-intervention average baseline of 6708 steps per day, which was the equivalent of 54 minutes of average stepping per day. Over the course of the 16 week intervention her daily average fluctuated anywhere from 44 minutes above her intervention average to 18 minutes below her intervention average. The peak of stepping occurred within the first four weeks of the study. At the end of the study she averaged 9245 steps per day (2537 above the pre-intervention baseline) or 14 minutes more of stepping per day above her intervention baseline (effect size = 1.2 considered a large difference). She also increased the number steps taken in those 14 minutes by 699 steps; thus, suggesting that Jane had not only increased her average volume of steps but also her intensity over the course of
the 16 weeks. Jane also saw a drop in her waist girth of 6.2 cm, her resting heart rate of 4 beats per minute, her systolic blood pressure of 12 mmHg, her BMI of .74, and her weight of 2.2 kg (refer to Table 4).

Jane’s perception of the skills needed to make daily activity part of her lifestyle did not change over the course of the study. She consistently disagreed when asked if she thought she was unsure she had the skills necessary to make daily activity part of her lifestyle. She also repeatedly disagreed when asked if she was unsure of her commitment

<table>
<thead>
<tr>
<th>Assessment items:</th>
<th>Pre-intervention</th>
<th>Post-intervention (week 5 -16)</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>99.2</td>
<td>96.9</td>
<td>97.0 (-2.2)</td>
</tr>
<tr>
<td>Resting heart rate (bpm)</td>
<td>84</td>
<td>76</td>
<td>80 (-4)</td>
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<tr>
<td>Resting blood pressure (mmHg)</td>
<td>138/84</td>
<td>112/72</td>
<td>126/86</td>
</tr>
<tr>
<td>Waist girth (cm)</td>
<td>105.5</td>
<td>100.0</td>
<td>99.3 (-6.2)</td>
</tr>
<tr>
<td>BMI</td>
<td>34.5</td>
<td>33.7</td>
<td>33.76 (-.74)</td>
</tr>
<tr>
<td>Glycemic values</td>
<td>7.3</td>
<td></td>
<td>7.2 (-.1)</td>
</tr>
<tr>
<td>Daily average number of steps</td>
<td>6708</td>
<td>-</td>
<td>9245 (+2537)</td>
</tr>
<tr>
<td>Daily average minutes of stepping</td>
<td>54</td>
<td>-</td>
<td>68 (+14)</td>
</tr>
<tr>
<td>Stage of change</td>
<td>Preparation</td>
<td>Action</td>
<td>Action</td>
</tr>
</tbody>
</table>

or lacked confidence in her ability to achieve her daily activity goals. In fact, on the last survey Jane acknowledged that every day was a fresh start even if she hadn’t had a perfect
record thus far. She obviously felt good having “four months under [her] belt!” Throughout the study she maintained she had organized her life needs to accommodate participation in the study and that her confidence would not diminish. The only response that changed in the survey had to do with the monitoring of her progress, the guidance needed and the amount of feedback required to continue with the behavior change which she initially agreed she needed help with. However, by the end of the study she was undecided; thus, suggesting she required less support and direction—more of an andragogical learner (refer to Table 5).

Table 5: Results of Jane’s self-assessment survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-intervention</th>
<th>Post-intervention (week 5 –16)</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disagree</td>
<td>Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
<td>Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>3</td>
<td>Disagree</td>
<td>Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>4</td>
<td>Agree</td>
<td>Agree</td>
<td>Undecided</td>
</tr>
<tr>
<td>5</td>
<td>Agree</td>
<td>Agree</td>
<td>Agree</td>
</tr>
<tr>
<td>6</td>
<td>Disagree</td>
<td>Disagree</td>
<td>-</td>
</tr>
</tbody>
</table>

Summation:

Despite my initial concerns, Jane proved to be one of the most steady participants in this research study. Her greatest success occurred during the first four weeks of the intervention when she exceeded a weekly average of 12000 steps (refer to Figure 2). On a day to day basis, Jane increased her stepping on average by 14 minutes more per day or approximately 2500 steps which is fairly consistent with her average weekly goal setting at the end of the study (refer to Table 6). Despite her fears or insecurities of going it alone,
Jane adopted and adhered to a pattern of increased activity over the four months of the study. Vacation time, warm weather and job responsibilities did distract Jane at times but her comments indicated a sustained positive attitude and optimism regarding her continued success.

Being treated as an adult with the appropriate support and direction facilitated a change in Jane’s dependency to become more independent. Hearing from others and offering support enabled Jane to assess the personal impact of stepping more, she saw an alternative to her preconceived notion of fitness that worked for her. She started to substitute stepping for previous activity patterns which served to increase her commitment as changes in her weight, blood pressure, feelings about life evolved. Extrinsic motivation or rewards were not essential to her continued success.
Table 6: Weekly results—Case study 101

<table>
<thead>
<tr>
<th>Time (weeks)</th>
<th>Weekly total (7)</th>
<th>Weekly goal setting (steps)</th>
<th>Weekly average (steps)</th>
<th>Weekly timed average Intervention average = 136 steps/min or 49 minutes</th>
<th>Waist girth (cm)</th>
<th>Glycemic values (7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td></td>
<td></td>
<td></td>
<td>Average baseline = 6708</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>70379</td>
<td>9708</td>
<td>10054</td>
<td>74 (+20)</td>
<td>105.5</td>
<td>7.3</td>
</tr>
<tr>
<td>2</td>
<td>83542</td>
<td>12000</td>
<td>11934</td>
<td>88 (+34)</td>
<td></td>
<td>7.1</td>
</tr>
<tr>
<td>3</td>
<td>85549</td>
<td>12000</td>
<td>12221</td>
<td>90 (+44)</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>4</td>
<td>80695</td>
<td>13500</td>
<td>11529</td>
<td>85 (+31)</td>
<td></td>
<td>7.26</td>
</tr>
<tr>
<td>Post-intervention</td>
<td>70251</td>
<td>13500</td>
<td>10036</td>
<td>74 (+20)</td>
<td></td>
<td>100 (-5.5)</td>
</tr>
<tr>
<td>5</td>
<td>52860</td>
<td>13000</td>
<td>7551</td>
<td>56 (+2)</td>
<td></td>
<td>7.2</td>
</tr>
<tr>
<td>6</td>
<td>61635</td>
<td>12000</td>
<td>8805</td>
<td>65 (+11)</td>
<td></td>
<td>7.9</td>
</tr>
<tr>
<td>7</td>
<td>62691</td>
<td>12000</td>
<td>8956</td>
<td>66 (+12)</td>
<td></td>
<td>7.8</td>
</tr>
<tr>
<td>8</td>
<td>74148</td>
<td>12000</td>
<td>10593</td>
<td>78 (+24)</td>
<td></td>
<td>7.1</td>
</tr>
<tr>
<td>9</td>
<td>33839</td>
<td>12000</td>
<td>4834</td>
<td>36 (-18)</td>
<td></td>
<td>7.1</td>
</tr>
<tr>
<td>10</td>
<td>56776</td>
<td>12000</td>
<td>8111</td>
<td>60 (+6)</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>41837</td>
<td>11000</td>
<td>5977</td>
<td>44 (-10)</td>
<td></td>
<td>6.7</td>
</tr>
<tr>
<td>12</td>
<td>58633</td>
<td>11000</td>
<td>8379</td>
<td>62 (+8)</td>
<td></td>
<td>6.8</td>
</tr>
<tr>
<td>13</td>
<td>55177</td>
<td>11000</td>
<td>7882</td>
<td>58 (+4)</td>
<td></td>
<td>6.9</td>
</tr>
<tr>
<td>14</td>
<td>67150</td>
<td>11000</td>
<td>9593</td>
<td>70.5 (+16.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>57321</td>
<td>11000</td>
<td>11464</td>
<td>84.3 (+30.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of study</td>
<td>63280.2</td>
<td>11901</td>
<td>9245</td>
<td>68 (+19)</td>
<td></td>
<td>99.3 (-6.2)</td>
</tr>
</tbody>
</table>
Figure 2: Average weekly steps over 16 week intervention
Case study 101

Average baseline = 6708 steps
Weekly average = 9245 steps

Number of steps
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
14000 12000 10000 8000 6000 4000 2000

Weeks
Pre-intervention (week 1 - 4)
Post-intervention (week 5 - 16)
Case study 102

Pre-intervention

Personal history

The pseudonym for case study 102 will be Brian. Brian is a 55 year old Caucasian male with a U.S. college background. His current occupation is a computer technologist which he has been for the past twenty-eight years although previous to this position he was a police officer and a recording engineer.

Brian was diagnosed with diabetes in 1978 and although uncertain as to whether or not he is a true Type 1 or Type 2 diabetic, he does take insulin on a daily basis and he measures his sugars “three times a day religiously.” Brian stated that he was in control of his diabetes and that he was “absolutely perfect as far as his specialist was concerned” because of the way he looks after himself. He noted that being diagnosed with Type 2 diabetes helped change his lifestyle for the better because he had to readjust his diet to become more “conscious of when you eat and what you eat.” However, despite being satisfied with his current quality of life, well-being and health status Brian did want to change the “activity aspect of it [his life]—something he said he has been talking about for two or three years.”

In preparation for this change, Brian informed his wife of his intent to join this study. He “let her read the questions and told her all about it.” He indicated her role would be “motivator, bitcher.”

Previous to this study, Brian participated in two research studies that involved alternative drug therapy treatment for diabetics and he attended a clinic on diabetes about 10 years ago; otherwise, any information he has gained on diabetes has been what he has read
“out of his own interest.” He usually sees his specialist once every six months at which time they talk about any changes Brian may have made in his lifestyle. Recently, Brian has started taking a cholesterol reducing drug to combat a cholesterol level which is just slightly above normal.

When asked about exercise, Brian denoted it was “reaching for the remote on the TV (laughter)” which is all he said he had done for the last year. Exercise had to be something he liked doing—specifically walking, tennis, sailing and cutting the lawn. Aerobics, lifting weights and “things like that are exercise but ones I would not do.” Brian attributes the year when he did nothing physical other than come home and watch TV to being “somewhat depressed for a variety of reasons—it [exercise] was the last thing on my mind.” Since then he says he has motivated and psyched himself up enough to make a commitment because he realizes the importance of being active.

Notwithstanding, the most activity Brian is doing currently is walking from the car to his office and working around the house on weekends. He predicts his average number of daily steps to range from 1000 to 1600. In terms of intensity, Brian couldn’t recall ever working hard enough to hear himself breathe but did recall sweating when cutting the lawn “that is if I am pushing myself.” In retrospect, Brian thinks he was more active prior to being diagnosed with Type 2 diabetes for fear added activity or exercise would alter his insulin intake and vary his regime of insulin. “I remember being very hyper the first few months so I was afraid to do any exercise at all.” He said over time, he resumed playing tennis in a league or with an organized group and that helped him feel and sleep better. He hopes by becoming more active again he will enjoy the same benefits and get a good nights sleep.
Brian admits he’s never really had a big interest in physical activity. What he considers activity includes “the things he would do anyway” like walk, sail, play tennis, “work around the house, cut the lawn, wallpaper, and paint.” He said he is “not interested in all the sports that normal people might get their physical activity from” and his perception of those who make exercise part of their regular routine is “pathetic, I hate their guts (laughter).” When asked to explain, he replied,

they [people who exercise] are too damned disciplined. I mean they have got their priorities right and I don’t like that....I am a slow learner. It has taken me a long time. I guess with diabetes [activity] is something I probably should have made a bigger priority in my whole regiment than I have but it was the easiest one not to bother with. Diet is the second easiest one not to bother with.

Brian’s acknowledgement of physical activity as part of his diabetes management regime comes about because of a recommendation made by his physician when first diagnosed with diabetes. He was told then to do something physical yet was not provided with any guidelines or suggestions as to what to do or how to do it. He thinks “they still don’t as a matter of fact or at least it has never been offered.” As a participant of this study, he hoped to increase his activity above his current level which was “pretty well on the bottom so anything was going to be a plus.” To do this, Brian was prepared to cut out TV watching with “less sitting around on my ass.” He was uncertain as to whether or not his eating patterns would have to change because of the added physical activity and subsequent change in sugar levels. He said he would monitor that closely. He thought about when he would walk and didn’t think mornings would work because “that seems like a real stress to get up early.”

The greatest preparation for Brian’s behavior change was mental. He said he needed something to motivate him because then he has something to live up to. “Anything no matter
what it is that makes me [Brian] actually feel obligated to somebody else whether it is a study or a person, it doesn’t matter....Self fulfilling, I am...doing it for my own use and if it works for you that’s fine.” In comparison to his wife who walks every morning for forty minutes before she goes to work, Brian admits he is exactly the opposite but hopes he can “get half as good as what she is.”

In anticipation of the behavior change and the group sessions, Brian expected me to be the one to “tell him what to do to get to a stage that was healthy.” He thought perhaps I would suggest a certain number of steps, or a specific time to walk or ride a bike even though he was already thinking about goals of his own. Brian reassured me that if he convinced himself he was going to do something for his own good or his own health, he could “smarten up after procrastinating and say yeah I’m going to do it.”

Andragogical issues

When I asked Brian about being an adult learner or an adult participant and his preferred method of instruction, he told me he did not like a formal classroom setting. His preference for learning was in a setting that was “like being with a group of friends sitting down talking about a subject” and being able to “talk to the instructor like [he or she] wasn’t the “God instructor” you know...that’s a good feeling.” As a learner, he expects the instructor to know more than he does. He likes to learn by doing particularly if shown one on one which he felt was the best method of instruction for him. He dislikes role playing the most.

As an adult learner in this intervention, Brian was confident he could change his behavior to become more active. On a scale of one to ten, he gave himself a score of ten. His level of commitment was “a little less [though] because of his own self doubt” which
meant he gave himself a score of nine on a scale of one to ten. In terms of support, Brian said if he bought into the behavior change 100%, he wouldn’t need any support. However, he noted that if he happened to be in one of his pessimistic moods or something is pissing me off or I’m depressed about something, it might take a little more motivation from anywhere, it doesn’t matter. If you [Tracy] yell at me and bitch at me and I go home and get yelled and bitched at because I am not doing what I should be doing I don’t have a problem with that....I mean there is no point in me looking at a journal and saying that I’m really screwing up. Doesn’t motivate me in the least. I just look at it and say yeah it just verifies what I already know up here....I gotta have somebody else almost a little bit pissed at me to say get your ass in gear and do it. I don’t take that as an offense because I know that is my style.

Brian also requested that if he was to receive feedback he would prefer that I be direct, “up front right off”, specific and not to worry about his feelings even though he might “snap back and say yeah, yeah.”

Stage of change

Prior to the start of this intervention, Brian considered himself to be in the contemplation stage of change because he said he was not in the same mental state as he was after having signed up as a participant in the study. He said making the commitment and realizing that he really wanted to do this—“that he had to do this”—helped him prepare mentally to start thinking more positively about the behavior change. And in so doing, he went out and purchased a new pair of walking shoes to start the program; thus, moving him into the preparation stage of change.

Intervention strategies/processes of change

When I asked Brian if he had ever tried to change a behavior before he thought he had as a “cop...to appear politically correct”—something he considered a “mental thing as opposed to a physical thing.” With respect to a physical change, he recalled buying an
exercise bike a few years ago to increase his activity levels but found riding to be “one hell of
a lot of work for very little.” The bike was

high tech...you put it in front of the TV and you put a video tape on of say bicycling
through Hawaii and as you go up a hill it changes pressure. You get people riding by
and it [the program] says keep up with the people. They are trying to entertain you
while you are exercising....Big bucks I paid for it. It does your pulse....I tried it for a
week and after the week I was just so beat. I was physically wacked. I could get my
heart rate just screaming but my legs were killing me. I thought this was too much
pain for no gain. I wanted instant gain like that though, that’s why it is for sale.

Brian did not try any other form of physical activity after that experience although he did
return to the bike last fall. He tried it again for a week cycling every second day, this time
without resistance using a timer on the bike set for ten minutes. Again his legs became sore
even after that short period of time which fueled the despise he felt for riding. He also never
turned on the video or recorded his progress on any of the forms that were provided with the
program. He simply was not motivated—“I was still in a real resistance stage” and so the
experience remained negative.

As we continued our discussion of intervention strategies and processes of change, I
asked Brian about his ability to self-reflect. Although uncertain as to what exactly I meant,
he told me he looked back at everything he regretted in life which he didn’t do too often
because “it was too scary.” However, he did reveal that he spoke to a counsellor once “to
talk about all of the negative stuff and this person made you think about all of the positive
things as opposed to the negative things.” Brian attributes anything he has done in life to
luck—“it hasn’t been because I was bright or had some goals set out, not a chance.”
However, he does feel he can talk to other people about his past now and tell them, especially
his children, what they should do to learn from his experiences.
Brian's motivation, it seems, starts from within but sustains itself extrinsically. For instance, he admits if he wants to do something bad enough, he will initiate and pursue whatever it is he is after. Beyond that, his motivation comes from not wanting to let others down like myself or his specialist whom he wants to be able to tell he started and has continued with a walking program for the past six months. If Brian comes up with an idea by himself, he admits he knows he can stop at any time because he is only going to do is let himself down which seems to have less of an impact than letting others down.

When Brian does accomplish something, he is learning how to tell himself he did a good job which he professes has "taken him this many years to brighten up." Given his past pattern of not doing anything right, he finds it "really neat to do something he was motivated to do, set goals for and then accomplished." Feeling good about it is reward enough for him. Journal writing is not a reward for Brian. Looking for patterns, changes, results or identifying feelings is "annoying to do." Brian's idea of journal writing is "strictly a number type with insulin and variations of insulin results and reactions."

Outcome issues

As we completed the last section of the interview, Brian revealed that he hoped to "get more active and in [so] doing feel better mentally and physically" as a result of his behavior change. He anticipated having to work harder at the mental part of the behavior change as compared to the physical part although he thought he was "motivated enough that it [the behavior change] wouldn't be that hard." With respect to physical changes, he didn't anticipate losing any weight as a result of increasing his activity levels but thought at age 55 he might feel "a little more pain in the muscles and joints." He didn't know if this would be from having not done anything regular for so long or whether it would be from age or a
combination of both. He did not expect to feel as much pain as quick as when riding the bike but was prepared to feel some tension or tightness from walking since he hadn’t walked since the previous fall. No matter, he was prepared to “suck it back and get used to it because walking was the wussiest of them all [activity options].”

Recognizing his weakness for goal setting, Brian felt his positive attitude and his concern for his health would help him “just do it—make the behavior change.” And as he struggled with this concept of goal setting, he thought perhaps what he was doing was “maybe the goal.”

In the past you know I didn’t call it a goal if I just wanted to do it, I would just do it. I guess it could be called a goal. I am more motivated on this than probably a lot of stuff I have ever wanted to do in the past because I think I am at the stage in life where you realize that you have got to get off your ass and do it. The goal is to do it.

Having made this statement, Brian commented that short term goals were more fun than long term goals. And in this instance, Brian’s short term goals were to fulfil the criteria I was expecting for the study. On the other hand, his long term goals were more of his own. He wanted to continue after the study to make the activity pattern he established during the study part of his regular lifestyle.

His expectations of me were explicit. He expected me to make it [the results he wanted] happen—“you are going to tell me how to do it.” He wanted to know what activities I would be making them do. He wanted to know how many more steps I would be asking them take on a given day. He wanted to know how I would analyze the data and present it, whether the analysis would be done individually or collectively. He wanted to know how the results would be measured particularly the qualitative data since he was more comfortable with quantitative documentation. He wanted to know the reality of his baseline steps in
comparison to others. Finally, he wanted to insure that I would provide the results of the study to him at the end. He explained how, in the past, he had declined to participate in several research studies because “they didn’t want to give up the results at the end” and this was what he wanted to motivate himself to know if he did well, “bad, indifferent or whatever.”

Active Intervention (week 1-4)

On the first night of the group sessions, Brian assumed a position of authority not so much by what he did but rather but what he shared with the group. His comfort level was high as well as his confidence. He spoke freely and asked a number of relevant, interesting questions. The group followed his lead including me. As I recorded in my journal, Brian helped establish a relaxed learning environment for the adult participants.

Brian was a great asset to the group to divert attentions and keep everyone up beat. He is very informed and aware of his diabetes. He presents a new twist to this whole study given that he uses insulin and regulating that in sync with his extra walking requires a bit more regulation. He is the expert on this and I have asked him to write a few notes down in his journal so that I can comment or reflect on them.

Brian has taken the leadership position. His knowledge carries him and Peter, in particular, seeks new information from him. Brian was insightful especially when completing the decision balance sheet. He found lots of benefits/gains to self and others but had a very difficult time identifying any losses. He prompted me to consider changing the title to costs rather than losses. He didn’t see any of the costs or losses as substantial enough to even mention and because he had committed himself to this project there wasn’t anything he wouldn’t do to make it work. I found that interesting. That was a first.

Brian continually commented that I could “kick his ass” or “bitch at him” if he wasn’t doing what he was supposed to do with this project. He seems quite externally motivated in some ways and yet is very intrinsic about the goal. He told me and the group that no matter what he needed me and others to get after him even if he got grumpy about our nagging. It seemed he was giving me more weight for doing this than even his family and his wife is already an avid walker. The reason for this may also stem from the comments he made about me completing the study and wanting to
make sure I get everything that I need. It would seem he doesn’t want to be responsible for my poor performance. I am not too worried about Brian.

Walking into the gym for our 10 minute walk prompted several sarcastic comments from Brian. He said things like “I’ve never been here before,” “what is this place.” I don’t think he knew what to expect from the walk and yet after about 5 minutes he got into it and started chatting with Jane. The time passed very quickly. He gathered an additional 1100 steps or so from the walk.

For his goal setting, Brian knew in advance that he was going to have an odd week. He mentioned that he had a number of meetings that would potentially limit his ability to walk a lot more than his baseline and yet he did set a goal to walk about 20(? ) minutes more a day. He thought he would do a lot more walking at work—that was a strategy—to shut down at lunch regardless of the students standing outside his door and go for a walk. He also mentioned that his wife walked in the morning but that he doubted he would walk then because of his sugar levels and insulin intake. He thought it would be better for him to walk after supper and that he had 2 dogs who would love him for it.

After the second group meeting, I wrote:

Brian was in his jovial mood again this week despite having an odd week—even more odd than he originally anticipated actually. His dog died very suddenly Tuesday evening, then a close family friend was very ill with cancer and they spent a lot of time dealing with that and they also had a funeral.

Despite this he did manage to almost achieve an accumulated score equal to the total number of daily activity steps x 6 days. He was about 2000 short even though he only reached his daily activity goal twice. His highest days were Tuesday and Wednesday right after the intervention meeting. His said his dogs loved him at least the one did for a day or two. The other dog stills seems quite happy. The rest of the week despite its difficulties he did manage to walk with his wife in the evenings which made it 2 walks a day for her. He said he enjoyed the company. It helped him. He had a difficult time commenting on any patterns because things were so messed up for him and said that this next week would be a better predictor of his ability to succeed. Consequently, he did not increase his daily activity goal by much (500 steps more).

Brian hates doing the journal. He said he’s a number kind of guy and that’s basically what he recorded in his journal for the week. So he wanted clarification after he told me that “this sucks.” I love his honesty. I asked him to perhaps provide some context for the numbers, for example, could he make a note that this week he had a funeral, his dog died etc. so that 3 months from now I would have a reference. I also assured him that he did not have to write in it every day. Amy, a second semester student, was there for the meeting and she commented that as part of the behavior
change project for my PHRE 227 class she was required to write in a journal and she too hated doing it. She said there were days that she had nothing to say because she achieved her goal quite easily but that being able to write it down helped reinforce her goal and made her feel good about it. She said it allowed her to reflect on her success after which reinforced her behavior change. I appreciated her honesty. I think it alleviated some of Brian’s concerns.

During the consciousness raising portion of the evening—Stepping into an active lifestyle—I asked about previous behavior changes. With a little poking and prodding, Brian came up with one which was his nail biting. He still bites his nails although he quit once before and hated having to clip them. So we talked about the process of trying to stop and what worked for him and what didn’t work for him. I offered my take on it as well after he challenged me to tell the group what behavior change I had tried in the last little while. From there we talked a lot about patterns and recognizing that relapse was likely inevitable, that despite biting our nails so low sometimes that they bleed we still continue. This is when Peter piped in that his daughter does the same thing and that he, too, asks her why she bites her nails low enough to make them bleed. I replied that she probably asks, “why don’t you walk more?” He was quiet then and it helped make the point about how difficult change was.

As we discussed Peter’s scenario at having reached such a high number of steps, Brian asked what could happen from there and what benefits were to be had. That is when I showed the group the graph from the CPAFLA manual which outlined the changes in BP, triglycerides, HDL and body composition with as little as 500 cals of extra energy expenditure per week (volume versus intensity). They found this interesting although I am not certain I made it clear as to what 500 extra calories were equal to. I should make a note to follow-up on this for next week’s meeting and tie it in to the discussion on heart rate and intensity changes. Anyway, after I thought more about Brian’s question I realized I should have offered another comment. And that was that by becoming active again and making walking part of your lifestyle, the activity may act as a springboard to take up some of the old favorites—like tennis, sailing, etc. I will mention that to Brian next week.

Brian also commented that he dislikes filling in the evaluation forms at the end of each session. I appreciate his feedback and told him that in a “real” intervention I would not do this except for at the end of the intervention. His comment prompted me to change the final evaluation to one simple question: “Would you recommend this intervention to friends or family who were interested in making a behavior change to become more active?” I thought that this question captured the essence of what I was after. I may give them the question to think about and bring with them when they return for their second interview and second assessment to allow them time to mull over their answer.
During our walk tonight Amy, Jane and I walked for awhile and then Brian and I walked for awhile. It was a slower pace. There was lots of discussion though and everyone seemed to enjoy themselves.

For the third meeting,

I was late without even realizing it. I had asked the week prior if Jane could come at 4 pm instead of 4:30 pm. I hadn’t heard from her for the week and assumed not. While I was at my exam she called and said she could make it earlier. So as I was going to my office, Jane, Brian and Peter were waiting patiently outside of our meeting room. What is interesting about this is that they all knew and I didn’t. As it turns out, Brian was visiting everyone and spreading the word. He went to visit Jane in the bookstore because he hadn’t heard and he wondered what was happening. When she told him she could come earlier he went to visit Peter and tell him. I thought that this was kind of neat that they were interacting and sharing information. So alas, I was 15 minutes late.

Brian had stickers tonight—his own pack and they were plastered all over his activity calendar. He jokingly drew attention to this fact. I am not sure if he bought them or if Jane gave them to him but he did comment that Jane pressured him into it last week and he thought he’d better comply.

Brian also brought a page of references from the internet for the group as well as 2 articles that he copied from the internet. One was a general article about exercise and the other was about exercise and diabetes. I thought that was fantastic. Everyone in the group had previously announced that they had internet access. I apologized that I didn’t have the article copied I had promised but that I would provide a copy ASAP. I ended up distributing Tuesday to everyone, along with the email I described to Peter which explained about sugar levels immediately after activity.

Brian said he felt like a “wuss” (he likes that word and he likes rye) when goal setting tonight because he was only increasing his daily activity goal to 9500 steps. He said in comparison to Peter that was wussy. At that time I reminded him of his baseline and that in fact he has almost doubled his stepping values in 3 weeks. I congratulated him on this accomplishment. From there I asked everyone to share their weekly activity goal and we compared that to their baseline to reflect on how far they had actually come. That was a good exercise to do at this time in the intervention.

Brian commented that he had noticed a slight decrease in his sugar levels since walking more. His dog continues to love him although he says he can walk faster without her. He has not done as much walking at school as he would like but thinks that when the students are gone next week that he should be able to do more. Now he is walking most of the time in the evenings. He said he even went for a walk in the rain the other night.
I asked how being more active would influence him in the next 6 months and specifically if he might resume some of his former activity. He indicated that he thought he would do a lot more sailing this summer. That was good news. Brian mentioned again that his bike was for sale. It had low mileage. Cheap! He said he would never do that again. It hurt too much. Then he and Jane commented that stepping more did not seem that intrusive and it was less threatening. It didn’t seem to require that big of a change and yet they were able to do it with some success. Yahoo!

Brian, Jane and I walked tonight. We followed Peter around the college twice. Prior to the walk we took our heart rates. Brian’s resting value was about 11 beats in 10 seconds (66 bpm). When we returned and took his exercise value it was about 18 beats in 10 seconds (108 bpm). When we calculated max HR and intensity values, Brian’s exercise HR was about 65% of his max HR intensity—right where he should be working. While we walked he was able to sustain a conversation and I reminded the group that that was indeed an appropriate way to monitor intensity. I did, however, mention to Jane and Brian that intensity changes were a long way off for them and that we should focus on duration for them first before making any other changes.

It sounds like Brian is still using his journal for a number cruncher. I don’t know if he is providing any context to his comments. I will have to wait until next week to find out. Peter, on the other hand, seems to like using his journal and refers to it at least once in each of the interventions.

Brian is checking his pedometer several times a day now. He regulates how much he needs to do at work so that he doesn’t have as much to do in the evening as well (he said it doesn’t always happen though). He does want to walk more in the day and thought that he might have to do a bit more visiting to increase his steps. He said the only difficulty is when someone comes looking for him in his office and he isn’t there then he has to explain his absence. He thinks it will be easier to step more when the students finish this week. We talked about parking and walking more to get to his office. Unfortunately, his parking lot is quite close to the college which would not require him to step much more even if he parked at the far end of the lot.

Brian seems a little more open to using the treadmills in the Fitness Center than Peter. He said, “Yeah and you wouldn’t even have to change because we’re not walking that hard.” I affirmed his observation.

Brian said one of his strategies that is working for him is more shopping with his wife. He indicated that now instead of sitting and people watching he is walking around the mall and people watching. He said he thoroughly enjoys people watching and Peter agreed that it was a fun pastime.
I got a real sense tonight that Brian and everyone for that matter is really thinking/living this behavior change. It's on their minds all the time and they are making intelligent choices. My theme for this week really fits as does my interpretation of the quote. Brian teased me about where or who I stole the idea from.

After the final group session, I wrote about Brian in my journal dated Friday, May 7, 1999. I noted that

Brian attended the 4th meeting and that he met his goal 3 times last week. He attributes his showing to his work schedule which has changed again. He said he was still having great difficulty working in the activity when the work continues to pile up and because it varies from one day to the next. Luckily, he's a social guy so he uses the excuse of having to drop something off somewhere to get out of the office and add a few steps to his pedometer. Either that or he says he has to walk to the bathroom about 18 times a day because it is so close to his office. He also said everything is too close to his office—including the lunchroom, the parking lot. He knows he should acquire at least 3500 steps by the end of the day so that he doesn't have to walk more than an hour at home to reach his goals.

He said evenings at home are no problem although he can no longer take his dog with him. He's afraid he might kill the second one. She can't keep up with his pace—"she slows me down." He indicated that he tried varying his intensity after last week's session to see what kind of a difference that made. He found himself more tired and unable to continue as long as he would have liked.

Brian really has a handle on this pedometer thing. He is very much a numbers guy. He likes recording them and manipulating them. On the other hand, he hates writing so his journals are pretty sparse. I still need a little context and will have to talk to him about that during the interview. Brian has a real need to know 'why' he is doing what he is doing but once he is told he's on the band wagon.

Brian commented that he liked the final evaluation. He thought it was a most appropriate question and willingly completed the evaluation.

He also liked the Gretzky quote as the introductory theme for the evening. He connected with it as did Jane and Peter (coincidental that Wayne retired just prior to me using this quote for this session). They all agreed with the message and it lead nicely into the topic of discussion tonight—planning.

Brian began his walk with Jane and I tonight but I had Kellen with me and I was carrying him. I was walking in front of Brian and I could tell I was slowing him down so I suggested he walk ahead of me. He passed me and proceeded to catch up with Peter who was leading the pack for us again. The two of them completed the 30 minute walk together. I think they were well matched for pace.
Brian indicated that time at the cottage will allow him to walk more. He won’t be restricted by his work schedule and he thought he would be more active then. He said he would walk up the 66 steps from the shore to his trailer—“now there’s an intensity change.” He was wondering where he might cap out with his stepping numbers. He wanted to know if I expected them to continue increasing their number of steps when they were off on their own. I said yes to a point. I used the term “saturation point” and said, like Peter, all of you will have to determine where you can’t fit in anymore steps and then consider your intensity changes. He was concerned that he might be at his point—at 9500 steps even though he indicated he still felt like a “wuss” compared to Peter who was now at about 16000 steps. Comparing numbers really has an impact on Brian.

Brian’s concerns about walking in the summer months included the heat, vacation time and job activity. I think he plans to walk in the early morning and late evenings to avoid the hot temperatures.

Brian liked the treadmill demonstration. Of course, we joked about being in the Fitness Center. He claimed there was no one in the Center that was smiling. He did however, try out the treadmill as did the rest of the group and they all thought it was OK.

When we talked about the intervention meetings being finished Brian thought that I should visit each of them in a couple of weeks at least to see how all were doing. He said he would continue to bring in his manual on Mondays so that I could drop by anytime and discuss how he’s been doing. All the other participants agreed. In fact, I think Jane wanted that to happen. I do get the sense that Brian is fairly confident that he will continue with his walking over the next 3 months. He seems quite determined and I don’t think this whole process is cramping his style. It fits into his lifestyle. He selected the confident level as compared to very confident level when I asked about “stepping out” on your own for the next 3 months. He said his mom always told him if you selected very confident or 10/10 there was no more room to go up/improve. So he thought selecting confident was the most appropriate choice.

He also mentioned he would likely be helping out a lot with friends sailing this summer and he thought that that would add an upper body work out to this lifestyle although he didn’t think he would accumulate that many more steps. I suggested he go for a swim, that it was physical activity but he said he did not swim a stroke and that it wasn’t even an option.

Brian discussed joining Peter for his noon hour walks. I think it is neat that they are connecting and supporting each other. I myself, would like to join Peter particularly since you know he is going every lunch hour. You can plan on it.
Brian also mentioned again he thought his sugar levels had come down slightly since he started walking. Brian did not add or delete anything to his Decision Balance sheet nor did he think any differently about the comments he made on it when we first completed it in the first session.

Brian mentioned that his wife loves the introductory themes and that she thought they were great. Brian says he’s not that kind of guy and doesn’t pay much attention to that stuff. He says she is artsy and he is the complete opposite.

Brian did mention that he had a few friends who were non-diabetics who would like to try this program. He said he would keep their names on file and tell me if I did another study that was for a non-diabetic population.

When I received Brian’s journals at the conclusion of the group sessions just prior to the second interview, I found a few notes had been entered for each day. Most of the focus was on his schedule at work, sleep patterns, number of steps taken and pace. After four weeks of this, he wrote me a note which said, “Tracy, I really hate these journal entry notes!” This came as no surprise given the comments made throughout the group sessions; however, I decided to follow-up more thoroughly in the personalized section of the second interview.

Post-intervention (week 5-16)

Outcome expectations

I began the second interview with a similar introduction as the first but explained how I had included a section that was personalized to each individual in the study based on journal readings, group sessions, transcribed notes and completed tools. From there I moved directly into issues regarding intervention expectations.

When I asked Brian if the intervention had met his expectations thus far, he replied that it was doing what he envisioned he thought he needed because the program had given him the “motivation that drives you to sort of get out and be active.” Brian also indicated that he would recommend this program to others because it didn’t require a “real high
amount of effort to still meet some valuable goals” and “if it works, if it is has some sort of value to you it has got to be positive.” Part of the appeal with this intervention was that it made Brian do what he had committed to do mentally. Walking was not a strenuous activity but rather “the easiest thing to do” which allowed him to “start at the bottom and work up.” Thus, he was able to achieve some of his goals which he thought was “amazing.” The least appealing part of the behavior change process was trying to work out a schedule that made Brian feel like he was actually doing enough to make it seem worthwhile. He attributed this difficulty to his work schedule which changed daily in comparison to his time at home which was “pretty constant except for the odd thing.” Creating a pattern made it easier to him to make a commitment and stand by it.

In comparison to previous bouts of physical activity, this intervention provided Brian with “more motivation, more drive, more purpose.” In part, Brian explained that he had “never kept track of anything before— there was no documentation involved”— which was fine but made it more easy “to drift off.” He also found walking to be much more pleasant unlike the bike whereby he “wasn’t willing to put up with the pain.” The lack of guidelines and general information provided regarding the bike program also inhibited his success.

What did seem to help Brian with his walking was establishing a benchmark for the minimum number of steps required at work— something he determined to be 3500 steps. By achieving 3500 steps during the day, he figured he could limit his walking at night to one hour in order to achieve his daily activity goals which was all he could take “not because he was winded but bored.” Knowing this intervention was not an ‘exercise program’ comprised of “push-ups, bench presses, bikes (laughter)” was great— walking was perfect. It didn’t require going to an exercise area “where you are intimidated right away” and “in with a
whole bunch of people younger than you to feel like a zilch.” Participating in this intervention with his cohorts also proved to be an asset because it gave Brian a reason to “walk over and visit” and talk with the other participants in the program just to put on steps. He did not feel his privacy was jeopardized because of this arrangement either although he recommended that I advise new participants to respect each other’s privacy.

Moving from the preparation stage of change to the action stage of change made Brian feel good. And as he looked ahead to his long term activity goals, he decided he would stay with the last number on his weekly goal setting sheet (9500) because he hadn’t met it yet. Recognizing his difficulty in meeting this goal and despite wanting to compare his 9500 steps with Peter’s success, Brian relented and complied with the parameters of SMART goal setting. For him, this meant a thirty minute walk every night which he was committed to and in fact, Brian said he didn’t “want to do anything less than thirty minutes a night.”

Behavior change issues

As a result of changing his behavior to become more active, Brian reported sleeping a bit better and having slightly lower blood sugar levels although he was uncertain if the increase in activity was solely responsible for the change in his sugar levels. With respect to sleeping, he indicated that he was sleeping at least one hour longer in the morning waking at five rather than four, and that on the nights that he did walk he was not nodding off in front of the TV which he felt contributed to a better nights rest.

Since the start of the intervention, Brian had increased his average steps per week by approximately 3000 which he felt good about. Although wanting to triple his stepping as part of his long term goal, he knew he needed to be realistic given his workload and scheduling problems during the day. He did think he would be more active on vacation
though just doing odd jobs around the house in addition to his regular thirty minute walk in
the evening. Brian noted that had some sore muscles in his calves during the first and second
week of the intervention as he began stepping more, but since then has had no other negative
physical changes or responses.

Brian figured his ‘saturation point’ to be somewhere around 9500 steps—"I could be
at it already." To accomplish this he knew he had to achieve at least 3000 steps at work and
accumulate the rest at home during his walk in the evening. Although thirty minutes was not
a problem, he felt he “would be lucky to get to forty minutes” because of the “boredom or
disinterest after that amount of time.” When I suggested taking an additional walk with his
wife in the morning or listening to music while stepping to alleviate some of the boredom, he
said he had considered doing that previously but had not acted on either option.

Given Brian’s background with the blood glucose meter, the pedometer became just
another measure—"not a big factor, there were no limitations to wearing it”—to reference
"how you were doing." Brian explained that every time he checked his blood sugar, he
would look at his pedometer and record both readings in this book. It became a habit for him
so much so that if he didn’t wear the pedometer he would wonder what number of steps he
was up to. Having said that, Brian thought could continue his active lifestyle without the
pedometer assuming he had “the motivation and a routine built up and established.” Yet,
when asked if he would like to keep the pedometer at the end of the study he said he would
like to because it helped him realize “how little he had moved when he thought he had been
busy tearing around the office.”

Brian also admitted he didn’t think he could have achieved the same success with his
behavior change on his own particularly over the long term. The reason given for making
this statement hinged on the fact that he had made changes previously when “he knew he was at a point where he needed to do something” but the changes had been short lived or never launched. Brian’s hope for this behavior change was that “at the end of the four months, he would just continue with no reason to back off.” It was particularly clear that Brian’s assessment results were not going to influence his motivation or his decision to continue with his behavior change. He clearly did not anticipate seeing any changes in only five weeks. He did allude to wanting to reduce the size of his waist girth and to have a lower blood pressure by the end of the four months though. Brian concluded by saying that being more active had “given him a little more positive look at exercise, mainly because it [the increase in activity] seemed to be working. I feel better…everything seems like it is going to the plus side and it’s not impacting my behavior with any radical changes.”

Content issues

Of the four intervention sessions, the first topic Brian identified as being the most interesting to him was the heart rate monitoring/intensity discussion held in the third week. He explained “he liked knowing about that and how to do it” and had actually started to use it “just to see if he was in the ball park.” As for the rest of the information presented, he found it informative because it provided some detail as to “what is behind a lot of the stuff—the whereas and the why forces.” He thought four weeks was an appropriate amount of time to spend together and that the information presented was what “they needed to know to make it useful to do and to know what they were doing.”

He thought the weekly themes were interesting while the Gretzky quote in the fourth week was good—“I could see exactly what you were talking about”—whereas his wife “thought the stuff was just fantastic. She loved it.” The decision balance sheet was not
difficult to complete but "it made a little more sense after I explained it" particularly the meaning of 'loss to self.' Brian thought the word 'cost' instead of 'loss' might clarify the intent of that section along with some clearly written instructions which would help him identify exactly what is wanted.

When I asked Brian for his thoughts on the usefulness of journal writing he eloquently said, "It sucks, I hate it. I never want to do it again (laughter)." He attributes these feelings to the fact that he's a numbers guy that has gotten "so used to doing the number thing with his blood sugars, fast and quick because that is all the time he wants to take." He also wondered if being a male had anything to do with it. His perception was that "women tended to be able to or liked to write a little bit more in journals than guys do." The bottom line was that he hated writing and didn't think of himself as a good writer and consequently, did not enjoy the experience of journal writing at all. When I explained my need for context in association with the numbers he was providing, we worked through the notion of preparing his notes on the computer and creating two columns to go along with his numbers to record heart rate and one or two words to clarify or explain the numbers. Brian thought this might work and said he "would try it just to see if it made a difference."

Following this discussion, Brian and I reviewed a number of the tools contained within The Step by Step manual as well as some of the content of the four intervention meetings. We started with the two information articles I had included. Brian thought they were good but was glad I hadn't given them anymore to read. "Things can get over done," he said. Since he provided the list of web sites, he was in favor of including it in future copies of the manual particularly the sites for the CDA. He really liked the weekly goal
setting worksheet especially the top part which was “right out, real easy to see” although he didn’t like the questions on the bottom of the worksheet because he wasn’t sure how he was supposed to answer. He thought perhaps he was “just a little bit thicker at getting this stuff or perhaps was overanalyzing and making a bigger thing out of it than what was expected.” The activity calendar worked for Brian. Any suggestions he had were format related with one deviation. He thought, perhaps, a space for recording heart rate should be included if it were to be measured every time.

Brian enjoyed the group walks that took place each session. He felt the group walks “showed him how to do it—we actually did what you expected us to do” however, he was expecting the last walk to be forty minutes long as compared to thirty. He also found the treadmill demonstration helpful and admitted that he had a feeling “if he were to stick with the walking he would wuss out in the bad weather, in which case a treadmill would be perfect.” He thought he would most likely buy his own treadmill rather than use the one in the Fitness Center although he hadn’t ruled out the possibility completely. The irony of Brian’s story is the fact that he had just “talked his wife out of buying one” the Christmas prior.

Having the opportunity to converse with other members of the intervention was an important feature of the behavior change process for Brian. Interacting and “talking about various things, because everybody sees or does things just a little bit different,” helped Brian weigh out various options and strategies to see if they would work for him as they had for other members of the group. He felt knowing the other members of the group prior to the start of the intervention also helped everyone share as much as they did. Scheduling of the intervention with respect to seasonal variations was also had an impact on the
success of Brian's behavior change. He reported that if the intervention had been
scheduled when it "was snowing or pouring rain out or in the fall, it might have been just
an easy way to say no." Brian considered a spring or summer program the "easiest time
possible because there was less chance that people could use something [like the weather]
as an excuse." It also allowed people time to develop their routine well enough in advance
of the fall so that they could plan alternative walking strategies if need be.

Despite Brian's limited experience being a 'good goal setter' he enjoyed the
opportunity to set his own weekly walking goals. He thought it was more realistic doing it
for himself as compared to having me as the facilitator do it for him. He remarked, "How the
hell does a facilitator know what my lifestyle is and how are they going to adjust it? It makes
more sense to set my own standard" referenced according to my baseline results. He found it
very important to "find the baseline for the individual not the group;" thus, reinforcing the
point that individuals "should set their goals." For Brian this meant, increasing his weekly
goal by 500 steps. Working his way through this process, helped Brian develop some
SMART goals even though he could not recall what this acronym stood for. He did however
associate SMART with the Gretzky quote from the fourth session which he interpreted to
mean planning ahead "to try and reach it [the goal]."

As a result of this experience, Brian felt he was prepared for the three months on his
own. He said he had no disillusionment that he couldn't do it.

I have got into the routine. The meetings have been good. They have given me the
information I need—how to base my goals. The amount to raise them if I need to
raise them and how to adjust it. The heart rate thing is going to be interesting. I am
real anxious to take that more often, increase the intensity and see what that does. I
think it [the weekly meetings] have given me enough information to make it kind of
fun.

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Andragogical issues

As an adult participant, Brian enjoyed the experiential learning that was built into the strategy oriented intervention. In particular, he thought “just getting out and walking was great…you actually got up and did it.” He also enjoyed the informality and the intimacy that came as a result of having a small group size. He felt that it was much more personal because he was getting more of “a reaction from the facilitator.” As for a facilitator, he thought the most appropriate person to deliver this type of program would be an individual with a “background in fitness as opposed to diabetes” like “a dietician or a nurse or a doctor or anything like that.” He clarified his point by saying since the focal point of the intervention was physical activity not diabetes, a facilitator with expertise in this area should be able to adapt and apply information regarding physical activity to suit the needs of the group. If however, the facilitator was working with a group of people who had diabetes, knowing “some things that a diabetics should be aware of like hypoglycemia and stuff like that” would be necessary. As an afterthought, Brian also added that he thought it was “good that I wasn’t a nurse…because some people get hyper as soon as you put the label nurse on a person. All of a sudden [you can get] into some heavy, heavy stuff and that is not what you really want.”

As a result of completing the active portion of the intervention, Brian reported feeling “pretty positive…more positive because he had seen, even though going really slow, that at least he was doing it [the behavior change] and that was just the best.” When asked to rate his confidence and commitment on a scale of one to ten, he gave himself a ten in both categories (up from his previous scores) indicating his desire to continue with the behavior change. He attributed some of this eagerness to the information presented in the four weekly
meetings which he felt helped him "prepare to continue to be active." Specifically, he thought learning how to "take the feedback that he was getting from the numbers and knowing what to do with them to make better goals" was critical for the three months without supervision. And he claimed he learned how to use the information well enough to be able to do it on his own.

In terms of reorganizing his life to fit in the behavior change, Brian stated it had been "pretty minimal." He said the decision was quite clear when he asked himself if he "really wanted to be healthy or if he just wanted to continue doing whatever stupidity that kept him busy." And so, he found reorganizing his time "to fit in one hour every night to keep healthy was not take that big of a stretch." For Brian to continue with his stepping, he thought it would be more helpful if I were to "walk with him (and whoever else was available) around the college for twenty minutes to half an hour at least once a week" in comparison to the two follow-up phone calls that were initially scheduled. That way if he needed to be bitched at, I could do it then and he would still accumulate some steps.

Brian's suggestion festered from his own uncertainty as to what to expect. He said he didn't know if things would go as planned or if he would need someone to whine and complain at him. He did know, however, that his wife would because he had specifically told her to and she complied. Interestingly, Brain had not given me any reason to "bitch" at him up to this point and although a "little disappointed that I hadn't got on his case" he realized he was actually doing what he was supposed to.

When asked to compare this behavior change to biting his finger nails, Brian said it was harder to "stop nail biting than to exercise." Nail biting was not going to cause a heart attack; there were no consequences other than "it just looks bad."
At the end of the interview, I conducted Brian’s second assessment (refer to Table 7). His results were all positive particularly the decrease in resting heart rate and systolic blood pressure. Brian seemed quite pleased with the results. As he was departing, we affirmed that Brian would try to complete his journal entries using his computer instead of the notebook provided and that we would meet again informally in the next couple of weeks.

End of study

Although Brian did not complete a written journal after leaving the second interview, I was able to speak with Brian sporadically during the last 10 weeks of the intervention. By the end of the 16 week intervention, Brian was walking faithfully “at least thirty minutes” almost every evening. He said, he had “to stay consistent with [his] after work regime in order to make up any time at all or [he] would be lucky to get to twelve hundred in a day.”

Brian’s wife, an avid walker, often accompanied him on his evening walks.

Brian was also very busy sailing with a work cohort whenever the opportunity presented itself. He said getting the boat ready was physically demanding even though the pedometer did not record this activity. At the end of a day sailing, he expected to “see a lot more results than what [he was] actually getting” but didn’t. While on vacation, Brian was less active walking than anticipated but busy completing other household tasks such as “papering and painting” that did not register as steps either. Nonetheless, he assumed “the other jobs and stuff had to be more active” than what he “got in the eight hours” at work.

In the future, Brian thought he might like to try tennis again because he really liked it and hadn’t done it for awhile. He also predicted that his stepping would improve in the fall and winter and in so doing stated that although the formal study was over he would “just
keep going” because it wouldn’t “bother him to keep filling out the number of steps.” Brian concluded by saying it was his goal to become more active, “that is why [he] wanted to start [the intervention] and “that is where [he] ended and that is the way [he] wants to keep it.”

His schedule at work continued to plague him particularly as his co-workers took vacation and Brian was left to assume responsibility for all of the office duties. For instance, on one of his lowest days at work, he accumulated only six or seven hundred steps which he attributed to “going to the washroom the old time” otherwise he said he was “sitting in front of a computer for almost eight hours a day.” As a result Brian felt he had “no control of what [he] could do at work” and so “made a real effort to go out every night.” He said it was “the only thing [he] felt good about—the consistency of walking.” For Brian, he “figured the important thing was to get the behavioral thing down, to not slack off and just think well I can miss tonight.”

When Brian gathered for the final group interview on July 29, 1999, he told me his strategy for getting the behavioral thing down was to “just do it.” He said he knew he was in bad shape and just “had to do it [make the behavior change to become more active]” and “wanted to do it—I was more positive.” Part of his strategizing was to make the walking part of his routine—“six thirty every night, just automatically, we set a time” and would go. Brian’s other strategy was to reference his timed walks specifically the half hour route in which he attained thirty five hundred steps. He said he would “use that at school” or at the mall when shopping with his wife to monitor his progress. Negative reinforcement did not work for Brian in that if he missed a day of stepping, thinking he would do twice as much the next day to make up for it never worked. Hearing of Peter’s weekly averages was also a bit of a negative reinforcement. Brian found it depressing at times because “you always had that
comparison thing” even though he knew the behavior change was meant to be done individually. Finally, knowing he was committed to “somebody other than [him]self” for the purpose of this study also motivated Brian although he insisted that motivation wasn’t “really a problem.”

For future interventions, Brian made several suggestions. First, he told me I should consider seasonal variations, particularly the impact of summer and vacations, and thus, the start date for future interventions. The manual was impressive but most of the emphasis should be on the “sheets that are in there” although a little more on intensity “with some samples and stuff” would be the only additional information he would suggest adding. Don’t give people too much—“just the points that are absolutely necessary, forget all the rest”—and avoid giving “a whole lot of homework”—“I do not want “to go home and have to read fifteen pages.” Brian wanted to have fun and “at the same time get some benefit.” Journal writing, however, was not fun for Brian. He hated journals but was willing to record and “write stuff down.” Revising the activity calendar to add a comment section instead of having to write in a journal was the alternative Brian could live with—“it is a daily thing and is something I am filling in anyway.” He thought the intervention was easy enough, the group walks “a good thing” and the time commitment minimal enough and so had no suggestions in this regard. On the other hand, he thought establishing an affiliation with a general practitioner’s office would be a great asset for recruiting future participants in need of a more active lifestyle. Advertising the intervention as “something non-threatening, non-strenuous that anybody could do” was also an important variable to consider. Lastly, recruiting people from the non-diabetic population to participate in a strategy oriented education intervention was also something Brian thought deserved further review.
Results of case study 102

Brian had a pre-intervention average baseline of 5778 steps per day, the equivalent to 50 minutes of average stepping per day. Over the course of the 16 week intervention his daily average fluctuated anywhere from 28 minutes above his intervention average to 17 minutes below his intervention average. Brian achieved his best results during the active portion of the intervention. At the end of the study he averaged 5996 steps per day (218 above the pre-intervention baseline) or 1.8 minutes more of stepping per day above his intervention baseline (effect size = .14 considered a small difference). He only increased the number steps taken in those 1.8 minutes by 5.5 steps (refer to Table 9); thus, suggesting that Brian did not change his intensity over the course of the study. Brian did however see a drop in his waist girth of 1.0 cm, his resting heart rate of 8 beats per minute, his BMI of .1, and his weight of .2 kg (refer to Table 7). Brian's blood pressure dropped significantly (-22 mmHg systolic pressure) during the active portion of the intervention when he was stepping the most although it did return to the pre-intervention level by the end of the study.

Throughout most of the study, Brian agreed that he was unsure he had the skills necessary to make daily activity part of his lifestyle but by the end had changed his mind to no longer feel this way. His confidence and commitment wavered continuously. He started the study confident in his ability to make behavior change decisions, then lost a bit as he prepared for the post-intervention portion of the study and then gained it back after successfully continuing with the behavior change for 16 weeks. His commitment followed a similar pattern although he finished the study feeling even more strongly about his desire to continue with his daily activity goals (refer to Table 8).
Prior to the start of this intervention, Brian was extremely hypokinetic. His occupation as a computer technologist and his attitude did little to enhance his desire to act on or include physical activity in his lifestyle. Having tried other exercise routines in the past with little success or enjoyment added to Brian’s resistance. Yet, Brian agreed to participate in this study because wanting to change the activity aspect of his life was something he had been covertly assessing and wanting to do for the past two or three years.
<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-intervention</th>
<th>Post-intervention (week 5–16)</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agree</td>
<td>Agree</td>
<td>Disagree</td>
</tr>
<tr>
<td>2</td>
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<td>Agree</td>
<td>Disagree</td>
</tr>
<tr>
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</tr>
<tr>
<td>6</td>
<td>Disagree</td>
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</table>

Brian’s preparation for the behavior change was primarily mental. He said he needed something to motivate him to get started but once started was committed. At the onset, I think Brian was unsure of the alternatives—that he had a choice with his activity patterns and I wasn’t going to be the one to tell him what or how to do things—and he was driven extrinsically. He often referred to the need to be “bitched at.”

Brian demonstrated his commitment to the behavior change not so much with an increase in his volume of stepping (+1.8 minutes/day or 218 more steps/day) but rather his diligence walking for at least 30 minutes every evening after supper. This pattern became a routine for Brian which the numbers do not speak to (refer to Figure 3).
Table 9: Weekly results--Case study 102

<table>
<thead>
<tr>
<th>Time (weeks)</th>
<th>Weekly total (7)</th>
<th>Weekly goal setting (steps)</th>
<th>Weekly average (steps)</th>
<th>Weekly timed average Intervention average = 116steps/min or 50 minutes</th>
<th>Waist girth (cm)</th>
<th>Glycemic values (7 days)</th>
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<tr>
<td>Pre-intervention</td>
<td></td>
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<td>Average baseline = 5778</td>
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<tr>
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<td>53318</td>
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<td>9000</td>
<td>8997</td>
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<td>4</td>
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<td>9500</td>
<td>8384</td>
<td>72 (+22)</td>
<td></td>
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<td>6364</td>
<td>55 (+5)</td>
<td>98.5 (-.5)</td>
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<td>6</td>
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<td>8500</td>
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<td>35706</td>
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<td>5500</td>
<td>5563</td>
<td>48 (-2)</td>
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</tr>
<tr>
<td>14</td>
<td>35527</td>
<td>5500</td>
<td>5075</td>
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</tr>
<tr>
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<td>32609</td>
<td>5500</td>
<td>4658</td>
<td>40 (-10)</td>
<td></td>
<td>9.4</td>
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<td>5754</td>
<td>50 (0)</td>
<td></td>
<td>7.6</td>
</tr>
<tr>
<td>End of study</td>
<td>41967.8</td>
<td>7218.75</td>
<td>5995.5</td>
<td>51.8 (+1.8)</td>
<td>98.0 (-1)</td>
<td>8.3</td>
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</table>
Figure 3: Average weekly steps over 16 week intervention
Case study 102

Average baseline = 5778 steps
Weekly average = 5996 steps
Case study 103

Pre-intervention

Personal history

The pseudonym for case study 103 will be Peter. Peter is a 46 year old college graduate who is currently employed as a technologist in a community college. He has worked at the college for nineteen years in the Motive Power Division and prior to that in a parts store where he assumed similar job responsibilities. Peter indicated both positions were busy and required “a lot of walking...the nature of the job has me going all different directions, all the time” with very little opportunity to sit.

Peter was the first person to express his interest in being a participant for this research project. He made it clear that “changes needed to be made” in his life particularly in regards to his health which he was “not too overly enthused about.” He said his wife was most supportive of his decision to participate and quite willing to provide encouragement to keep him [Peter] going. In fact, Peter’s wife had “read all of the pre-intervention material and was quite aware of the [study requirements] and behind it” all the way. Peter’s desire was to lose weight—“I have to lose weight in order to get off the medication I am currently taking to control my diabetes.” By getting off the medication he could then “control [his] diabetes by diet” which had “been up and down” since being diagnosed about a year ago. Getting off the medication was his number one goal.

When diagnosed Peter’s blood sugar level was 28 which in comparison to his current level of 2.7 to 14 was extremely high. He believes he may have been diabetic for up to a year before actually being diagnosed but was too busy completing a major project that
involved long hours and a lot of physical labor to acknowledge the obvious warning signs. Peter does not have a strong family history of diabetes although his father at age 81 was just recently told he had high sugar levels. He was told to lose weight. None of his other five siblings has shown any signs. Consequently, Peter still ponders why he developed Type 2 diabetes. He struggles with many unanswered questions to find some sort of explanation for his “lazy pancreas.” He wonders, despite being “fairly positive” and “everything else being fairly decent, fairly even” if perhaps some difficulties at home that were highly stressful contributed to his diabetes. His frustration was most obvious.

Given the relative newness of his diagnosis, Peter feels that the diabetes still controls him and he does not like that. Thinking of diabetes as a disease that requires medication compounds his feelings of dislike even more. He wants the control back. One way for Peter to regain some control is to know as much as he can to better understand why the things that are happening to him are happening. And so, Peter tends to and needs to ask a lot of questions.

Peter realizes dieting alone is not the best way to manage his diabetes. For example, in the past when he “dieted too hard,” he ended up hungry and his blood sugars dropped too low which then put him in danger of blacking out. He also found out “tackling it [dieting] too hard” was only a quick fix; the weight did not stay off. So now he sees a dietician but the diet he is on has caused him to gain weight—all he wants to “find is a happy medium.”

In terms of Peter’s quality of life and well-being, he admits the major area that has been affected since being diagnosed with Type 2 diabetes is his eating. Now he looks at every label for the product’s sugar content. He finds it frustrating “to get food for people that have Type 2 diabetes” or “to order in a restaurant because there is nothing on the menu that is
low in sugar and not just sugar but carbohydrates, everything your body makes into sugar. That’s the major impact.” The rest he said is fine—“the rest of my lifestyle is the same. We don’t do anything different as a family—they forget a lot.” His extended family forgets the most but he doesn’t blame them for that. And despite all this, he thinks he still has a positive attitude “as far as not letting it [the diabetes] get me down.”

Within four to five months after being diagnosed with Type 2 diabetes, Peter “went through a whole program” at the Lawson Institute where they “educated him on what diabetes is and how to live with it so to speak.” He has talked to a dietitian as well. He found the diabetes education program “more general than anything else, not very specific to [his] needs.” In particular, Peter had to deal with blurred vision and pain in his legs and feet when first diagnosed. Since then, he said his vision has improved and the pain has diminished but standing a lot and walking too much on the concrete floors at the college can aggravate the situation again. To minimize flaire ups, Peter stressed the importance of having “good shoes and the more cushioning the better.”

Peter defined exercise as “being or keeping active whether it be walking, whether it be gardening.” It was something he said he enjoyed doing. He declared he was not the type to sit for hours especially because his “minor back problems” would cause his feet to hurt if he sat for too long. In addition, a lack of circulation would also hurt his feet which “goes along with diabetes as well.” To aid with his circulation, Peter walks “daily (4 out of 5 weekdays) about 20 minutes” with his wife. It’s kind of a time together which we don’t seem to find when we’re in the house (laughter).” In the summer, they spend more time gardening which Peter feels keeps him very active. He did not consider the walking and standing required of him at work to be “necessarily active.” He wished he could be more
disciplined. He felt his schedule was too busy which prevented him from “doing a lot more that he wanted to do.” He considered weekends to be more active than weekdays.

Since he began walking consistently for 20 minutes, Peter has noticed he doesn’t breathe “heavily at all anymore” which is something he used to do especially when going up the stairs. He was most satisfied with this change. He noted keeping additional weight off also helped with his breathing and did not cause him to perspire as much.

Peter attributed being diagnosed with Type 2 diabetes as being responsible for the increase in his activity patterns. “Making time and knowing it [activity] was important” helped get him started but once started it made him feel better—physically he wasn’t tired, he had more energy and “probably happier, maybe a little less grumpy.” He added, “The fear was also put into me that if I didn’t do something I wouldn’t get control of this and that was more scary because I might be on insulin eventually and I don’t want to be.” What has helped Peter stay committed to his daily walk is walking with his wife. “It’s fun this way,” he remarked which might explain why Peter tended to devalue the walking and gardening he was doing as “not enough…there will probably have to be other things as well.” Peter was unclear how something he liked doing, that “got him away from his job” could be of benefit to him.

However, Peter did realize that he feared monotony, he enjoyed activities with other people and activities that he considered fun; otherwise, he said he did not have the discipline to adhere to a routine.

Some of the encouragement Peter received to start an activity program came from his physician when first diagnosed. Peter said walking was recommended to aid with his circulation but there was “no time taken to personalize anything—that wasn’t done.” Since
then, Peter indicated little more has been mentioned about exercise—“it doesn’t really come up”—despite visits to his doctor every six weeks. Participating in this research study was Peter’s window of opportunity. He saw his participation as a “perfect opportunity to see what he could do to change…and perhaps have other people guide him where he hadn’t been before.” In addition, he thought the activity intervention might “help get him over his stalemate” to “lose weight consistently and not too quickly” as his doctor and nurse had recommended.

Beyond this, Peter had no preconceived expectations of the intervention. However, when asked about the expectations of himself, he knew he had “never been very active, even as a child” but was willing “to do as much as he could” because “he was “kind of dedicated to make things work to the best of his ability.” His only limitation, he thought, might be time depending on the demands of the intervention given his geographical location from the college and his responsibilities at home.

Andragogical issues

Although uncertain what ‘andragogical’ meant, Peter did know that he didn’t like being talked to as a learner in a classroom environment. He enjoyed having “plenty of opportunity for input and people talk” because listening to others share their experiences enabled him to “relate to them [their experiences] and improve….Just learn new ways of doing things.” He felt he learned best in this fashion and consequently took this same approach when teaching students in his own classes.

I try to include everybody and give them the opportunity to feel good about themselves and that’s probably the whole basis, if you feel good about yourself you are going to do better….I like to talk about different situations, their experiences. It makes them feel more at ease as well.
Peter also felt facilitators had a responsibility to “treat everybody equally so people aren’t left out” even if some individual learners don’t know as much or aren’t as forward as others in the group.

As a learner in this study, Peter was 100% committed “to try and change something.” He was 80% confident he could change, although if he was only 50% successful he would still consider that positive because it was a move in the right direction. Peter said he would “definitely need feedback” to confirm that he was “doing the right things” even if he didn’t “feel any better” or was not losing any weight. He was aware, though, that if he “didn’t see something positive, he might not try as hard.” Positive support was critical—he did not want to hear that he was not doing well. Having “enough guidance or support” to let him “know he was making a difference” was also important.

Stage of change

Peter considered himself a beginner in the preparation stage of change. He realized he needed to start somewhere to “become more regular” and “to do what he felt he should be doing.” Peter did not think he would have selected the same stage of change had he not agreed to participate in this study.

Intervention strategies/processes of change

Prior to this study, Peter’s only recollection of a behavior change was “years and years and years ago” when he “changed by dropping sugar from his coffee.” His approach was gradual which “works much better...because you’re likely to stick with it.” He admits he was never successful losing weight, though, despite “cutting out sweets and that sort of thing” and monitoring his progression on the weigh scale—“I seemed to be powerless to do anything about it.” This experience was frustrating for Peter and he would often be left to
ponder “what was happening.” Today, Peter still self-reflects except that he does this more often with his wife while they are out on their walks. He said it helps them deal with their frustrations and stress, and “be in tune with each other...to know what they’re doing and where they’re going.” Peter has never self-reflected using a journal before but is willing to try for this study.

Peter’s motivation comes from his stubbornness although he would prefer to think of “it as more of a dedication.”

I like to think of myself as a person that can make a difference for somebody else. It may not be short term, it might be long term....I like to make a difference at whatever I do even at work.

His motivation is not extrinsic. Physical rewards are something he’s never really thought of. His satisfaction comes from seeing “definite improvement...that’s rewarding enough—change, positive change.”

Outcome issues

Peter’s desire to participate in this study stemmed from his hope to “gain a better insight into how to maintain and be more disciplined” with his exercise routine. He expected to work “fairly hard at it in the beginning “because it’s not something that comes naturally” but “hoped it would become natural” by the end. He kept reiterating “it’s something I have to do.”

Peter anticipated only positive physical changes as a result of his increased activity level particularly losing weight and feeling better physically. He did not think it would be difficult to change his behavior, other than a little push to get him started, because “it had to be done.” I got the sense that he was excited to have someone sit down and finally advise him on what to do.
Peter clearly stated he had no difficulty goal setting or meeting his goals. He attributed this success to his upbringing especially what he learned from his father—“a very disciplined man in what he did.” Because of his background goal setting, he thought he would be better prepared to complete the tasks asked of him in the intervention “by a certain time without letting things drag on” and in the short term “feel better about what has happened.” As for long term goals, Peter stated previously he wanted to “get off the medication” and the way to do that was to “keep his weight in line—that’s very important to me.”

Peter felt his impending success was somewhat dependent on the guidance he would receive in the intervention. He did not think he could complete the behavior change on his own. My role as the facilitator was to keep Peter informed so as not to “embarrass him about anything” and to ensure a certain level of comfort with the content and procedures in case he did not want to participate. Assuming these criteria were met, Peter thought changing his behavior to become more active would have a positive effect—“there’s no doubt about it and that’s what I’m looking for.” In turn, his health, well-being and “everything would improve as well as the management of his diabetes.”

Active intervention (week 1-4)

On the first night of the intervention, I felt Peter was a little nervous about being in the group setting. He seemed a little quiet at the onset. As the evening progressed though I think he relaxed and then started asking a lot of questions of the other two members of the group. Perhaps he was uncomfortable talking about his diabetes—it seemed they all were a little. Given that Peter was the ‘rookie’ in the group with respect to having only had diabetes for one year that may have been the reason. In particular Peter wanted to know about control. He felt the diabetes was still in control of him and he stated he still fought the urges to
eat the chocolate cake served at the family function. Jane reassured him that even after ten years she still dealt with the same thing.

Peter described himself as never having had to worry about his weight as a kid or even as a young adult. He said it had only been in the last while that the weight started to creep on but that when he was first sick and not yet diagnosed with the diabetes he lost a lot of weight. In fact, people said he didn't look good—that makes sense—he was sick.

Peter was the most active of the group. His pre-intervention baseline was about 11700 steps per day—almost as much as the pilot group's highest achiever. He certainly casts a different twist to this study. I wonder how much more I can expect him to achieve. It seems that once you reach the 14000 mark you are walking about two hours worth of steps which is difficult to do if you have a busy lifestyle. Peter currently walks in the evenings with his wife. They travel around the block which takes about 15 minutes. He said they try to do this on a daily basis but I'm not certain that it happens 7 days of the week. He explained that this was their time out of the day to discuss various issues (e.g., they have 2 teenage daughters that keep them busy). The others in the group were in awe of the number of steps Peter was taking. They thought his results were amazing even though Brian offered some sarcastic teasing. Peter received the compliments with modesty. I don't think he thought it was a big deal because he was just doing what he set out to do. That's what will make this a challenge for both of us—to see if we can increase his numbers and potentially bring about any sort of change to his quality of life (e.g., feeling better, better control of diabetes, weight loss, heart rate changes, etc.). At the onset of the evening, I think all of the participants including Peter were expecting me to tell them what to do to make this intervention work for them, almost as if I had the magic pill that would make the activity intervention work miracles for their diabetes control. Peter had high expectations for this project. He was determined and confident he could commit and make a change.

During our walk I learned that Peter is an avid gardener. He has a huge perennial garden that covers most of his property. He spends a lot of time working in his garden over the course of the summer. This might help him accumulate more steps without making it seem like additional work. Peter and I led the pack during the walk tonight. We set the pace even though it was only for 10 minutes. Brian and Jane followed a few steps behind. It was a leisurely pace nothing too strenuous.

During the Decision Balance, Peter made several contributions. He seemed to find the whole exercise quite easy and at times would go off on his own to make entries on the sheet. He willingly shared several of his ideas and offered some suggestions to Brian who was having difficulty coming up with costs/losses. Peter again came back to control and feeling like you were giving a little of it up to make this work.
Peter seems determined to use this project as a way to get control of his diabetes. I hope it helps. He says that only his father has high sugar levels in his family but has not been diagnosed with diabetes. It seems the control issue would help him deal with this lifestyle adjustment a bit better. He says family members still forget that he has diabetes at family functions and they will ask him if he wants dessert.

He indicated that his wife is very supportive of his participation in this project. She most likely will continue to walk with him. I wonder if his children will. During the consciousness raising, Peter took off on a tangent about eating habits with Brian and Jane. I got the sense that he wanted them to give him the secret—all of the answers—to allow him to regulate his diabetes a bit better. I let the conversation go and they talked for about 10 minutes on this topic. It seemed to set them at ease like it was the first time they had talked about their diabetes with coworkers. It was perhaps rewarding for Brian and Jane to be able to share their knowledge and experience.

When the first session ended, I reminded everyone to remember to record their comments, thoughts, and feelings in their personal journals. Peter was very astute at completing this task which allowed me to follow his thinking and experimentation with the behavior change. For instance, in Peter's journal for the first week of the study, I got a sense that he was working to establish a pattern or a routine. If he was busy at work, he would not walk as much at night; however, if he had a slow day at work he would try to walk more at night or more frequently throughout the day. In addition, he was also trying to fit in his gardening which also demanded much of him physically. Sunday was his day of rest. Peter finished the week with a daily average of almost 14000 steps.

The second intervention began with the group sharing the details of their activity calendars after I shared the introductory quote/theme for the evening. Tonight's message was about walking a tight rope and how that felt in relation to the first week of behavior change. Everyone seemed to agree with this message.

Peter told the group that he walked close to 13700 steps per day this week but that Sunday was a right off. His idea of a right off was 10000 steps. When we took the total number of steps for the week it came to 87000 which exceeded his daily activity goal. He said he had been checking his pedometer throughout the day and trying to walk more in the evening. He gauged his day on the number of steps achieved at noon and then prior to leaving work so that he didn't leave himself with too many
steps for the evening. He said he typically walked about 30 minutes or two loops of the block at night to help him reach his goal. He indicated that his wife continues to walk with him and that his daughter joined him as well.

Early in the evening, I sensed Peter was perhaps a little frustrated wondering where to go from this point. I got the impression that walking as much as he was consumed a lot of time. I didn’t doubt him given that one of the fall pilot study participants walked about the same number of steps and it took her approximately two hours of stepping each day to complete. The difference between Peter and this woman was lifestyle. She was widowed, retired and had no extra responsibilities; Peter, on the other hand, works full-time, has a young family and likes to garden. He is also very involved in his church. What is realistic for this behavior change to continue?

I remember thinking about this question for some time the following week. It warranted further consideration not only for Peter’s sake but for future interventions. By the end of the week, I found myself thinking of this situation as a “saturation point”—a point whereby individuals reach a maximum volume of stepping given the constraints of their lifestyle. I began to wonder if Peter had reached his saturation point and what move I should make next to encourage and support his behavior change efforts. I decided to address my concerns at the next intervention. My approach was going to start with a reminder to everyone about the importance of establishing a consistent pattern to his or her behavior change. This pattern would be identified as an increase in steps over a specific period of time which in the transtheoretical model was denoted at six months when individuals moved into the maintenance stage of their behavior change. Following that, I decided I would introduce intensity to the group even though Brian and Jane were definitely not ready for an intensity change (this is what makes Pratt’s model of adult education so appealing because I can individualize to suit the needs of each learner). I figured I would also introduce 1) calories burned to show how intensity changes energy expenditure 2) heart rate monitoring and 3) ventilation threshold/talk test.

As my journal writing of Peter continued, I wrote some notes about the first question of the consciousness raising when I asked individuals to discuss previous behavior change attempts.
This seemed to stump them. Peter did however, dig back in his past to recall giving up caffeine. He said he had few vices and other than his dietary modifications for management of his diabetes, caffeine was about all he could come up.

As the group discussion continued, Amy (a FHP student) was asked to talk about her behavior change from the PHRE 227 course. She explained how she had tried to better manage her feelings especially her stress. Her story prompted further discussion. Brian then added, well in that case, I’ve tried to quit biting my finger nails many times before with little success. To that end, I shared my attempts at trying to quit biting my finger nails which is when Peter joined the discussion again. He told us his daughter also bites her finger nails but so low that they sometimes bleed and he finds himself asking her “why?” I replied, “She perhaps wonders why you can’t walk more or lose weight.” He was quiet. I used this opportunity in the group meeting to talk about behavior change as a significant alteration in life, and that one is better to view it and prepare for it as a difficult tumultuous process—bound to be marked by strategizing and relapses that ebb with the various stages one goes through. We also took the opportunity to revisit the concept of SMART goal setting and its relationship to behavior change.

After the second intervention, I happened to run into Peter in the hallway of the college. He was just coming in from a walk at noon. I indicated to him that at the next session I would provide some more direction for him to consider adding intensity to his walking routine. I also acknowledged that I sensed he was a little frustrated and that that was reasonable given the volume of stepping that he was attempting to do. I think that he felt a little relief knowing that I was attuned to his feelings. I asked him if he would be our leader for the walk next week given that we would be outside. He could plan the route for us.

Throughout the remainder of that week, Peter was extremely successful walking except for one night when the weather was inclement. He continued to experiment with frequency and pace. He also discovered he was able to achieve 2634 steps in 20 minutes of walking at home as compared to 2239 steps in 20 minutes of walking around the gym at the college. He continued to take Sunday as his day of rest.

We started the third intervention with a review of the third theme; whereby, we discussed the importance of making intelligent choices. I provided a brief overview of the evening and indicated how we would discuss intensity changes to help Peter with his stepping needs. I think that made him happy. I informed the group that Peter would be our leader tonight on the walk and he smiled when I said that. In fact, he was quite prepared. He knew that one lap around the perimeter of the
college took approximately 15 minutes at his pace. Brian jumped all over that and jokingly said he wouldn't be able to keep up with that pace.

This week Peter stepped over 102000 steps. He met his goal approximately five days of the week although Sunday was still low (10000 steps again). He said he felt he deserved a day of rest and I agreed. Ten thousand is still great. I reminded everyone that what Peter was doing was awesome and very difficult given the circumstances (in comparison, people in the Japanese study were hospitalized and the woman from the fall pilot study was on her own with few additional responsibilities).

Peter and Brian both had star stickers on their activity calendars this week. Neither of them did the week before although Jane offered, in fact, insisted that they put some on. Brian actually had his own stickers with him this week.

Peter had all of his calculations done when he arrived for this session. He informed us of the results of his 20 minute walk at home and his 20 minute walk with us as a group last week. He revealed that when we walked as a group it was at a much slower pace than his pace at home and that the difference between the two was about 600 steps. He said he found the group walk too slow/too easy. Consequently, his pace for the evening walk was a challenge for most, Jane especially. In fact, he was ahead of us after the second lap by a good two to three minutes.

Prior to the walk I asked everyone to take a resting heart rate (they had been sitting for about 20 minutes). Peter's heart rate was 12 beats in 10 seconds. He found his using his carotid pulse. At the end of his walk his heart rate was 19 beats in 10 seconds. When we determined his predicted max heart rate and the range for intensity (between 60 and 90 percent according to CPAFLA standards) his heart rate of 114 bpm was about 65% of his predicted HR max—right on. What we determined he should do after a lengthy discussion was attempt to finish his 45 minute walk with a more consistent intensity/finish. He indicated that he tended to slow down in the last 15 minutes of the walk. I suggested that once he could complete the 45 minute walk at that same intensity (he could check his HR as he went along) that then we would look at upping his intensity—not before. He agreed. I reminded the group that duration was key first.

Peter has not noticed any changes in his sugar readings. In fact, he was experimenting—after eating one night, he immediately went for a walk and then took his sugar reading as soon as he returned to the house. He said there was no decrease in his sugar level which he found troubling. I then recalled the email from Catrine about her study wherein she, too, had found that walking immediately after eating did not seem to bring about changes in her subjects' sugar levels either. I told him I would provide a copy of the email and he seemed quite interested in hearing more about this.

Peter mentioned that he was more hungry now but that he was not giving in to the desire to eat more. He said he had not adjusted his medication in any way and he still
found his sugars to be jumping around a lot. I asked if he had noticed any other changes, for instance, his weight and he said he was not monitoring. I reminded the group that it had only been 3 weeks and not to expect miracles right away. I suggested that we wait until after the 4th session and the next interview and reassessment to make any judgements. I also suggested that some changes could be very subtle and not to expect overt changes. Jane did offer some positive reinforcement by sharing her opinion that she was definitely feeling better especially in the mornings. She said she wasn’t feeling as sluggish as she used to. I think that that helped for Peter to hear this from his peers.

When I mentioned that next week we would discuss planning for the future especially the 3 months on their own Peter smiled. It was almost an “oh my gosh, we’re on our own” smile. I then reminded the group that I would be taking them to the gym next week to show them how to use the treadmills in case they had inclement weather. They were quiet and then Peter said he did not feel at all comfortable going into a place like that. He said everyone is so fit and that he didn’t feel like he belonged. He said he preferred walking at home where no one could see him. I tried to reassure him that he would not look out of place but he was pretty strong with his conviction. I also told the group that the summer was a really quiet time and early mornings and evenings were the least populated times to use the facility if they so desired. I also told them they need not change to use the treadmill given that none of them were working at high enough intensities to sweat. I also told them about the TVs and the people watching aspect which we had previously discussed in review of last’s weeks progress.

Peter has not told many people about his participation in this study. He said he did not want to tell too many people in case he did not do well. Then he wouldn’t have to explain or be embarrassed if he didn’t succeed.

This week both Peter’s daughter and son walked with him. He said he quite enjoys it when he has someone to walk with him. He said for the summer he thinks that he and his family will plan special trips to Springbank Park to walk so that they can look at some different scenery. He also suggested to the group that if any of us were interested in going on a tour of London gardens he had information. He somewhat shyly said, “It was a walking tour.”

I suggested that all of them consider where they would be in six months to enhance our discussion for next week. I asked if any of them saw this project as a way to spring board to other activities. Peter was the only one who didn’t have another option in mind. I find that interesting although consistent with his past. He didn’t participate in much as a youth/young adult either.

Peter had another successful week of walking on his own. It seems Peter uses the time spent walking to think which helps him to feel better. The one day he spent travelling in a vehicle
for six hours was his worst stepping day and when he said he felt the most tired. Sunday was again considered a day of low activity (9384 steps) in comparison to the rest of his week (weekly average equal to 17457 steps) (refer to Appendix Q).

On Wednesday, May 12, 1999 after our final intervention meeting, I wrote that

Peter continues to awe the group. They can’t get over how many steps he completes on a day to day basis. Peter is up around 16000 steps daily despite having a bad cold most of this week. He is really faithful to his stepping. I know he is still in search of knowing why he got this disease. I don’t think he will rest until he does. And until he knows, he may continue to feel that he doesn’t have control.

Peter was asking a few more questions tonight about diabetes in general and again I let the conversation continue. He is up around 16000 steps daily despite having a bad cold most of this week. He is really faithful to his stepping. I still want answers. Now he would like to know about stress and sugar levels. He says his sugar levels are bouncing around even more now particularly since he started walking. He says he can go to sleep and wake up after having had a glass of milk before bed with a reading one time of 11 and the next of 4. He can’t make sense of it. I provided a little information regarding muscle mass and an increase in metabolism as a result of more activity but I am not sure it clarified anything for him. I should look up some more information for Peter on metabolism and stress and the effects changes in either or both might have on sugar levels. I hope that he pursues some of his questions with his doctor the next time he is in. I believe Peter also mentioned that he is still going through more testing to determine the severity of pancreas damage which may also tell him some more information. I get a real sense that Peter wants his sugar levels to level off or at least show some signs of consistency because of his stepping—yet his volume of stepping continues to increase each week. So in reality he may need to stabilize or plateau with his stepping before he can make an accurate assessment regarding his sugar levels. I will email him with this idea.

Peter is fairly cautious yet as to the success he has achieved. I get the sense that he doesn’t want to expect or hope for too much in case it doesn’t happen. As he said before, he has not told anyone that he is doing this program except for his family in case he fails and then he doesn’t have to explain. I wonder what his family will say. I know that he spends a lot of time walking with his wife. From his journals it would seem that they use the time to talk and sort out some of their daily aggravations.

When we revisited the Decision Balance sheet, Peter indicated he would not add any more to the lists. Again, because he tends to err on the cautious side. I don’t think he even hoped to achieve some of the gains to self he may have listed (interestingly, he had mentioned he would like to lose weight but did not have it listed as a gain to self on the Decision Balance sheet). He also did not say anything about having a higher feeling of self worth as a result of his accomplishments. Perhaps, he was a little reserved because the others in the group tease him about the number of steps he takes.
and the speed at which he takes them. Yet, I sense that their teasing is nothing more than that and that in reality they too would like to be able to do as much as Peter.

Peter led the walk again tonight. This time he had a different route which worked out to be about 30 minutes. Brian walked with Peter tonight since I found Brian to be stepping on my heels. They kept up with each other well and Peter even said later that Brian set the pace for awhile. Brian and Peter talked about walking together at lunch while at work. I hope this happens. Peter is fairly consistent and walks every day around 12:15. I would like to walk with Peter. Again, I thought it was great that Peter was able to provide us with the route. We walked out to Cheapside, south on Highbury to the corner of Highbury and Oxford and then east back to the college. We were right on 30 minutes.

Peter tried the treadmill as did all of the others. He thought it was OK and even said he would consider using the treadmills if the weather was unfavorable. I still don’t think he would be comfortable in the club setting but if it were an off time to go in he might feel OK.

When we discussed relapse planning, Peter indicated that a short relapse would not set him back. He was, although, uncertain about a long relapse (e.g., if he injured himself and was flat on his back for a month). He felt it would be really difficult to get back into the swing of things simply because he would have lost all that he had gained.

Peter is playing around with intensity. I am not saying too much because he needs to experiment. I think I have provided some good guidelines and we will see how he makes out. I will encourage him to work at it (the intensity changes) using some interval work. I will follow-up with him at the second interview to make sure he is on track. I don’t think it is worth discussing with the group given that the rest are not there yet and I don’t want to bias them to try it yet. Duration is the key first and consistency.

Peter said he would recommend this program to his family and friends. I was glad to hear that because even though he had done the most out of the group, he was probably the one I was most concerned about in terms of his buying in to the benefits. I think his goals were big given his feelings of no control. I hope that his assessment results show a change.

What appealed to Peter, as indicated on his final evaluation of the intervention, was the chance to plan and set goals for himself and to have someone there to help him through the behavior change process.

Post-intervention (week 5-16)
Outcome expectations

On the day of the second interview, I decided to follow-up on my last journal entry regarding Peter’s final evaluation of the intervention. His scenario intrigued me and I was curious to know more, particularly if he thought the intervention met his expectations. His response was simple. The intervention gave him the push he needed to start and he figured “everybody whether the person is old, young whatever...needs a push to get started” which is why he would recommend the program to others.

The most appealing part of the behavior change process was “not having to do it alone.” From this comment, Peter meant not only doing it alone from a participant perspective but that it was also important having a facilitator there to “coax you on so to speak.” The most difficult thing for Peter was “trying to find the time to get out and meet the goals” particularly during the day because of meetings and student schedules. His strategy for dealing with this potential barrier was to “make a point of getting out,” “become more disciplined in planning, looking ahead,” “it is just a matter of making time,” and “just closing the doors” something he said he didn’t do in the past. He also indicated that looking at his pedometer helped him gauge his day to ensure he left work with a certain number of steps already done; thus, enabling him to reach his goal without having to walk all night.

Peter enjoyed walking and did not find he had to work very hard at his behavior change. He did not consider the intervention an exercise program and was relieved to hear me say that at our first meeting. He told me during the interview, “I’m not into exercise...the sit ups and that, push ups and all that kind of stuff. I don’t think that would have worked.” Having co-workers participate in the same intervention did not hinder his performance either. Although he did not share much with his immediate co-workers, having access to the other
intervention participants was a plus. In fact, he wished their schedules were more coordinated because he would have liked to walk more with them on his own time—"that might have been a fun thing to do." For future interventions Peter suggested I consider "getting people to maybe team up in pairs or even in threes" to "kind of promote each other, support each other" when walking particularly if all from the same work environment.

Peter's move from the preparation stage of change to the action stage of change made him think he was moving in the "right direction." However he realized "sticking with it to the end and beyond was probably going to be the biggest challenge especially with the summer coming." Fortunately, Peter recognized his limitations with respect to time and concurrently his future goal setting. He saw 17000 steps as "pretty much it" with the only other option being an increase in intensity which was something he was still experimenting with. Peter also understood but did not abuse the concept of goal setting—averaging busy days and slow days of stepping each week—and the importance of days like Sunday when rest and family time were not to be confused with relapse.

When asked to consider the impact of his behavior change on his quality of life, well-being and health status, he was cautious yet optimistic. He thought perhaps it was still too early to "see changes on the diabetes part of it" but knew "it was going to make [him] healthier living a lifestyle that was more active. It can't hurt....nothing is in vain as far as exercise is concerned." He advised me to check with him "a year from now" to see if he had "a different point of view." In a different light, Peter said walking provided a window of opportunity to talk with his wife about different situations—"actually a good thing"—enabling them to "start walking with a problem and come back with it solved."

Behavior change issues
Over the four weeks of the intervention, Peter increased his weekly average from 11700 steps per day to roughly 17000 steps per day (refer to Appendix Q-103). He felt good about this but also “tired at times.” When compared to the Japanese study, Peter’s success was quite remarkable since the Japanese participants were hospitalized with little else to do. Peter attributes some of his success to “his frame of mind”—he just “wants to walk more… it is a good way to get out and think. So sometimes I spend a lot of time doing that.” The pedometer was also “really important—a necessary thing” for Peter to assess his day to day progress. The pedometer helped him “know during the course of the day where [he was] at” given that he would check it three or four times. When he forgot to wear it one day, he said he “had no clue he just went out and did whatever.” The pedometer reminded him that he had to go out and walk. He did not feel he would be able to continue his active lifestyle without it and if I were to remove it from his possession, he said he would go out and “buy one or find one.”

Peter noted that while walking more, he experienced some initial muscle and foot soreness but “not as much now.” The heat was more of a factor for Peter. It always bothered him and “so [he] has to watch it otherwise [he] will sweat too much.” The week prior to the second interview he had a cold which he found hampered his stepping and made it “a little bit more difficult.”

Peter figured he was “pretty well” at his saturation point; whereby, he felt he could not step much more because of lifestyle restrictions. And so, his long-term plan was to gradually work on intensity changes particularly during his walk at night when he could gauge his heart rate response more accurately to ultimately maintain a more intense pace throughout the full volume of stepping.
Peter did not think he could have made the same progress on his own despite receiving a push and some direction from his doctor prior to the start of this intervention. Peter said he had little else to go on other than his hope which was if he started to walk on his own, “then maybe that would lead to something else which would lead to something else.”

Content issues

Generally, Peter considered the four week intervention to be “pretty helpful” particularly the discussions and the insight shared by different people. He wondered if four weeks was a little too short though especially “having to go on your own right away.” He thought perhaps six to eight weeks would be more suitable to allow time for feedback and follow-up. To accommodate different lifestyles and address some difficulties people might have meeting their goals walking, Peter suggested including “other physical activities that would accomplish the same end or the same goal” as part of this expanded intervention.

More information on diabetes and “what physical activity can do for it” would also be helpful in Peter’s estimation. I responded to Peter’s ideas positively but remarked that the two extra weeks at the end of the intervention might be better spent on individuals who through their various needs volunteer to attend. In so doing, the intervention could service the adult learners who require more support and direction than those who do not.

In terms of the manual materials, Peter willingly shared a number of thoughts and ideas. Although not one to focus on introductions and themes, he thought the weekly themes were good and “all made sense.” The Decision Balance sheet “was kind of hard to figure out at first” even though it was easy to come up with gains and losses to self once explained. Peter agreed with the other participants that including leading statements instead of just the captions ‘gains to self and others’ and ‘losses to self and others’ on the Decision Balance
sheet would make it more user friendly. The journal writing was a non-issue for Peter in that he didn’t find it difficult to maintain; however, he was concerned about what he wrote down. Aside from recording his sugar readings in the journal he told me, “I didn’t know exactly what you were looking for….I hope what I wrote down was helpful.” I assured him that what he was doing was fine and that as an adult I didn’t want to dictate or suggest what he should or shouldn’t include in his journal. Peter found both information articles helpful because they provided “a lot of background” although he considered the article on “Diabetes and exercise” the better of the two. Having a variety of web sites available was also useful because people could reference specific issues at their leisure.

The weekly goal setting worksheets were repetitive for Peter. He attributed this feeling to the level of stepping he was working at; whereby, he “couldn’t really increase very much” and so “just put in the same [response on the worksheet] as last weeks.” Instead, Peter referred more to his journal because he “opened it everyday” and his activity calendar where he could quickly access all the numbers not just the week previous. I also think Peter was a good goal setter from the start which added to the repetitiveness of this exercise; however, for other participants who were less skilled the repetition of completing a weekly goal setting worksheet may have been absolutely critical to the success of their behavior change.

Peter thought the group walks were alright despite having to walk most of the time by himself—his sacrifice to get as much intensity out of the walks as he possible could. The length of time spent walking was appropriate although he would have increased the last walk from thirty to forty minutes. The treadmill demonstration was helpful but “kind of weird.” He was unsure if he would ever use the treadmill in the Fitness Center again because of time
constraints at work but was considering purchasing one for the winter. He said, “I think if I stick with this [behavior change] that is probably something I am going to get in the fall. I can’t walk in our neighborhood in the wintertime, there is just too much snow. So I will have to do something different.”

The activity calendar was one of Peter’s favorite tools. He referred to it frequently because he could “put everything on one piece of paper.” He did request that the final column be changed though to “do away with the percent” and focus more on the “total [number of steps for the week] and the average for whatever days.” In Peter’s case, this meant averaging six days instead of seven because if “he had of included Sundays it would have dragged the average way down and [he] didn’t think that was fair.” Peter used the stars to record the days he achieved his daily goal.

Peter thought the group discussions were good as well “because it was nice to talk and hear about other people’s experiences.” They helped the “time fly by.” The group discussions also facilitated the weekly goal setting sessions which Peter thought were most effective when done independently—setting his own goal was “the proper thing to do…because [no one else] really knows perhaps what level you are comfortable with.”

“Setting your own goals also disciplines you to set your goals later on,” he said. In addition, learning what was attainable and realistic as part of his SMART goal setting was also important to Peter. Peter was unsure if starting the intervention at another time of the year would have influenced the success of his behavior change. On the one hand, he thought it would be tougher to start in the fall because the “focus would have to be on indoors, treadmill activities or gym activities rather than walking” as compared to “this time of year [when] it is nice to get out and walk.” Yet, he argued that “once you become disciplined to
[walk]...you carry it on and you just keep going no matter what.” In a different context, Peter told me the four weekly meetings had done just this—made him “disciplined enough to be able to plan for the upcoming weeks and months” and given him “good preparation to kind of take things in step....I know where to go from here so I [will] just keep doing it.” Just as importantly, Peter acquired an understanding for relapse so as not to get down on himself if he had a couple of bad days; thus, enabling him to “just keep going no matter what.”

Andragogical issues

From an adult learner perspective, Peter said this intervention provided enough of an opportunity for experiential learning which “was a good way of doing it.” He noted explicitly it was the first diabetes education session that “had some substance to it as far as doing things—this one is different you actually get actively involved”—without someone just standing at the front of the room telling you to do this and that. He felt his learning from this experience “should last more.” He also thought the most appropriate person to deliver this type of program would be someone with a fitness background and an understanding of diabetes. However, he clarified that he didn’t think the instructor had to be a “guru of diabetes” because the emphasis was on fitness and “there is all kinds of stuff out there” to read on your own about diabetes.

Over the course of the four week intervention, Peter felt that his confidence had improved. Although “still a little bit cautious” by nature, he gave himself an “eight maybe nine” on a scale of one to ten that he “could stick with it [his behavior change].” His wife’s support played an important role. Peter’s commitment to his behavior change was also high with a value of nine out of ten. He remarked, “if I can do it for the next three months I can
do it for the next ten years." In my estimation, this was a significant statement to make on Peter’s part. Not only was he still experimenting with his time and intensity but his blood sugar values continued to fluctuate minimizing his quest for better control of his diabetes. And as I mentioned in one of my journal entries, Peter’s frustration peaked the night of the second weekly meeting. When I asked him to reflect on that night, he said he was frustrated because he didn’t know if he was or wasn’t doing the right things, he wasn’t sure the behavior change “was going to go anywhere” and he heard what other people were doing and he “didn’t think he was doing it.”

Ironically, Peter was considered a positive influence or role model by the others in the group. They thought of him as an inspiration—his success became their goal—yet Peter did not see this. Instead, he thought the opposite that they “might get very discouraged” and he didn’t “think they appreciated it [his success].” He “kind of felt that he was…making them feel kind of awkward” and he didn’t want to frustrate them. He suggested for future interventions I should “try and get people together with similar levels” to alleviate this potential problem.

At the end of the interview, I completed the second assessment on Peter which revealed some tremendous improvements in all of his physical measurements (refer to Table 10). He was obviously pleased but predictably cautious. From that point on until we met again officially on July 29, 1999 Peter continued to walk. Although there was more variation to his weekly average, he continued to adjust his intensity. He also incorporated more general physical activity/work into his lifestyle in the form of gardening—one of his favorite pastimes. Vacation (e.g., week 11 of the intervention; refer to Figure 4) and a slower work schedule also negatively influenced Peter’s weekly average so Peter “lowered his goal (week
12 and 13; refer to Figure 4) to reflect an attainable level.” After doing this, he assured himself in his journal writings that he “still felt good about the walking….I feel I am doing as much as I can.”

End of study

Despite Peter’s proficiency goal setting, he was the first one to admit he did not give enough consideration post-intervention to “all the different variables [he] was not aware of ahead of time.” For example, he said,

I found a little concern during the holiday period….You know everything contributes to your day and I wasn’t prepared for that in a way….Had I known some of the differences as far as the timing whether I am at work or on vacation or other things, I probably would not maybe have set as high a goal. It was kind of depressing when you can’t meet your goal.

Even though Peter felt “like the variables were controlling him” he remained dedicated to his behavior change and “after a week decided there was no way to meet his goal, the existing goal and so only thought it fair to himself to lower it.”

You know I didn’t lower it to the point where it was really bad but I felt I could attain a certain level during vacation time and I think I did pretty good. I felt better the second week.

He said, “I am not going to worry about it. Do the best you can.” Peter’s realization to adjust and set “more realistic goals” reflects his ability to SMART goal set.

Peter felt strongly about the importance of goal setting. He wanted to “do two hours a day” of walking and so used his goals as a reference point to plan his daily activity. The pedometer provided the necessary information to facilitate his goal setting—“it [the pedometer] is a must because if you don’t have it you don’t know where you are at. I use it like a watch. It is like wearing a watch.” However, he cautioned that “wearing the
pedometer would have been fruitless so to speak if you didn’t have a goal”—the two were synonymous in his estimation.

Peter saw the pedometer as a “reinforcement but not a motivator” and although “important to have” was “fairly insignificant” to be considered a strategy worth incorporating in future interventions (earning the right to keep the pedometer at the end of the study by maintaining a minimum daily activity level). Peter felt the pedometer was inexpensive enough that if asked to return his he would just “go out and buy one.” Besides, he felt the “motivation should be to feel better due to walking rather than getting something physically” which is what motivated Peter; otherwise, he “would have quit.”

Peter’s ability to modify his goals and consequently his behavior change to accommodate “an activity level that wasn’t consistent” during the post-intervention period also reduced his risk of relapse. And hearing him assure me that it was not that I wasn’t important anymore, “it is just that now we kind of do it [the behavior change] on our own” endorsed my thinking. Making the behavior change part of Peter’s routine contributed to his success. For Peter, establishing a routine meant early—during the active portion of the intervention “when we set goals and stuff like that.” He also found it “easier to set a particular time [rather] than try and find time” because as he says “if you don’t set a time you can always say to yourself well I will walk later and it is not going to happen.” Starting the intervention with a support group and during the academic year “definitely helped” Peter establish a routine as well. Because there was more consistency to his day and he knew what to expect during the school year, he was able to plan his walks to make the most of his behavior change. Peter went so far as to say “if you [Tracy] would have done this program in September for me I would have had no problem in four months...because of my activity
level during the school year....I am kind of looking forward to the fall so it [my steps] will go up again.”

Another important point Peter made regarding his success was the impact of hearing the words ‘behavior change.’ He said these words were important mentally to bring about a shift in his attitude towards becoming more physically active and his perception of an active lifestyle. Walking everyday, digging a pond, shoveling mulch, and gardening, for instance, reflected activities that were suddenly more realistic “as far as age and activity level” and valuable in terms of quality of life, wellness and health related issues. Peter began to equate being physically active with his own self worth and having “good days” and “not feeling so bad” because he’d met his goal. He explained,

I felt like almost putting that on the sheet [activity calendar] even though it [the pedometer] only said seven thousand, check it off that I met my goal because there was a lot of other activity that I feel should have went along with it

The approach taken in the intervention also appealed to Peter because it was “something he felt he could do. It wasn’t overwhelming,” rather progressive which he said served as the catalyst to move him from contemplation into the preparation and action stages of change. The small group size of the intervention didn’t allow him to fade into the background either, thereby, increasing his accountability to the group. Focussing on diabetes and exercise rather than exercise exclusively and sharing that commonality with the other members of the intervention also weighed heavily with Peter—“Quite frankly I think if you had not focussed on the diabetic part just an exercise thing I wouldn’t be here.”

Regardless, Peter concluded the interview by telling me he “would recommend it [the intervention] to anybody that is having to struggle with being active. It just might be the
push they need.” With that, we concluded the final interview and I completed Peter’s final assessment (refer to Table 10 and/or Appendix Q-103).

Results of case study 103

Peter started with a pre-intervention average baseline of 11770 steps per day which was the equivalent of 103 minutes average stepping per day. His baseline was significantly higher than any of the other participants in the study—the closest being 7523. Given his volume of stepping, Peter decided to “take Sundays off from stepping” and consequently chose not to record his steps on that day. As a result and in accordance with the adult learning principles I espoused, I elected to respect Peter’s decision and calculated his weekly average using 6 days instead of 7 as I had with the other participants.

Correspondingly, Peter’s daily average fluctuated anywhere from 51 minutes above his intervention average to 28 minutes below his intervention average. At the end of the study he averaged 13610 steps per day (1840 above the pre-intervention baseline) or 16 minutes more of stepping per day above his intervention baseline. If I had used the 7 day average, he would have only exceeded his pre-intervention average by 157 steps or 2 minutes more of stepping which would have severely defeated his accomplishments. Peter only increased the number steps taken in the 16 extra minutes of stepping by 4.8 steps (effect size = .8 considered a large difference) thus, suggesting that Peter had not changed his intensity over the course of the study. However, Peter did see a drop in his waist girth of .8 cm, and his resting heart rate of 12 beats per minute (refer to Table 10). The remaining measurements returned to or slightly exceeded his pre-intervention scores which I attributed to summer vacation and several personal crises that consumed much of his energy and attention.
After a successful start to the intervention (week 1-4), Peter felt the strongest about the skills needed to make daily activity part of his lifestyle. However, summer vacation, family, warm weather and alternative physical pursuits and job responsibilities that interfered with Peter’s walking routine during the post-intervention period causing a decrease in his weekly average may have softened his response to question one by the end of the study. I would suspect that the variables listed previously also negatively influenced Peter’s confidence and sense of commitment to meet his daily activity goals as evidenced by his change in response to questions two, three and six (refer to Table 11). Nonetheless, Peter’s response of strongly agree post-intervention and at the end of the study to question five suggests that he felt he had done all he could to organize his life to accommodate his behavior.

Table 10: A summary of Peter’s results

<table>
<thead>
<tr>
<th>Assessment items</th>
<th>Pre-intervention</th>
<th>Post-intervention (week 5–16)</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>87.1</td>
<td>85.6</td>
<td>87.5 (+.4)</td>
</tr>
<tr>
<td>Resting heart rate (bpm)</td>
<td>60</td>
<td>60</td>
<td>48</td>
</tr>
<tr>
<td>Resting blood pressure (mmHg)</td>
<td>148/96</td>
<td>138/92</td>
<td>160/96</td>
</tr>
<tr>
<td>Waist girth (cm)</td>
<td>97.8</td>
<td>95.0</td>
<td>97.0 (-.8)</td>
</tr>
<tr>
<td>BMI</td>
<td>30.3</td>
<td>29.8</td>
<td>30.5 (+.2)</td>
</tr>
<tr>
<td>Glycemic values</td>
<td>6.3</td>
<td>-</td>
<td>6.9 (+.6)</td>
</tr>
<tr>
<td>Daily average number of steps</td>
<td>11770</td>
<td>-</td>
<td>13610 (+1840)</td>
</tr>
<tr>
<td>Daily average minutes of stepping</td>
<td>103</td>
<td>-</td>
<td>119 (+16)</td>
</tr>
<tr>
<td>Stage of change</td>
<td>Preparation</td>
<td>Action</td>
<td>Action</td>
</tr>
</tbody>
</table>
I think over time he was able to see that some of the variables were beyond his control and so resolved himself to that; thus, enabling him to feel better about his behavior change decisions. As for his change in response to question four post-intervention from undecided to agree, I would contend was due to the uncertainty of going it alone. And despite feeling quite confident and committed, having spent only four weeks in the active portion of the intervention with someone to guide him Peter was still in need of continued direction and support. Changing his response back to undecided by the end of the study; however, suggests a change in his dependency and an improved reliance on himself for feedback, and assessment of progression and performance.

*Table 11: Results of Peter's self-assessment survey*

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-intervention</th>
<th>Post-intervention (week 5-16)</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disagree</td>
<td>Strongly disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>2</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>3</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>4</td>
<td>Undecided</td>
<td>Agree</td>
<td>Undecided</td>
</tr>
<tr>
<td>5</td>
<td>Agree</td>
<td>Strongly agree</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>6</td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Disagree</td>
</tr>
</tbody>
</table>

**Summation**

Having had diabetes for only one year, Peter was still searching for answers as to why he developed Type 2 diabetes. I believe his quest for control, resolution and determination is what brought him to the study—Peter wanted off the medication and he
most certainly did not want to start taking insulin. Changing his behavior to increase his activity was a first step and consistent with a recommendation put forth by his physician. Although relatively active prior to the start of the intervention especially in comparison to his intervention cohorts, Peter managed to increase his stepping quite dramatically (refer to Table 12). Establishing a routine early on was key to his success. Peter's determination, intense desire yet cautious demeanor, and thirst for knowledge and direction also facilitated his successful behavior change. In addition, his long term vision for an improved quality of life as a result of his enhanced diabetes self-management was also paramount.
<table>
<thead>
<tr>
<th>Time (weeks)</th>
<th>Weekly total (7)</th>
<th>Weekly goal setting (steps)</th>
<th>Weekly average (6 days)</th>
<th>Weekly timed average</th>
<th>Waist girth (cm)</th>
<th>Glycemic values (7 days)</th>
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</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>Average baseline =11770 103 minutes</td>
<td>121 (+18)</td>
<td>6.2</td>
<td>97.8</td>
<td>6.3</td>
<td></td>
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<tr>
<td>1</td>
<td>96465</td>
<td>14064</td>
<td>13781</td>
<td></td>
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<tr>
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<td>16094</td>
<td>17547</td>
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<td>84232</td>
<td>17000</td>
<td>14039</td>
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<tr>
<td>Post-intervention</td>
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<td></td>
<td>115 (+12)</td>
<td>95 (-2.8)</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>78691</td>
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<td>6</td>
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<td>16106</td>
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<td>10000</td>
<td>8596</td>
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<tr>
<td>13</td>
<td>72170</td>
<td>10000</td>
<td>12028</td>
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<td>65487</td>
<td>17000</td>
<td>10915</td>
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<tr>
<td>16</td>
<td>108565</td>
<td>17000</td>
<td>15509</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>End of study</td>
<td>83489.0625</td>
<td>15771.375</td>
<td>13610</td>
<td></td>
<td></td>
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<tr>
<td>170</td>
<td></td>
<td></td>
<td>119 (+16)</td>
<td>97 (-.8)</td>
<td>6.9</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4: Average weekly steps over 16 week intervention
Case study 103

Average baseline = 11770 steps
Weekly average = 13610 steps
Case study 104

Pre-intervention

Personal history

The pseudonym for case study 104 will be Joan. Joan was employed at the college as a secretary. She was 49 years old with a grade 12 education. Prior to working at the college, Joan worked in a variety of different occupations that kept her on her feet. In her current position, Joan said she walks “to and from work in the morning, then home for lunch and back home again in the evening” since she only lives across the street from the college. She considers that her routine. Joan does not own a car either so walking is her primary mode of transportation.

When diagnosed with diabetes six years ago, Joan was actively participating on an organized baseball team, swimming, walking with her daughter and bowling. She loved playing ball “because [she] got to go a lot of places, meet a lot of people, see a lot of things—it was wonderful.” Then she said she “got very lazy,” “got stagnant, became somewhat of a couch potato” especially after her daughter moved out. Without someone to do some of these things with, “it kind of makes you not bother.” Now she’s “rethinking those things” and “ready to reactivate.” Her family supported her position and wanted to get her back into “something to get [her] motivated again.” Joan thought “exercising again and doing something more routinely every day” starting with this behavior change was the answer.

Joan controls her diabetes with diet and medication which she takes three times a day. Her father was just recently diagnosed with diabetes at the age of 75 but no other family
member has it. She remembers feeling angry and not wanting to accept her diagnosis at first because that was like admitting she was ill. Joan currently believes she is in “control of the medical aspect of the diabetes” but realizes that can change all too quickly. She is happy she did not have to go on insulin right away. Being diagnosed with diabetes also helped Joan cut back on her alcohol consumption which she typically did a lot of on the weekends.

Joan attended an education session on diabetes when first diagnosed. She said there were three parts to the presentation. First, she was assessed physically (e.g., weight, height, blood pressure), then she saw a nutritionist and they went over Canada’s Food Guide, and then finally she viewed a film on the history of diabetes and the effects of diabetes and insulin on the body. She found it very informative. In terms of reference material for physical activity, Joan said she received a handout with three or four pages of activity options. “They gave you a choice…and said you should be doing this [exercise] but they didn’t say you had to.” Beyond this, Joan said she’s had little discussion with her doctor and her doctor’s shown little concern given that her weight was stable—“at an even keel”—and had been for the last three years.

When I asked Joan to explain exercise, she stated “it is the part of you [wanting] to feel more fit.”

If you are getting out and you are walking regularly or you’re involved in some kind of function where you are physically active…that is exercise….A lot of people tend to think you have to go to the gym or you have to work out. I have been that route for years and years and years…. [but] it is not necessarily going to the gym to get exercise. It is what you can do at home as well. [It] is everyone’s individual choice….If it is what makes you feel good and healthy and you feel you are gaining from it then go for it…. [Exercise] makes me feel fit.

To feel somewhat fit, Joan focussed on walking back and forth between her apartment and work environment everyday regardless of weather conditions. On the weekends she would
go grocery shopping or to the mall. "I am not just flopping out on the weekend," she said. In her estimation, she figured she was accumulating ten thousand steps on any given day not only because she still did a lot of walking but also because she was shorter and had to take “twice as many steps as a taller person.” As for intensity, Joan indicated she doesn’t sweat. She might, however, get a little short of breath sometimes if she is in a hurry and has to climb the stairs. This state is exacerbated by Joan’s history with sinus colds; consequently, she has inhalers to help with her breathing.

Joan said she would love to play ball again but did not think she was able. Coaching a girl’s baseball team was the other option because she could still get out and be active and have fun. She was also talking with her sister about bowling again. Joan’s limitation was a vehicle—she didn’t feel she could “join something that was across town if [she] couldn’t get there.” Joan hoped to get some new ideas by participating in the study. She wanted to “find something…to maybe enhance exercise and not make it feel like it [was] a job but sort of become part of a daily thing.” Turning fifty in July contributed to her motivation.

Stage of change

As Joan answered the questions for the interview, she placed herself in the preparation stage of change but clearly said she was in the contemplation stage prior to reading the ad for this study. “I was at this level where I just felt comfortable doing the day to day things. I wasn’t really getting motivated to do [anything].” She attributed this state to her inherited ability to procrastinate—she figured she earned it legitimately from her family. Preparing for the intervention helped her “uplift things again” which excited her because as she reported when she’s physically active she’s mentally more active.

Andragogical issues
As an employee of the college, Joan participated in a number of workshops most recently for new computer software. In her experience, she found one instructor went too quickly, and the next didn’t provide enough information or know enough about the program. She declared neither was prepared to deal with the learners or their various levels of understanding; consequently, she didn’t feel she “really gained anything from it.” Joan’s preferred method of learning is in group settings and discussions where she can “take in the whole picture.” Lectures are “all right too if the lecturer is a good speaker” otherwise she gets bored—“it has to be someone that gets my attention.” If someone is boring or mono, Joan would prefer a handout which she said she will read and “get just as much from it in content” than listening to the speaker.

Joan’s confidence and commitment ranked very high, scores of nine out of ten, as she approached the start of this behavior change. She did not think she would need extraneous support but rather confidence in herself to make the behavior change. Living alone fueled this response. She was most definitive that she had “come here at this time for [herself].”

Intervention strategies/processes of change

Joan was and still is a smoker. In the past, she tried to stop “fifty zillion times (laughter)” with no long-term success. She did, however, manage to quit for several months at a time during her pregnancies, when she had gall bladder surgery and at least cut back when the children were in diapers and her daughter had really bad asthma. She considers herself a steady smoker now and has resolved to being a “coffeeholic” which she feels contributes to her smoking. Both are marked by “habit and ritual.” To date, she has not
found an intervention strategy or reason, including money or health, that has made her want to stop.

Joan does not make this statement lightly. She has spent much time self-reflecting on this issue. Joan uses self-reflective practices when she “is feeling sort of blue” or when “there is no one around to really communicate with everyday.” Joan’s techniques for self-reflection include looking at pictures of her grandchildren, sitting and reading or sometimes writing letters. Previous to that, she used to write in a diary as a kid. Since then, her only use for a journal was to record her feelings when she had a breakdown at age thirty-five—"I think it is what kind of pulled me out and got me back together."

Joan described herself “as pretty much a spontaneous person” most of the time. She only liked to plan ahead “if [there] was a special occasion” although she said she was a great one for “keeping track of stuff on calendars.” “Everywhere I have a calendar you know a hair appointment, a dental appointment, a nail appointment, well it comes from being a mother (laughter).” To reward herself for a job well done, Joan liked a nice dinner out that way she didn’t have to “do any dishes, cooking or cleaning up.”

Outcome issues

Joan’s expectation for the behavior change was that she was going to have to be aggressive “instead of procrastinating” and “just realize that some changes needed to be made for the more positive.” Furthermore, she didn’t think she would have to work that hard or spend a lot of time making the changes and if she felt she was being more productive, having a different outlook on the behavior change would build her self-esteem.

In anticipation of the behavior change, Joan’s general goal was to “tone up a little more, feel a little more sort of sturdy” and “become healthier and stay healthy” as a result of
increasing her activity levels. Being consistent with the behavior change reflected her short term goal while trying to maintain it reflected her long term goal. Aging influenced Joan’s desire to stay “physically active, inside and out” particularly when she thought about “rotting away in a [nursing home] facility” instead of being “a normally productive person in your own residence.” Fear of getting set in her ways and losing “that goal oriented feeling” also motivated her “to spark it up and carry on” to successfully achieve her long term goals.

Although unable to identify specific quality of life or health related changes that might come about as a result of the behavior change, Joan hoped that by keeping well physically she would be stay well emotionally. She considered the combination “kind of a well rounded thing” and by keeping the intensity up she would be less likely to fall back.

As we concluded the interview, I asked if there were any additional questions or comments and Joan replied, “no” so we proceeded with the pre-intervention assessment. At that time, I reminded her of the date for our first meeting and asked if she could possibly bring a copy of her glycemic values for the next week.

Active intervention (week 1-4)

The week of April 12 we began the active portion of the intervention. Joan did not attend and despite her best intentions was never able to attend any of the four weekly group sessions. And even though I made a diligent effort to share her experiences and results with the group, some participants of the intervention began to question her actual existence. They thought perhaps she was a figment of my imagination.

As a result of her absences, my notes on the active intervention are based solely on my journal notes written shortly after meeting with Joan. Although brief, I have also tried to include several of her journal entries.
Joan missed the first intervention. She had a cold and was unable to attend. I met with her on Thursday (April 15)—later than I had wanted to but time did not permit otherwise. Anyway, in a phone conversation prior to actually meeting I mentioned to her what we did over the course of the two hours together and also indicated that we walked for ten minutes as a group. I explained how we recorded the number of steps taken in the ten minutes so that we could determine our first weekly goal.

When we met at the end of the day on Thursday, Joan proudly presented me with her numbers explaining that she had already gone for her ten minute walk on her own and that her steps for ten minutes were over 3000. I couldn’t believe it. I don’t think she takes that tiny of a step. In comparison to anyone from either the fall groups or this group, no one has ever come close to having that many steps in ten minutes. I was concerned there was an error but opted to simply ask a few more questions and try and work with the numbers. I figured it would even out at next week’s meeting. So we set up a goal for Friday to Monday although there was little change from baseline because her grandson was in the hospital and she didn’t think that she would have much opportunity to walk over the weekend. We did however, work through the Decision Balance sheet and discussed the costs and losses, and the strategies that might help her stick to her goals. Feeling better was a big gain to her and having more energy for her grandchildren.

I concluded the meeting by explaining that I would need her glycemic values from Friday to Monday, how to write in her journal, and that our next meeting was Monday the 19th. I also asked her to make certain that she wore her pedometer daily and that she recorded her steps on her activity calendar.

It was only at this point that she revealed that she did not record her glycemic values even though she tested daily. I had spoke with her about this several times prior and had asked for the records early on before the intervention actually started. I found this a little frustrating. I hope she remembers to do this for next week. I remember assuring myself that she was an adult but also reminding myself at the same time of Pratt’s relational construct of andragogy.

**Wednesday, April 21, 1999**

This is the second journal on Joan even though I am writing on the same calendar day about her. Joan missed this past Monday’s intervention as well. I spoke with her first thing Tuesday morning and asked where she was. She replied, “Were we supposed to meet?” I couldn’t believe it. She then proceeded to tell me that she had had a chiropractor’s appointment and that she wouldn’t have been able to make the meeting anyway. I was speechless. So I asked her when we could meet again to discuss what happened at the meeting and we agreed on Wednesday. I don’t know what to expect for this meeting. I then told her to plan to attend the last two meetings for the following Mondays. I asked her to meet me in my office both nights prior to the class.
Note: I should call her prior to lunch to remind her to bring her journal, her manual and her glycemic records from home.

Tuesday, April 27, 1999

Joan and I met Wednesday evening at 4 p.m. to discuss the second intervention details. She had already completed her 20 minute walk on her own the night previous. She forgot her manual though so we could not refer to her activity calendar or weekly goal setting sheet. She did tell me she recorded her glycemic values for the five day period I had asked about last week. She also indicated that she was walking and on Saturday had walked to Gibraltor Trade Center which she hadn’t done in a long time. I spoke to her about her strategies and the long and the short of it is, she has a definitive pattern in her day and the only room for negotiation or alteration is at the end of her work day. She faithfully walks to work, home for lunch and back, and then home. She travels the length of the hallway to E block to have her smokes so the construction that is taking place in the stairwell next to her office does not interfere with her regular routine. It seems she only looks at her pedometer at the end of the day and then adjusts her steps. She seems to feel that she reaches her goal by the number of steps she feels she has taken rather than constantly referring to her pedometer. Even though I hate to admit it, Joan does have a good sense of the volume of her walking and she certain has a routine for her that is working. She reaffirmed her commitment to this study even though she has not been able to attend a meeting yet. I suggested that she may need to alter that by checking her pedometer earlier in the day if she continues to increase her weekly goals. She concurred.

We made sure to pencil in the meeting time and location for next week. I hope she makes it. I think the rest of the group thinks she is a figment of my imagination. I must remember to mention her success as well at the next group meeting.

I provided a copy of her transcript. I asked her to read this for Monday.

Unfortunately Monday never came and Joan missed the third intervention. As it turns out, on the weekend of April 24, 1999 (the start of her second week) she hurt her back and could barely walk. This condition lasted until after she visited her chiropractor sometime around April 29, 1999. Up until then, she was incapable of making it to work and restricted from walking except in her apartment. I decided I would call her to follow-up.

Friday, May 7, 1999

Joan did not attend the fourth intervention meeting. I did not hear from her ahead of time although I spoke with her first thing Tuesday morning. She was at work and had a band-aid over her lower lip. She explained that in addition to having the back
problems the week prior she also had to have two moles burned off and she required a couple of days at home to recover because of the bleeding. She apologized but said that she had been keeping up. I think she was referring to her journal writing and some stepping. She explained to me that it was very uncomfortable just taking one or two steps so I really have no idea how she has or has not progressed at this time.

I have scheduled a meeting with her at 8:00 am next Tuesday morning to sort out where we are at and to devise a process for her to continue so that she doesn’t lose out. I am finding that Joan has a very set schedule during her day and that evenings are not really an option for her so we have to meet very tight to her work schedule to fit in even these short meetings. She certainly doesn’t want to give up her lunch hours.

I think I will extend her 4 weeks to 5 weeks so that she can attempt to make up the third week when she was down and out with her back. Consequently, I will postpone the second assessment and interview accordingly. I will still include her as part of the final interview. She certainly presents a different take on this whole process.

Tuesday, May 11, 1999

I just met with Joan for 30 minutes to follow-up on her absences from the weekly interventions. Her back is better and she seems to have resumed her walking schedule on her own. In fact, this last week she did quite well stepping over 9000 steps three days of the week. On Saturday she accumulated 15000 steps. Yet, she did not set a specific weekly activity goal. When we discussed this, she indicated that she did not want to increase it too much for fear of not achieving the goal. She stated that she still has three months to go and that she is taking it slowly. It sounds like she still has some fear about hurting her back again.

When we back tracked through her notes she had not completed any of the weekly activity goal setting sheets beyond the first week. So we reviewed each of them and filled them in as best as could be. For three weeks she had not increased her goal. It was set at 7623. This is up 100 steps from her baseline. After that I explained to her what everyone else in the group had achieved by now and she was surprised but did not falter from her own path. She only bumped up her goal by 200 more steps for week five so her new goal was almost 8000 steps for the week. Reviewing her activity calendar and trying to determine the start of the new week was difficult because Joan missed each weekly meeting. When we got together varied each week as well so we pieced it together as best we could. I should have brought my calendar with me and referred to my own dates for final validation. I’ll do that once I copy everything. I know we did not meet at all the 3rd week of the intervention because Joan was off the entire week with her back problem. She frequently missed Mondays at work and then my work schedule typically kept me busy Tuesday and Wednesday which left Thursdays for us to meet.
From previous conversations, I know Joan is not checking her pedometer during the day. She relies on how she feels. She says she knows she’s not going to change her routine during the day so why check her pedometer. Her only avenue for change is in the evening. Yet, she says she faithfully puts on the pedometer each morning and that it really is not a burden to wear. It is second nature now.

On her activity calendar, Joan is recording her sugar levels the same way that Jane is. I told her I thought that that was a great idea and that she was the second person to do so. I also told her about the others in the group using stickers to mark the days that they achieved their daily activity goal. She clearly said she was not a sticker person although she might consider coloring them in.

I asked to meet with her again next Wednesday morning to review her answers to the week four notes (e.g., confidence and preparation for the three months on her own). I will photocopy materials then.

When I went through the rest of the manual with Joan I asked if she had read the article from the 3rd week. She said no.

When I asked Joan about her steps for the 20 minute and 30 minute walks she showed me what she had achieved. She said for 20 minutes she had walked 5310 steps (approximately) and for 30 minutes she had walked 15810 steps. When I checked her activity calendar on the day she completed the 30 minute walk the total number of steps taken was equal to 15810. I don’t think she subtracted the number of steps taken in 30 minutes from the total number of steps taken for the day. I don’t think I can count on her tally for a reference. This number is way too high. Despite trying to explain this concept to her as simply as I could I don’t think she understood. I couldn’t help but think does she represent the average community member? Are Brian, Bert and Jane the odd balls—above average. Is This a select group, different than the random sampling done in the fall pilot? Is it more realistic to only have one individual like Jim in the fall group as compared to three as in this group? It makes it so much easier and rewarding working with individuals who 1) attend and 2) follow what it is you are saying.

I think I need to get Joan to think about her “saturation point.”

Joan and I agreed to meet May 20, 1999 for the second interview and assessment.

Post-intervention (week 5-16)

On May 20, 1999 Joan and I met. The interview took about 1.5 hours to complete.

Prior to her arrival I reviewed her journal entries, weekly goal setting sheets and activity calendar. I was surprised with the results. Her journals were quite sparse.
During the interview I found she hated writing in them. She said she may have thought of things to write but then didn’t make the time to do it. I found out more during the interview than I had all month.

Joan’s a talker and prefers it that way which is why I think she would have enjoyed the group sessions. Yet she felt she didn’t miss that much except for maybe the sharing and hearing about others’ experiences. She had no regrets.

Her weekly goal setting sheets were empty. She hadn’t used them and when we discussed this further she was very cautious about her goal setting. She didn’t want to set herself up and not achieve her goals. She was also very cognizant of the time frame and did not feel the need to rush her stepping. But when I looked at her activity calendar and calculated her total steps for the week and then averaged them over the course of the seven days she was exceeding her daily activity goal by 2000 – almost 4000 steps depending on the week. On certain days, usually weekends, she was stepping almost 15000 steps. So we spent a fair bit of time during the interview discussing her goal setting. I asked her to use the weekly goal setting sheets which she thought were a good tool (despite not using them). I also wanted her to think about her ceiling value (saturation point) of stepping). She didn’t understand me at first but then when I asked if she would be willing to step more than the hour she currently puts in in the evenings she said maybe up to an hour and a half. So we figured her saturation point to be in and around the rest = 14000 steps on the weekdays. I didn’t go any further with intensity. I did not want to pass over this quickly. Besides that Joan was already talking about trying roller blading for the summer and she had recruited two other tenants in her building to walk with her. She said she told them all about the program and one of the women recovering from open heart surgery thought that the walking idea sounded like a good one. So they walk faithfully every night. Apparently, this woman who joined Joan has progressed from one block to three since she began. Joan also commented that she is smoking 5 – 7 smokes less a day. Awesome—who would have thunk it?

Joan also used the activity calendar to record her sugar readings on as Jane had done. And after having seen both of them use the calendar this way, I think it is a worthwhile change to make to future versions.

By the end of the interview, I was convinced Joan was going to succeed with this project even though she was really going it alone. I also believed her when she told me the pedometer was like her best friend (she said she had a special place for it when she put it away every night). She was obviously motivated and determined.

The following is a recap of our interview.

Outcome expectations
Joan started the interview by telling me the intervention had met her expectations. She said it was the incentive she needed to “get back doing something physical.” Joan viewed the behavior change process as “all positive”—the pedometer was “getting her out more” and had “given her the opportunity to really get going. The fresh air was wonderful and the weather great.” She said the pedometer reminded her of her goal which helped her “keep going with it.” Having to focus on walking only also enabled her to make the behavior change without too much difficulty but prompted her to consider taking up roller blading for the summer—“something a little different...instead of walking.” Joan also planned to swim at her apartment complex in the summer.

Thinking of the intervention as a behavior change process rather than an exercise program appealed to Joan. In fact, walking was viewed simply as “a routine thing we do everyday”—a message Joan shared with several others in her apartment complex. In so doing, Joan recruited two women to walk with her one of which was recovering from heart surgery. Their pattern was to walk around the first block together and then Joan would “continue on with the rest.”

Behavior change issues

Because of Joan’s desire to “get out there and do it [walk] every night” she found her breathing had improved. She discovered she was not as reliant on her inhalers as much either and actually only needed to use them “maybe once a week” instead of “every other day.” Consequently, Joan was able to walk a little faster—“getting out there and pumping”—because she felt comfortable doing that. Walking also helped Joan cut down on her smoking—“down by about six or seven [cigarettes] a day”—especially the weekends when she would get out of the house and leave the cigarettes behind. In addition, she found
she was sleeping better at night coming in "zonked" from her walk and all the fresh air. She reported no change in her sugar readings which she attributed to diet and she had not experienced any muscle fatigue or soreness. Otherwise, Joan was feeling good inside and out and enjoying herself immensely.

Joan did not expect to see any "big changes" in her second assessment results as compared to her first. She said she "tended to maintain fairly well" and was not looking to "lose any massive weight or anything." Furthermore, she felt her progression would not be hindered if there weren’t any changes because she was feeling better and "staying healthy." This was particularly important to Joan for two reasons: 1) she would be fifty in July; and 2) she felt the "tendency for people living alone was to get lazy." She simply wanted an "outlet to keep physically in shape" and this behavior change was doing that for her. Her position had a direct influence on her goal setting.

Over the course of the first five weeks of the intervention, Joan only increased her weekly goal by 300 steps yet consistently managed to exceed that value (excluding the second week when she injured her back). Her approach puzzled me particularly since she was achieving significant weekly averages. When I asked for clarification during the interview, Joan explained her thinking.

I was just kind of sticking with [those goals] because it seemed like no matter what happened it would be okay....At the time it was sort of what I felt comfortable with....I had to set some kind of a goal as a median to reach but anything over that was like gravy. It was a bonus. I think the first month I just had to get going on it...yeah getting in the routine...but now if I keep this up on a regular basis, I will definitely go to ten thousand for sure. I just want to keep it at a level I know I can maintain.

For Joan this level was based on a fairly set routine or "daily format" especially Monday to Friday—"watch less TV, supper by six and by seven go for a walk." Weekends were a little
different because she tended to do different things like walk to, around and back from the flea market or go shopping. She wasn’t certain what the summer routine would be like though when she went on lay off, although she was quite certain her “goal would still be the same.”

The pedometer was an important determinant of Joan’s goal setting. It let her know exactly how many steps she was taking in a day which she found “kind of an incentive.” Although the pedometer fell off on her once, she still thought it was an easy instrument to use, “very handy,” and “kind of a habit forming thing as well.” She enjoyed keeping track of her steps and thought “it would be great” to keep the pedometer at the end of the study. Joan did not think she would have achieved the same success with the behavior change on her own.

Content issues

Because Joan was unable to attend any of the weekly intervention meetings and had to, perhaps, rely more on the manual than the other participants, I was most curious to discuss her thoughts on the manual, its content and usefulness. To begin, I started with a topical overview. She said they were all interesting. She thought the weekly themes were also good and helped her understand what she was doing. The Decision Balance sheet was easy enough to use and had “pretty much the information [on it] that you needed to know.” The article entitled, “Exercise and diabetes,” was okay but “kind of long” and was “all stuff that [she] knew about.” The web sites were not useful because she did not have access to a computer. The weekly goal setting sheets were good because as she progressed she could “see what [she] wrote down and how [she] did at the end of that time.” Similarly, the activity calendar tracked her stepping so she could easily adjust her walking for the next day and
being able to see that made her feel better about herself. Joan, like two other members of the intervention, also used the activity calendar to record her sugar readings.

The journal writing was not a favorite of Joan's. She did not think of herself as a writer or "a journal person" and unless the journal was right at her fingertips she would "tend to forget" and then not write anything down. Instead, she said her tendency was to stockpile and then "write a month's notes at one time." Goal setting, on the other hand, was a task Joan enjoyed doing. She thought "it was a good thing" to have to do herself because it gave her something to work towards. Consequently, Joan felt having to complete this paperwork along with the other "daily things [worksheets] caused [her] to be a little more prepared" for the last three months of the intervention on her own.

Joan did not perceive being unable to attend any of the weekly intervention sessions as a problem or limiting factor to the success of her behavior change. For her the process was very much personal "more of a self one on one." "It is not like we are doing it in a group," she said. The only advantage of the group meetings for Joan would have been to hear from others and it "may have been nice to get some feedback from other people" otherwise she "did not feel it was absolutely necessary."

Lastly, offering the intervention "at this time of year [spring] was a good time to start" for Joan. She did not like to walk in the winter. She said with a spring intervention the weather was more predictable—"you could count on the weather and do more of a daily ritual"—which she found attractive and more motivating in terms of getting started with the behavior change. For the future fall and winter, she figured she would need to get a membership somewhere to use a stairmaster or treadmill that would "still give her the same advantage" as walking outdoors.
Andragogical issues

Joan considered herself an experiential learner and “getting out and exercising” as part of the intervention was valued as an important learning opportunity. Unlike previous diabetes education sessions that did not provide any “real incentive to push you to do anything,” Joan just felt good about her participation in this study and “wanted to get out and do it [walk] every night.” Thus, her confidence and commitment to a continued behavior change were high—she scored both as nine out of ten. She said she had “lots of plans for the summer and depending what happens [she would] still be out walking no matter what.” To facilitate continued success, Joan suggested an individual with a fitness and health background be the one to deliver future interventions of this nature.

As I finished this line of questioning I realized how strongly I believed in Joan, particularly as I reflected on the start of the intervention when she injured her back. That would have been an easy time to relapse. However, Joan’s strategy of putting on her pedometer when she got up—“it was an automatic thing”—and receiving support from her chiropractor to “keep up [her] daily routine” got her over the hump. Joan simply “just cut everything back” to what she could handle and it worked. And so, thinking ahead to the final three months of the study did not cause me concern. I figured she would do her own thing no matter what even though she professed that a monthly checkup would “be a good plan” so as not to “feel left out totally on your own.” With this in mind, she wrote the date for the first meeting in her calendar.

At the conclusion of the interview, I completed the second assessment. Joan showed a weight gain of .6 kg while her other measures were consistent with the rest of the group—her BP dropped as did her resting HR and waist girth (refer to Table 14 and/or
Appendix O-104). So despite her lack of interaction with the other intervention participants, her varied use of the intervention tools and processes and her back problem Joan’s behavior change was as much of a success as the others in the study.

Following this meeting, I spoke with Joan occasionally but did not meet with her formally until July 29, 1999 at the group interview. During this three month window, Joan continued to walk steadily except for the week following June 30, 1999 (week 12 of the intervention; refer to Figure 5) when she smashed two toes on her right foot. In her journal she wrote:

July 1, 1999 to July 6, 1999
Did not do much walking except around the house as necessary. Hope to be back to regular walking soon.

End of study

Joan attended the final group interview scheduled for July 29, 1999 and although this was the first occasion for her to meet collectively with the other study participants, she had no difficulty interacting with the group. Joan was very relaxed and quite willing to share her opinions and perspectives even if they differed from the others.

Joan, like the others, began the interview by telling me how important it was for her to establish a routine early in the intervention. During the work week, this meant walking between her apartment and the college three times daily and adding an additional walk to her day “somewhere between ten and eleven” at night when she found it cooler. On weekends she opted for a little more diversity by running errands and going shopping. During her summer layoff, Joan walked “for a longer period of time at night” and was “active doing lots of other things too.” Vacation did not interfere with Joan’s behavior change as much as it did for the others in the study although she implied that vacation time was interruptive and that

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the study might have “worked better when people weren’t taking as much time off.” She thought perhaps I should have “done the study two months in the spring and two months in the fall and just kind of let us do our own thing in between and then averaged it all out.”

For her, it was important to be “consistent and do it [the behavior change] everyday” which is really quite remarkable when you consider the two set backs that Joan dealt with (a back injury week 2 and broken toes week 12) during the study. And despite being unable to continue her regular routine for these two weeks, Joan did not relapse. Simply put she said, “You just have to work around it.” Even when her walking partners left for vacation, Joan—a self proclaimed “totally independent person”—continued to walk on her own with plans of “getting back together in the fall.”

The warm weather bolstered the commencement of Joan’s behavior change. She loved the spring and summer. Winters were not her favorite though—“I am not a winter walker”—and in anticipation of the cold and rainy season, Joan said she was interested in using the treadmills located in the Fitness Center to “keep up the pace” and continue to accumulate steps. In the meanwhile, Joan expressed interest in augmenting her walking with other active living activities such as roller blading with her granddaughter and swimming at her apartment complex during the summer months.

Joan’s success had much to due with her motivation which she attributed to starting the intervention—the “perfect thing to remotivate me.” Having been an active person prior to becoming “a couch potato,” Joan wanted to “pursue being active on a regular basis and not fall back into the lazy lifestyle.” Walking was something she did for the “sheer enjoyment” of it but having it “summarized in terms of actual counting of steps...was more of a motivator to get me back walking regularly.” Recording the number of steps “down on
paper" also made "it more realistic" and having a weekly goal "was a big factor...to see if I could reach that goal." Hearing how others were doing with their behavior change and realizing she was the lowest goal setter in the group, also "pumped her up (laughter)." She said,

Because I am very competitive, you give me a challenge and I will go after it you know but that is the way I am. That is my personality....I am not going to be the lowest guy on this time...when you told me my numbers were low I was out there.

Joan’s physician offered her some motivation as well. She congratulated Joan on her progress physically and commented that as a result of her behavior change she sounded better/clearer, was less congested than she used to be, and looked healthier despite her continued habit of smoking. Concurrently, Joan noted that since starting the intervention she had had less need to visit her doctor which

kind of let her know like hey I am doing better and I should keep this up because I am getting more exercise and I am doing more things....It just physically makes me feel a lot better. I sleep better.

To help Joan continue with her behavior change, a number of suggestions were put forth. First, she thought the "sheets where [she] had to keep track of everything and the journal" was necessary. "The other stuff was just like a handout." The record keeping kept her on track. Second, the pedometer was critical for feedback and goal setting. Third, time and age were also important variables to consider particularly when applied to the stages of change model. For instance, Joan thought denoting the maintenance stage of change at six months was "nothing" for "the middle age population. It takes us longer to get motivated...it takes a year for [us] to get something out of it (laughter).” Consequently, she recommended the study be extended to a full year rather than four months to follow the participants’ progress. And lastly, Joan suggested that the activity calendar be revised to include a
comment section for recording “secondary activities that we can’t count on our pedometer” but still make you “feel like you have completed a whole day and reached your goal in terms of the actual physical activity.”

With that, we concluded the final interview and I completed Joan’s final assessment (refer to Table 13 and/or N-104).

Results of case study 104

Joan started with a pre-intervention average baseline of 7523 steps per day. Over the course of the 16 week intervention her daily average fluctuated anywhere from 6738 steps above her pre-intervention baseline to 2324 steps below her pre-intervention baseline. In Joan’s case, I was restricted from using her timed walks to determine an intervention baseline because of several inaccuracies in the recording procedure. Unfortunately, Joan was unable to attend any of the group meetings and thus, monitored her timed walks with only verbal direction from me.

By the end of the study Joan averaged 11436 steps per day 3913 steps above the pre-intervention baseline (effect size = 1.3 considered a large difference). Joan saw a drop in her waist girth of .7 cm, and her resting heart rate of 4 beats per minute (refer to Table 13).

Over the course of the study, Joan affirmed her certainty, confidence and commitment to make daily activity part of her lifestyle by repeatedly responding with a 'strongly disagree' to the first three questions of the self-assessment survey (refer to Table 13). Based on Joan’s interview responses, it seems readily apparent that she organized her life needs to accommodate her behavior change. Joan’s response to question five confirms her actions. Finally, I would suggest that Joan’s answers to question four and
### Table 13: A summary of Joan's results

<table>
<thead>
<tr>
<th>Assessment items</th>
<th>Pre-intervention</th>
<th>Post-intervention (week 5–16)</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>71.5</td>
<td>72.1</td>
<td>71.8 (+.3)</td>
</tr>
<tr>
<td>Resting heart rate (bpm)</td>
<td>84</td>
<td>76</td>
<td>80 (-4)</td>
</tr>
<tr>
<td>Resting blood pressure (mmHg)</td>
<td>132/90</td>
<td>126/82</td>
<td>144/94</td>
</tr>
<tr>
<td>Waist girth (cm)</td>
<td>96.5</td>
<td>96.0</td>
<td>95.8 (-.7)</td>
</tr>
<tr>
<td>BMI</td>
<td>28.3</td>
<td>28.5</td>
<td>28.4 (+.1)</td>
</tr>
<tr>
<td>Glycemic values</td>
<td>-</td>
<td>-</td>
<td>7.0</td>
</tr>
<tr>
<td>Daily average number of steps</td>
<td>7523</td>
<td>-</td>
<td>11436 (+3913)</td>
</tr>
<tr>
<td>Daily average minutes of stepping</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Stage of change</td>
<td>Preparation</td>
<td>Action</td>
<td>Action</td>
</tr>
</tbody>
</table>

six at pre-intervention were less than 'strongly disagree' because of the unknown regarding the study. At pre-intervention, Joan was not aware of the pedometer or its role in the behavior change process, nor was she aware of my expectations or perhaps even her own as evidenced by her very conservative goal setting. However, given Joan's strong desire to assume more daily activity, her responses quickly changed to 'strongly disagree' by the fifth week when the second self-assessment was completed.

**Summation**

Joan broke the mold and distinguished herself on a number of occasions as being different than the other participants in the intervention. Yet, she managed to achieve
Table 14: Results of Joan's self-assessment survey

<table>
<thead>
<tr>
<th>Question:</th>
<th>Pre-intervention</th>
<th>Post-intervention (week 5–16)</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>2</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>3</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>4</td>
<td>Undecided</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>5</td>
<td>Agree</td>
<td>Agree</td>
<td>Agree</td>
</tr>
<tr>
<td>6</td>
<td>Disagree</td>
<td>Strongly disagree</td>
<td>Strongly disagree</td>
</tr>
</tbody>
</table>

great success with her behavior change. She challenged and frustrated me at times and conversely, surprised and delighted me on other occasions as the facilitator. She was extremely independent and intrinsically motivated. She truly enjoyed walking. Her routine was firmly established and despite several potential setbacks, Joan did not relapse. The pedometer became her best friend.
Table 15: Weekly results--Case study 104

<table>
<thead>
<tr>
<th>Time (weeks)</th>
<th>Weekly total (7, Weekly goal setting (steps)</th>
<th>Weekly average</th>
<th>Deviation from Intv. Avg.</th>
<th>Waist girth (cm)</th>
<th>Glycemic values (7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>Average baseline = 7523 steps/day</td>
<td>Intervention average = 965 steps/day</td>
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Figure 5: Average weekly steps over 16 week intervention
Case study 104

Average baseline = 7523
Weekly average = 11436
Case study 105

Personal history

I am case study 105. I am the facilitator of this intervention and the principal investigator of this research study. It has been my privilege to work with the four individuals who volunteered to participate in this strategy oriented education intervention. As a college educator of eleven years, it was a pleasant change to interact with a group of motivated adults who brought with them their life histories, their experiences, their fears and their aspirations to put forth a sincere effort to make a health related behavior change.

My interest in this area of research stems from my life experiences, educational background, professional development and personal inquisitiveness. As an individual always involved in fitness, I know first hand the benefits I have experienced from being fit. However, I did not fully appreciate the potential benefits of being physically active as compared to being fit despite the rhetoric I espoused in the classroom.

It was not until I had my first child that I realized what a disservice I was doing to my field. Unknowingly, when individuals would comment on the success of my post-natal recovery I would down play the significance of the daily walks I was taking with my son. Because the walking wasn't 'exercise' to me, I didn't value it to the same degree I would have if I had been using the stair master or rowing machine at 80% of my predicted maximum heart rate.

When I returned to the classroom after my maternity leave, I approached the concepts of physical activity, lifestyle and exercise/fitness differently as a result of this experience. I respected each variable for its own merits and tried to convey that message to the learners. I realized the tremendous implications the new health related model of physical activity,
fitness and lifestyle being touted by the Canadian Society of Exercise Physiology (CSEP) could have on the majority of individuals turned off of exercise/fitness because of the antiquated “no pain, no gain” paradigm.

The inclusion of the transtheoretical model of behavior change by CSEP in the Canadian Physical Activity, Fitness and Lifestyle (CPAFLA) manual complimented the new health related model of activity. And although unfamiliar with the transtheoretical model prior to the release of this new manual, the simplicity of the model and the ease with which it was understood by the learners in my classroom had great appeal. Furthermore, as I continued to apply the stages of change, decision balance, processes of change and self-efficacy concepts within my teaching, not only in my Fitness Evaluation class but also my Principles of Wellness class, I discovered how important it was to focus on the process of behavior change—whatever the behavior change—not just the intended goal. Having a comprehensive model from which to reference strategies, techniques, tools, to develop a better understanding of goal setting, the use of appropriate feedback in relation to behavior change and the cyclical nature of behavior change was also tantamount in the successful application of this model with college learners.

And so, given my classroom experience and my participation in the fall pilot study, I yearned to “test” the transtheoretical model of behavior change in the field with adults who had “real” health related concerns. My desire to interact with adult learners was fueled by my experiences as an educator in the college environment, particularly with the introduction of the Fitness and Health Promotion (FHP) Directed Independent Study (DIS) option. The DIS option was designed to target adults who had the urge to learn independently using varied teaching methodologies.
After two years in DIS and a multitude of positive and negative experiences, I found the adult learners engaging yet challenging to teach in their own right. The adult learning theory I was reading sufficed but did not readily match the needs of the learners I was involved with. Consequently, when I began work on my Master of Education and then on my Doctor of Education, I sought a more suitable model for adult learning. Daniel Pratt’s model of relational construct filled the gaps for me as an educator of adults. Thus, when I was designing the strategy oriented education intervention, incorporating Pratt’s theory into the structure of the behavior change model seemed like an appropriate fit particularly with the lack of diabetes education programs rooted in andragogical principles.

My experiences co-facilitating the fall pilot study provided the initial opportunity to test the suitability of the adult learner materials and processes included in the first draft of the intervention manual. From there, I was able to revise and modify in preparation for my own research project and the creation of the Step by Step manual.

What follows are the personal journal entries I made as I conducted this research study starting in April through to September 1999. The notes are meant to capture the essence of my experience as the facilitator of this 16 week intervention. As you read, you will find that in some cases my notes are entirely descriptive and at other times are rather analytical and self-reflective. I ask a medley of questions sometimes without any answers. You will also notice that I chose to present my notes in their entirety to maintain continuity of my thoughts at the time and to create a feel for the flow of the intervention as the participants and I progressed through the ebbs and tides of pre-intervention, active to post-intervention and then through to the end of the study. My first journal entry was Friday, April 9, 1999.
It is the Friday before the start of the actual intervention. I thought it would be an appropriate time to reflect on what has happened over the last few months preparing for this date. First, it has been extremely busy. Knowing now what I have had to do to prepare certainly makes me realize I wouldn’t have been as thorough or perhaps would not have even had the time to fit everything in that needed to be done. For example, I posted notes up 4 weeks in advance to invite anyone interested in participating in this study to give me a call. I got 4 responses but what surprised me was that they had questions, maybe even uncertainties about starting this project. They wanted details and because I had done a fair bit of preparation for my proposal and ethical committee review I had want they needed. Even so, one participant (Jane) needed time to review my materials before committing. I am taking that as a good sign—to me it means she is taking her participation in this study seriously. In actual fact, my sense is that Jane is by nature a cautious person. Another individual (Brian) was willing to commit but wanted to know very specifically what would be done to him and would he be privy to the results of this study. I clearly explained that as an adult learner he most definitely would be involved. I told him I would provide a copy of his first assessment results and that for each interview he would have the chance to review the transcribed notes and add, delete or clarify as he saw fit. I appreciated his honesty and I also saw the value in using a methodological approach that included the participants. I enjoy interacting with the clients and I enjoy sharing, probing, and examining ideas, issues and thoughts. I don’t like having to be on guard so as not to bias their opinions as was the case in the fall pilot. The focus group format, for instance, was not my “cup of tea” even though I can appreciate the fact that you don’t want to lead the participants. However, I don’t think we got the all of the answers we were after. The groups were sometimes limited by the constraints of the group members and their own subjectivity. So is this not a reality in my own study? Probably, yes but I would like to think that by using a qualitative approach—specifically a case study analysis—I can then go after the subjectivity and use it to feed each other as well as myself to look at things from a variety of angles.

So I have 4 participants for this study which is great—two men and two women—a nice balance for the first study. I am finding this busy enough. I can’t imagine having 8 at least not for thesis purposes. I don’t think it would be the same if I was simply running this as an intervention but having to screen the individuals and then collect the preliminary assessments, secondary data, and interviews does consume you. Plus, you want to make sure that everyone is on board and following the program (e.g., are they wearing their pedometers correctly, did they remember to call their physician for the PAR med-X, etc.). It certainly is handy having everyone at the same location. I can scoot around and see everyone quickly. I know 3 of the 4 participants. Jane is the only one that is a fresh face. I am not sure how this familiarity will influence their behavior change. All seem most cooperative and enthusiastic though at this point. And I must say I feel a real sense of comfort talking to each of them. It doesn’t seem that any are embarrassed or uncomfortable talking to me. I am very conscious of respecting their privacy though especially if I pay them a visit in their office or work area. I think that that might be something I should
address the first night of the intervention and reassure them that whatever is said during our two hours together stays with us unless we indicate otherwise.

All of the participants seem really ready for this change. They all said they were in the preparation stage and yet said that if they hadn’t signed up for this study they would have put themselves back in the contemplation stage. For all, it seemed my timing was perfect. Participating in this study was the push they had been looking for. Jane seemed the least sure of anyone about whether or not she could succeed but she certainly was going to give it a try.

All of the participants varied in the time that they had had diabetes. Brian has had it the longest, then Jane, then Joan and then Peter. Peter was diagnosed about a year ago. Three of them are in their late 40's and Brian is mid-50. The apple shape—thick waist, typifies their build especially. Brian is the only one who takes insulin. Peter is quite worried that he may need insulin and wants to do everything in his power to avoid having to do that. Joan noted that her medication has been increasing steadily over the last 6 years and she feels the same as Peter that she doesn’t want to have to take insulin if at all possible. Jane has had a weight problem all her life so that might have an impact on the success of her weight loss. She was the most difficult to interview—very succinct at times and maybe a little shy.

All of the participants enjoy learning by experience. They don’t like role playing. They have all completed grade 12. They have few if any preconceived ideas about the intervention and few questions or issues or topics that they would like me to specifically address although they certainly view me as the expert. All of them want me to tell them what to do. They want me to tell them how many steps to take, how often they should be walking, when they should walk and even how fast. I don’t recall any of them doing anything hard enough to hear themselves breathe except maybe Joan—she’s a smoker and climbing the steps to my office caused her to lose her breath. It was interesting to find out what their predictions were as to how many steps they think they take in their day currently. I can’t wait to see what the actual numbers are. My guess is that Joan is not taking as many as she thinks she is, Brian probably is taking more than he thinks he is, and Peter and Jane may be closer to their actual.

I think that by having them wear their pedometers over the 3 days of the week and the 2 days of the weekend I will get a more accurate baseline as compared to the fall pilot. By taking the 5 day average I hope to avoid the “Jim” scenario whereby he said the 3 days he wore the pedometer were unusually busy; thus, pushing up his baseline and potentially limiting his opportunity to increase his steps more than he did.

I am also glad I opted out of skinfolds or an aerobic test of any sort. I was a little uncertain about the PAR-Q but after having a conversation with York University I was reassured that the PAR-Q was a valid way to screen the participants. All of them seemed to have very close contact with their physicians anyway so asking them for a PARmed-X would not likely have caused too much difficulty. And as it turned out
Brian and Peter both had BP’s that exceeded the ceiling values used in the CPAFLA protocol so I chose to have doctor’s permission anyway. I must remember to ask for their physician’s phone number and next of kin just in case. I also need to clarify or classify their current activity level. It could be as simple as high, medium or low. I may use the Healthy Physical Activity Questionnaire and see what kind of a response I get (?).

Other than that I am quite pleased with the art work that Bruce has done for the cover and I am really pleased with the content. I think my introduction is great—the John Davidson story has impact. I am also happy with the themes for each week. I think that this will help the participants move along the continuum nicely and prepare them for the 3 months on their own. I think that having them wear the pedometers for the 3 months will provide some interesting data to compare to the pilot study since she had her clients stop wearing the pedometer after 2 months. I just recently read an article that emphasized the importance of follow-up for individuals with Type 2 Diabetes involved in an activity intervention. I wonder if 2 phone calls will be enough? We may want to discuss this in our last weekly meeting. I suspect that since we all work in the same institution that there will be enough informal contact and that the 2 phone calls will be enough. Things might definitely be different though if participants come from a multitude of places.

I also read a bit of information that I must remember to include in the manual. It came off the internet from the ADA, 1998. It presented information on preparing for exercise and just had a few simple yet important reminders for individuals with Type 2 Diabetes (e.g., foot wear, hydration, sock selection, heat, etc.).

**Wednesday, April 14, 1999**

Our first session was a hit. Everyone was present and accounted for except Joan. She had a bad cold and was unable to attend. I wasn’t even able to collect her baseline steps. I had everyone else’s though—got him or her first thing in the am. Wow, quite a variation from the fall pilot. The lowest baseline was about 5700 and the highest was 11500. This startled me and yet was kind of exciting since it was different than the pilot study. I figure that we can still approach the behavior change the same way it’s just that our goals will be slightly different. Maybe one of these individuals will hit the 19000 mark like the Japanese study.

I couldn’t believe the last minute details I was preparing for minutes before the start of the intervention. I knew what needed to be done I just had to do it. Things like evaluation form revisions, final scans of all forms to make sure that I had all the information I needed for each person. As it turns out I still need to get everyone’s PAR-Q witnessed. I did collect physician information and next of kin.

It felt good giving out the manuals finally. I was quite proud of them and the content that they contained. The first module really flowed well. The only change I made was to relocate the SMART goal sheet to the page previous to the weekly goal setting
worksheet; otherwise, the materials seemed to mesh nicely. I spent less time on the introductions with this group given that everyone knew each other from work. Consequently, we focussed more on the theme for the module and related it to personal perception in the context of the intervention. I got a sense at the beginning of the evening that people were a little shy perhaps reserved talking about their diabetes to their fellow co-workers but that soon dissipated as the evening wore on and their attentions were distracted. It seems that the walk loosens people up and gives them a chance to talk about what they want to talk about; however, I still got the sense that they were expecting me to tell them how fast to walk, what they should say or at least think about while they were on their walk and I didn’t. Peter and I just started up a conversation about perennials and gardening. It was a great diversion and the 10 minutes went quickly. I should remember to wear a watch with a second hand though so that I can monitor the time without having to leave the conversation.

I think the tool that prompted the most discussion from the group was the consciousness raising portion—Stepping into an active lifestyle. They really went off on a tangent about diabetes in general on the second question. I let it happen. Peter especially began digging for more information from the two more experienced diabetics. He is just one year with diabetes while Brian is 21 and Jane is about 10. Peter wants control he doesn’t want the diabetes to control him. All of the participants are still quite confident that they will be successful with this behavior change. All said at least 8 on a scale of 10 that they believed they would be successful. The decision balance was also a helpful tool for prompting discussion. All scored higher on the gains section than the costs/losses. I made a point of having all of the participants share their lists of gains and losses. This was meant to prompt discussion and further thought regarding their own sheet. I told them that we would revisit this sheet during the last module and reflect on the losses and gains to see if any of them had come true. Brian had a real hard time filling in the losses side. He didn’t feel that there were any. Perhaps, I should rename that section (costs is an option). I mentioned at this point that if they weren’t in the preparation phase chances are that the losses side would have scored higher than the gains side. We completed both sections—self and other. We saved the strategy section for a separate discussion and included ideas on rewards. Again, most seemed very intrinsically motivated.

Everyone clicked with the weekly goal setting sheet right away. The work we did prior to the walk and immediately after the walk to determine how many steps they took in 10 minutes and again in 30 minutes worked really well. The goal setting varied dramatically. I encouraged them to think about setting their goals with the concept in mind that they would be 90% sure of achieving their goals. Brian and Jane set a new daily goal of 3000 more steps – close to 30 minutes more of walking a day and Peter set his at 500 more a day – conservative but perhaps more realistic. I did not want to dissuade any of them from their first goal so I said we would wait and see how they did next week. I also mentioned that I was intentionally not giving them a lot of direction at this point because they knew better than anyone what their life demands are and how committed they are to this behavior change. I keep
emphasizing that being more active is supposed to become part of their lifestyle forever not just something they do for this study.

The evaluations revealed similar comments as the fall results—the participants like sharing and hearing from each other. They enjoy the walking. There were no frustrations or things that they would change. I asked the group at the end if they would like reading materials on the subject of exercise and diabetes and they all said yes. I indicated that I had included one article in the manual but that there was a lot available on the internet. I made a point of saying that I would assemble some materials—perhaps a list of web sites since all indicated that they had access to the internet.

It certainly is a different experience having all of the study participants from the same environment. I know that if I forget to tell them anything I can find them at work. I know that if they see each other in the college or if I see them in the college, we will ask how each other is doing and offer support during the study and after. There are direct benefits to this approach as compared to having individuals assemble from across the city. There is a familiarity with the environment and each other, which is both a help and a possible hindrance. I think that by the end of the 4 weeks, it will be a definite asset. I should talk to them about confidentiality though as I mentioned in the first journal just in case anyone is uncomfortable or uncertain about what may or may not be said about them in the work environment. I can’t help but think they all had their guard up slightly when having to describe their diabetes although once that was established they chatted and exchanged ideas and thoughts freely.

It felt good including the section on exercise and preparation. Given that we are approaching the spring/summer season, talking about hydration and footwear was especially relevant.

The participants conveyed the same response as the fall group when they saw that this study was not an exercise program. All were relieved. When I mentioned that they would have access to the Fitness Center as part of this study, all were caught off-guard. They certainly did not expect that. However, when I said that they could simply come in as they were except with maybe their running shoes on and use the treadmill, you could see that they felt a little more comfortable. This did not require them to change or anything else. What I might do is arrange to show them how to use the treadmills the last night of the intervention just in case they decide to come in and use on a rainy day. I’ll check with the Fitness Center.

Wednesday, April 21, 1999

The theme for the week was most appropriate and my introduction that complimented the quote was well received. Everyone seemed to connect to the concept of a tight rope walker and the feelings that were associated with that. They were definitely feeling things this week. I reminded them that through their thinking last week they were able to make some decisions that influenced some change, which is what
resulted in what they were feeling this week. Peter said he felt his calves. Jane said she felt like doing nothing on Sunday. Peter agreed. Brian said he felt he didn't do all that he wanted to because of the week from hell.

Amy, a FHP student from second semester, sat in on the discussion with us tonight. She provided some wonderful insights especially from her experience in PHRE 227 and the behavior change project. It was much more effective coming from her. In particular her contributions were most effective during the consciousness raising session and when Brian asked about journal writing.

After reviewing last week’s activities and noting how much stepping people did, what they did differently, etc. I realized the activity calendar needs some modification. In particular, the last column needs more options (e.g., instead of just listing percent and total number of days the daily activity goal was achieved, the total number of steps taken for the week should be listed compared to the total number of steps that would have been taken if based only on the daily activity goal x 6 days). I will speak to Bruce about the redesign.

I also thought of a more appropriate evaluation form for the final session. I am going to ask if the participants would recommend this program to their family or friends and ask them to explain their answer. I think that this question is perhaps worth more than asking specific detailed questions.

I should also start to think about the next set of interview questions. I must remember to establish a file so that each time I think of a new question I can record it before I forget. The transcripts from the last interview were just distributed today. I have asked the clients to review, add, delete or clarify as they see fit and bring the finished product back for Monday’s session. I will then review and compare the transcribed notes to the actual tapes for accuracy.

The other realization I had regarding this group is that I can't rely on the experiences of the fall as the rule. Because I did not deselect the same way that the pilot did, the clients of this study are different and consequently, their outcomes should be as well. Peter, for instance, is already walking 14000 steps at the end of the first week. That is the maximum that anyone did (actually only one person from the fall reached this level) in the pilot project and that individual was single, retired and had a lot more free time than Peter. The individual from the pilot study took 2 hours every day to reach her goal of 14000. I don't think it is realistic to expect Peter to step much more. I need to look at intensity changes for him and that is definitely different than what the pilot study proposed to do. I must review the research on ventilatory threshold—it may be useful in this scenario.

What I would like to do is show Peter and the others how the same weight individual can burn as many calories stepping a bit more quicker for a shorter period of time as compared to someone who walks at a lower intensity for a longer period of time. I believe this is the only realistic option for Peter otherwise, his frustration that was
somewhat evident Monday night will only continue. And I would suspect that any
changes he might see re: his weight, waist girth, BP etc. would be minimized if I just
suggested that he step longer. I should also check what intensity would be best for
him. I might need to monitor his heart rate and get an idea of what pace he is
currently working at then prescribe for him based on a week’s worth of heart rate
responses. Perhaps I could use the heart rate monitors as a means to measure his
intensity. I will copy the calories expenditure chart from the CPAFLA manual and
use Monday and also print the table that shows how BP, triglycerides, body
composition and HDLs change with calories burned. I also want to make a point with
Brian again that these changes are exponentially greater for individuals who are less
fit and that the more fit see smaller gains but also add that if this daily activity
becomes a fixed behavior change it may prompt him and others to start or resume the
activities that they used to do (e.g., tennis, baseball, bowling etc.).

Wednesday, April 28, 1999

The third session was a positive experience more so than I felt the second one was.
The second intervention felt flat. This session had a bit more life perhaps because we
walked outside tonight and had a real change of scenery. The group was enthused
tonight. They shared some important insights, which I will discuss further. Joan did
not make it again. Brian really believes she doesn’t exist now.

Tonight the message was about making intelligent choices. I think that it was a most
fitting theme. They have thought and felt enough now over the last 2 weeks to be
able to make some educated decisions. My introduction of the theme was also most
appropriate and Brian teased asking if I had stayed up all night thinking of that. I take
it from his sarcasm that I am on track.

The next thing that we did was review how everyone did over the last week. All
pulled out their activity calendars. To my surprise Brian had his own stickers and
Peter even had stickers on his calendar. I am not sure where Peter got his but Brian
had his own. They had all tallied their total number of steps and had marked on the
number of days that they had achieved their daily activity goal. This works well—I
will continue introducing how to calculate and evaluate their success in the second
week. It gives them ownership and will make the 3 months on their own that much
easier. Jane is also using her calendar to record her sugar levels—a great idea. I will
pursue modification of the calendar with Bruce. I would also like to alter the last
column so that all the ways to evaluate weekly success are identified and ample room
is provided.

Tonight I talked about intensity very briefly before we went for our walk. I had the
group find their pulse using either their carotid artery or their radial. Brian and Peter
used their carotid; they couldn’t find their radial. They counted for 10 seconds. We
recorded that value on their weekly goal setting sheet. I told them that we would take
a second reading immediately after they finished their 30 minute walk. Again, it
would be a 10 second reading. I mentioned that this information would help
determine any intensity changes that we might need to make. The only person I thought that this would realistically impact was Peter. From last week’s session, I thought he had pretty much reached his saturation point—that is walking as many steps as he could given the current lifestyle he was trying to sustain. I am trying to be realistic so that walking doesn’t become a burden and turn any of them off. The pattern seems to be that at around 14000 steps, 2 hours of walking is required. Peter tries to achieve 5000 steps by lunch and then another 5000 steps by the end of the workday so that he only has to walk an additional 30 - 45 minutes when he gets home. I think at this point it is more like 45 minutes of walking at home, which isn’t too bad, but it leaves little room for much more. He had asked at last week’s meeting how much more he needed to do. This was a new situation for me given no one had had that problem in the fall pilot. I decided to show the group how many calories were burned if someone ran at two different intensities for the same period of time. I thought that this would illustrate the differences with respect to intensity. Then I showed them how walking at a slower pace for a longer period of time would also achieve the same thing just that it took longer. I tried to keep it simple. I did this on an overhead and each of them did the calculations on their own sheets. I used the calories burned per minute sheet from the CPAFLA manual. It was the simplest tool to use. I provided a copy for them. I stressed that I didn’t want them to start counting calories but that this was the simplest way to illustrate the impact intensity and duration had on energy expenditure. I stressed that duration was still the most important variable for all of them to achieve first and then when they had reached their own saturation point we would consider intensity changes. Brian and Jane were happy to continue at their current pace.

Through some further discussion with Peter, he mentioned that while he walked for 45 minutes he did not think that he could sustain the same pace for the full 45 minutes. Brian agreed and said that he found 10 extra minutes really made a difference. He said he couldn’t keep up the same pace if he walked any longer than 30 minutes. So the strategy for Peter was to try to achieve the same pace consistently for the full 45 minutes before we made any other changes. I will have to remind him next week that it should take about 2 weeks to fully adjust to this alteration. Be patient. I sense Peter wants change now. The other strategy I suggested he consider for the future was to include a burst of higher intensity walking within a “normal pace” walk to work up to a higher intensity walk for the full 45 minutes. For instance, Peter could walk at his regular pace for the first 15 minutes, then up the intensity for the next 15 minutes and then bring it down to the first intensity to finish off the walk. Once that is accomplished with consistency and comfort (adaptation has taken place), then up the intensity for the second 15 minute block and only have one 15 minute block that is at the original pace. Eventually, all 45 minutes would be done at a higher intensity. This change would likely occur over the full 4 month period. I will have to map this out for Peter next week. He knows this too. He mentioned a while ago he could never have walked as quickly as he is now. He said he would have been out of breath. That is an important observation on his part and he needs to be reminded of that again. This behavior change takes time.
When Peter said he didn't think that there had been any other changes, I reminded him that some of the changes he may be feeling could be very covert and to let me reassess before he decides that there have been no differences. I hope that we see a change in BP or waist girth to give him some form of positive reinforcement. We had a brief discussion at this time about muscle mass versus fat mass and the differences in weight and metabolism. Perhaps, I need to include or at least have more of this information available to the group to show them the difference. The overhead from the Wellness text does a pretty good job of showing this difference (I will bring to class for the last intervention). This is when Jane piped in that she felt different. She said she felt less groggy in the mornings and that she had noticed a slight change in her sugar levels. Good. Peter then added that he at least had not seen an increase in his weight—ahh, a positive observation.

I asked Peter to start recording his HR while he walked so that we could determine his intensity level. Perhaps I should have asked him to record it during the first 30 minutes and then at the end of the 45 minutes to see if there was a difference. I will let him experiment with this before I say much more.

Brian provided a list of web sites to visit if anyone wanted to read more about diabetes and diabetes and exercise in particular. He provided 2 articles to the group that he had copied for us. I apologized that I didn't have the article ready for the group that I had promised. I did manage to deliver it to everyone on Tuesday though along with the email from the pilot re: fasting, activity and eating, sugar level responses. I sent this email with the article because of a question posed by Peter. He said that he had eaten, then walked and then taken his sugar reading to see if the walk made a difference to his sugar levels. He reported that there was no difference. I could tell he wanted there to be a change—a drop. He is certainly playing around with this whole exercise as a management technique. I can only hope that it does provide him with some sense of improved control when all is said and done.

Anyway, when his sugars didn't change I think he was disappointed. So I said not to be, that it wasn't just him but that a recent study had found similar results. He said he would be very interested in reading more about this; hence, I provided a copy. We'll talk about it at the next meeting.

Tonight I had everyone take his or her heart rates. I wanted them to relate this to intensity. I told them their range should be at 60-90% of their HR max using the 220-age formula. All determined that their 30 minute walk put them in that zone although Jane was the highest at 75% of her predicted HR max. Jane commented on the walk that she wasn't sure she could keep up so I think subconsciously Brian and I slowed down. We didn't try to keep up with Peter any longer. Jane tended to be about 1 step behind Brian and I for most of the walk and didn't say that much. Peter and Brian were perfectly situated at 65% of their predicted HR max. The troubling thing about this discovery is that Peter was moving at a fairly good clip already and if and when we opt to increase his intensity he will be moving close to a light jog. I don't think he wants to go there and I perceive that to be an unfavorable option. I will have to take a closer look at his walking style to see if he can use his arms more vigorously or at
least get a sense as to how far away he is from actually jogging. I will make a point
of walking with him next week to determine this. I can also suggest that he consider
walking up hills if available. If Peter were more akin to using a treadmill this
wouldn’t be such a difficult proposition.

Tonight I forgot to have them fill in their evaluation forms. Not a big deal because
the evaluation form was the same as last week. We’ll see if they do on their own. I
would be curious to know if Peter found tonight’s information more helpful than last.

I believe I need to change some of the “How did you do” questions for this week. I
found I asked one or two questions that were actually part of the consciousness
raising section. That is perhaps not a bad strategy. I think that I need to alter the
consciousness raising questions too though and include a question in there about are
you feeling any differently. It was by coincidence that members of the group shared
this information so I think I need to make it an explicit question.

I also need to create the questions for the next interview. I promised the group that
this interview would take less time and so it should with the background information
already covered. I asked them to bring their day planners with them next week so we
could book appointments at Monday’s session. I will also need to collect their
journals next week and copy their activity calendars, and weekly goal setting sheets.

Wednesday, May 26, 1999

The final group session proved to be a nice finish although there were a few
administrative things that could have been changed. 1) Kellen went on the walk with
us and he was a little shy and clingy which made it a bit awkward to function as I
normally would. Fortunately, he only joined us for the walk so it wasn’t too
disruptive. 2) We got locked out of the meeting room for about 15 minutes after I
specifically asked that we be let back in shortly after 5:15 p.m. We had to get
security to let us in. I don’t think that I would use that room again—not enough
control. 3) I would not include the certificates in the manuals. It looses a bit of the
punch for receiving them when I have to dig through the participants’ binders to find
their certificate. These should be handed out separately. 4) The revised evaluation
form worked well although I had thought to myself to let them think about the
question over night then I would pick up their responses the next day when I picked
up their binders. But I forgot so I will include this question in the interview and
discuss with them at that time.

Joan was the only one unable to attend. I believe she had another chiropractor
appointment. We started the meeting by discussing a few administrative tasks – 2
phone calls as a follow-up, the final group interview the end of July, collection of
binders, etc. What transpired was that I would pick up the binders in their entirety the
next day and that I should check up on the group more frequently than the 2 planned
phone calls. They suggested that we actually meet or that I physically go and visit.
We decided that we would meet in about a month’s time but that I would visit
informally and check on their progress. Thus far, I have seen Peter out walking at noon once. And Jane has called me to replace her pedometer because her first one broke. Actually the arm to hold the pedometer onto her shoe is what broke.

We went for a 30 minute walk again tonight although they were all prepared to go for a 40 minute walk. Peter had a different route for us tonight although it was a 30 minute option as well. We walked out to Cheapside and then west to Highbury St. and then to the corner of Oxford and Highbury and back to the college. It took 30 minutes right on again. I am so glad Peter had this mapped out. It worked really well. Brian started the walk with Jane, Kellen and myself but I could feel him walking right on my heels. At that point I was still carrying Kellen because he was stuck to my neck. So I suggested Brian pass me which he did and then caught up with Peter. The two of them walked the rest together. Peter told me later that Brian actually set the pace for a period of the walk. Jane and I had a leisurely pace despite pushing Kellen in the stroller. We had a nice walk. It was warm and I think our sweat had more to do with the air temperature than our pace.

When we returned to the college I took the group into the Fitness Center. They were like kids in the candy store. They didn't seem like they really wanted to touch anything. Brian kept saying things like, "look at their faces, no one in here is smiling." Nonetheless, I did convince them to try a treadmill. Elijah provided the demonstration. They all managed to get on and walk for an additional 5 minutes. Jane seemed the most uncomfortable. She walked with a lean and connected herself to the kill switch. When we got back into the meeting room finally, they all seemed a little more relaxed about the treadmill and said that they didn't think it was that bad. They did find it a different walk but OK. I believe the experience was worthwhile and I would keep it in the program for next time. I doubt any of them will bother with a membership although I would suspect that their reaction might be different if this program had started in the fall and I had asked them to walk through the winter. That in itself would make an interesting comparison. Does the time of year the program is offered impact adherence? I will have to ask the participants.

When we discussed Gretzky's quote everyone connected with it and could see its relevance to this evening's discussion. Brian especially liked it—I could just tell. All of them agreed that they would need to plan for the future. Jane seemed the most cautious almost scared to go off on her own. Peter was probably next cautious with Brian in the rear. I get the sense that Jane would like one or two more meetings. They seem to offer her a little security. I hope that our interview next week will give her the chance to reconcile some of her concerns. If she sees any changes in her assessment results I think that this will really motivate her as well. Peter is mixing up the intensity now and has a good handle on that. He would still like some info on stress and sugar levels. I must remember to get him some info. It will give me an excuse to visit him.

The entire group handled the relapse scenarios well. Some of the scenarios need to be changed again to suit the time of year. Christmas, for example, is no longer an issue
for this intervention. I got the same response from these individuals as I did the fall when we discussed relapse planning—just do it. There did not seem to be any hesitation. I really get the sense that this program is not difficult to adhere to; consequently, finding excuses to not continue is difficult. I did ask them to consider their own relapse scenarios and most felt that the hot temperatures and vacation time would pose the most threat to their continued behavior change. So we discussed strategies to deal with these scenarios and finished the discussion talking about goal setting for the rest of the study. The saturation point became an important juncture for them to recognize so they could determine what to do differently. I kept reminding them that Peter had still managed to reach 16000 steps before worrying about changing his intensity levels. Jane is not ready for that yet anyway but I know Brian wants to play. He wants to do the same thing as Peter. We’ll have to see how he makes out. I didn’t discourage anyone. I simply reminded them of JAB—just audible breathing. I think that they all understand. I know Peter is now taking his HR on a regular basis.

**Wednesday, May 26, 1999**

Well I have finished the second round of interviews and assessments. I am extremely pleased with the results. Everyone did really well and the interviews provided some very interesting suggestions and reflections.

The activity calendar is being used to record not only steps but also sugar levels. I think I will include a brief instruction about that so that everything appears on one page. I will also change the last column to record total number of steps for the week and the average. Percent is not as influential and people can see the stars to determine the number of days that they achieved their daily activity goal. I will modify and then give to Bruce for professional zing.

Weekly goal setting sheet was really popular. There were few changes suggested. Perhaps better clarification when answering the questions 1 through 3.

Decision Balance was identified as being really useful but not until I explained how to complete it. The suggestion that Brian and I came up with was to make more of a leading statement rather than simply list gains and costs. For instance, “If I were more active I would gain the following....” I will work on this and revise for the next edition.

The journals had mixed reviews. Jane thought they were really effective and she didn’t write that much in them. Brian hated them. Peter had mixed feelings although I think he thought they were more useful than a hindrance. Joan didn’t like them. I think for future interventions, the journal may be more of an optional thing to cater to the adult learner’s needs.

Everyone’s response on the stages of change questionnaire moved from 3 to 4. All were in the action stage.
And the self-assessment survey proved interesting. I had everyone answer as they were looking ahead to the next three months on his or her own. I think I can use again in July and then have them answer looking ahead to their time alone. I saw changes in most answers. I was most happy to see changes in confidence and modification of life to fit in active living.

When I interviewed I found the personalized questions most helpful. I think that the participants enjoyed the personal touch as well because it verified that I had read their journals, reviewed their manual details and first transcription. I got the sense that sometimes they were thinking, "oh, so you caught that."

I think the best thing that was said came from Brian when I asked him about the "bitching" that I never did. When I asked him why I hadn't needed to do that he replied, "because you made this damn thing too easy." I haven't had a reason yet that I needed you or anyone to bitch at me. That felt good. He also said his wife really liked the weekly themes and that he had showed the materials to others who were non-diabetics and they expressed an interest in trying this program. Perhaps I can go off on this tangent in the future.

All the participants want to keep their pedometers at the end of the study. I will arrange for this to happen. For future interventions I would simply build the cost of the pedometer into the registration package.

I cannot explain how happy I was for Jane the day we completed her second assessment. During the interview she explained how she would feel if there were not any changes to her results—she would be disappointed and I was concerned that it might influence her motivation. So when we retested and I didn't look at her previous results in case it biased me we were both extremely pleased to see the changes. Everything came down. I felt like crying or at least hugging her. I didn't but I kept telling her how proud I was of her success. She walked out on a cloud. Peter came a close second. He was not optimistic that there had been any change and yet there was significant change. Inside I know he was pleased because he kept protecting himself by saying long-term, "I don't expect too much, there hasn't been enough time." "If I don't see changes in the long run than I will be more disappointed." Brian's BP was the biggest change and I was really glad to see that. He raised an interesting point though. When I tested him and said it was high and he had to have his doctor test again, he said they told him it was where it normally was. He got to thinking. Does that mean that it came down and really was OK or does that mean that he has a higher BP and that for him it is where it always has been. He wants to know because this high BP really bothered him. I told him to ask for the specific numbers and then he could compare them to his Client Info Sheet, which I will provide when the second transcription is done.

The other interesting point that came about from the interviews was Peter's perception of his success. He thought that the others in the group were going to be angry with him for doing as much as quickly as he was. He said he thought that he
should tone down a little and that if there had been a bigger group he might not have stood out so much. I affirmed that this indeed was not the case and that he was in fact a role model to the rest of the group. This honestly came as a surprise to him. He didn’t believe it.

Journal writing is extremely time consuming for me. I think that for future interventions I will use a tape recorder to record my thoughts and then have them transcribed. I also think that I will simply do one journal for everything.

**Thursday, June 3, 1999**

I met with the study participants on Tuesday this week. Everyone came except Joan. It was a very informal meeting and not planned in the original study. However, it seems that the group thought a meeting was necessary and would help them to stay on track. After talking with them for approximately 35 minutes I realized it was a good idea.

It seems that Brian and Jane have not been doing as well with their walking since the group meetings ended. They mentioned that some days they have been as low as 3000 steps. Brian said he has even dropped his weekly goal setting to about 9500 on a daily basis. He mentioned that work has picked up and that doing any walking at work is next to impossible. He also commented that while on vacation the week after the long weekend of May also proved difficult to accumulate steps. He said he did an awful lot of sailing but not as much stepping as he thought he should. He said he monitored his steps the first few times sailing to see if he put on many and he said he didn’t but that he was certainly tired. He told the group that he realized how out of shape he was because his shoulders and upper body were very sore. I affirmed that he was in fact still active although not collecting steps and that this was still noteworthy because he hadn’t done this for some time. He thought he might tie his pedometer to his dog’s leg to get a few more steps next week. And he even said he could cheat if he wanted to show more steps but it doesn’t do him any good so why bother.

Jane said she just hasn’t been stepping as much. I am not sure what she attributes it to. She is back and forth between the clothing store and cash in the Book Store but beyond that I am not aware of a change in her patterns—unlike Brian and Peter who both took holidays. I think that this is valuable information; however, since when we did the relapse planning they all scoffed at the vacation idea. And said things like they would be more active on their vacation. I will have to remember to use this anecdotal information for the next intervention. I thought Jane might have stuck with it more than she has given her positive results with the last assessment. Perhaps, this worked to her disadvantage because she felt over confident with her success. I would have hoped it would have motivated her even more.

Peter continues to persevere. He, too, was on vacation for a week since our last meeting and he, too, said it was difficult to step as much especially the days that were
wet (first 3 of the week). However, on the last 4 days he managed to step over 20000 while he was gardening. Everyone in the group was impressed and perhaps inspired again. I hope.

He needs a replacement pedometer. His pedometer broke in a similar place as to Jane's. Once I get his back I will send both back because they are covered under warranty.

In all honesty I don't think I was as prepared for the meeting as I should have been because I didn't anticipate their relapse. I thought they might have done better to maintain but this was not the case. Jane's apprehension about ending the group meetings at 4 weeks came true. So what I suggested was that we walk as a group with Peter as our leader next Tuesday. I thought that if we organized an informal walk they might get back on track. I want to review the processes of change suggested for individuals in the action stage of change. I know that helping relationships and counter conditioning are examples and it sounds like some of the individuals need it. I believe a group walk may provide some direction and motivation again. I will consider other options before next Tuesday as well. I would like to see them continue this pattern on their own. I think that they still need to control the stimulus or limit their distractions and plan consistently.

Joan was not in attendance at the meeting but ironically enough I am not as worried about her. I think she is on track. I will touch base with her this week when I provide a copy of her last interview and assessment results. I will also invite her to walk with the group next Tuesday although I doubt very much that she will alter her daily routine.

I showed the group the revised Decision Balance and Activity Calendar which they all thought was appropriate. I gave them their second transcribed interview, assessment results and a memo indicating the date of the final group interview. I asked them to return their interview with corrections by next Tuesday.

**Wednesday, June 9, 1999**

Yesterday we went for a group walk. We all met at 12:15 outside of D block night entrance. Joan did not attend. She was not at work Tuesday. Peter was the leader. Jane walked with him at the onset. Brian and I took up the rear. We headed out to Cheapside and then to Highbury where we turned to walk towards Oxford. About half of the way to Oxford (about 15 minutes into the walk) Jane said she needed to slow down. So I joined Peter, Jane and Brian followed. Peter and I talked about our family responsibilities and the time passed quickly. Brian and Jane completed the walk only a few minutes behind us. So despite having the need to slow down I don't think the pace changed drastically. I think we finished in about 30 minutes as we had the last time. Everyone was quite jovial about getting together. The conversation flowed easily and all of us asked questions of each other that related to something we had talked about or shared together before.
At the end of the walk, Brian voluntarily asked if we were going to meet again at the same time next week. There was no prompting. I agreed to see him then. I will email everyone so all have the option. I think Brian needs this type of stimulus control. I think Jane does as well. If I email everyone, my hunch is that Peter will select a new route for us to go.

The temperature on Tuesday was hot. It was approximately 28 degrees. Peter worked up quite a sweat—something he usually doesn’t like to do. He would prefer to perform his activity and not have to shower after. The timing of this pattern fits his work schedule. It didn’t look like Brian or Jane was sweating as much.

I collected everyone, except Joan’s, manuals so that I could copy this month’s activity calendar and their journals. I hope to read and make comments to everyone. I think this might be the reinforcement that they need. I really want to make an effort to use the processes of change as indicated in the transtheoretical model. Thus far, I think that we have used the helping relationship and stimulus control processes. The group walks need to continue with me participating for now. The goal will be to wean the group from needing me to initiate.

It seems Brian is trying to write in his journals using his computer. I will have to see if this works for him. On a funny note, Brian asked me how I was doing with my nail biting. I think that by keeping track of my success with my nails, he can monitor his own progression with his walking. It is an interesting comparison and evaluation stick.

Friday, September 17, 1999

Today I finished final calculations—at least what I think are the last calculations. I hope to meet with Sue when I travel to Toronto in October for the OASES conference. In some respects, the numbers are encouraging and in others discouraging. If this was purely a quantitative study I don’t think I would feel too positive. Yet, having the transcribed data to correlate with the numbers sheds new light. Brian is consistently walking. Although his numbers aren’t extreme especially in comparison to his baseline he has made a significant behavior change. Jane has also done extremely well—most likely the best of the bunch relatively speaking. I suspect her intensity changed the most although I can’t speak to Joan’s intensity because we didn’t get accurate numbers for her timed walks in the first 4 weeks. Joan continues to chug along and has accumulated quite a number of steps over the summer. She certainly works at a progressive yet consistent rate. Good for her. Peter is still the top achiever with respect to numbers although he gained some weight back since the start of the intervention. However, there were some tremendous changes in his cardiovascular abilities. His last resting heart rate measured in July was 48 bpm. On the whole the group blood pressure readings on the day of the final interview tended by a bit higher than what I would have expected. I attribute this to 2 things: 1) they were all anxious to have lunch—we finished the interview about 2:30 which is about 2 – 2.5 hours later than most are accustomed; 2) perhaps the
summer vacation time had taken its toll in that a few had not been walking as much and consequently, there was a slight change in BP readings. I would suspect the first reason had more of an impact. All of the participants enthusiastically declared that I was not done with them yet. They all said that they would like to continue the study even if on their own for a full year. They said they would continue to complete the activity calendar and send my way as they filled it in. I could do with it as a saw fit. They said they wanted to see how their activity pattern changed over the seasons particularly since none of them really anticipated how much of an impact the summer/vacation time would have on them. This in itself is extremely interesting because all of them were very certain that the spring and summer were the best times to start an intervention like this. The weather was a prime motivator. What I think they realized however, as did I, was the importance of a routine. Coming to work provided the structure and consistency that kept them on track.

Everyone agreed that the activity calendar was an important tool but they suggested several significant changes to the design. They thought that one page should only house one week’s worth of information. There should still be a weekly goal but also room to modify and insert a daily goal if you knew ahead of time that Wednesday, for example, would be a write-off. They also thought that under each day there should be space to record glycemic values, and write a short journal type comment for the day. These changes would be in addition to the space already provided for the number of steps and perhaps star. They also liked being able to assess their success a number of ways at the end of the week so they thought that that should be continued.

Although Peter continued to feel a little alienated because he progressed so much further than the rest of the group, he did find reassurance that the group still supported him. And in fact, he was their role model. I believe they find him extremely motivating and he presented a challenge to the rest of the group to keep up. Peter, on the other hand, said he might have appreciated being with a larger group or at least someone who was taking as many steps as he to feel that he too, had a partner or a peer.

On the whole, this group was extremely intrinsically motivated. They did this study for themselves and their health. Even though they may not have seen tremendous earth shattering changes I don’t think any of them really expected to. Instead I think they truly had this in perspective that this was a necessity to manage their diabetes which they had to live with for the rest of their days. And it seemed that they were willing to do whatever they could to enhance the quality of those days. For some that meant, not having to increase their medication for others that meant not having to take insulin, for others it meant to simply feel better about themselves because they knew that they were doing something for themselves. It was that simple. They all live with their pedometers quite happily and were glad to keep them. It seems that this little gadget is now and friend. Peter said he felt lost one day when he didn’t wear it. It is a simple tool that provides instantaneous feedback, which allows them the chance to modify their behavior on their own with discretion. It empowers them and provides them with the control. I don’t believe all of them have told many of
their co-workers they are even wearing the pedometer. I have little fear of relapse knowing they own this little gadget. I really get a sense that they have made the behavior change, which puts them in the action stage of change. Now, having said that, I would put a small condition on it. I think that this stage is too broad as a stand alone category. Within this stage, I believe are various levels of action. Jane, for instance, would be positioned somewhere in the first quarter of this stage as compared to Peter who would be positioned in the last quarter. Joan would be somewhere in the last half and Brian would be somewhere in the first half. The significance, as I see it, is that each quarter needs different levels of support rather than a paint brush approach to the entire category. Perhaps, certain processes of change that normally fit within the action stage would be better suited at various points within the action stage rather than saying all the processes of change are suitable for the entire category.

As I was tabulating today I also thought it would be interesting to cross-reference the 16 week daily average with respect to time and steps in comparison to the baseline data determined by using the 4 walks and corresponding steps. Peter and Brian’s data came out fairly consistently suggesting that their intensity did not change that much over the course of the 16 weeks and that the predicted steps/minute was a fair estimation. Joan’s data was not useable given that her timed walks were faulty. Jane’s data, however, suggested that her intensity changed over time. It appears that Jane’s daily average at the end of 16 weeks is about 700 steps more than what it would have been at the start of the intervention in the same period of time. Thus, not only did she increase her duration/steps per day but also the intensity at which she moved. Which leads me back to my comment at the start of this entry, which had to do with relativity and the fact that I think Jane, made the most gains in this whole process. What an interesting way of viewing the behavior change. I think she would be quite thrilled to know this and that it might provide her with the positive reinforcement she requires to stay motivated. I will have to be sure to tell her.

All participants would like to read their case study and the analysis that goes with it. All said that they would like to provide additional comments should they be warranted. I agreed.

Cross-case analysis:

As previously determined, further investigation of issues related to how people change and how that change impacts their quality of life, health status and well-being has been documented in the literature. Consequently, this study compiled five within case analyses or single case studies to explore and examine the context and process of behavior change for adults with Type 2 diabetes trying to adopt and adhere to a more active lifestyle.
A cross-case analysis was then incorporated to extend the within case analysis to enhance the interpretation and theorizing already initiated in the single case studies. The intent was to enrich the understanding of each case and the study collectively for the development of new conceptual categories and/or to support or challenge existing theoretical assumptions.

Collectively, the four participants in this study were a fairly homogeneous group. They were all adult Caucasians ranging in age from 45 to 55 years (the mean age was 48.8) with at least grade 12 education. There were two female and two male participants. Both the male participants were married. Only one of the participants (Peter) had children living at home, the others were alone but supported by their children and grandchildren. All were currently employed at a Community College in a support staff position and diagnosed with diabetes. The treatment protocol for their diabetes was diet and medication. All participants had a BMI greater than 27 (the mean was 30.1) when they embarked on their behavior change. At various points in time since their initial diagnosis, all participants had attended a diabetes education program.

All categorized themselves in the preparation stage of change at the onset of the study and in the action stage of change at the conclusion of the study; however, all indicated they would have left themselves in the contemplation stage thinking about how to become more active again had this study not come along. Once in the action stage there were varying degrees of action—a rather broad category in the transtheoretical model that I feel needs more explicit delineation. Jane, for instance, increased her daily average number of steps by 2537 or 19 minutes, Brian increased his daily average number of steps by 218 or 1.8 minutes, Peter increased his daily average number of steps by 1840 or 16 minutes while Joan increased her daily average number of steps by 3913 (refer to Tables 4, 7, 10 and 13).
Obviously, there are significant quantitative differences in the participant’s level of action yet the action stage of the transtheoretical model does not differentiate levels. And although each participant appears to have successfully taken action to change their behavior to adopt and adhere to a more active lifestyle, I would suggest after visiting the qualitative data that each case be viewed on a continuum of action given that the participants do not travel to the maintenance stage of change together. Furthermore, data should be triangulated qualitatively and quantitatively to accurately analyze each situation. Brian’s case clearly illustrates this point. Although up only 1.8 minutes of average stepping per day at the end of the study from baseline, Brian still made a tremendous behavior change. He went from being completely sedentary pre-intervention to walking consistently for a half hour each night. He said he negated everything he did at work “because [he] never knew what the day was going to be like but at least [he] knew the one positive thing was doing at least thirty minutes at night...that sounds more positive than looking [just at the numbers].”

It seemed all had received some direction or encouragement from their physician or diabetes educator regarding the necessity of incorporating physical activity in their life and were assessing the impact of such a behavior change; however, none were formally acting on the directive. Everyone attributed some fault to someone else for using a “one program fits all” approach or not providing guidelines or enough instruction as to how to begin an activity program or what to include. There seemed to be an underlying question of ownership for the behavior change and as a facilitator they expected me to tell them exactly when, how much and how quickly to walk. When I did not comply, they soon began to collaborate by sharing some of their fears, concerns, assumptions, previous experiences,
strategies and successes to carve out a behavior change path of their own; thus, requiring progressively less input and direction from me as “the expert.”

All but one of the participants were “non-sports” type people who prior to this study had seldom participated in organized physical activities even as children. When invited to use the treadmills in the college Fitness Center, the majority were not very keen or interested. They did not think they would be comfortable in that environment, nor did they wish to sweat or bring along a change of clothes for “working out.” After a brief tour of the Fitness Center and demonstration of the treadmill the last night of the weekly meetings, three of the four participants thought they would either purchase a treadmill for use in their own home or would consider using the treadmills in the club during adverse weather conditions.

All were committed to improving their quality of life most strikingly over the long term. In fact, they all kept their pedometers to continue with their behavior change at the end of the 16 week intervention because they felt the pedometer provided an objective measure from which to gauge their daily activity. They had become quite reliant on this little device—“it is like wearing a watch”—and seemingly doubted their ability to use time as a means to accurately or as concisely monitor their stepping. For all the pedometer provided a “sense of security….You get to rely on it…it is a reference” and “it works.” Using the pedometer to establish a baseline of average steps per day was also considered critical because the baseline became a reference point from which to set goals. And recording the pedometer values at the end of each day “made it [the behavior change] more realistic” to “be able to change one way or the other.”

No one in the group utilized physical/tangible rewards to keep themselves motivated. For example, when I suggested using the pedometer as a reward mechanism to be earned at
the end of the intervention, everyone adamantly agreed “the motivation should be to feel better due to walking rather than getting something physically.” They also said if they really wanted the pedometer all they would have to do is “fudge their numbers...they wouldn’t have to be truthful.” And “if a ten dollar item causes you to quit then you have got a more significant problem. It is your whole behavioral thing that is not working.”

Being truthful was an essential element of the intervention—I expected it of the participants. They expected it of themselves. However Brian assured me “there was no way I could really know if a person was honestly answering the information” and neither could his specialist when reviewing his blood sugar records.

You have to hope that people are being honest with you. Your only way of knowing is by going through all of these questions and interviews and stuff as to your best perception that we are giving you an honest answer. There are no guarantees, you can’t guarantee....There is no way you can give a total 100% reliability.

What he did say though that convinced me his findings would be reliable and valid was his need “to know exactly what [his] body was doing with the insulin, exercise and diet.” In other words, his health was at stake—something he wasn’t willing to jeopardize by falsifying numbers. Peter supported Brian’s position and added that the readings they reflect more of an honest [response] because we are up and down all over the place. If they were very very consistent, always within the range, then I would, me as a facilitator would question [them].

Both concluded by saying the person who distorts the truth “does not have anything to gain, they have more to lose as opposed to gain” and Jane agreed. She too said, “You are only fooling yourself” by not reporting the truth.

All wanted to change their behavior to feel better and manage their diabetes more effectively. And by the end of the intervention everyone, except Peter, said they felt healthier which meant they were sleeping better, breathing easier, were not as tired, and/or
had more energy (results showed everyone increased their daily activity by 1.8 to 16 minutes and decreased their resting heart rate 4 to 12 bpm and waist girth .8 to 6.2 cm (refer to Tables 4, 7, 10 and 13)). Peter, on the other hand, viewed his quality of life changes more cautiously saying he felt only marginally better. He explained that his behavior change had helped him become more active but that it was “only part of the whole picture” and as far as controlling his diabetes there were still other factors he needed to consider before he would say he felt better. He did however think that by mastering the physical activity part of his diabetes self-management, he could “focus on the diet end of it” and then everything would work together.

I believe I respected each of the participants for their individuality and approached their learning needs with Pratt’s andragogical construct in mind. I was sure to include the opportunity for experiential learning (e.g., group walks) and information sharing (e.g., weekly reports, Stepping into an active lifestyle sessions, preparation for SMART goal setting) in each of our weekly meetings. From the onset, I sought to create an informal, casual environment with only a small number of participants by including them in the decision making process, selecting group leaders, consciously practicing my active listening skills and using a “we” approach as compared to a “them and me.” I tried to offer support and direction to accommodate the varying dependence needs; however, I do wonder if I fell short for some at the end of the four week intervention. Jane and Brian, for instance, may have been more confident venturing off on their own if I had extended the group sessions for one or two more weeks. I surmise there was some consolation meeting one month after the end of the active portion of the intervention for those who chose to attend, the informal email and phone conversations, the sporadic informal visits or chance encounters made as a result
of working in the same work environment, and the weekly group walks. I also contend that
having the participants complete the goal setting worksheets, reference their pedometers,
review and determine their own calculations and subsequent success or failure using the
activity calendars during the active portion of the intervention provided them with the
decision making tools and skills necessary to minimize their dependence and maximize their
self direction post-intervention. Concurrently, I would suggest intuitively that the
participants’ self-efficacy improved over the duration of the 16 weeks as evidenced by their
desire to continue with the behavior change, their increased stepping and their high scores of
confidence and commitment on the self-assessment survey at the end of the study; thereby,
empowering them to continue with their behavior change. Previous research conducted on
exercise behaviors found a similar response in that “self-efficacy scores reliably
differentiated subjects at different stages, with a positive linear relationship between self-
efficacy and advanced stage” (Herrick et al., 1997, p. 54).

No one in the study group realized the impact warm weather and vacation would have
on their behavior change. During the relapse planning session the fourth night of the weekly
meetings, all dismissed these variables as manageable. Moreover, all of the participants
thought spring/summer was the better time of year to introduce a behavior change
intervention such as this in comparison to the fall/winter when the weather would be colder
and less conducive for walking. To reflect a more accurate picture of the current behavior
change process, all the participants suggested I “re-evaluate this particular team perhaps in a
year from now” because a “year would be a better measuring stick for a program like this.”
In particular, Joan commented that a year would allow people time to get into a cycle, while
Brian said it wouldn’t “bother him to keep filling out stuff” because over a year you would
get an idea...you would be up and down with the seasons” and Jane asked to meet in a year to review each other’s progress. Peter would have liked more time to address the “differences as far as timing” and “change a few things to [better] reflect [the variations in his] lifestyle.”

To compensate for the seasonal influence and diminished stepping, most of the participants lowered their weekly goals and began substituting other physical activities for walking. For example, Brian took up sailing again with a friend, Peter gardened more, Joan swam at her apartment complex and Jane was busy working around her yard. In doing this, the participants relapsed to a certain degree with their walking but avoided an all out reversion of their behavior change. I believe they demonstrated SMART goal setting and an appreciation for active living as compared to fitness or exercise exclusively—something they perceived as the only option pre-intervention. Furthermore, I believe their actions spoke 1) to the importance of viewing the intervention as a behavior change process rather than an active living program exclusively; 2) the format of the intervention which recognized and respected their needs as adults; and 3) the value of a low intensity, active living approach for improved health, quality of life, and well-being.

The one criticism levied by all of the participants was the inability of the pedometer to recognize other physical pursuits; hence, a number of suggestions were levied to rectify the situation. However, given the constraints of the intervention revising the activity calendar to reflect some of the participants’ suggestions was the most appropriate alternative. The suggestions put forth were to: 1) redesign the calendar to reference one week at a time instead of a complete month; 2) “make the squares nice and big with more room to write in;” 3) record total number of steps at the end of the week to determine weekly average rather
than percent or number of days the goal was reached; and 4) for each day of the week include several different sections to record glycemic values, number of steps, daily goals, and comments (refer to Appendix P). In so doing, the revised activity calendar would replace journal writing (which was appreciated by some and hated by others) to streamline the record keeping to one sheet. Most importantly, the comment section would be used to chronicle other physical pursuits.

Three of the four participants peaked with their stepping during the active portion of the intervention followed by a progressive decline for one or two weeks post-intervention after which, the patterns differed tremendously (refer to Figure 6). The one exception was Joan. Her first two weeks of the active intervention were marred by personal setbacks that actually caused a drop in her volume of stepping from the original baseline. Shortly after though, she made significant progress and sustained an elevated level of stepping until she broke two of her toes during the twelfth week of the intervention. Joan was also somewhat unique in that she never attended one of the weekly group meetings scheduled during the active portion of the intervention. She and I met individually usually one or two days after the group sessions. Joan was a rather conservative goal setter that typically out stepped her weekly goal by a significant value (refer to Table 15). She was very internally motivated—"a totally independent person"—and did not feel she missed out on anything by not attending the group sessions.

As a result, Joan was not directly influenced by Peter's performance as the others in the study were—that is until I shared his results with her. Then because of her competitive nature, catching up became a challenge for Joan and she decided to "go after it [more steps]... that is the way I am. That is my personality. I am not going to be the lowest guy on
this.” For Brian and Jane, Peter was typically viewed as a role model—someone to emulate—although at times Brian admits he found it depressing. He said, “You always had that comparison thing where you want to compare, even though it [the behavior change] was individual.” In the end, we agreed that future facilitators have to clearly remind participants that despite human nature, the intervention must be viewed as an individual process—“you are going against yourself. It’s your lifestyle.” Peter and Brian’s strategy for working individually involved using their timed walks, specifically their respective thirty minute walks, as a benchmark from which to reference their progress on an hour to hour and day to day basis.

The other item the group agreed on was the importance of establishing a routine. As a behavior change strategy, it was most pronounced. For example, setting a specific time to walk during the day or evening and being consistent was considered essential for one to be successful. Most decided within the first four weeks of the intervention what time would work best for them and as one individual pointed out, ‘finding time’ rather than setting it aside was like “lying to yourself and it never worked (laughter).”

Everyone had some form of helping relationship in place to support their behavior change whether it was each other, a spouse, neighbor, parent or child(ren). In some cases, the support person walked with the study participant and in others the support person was more of a sounding board, encourager and motivator. The number of support persons recruited varied per study participant as did the number of people who knew the study participant was involved in the intervention. I considered myself a support person and I believe the participants grew to see me as that particularly as a health promoter devoid of a medical background.
Figure 6: Average weekly steps over 16 week intervention: Comparison of case study results
Lastly, the participants felt there was great value in the Step by Step Program for individuals other than Type 2 diabetics who needed to change their behavior to “improve their activity level.” In fact, Peter said he would recommend it to “anybody that was having to struggle with being active... it just might be the push they need” while Brian commented that it was “easy enough and the time commitment pretty minimal.” Collectively, the participants made several recommendations as to how to advertise for future interventions.

Don’t advertise it [the intervention] as ‘we will make you physically fit.’ Advertise it as something non-threatening, non-strenuous that anybody could do....Affiliate with a doctor’s office they know the people who need to have some more exercise....If the doctor says you need exercise you take it a little more serious than if your boss at work [does].

You could give general handouts to stick in every doctor’s office....Or run ads in the paper...Make it more personal than just an ad in a flyer....Mention it is part of a study—people see this as something worthwhile as opposed to something you do in your spare time....Make it specialized like the focus on the diabetic part not just the exercise thing....to pull people together who have something in common—something significantly the same.

Prior to conducting the final assessments, the group concluded by telling me that several of them had new recruits interested in future interventions and that they would all be interested in reading/editing a copy of the final draft. I agreed to provide a copy as soon as it was done.
CHAPTER FIVE: Recommendations

Synopsis of the research experience:

This journey has been an incredible experience. I have lived what I teach and instruct others to do. I have watched four people make real-life behavior changes and been privy to their trials and tribulations. I’ve been excited for them. I’ve been scared for them. I’ve been angst for them and I’ve been hopeful with them. They have shown me how to deal with adversity to gain or regain control and make the best of a common condition within a diverse set of circumstances. I have watched them learn about empowerment.

I have examined and reexamined my teaching style, communication and active listening skills, my ability to empathize, and my ability to interpret and apply the theory beyond what my intuition tells me. I’ve learned to curb my optimism and remain as objective and honest as possible so as to attain the most accurate and realistic results. Conversely, I’ve realized the importance of subjectivity, individuality and the equality of inequality. Each participant in this study offered something unique yet had different demands he or she had to contend with at home and work which, in turn, influenced his or her dependency and quest for direction and support. The challenge for me was to tailor the content of each weekly session to suit the needs of each participant empowering and enabling them to assume more responsibility and control of their activity patterns and diabetes self-management strategies.
Recommendations:

My purpose for conducting this qualitative study was to design, implement and examine the impact of a strategy oriented education intervention on adults with Type 2 diabetes using the transtheoretical model of behavior change in conjunction with the empowerment ideology and Pratt's relational construct of andragogy. Based on this premise, the specific intent of the intervention was to guide adults with Type 2 diabetes from preparation into the action stage of behavior change to incorporate physical activity into their lifestyle using a pedometer for feedback as part of their diabetes self-management routine.

I selected the contemporary research paradigm using a case study approach to frame my examination of the strategy oriented education intervention and its effects on the behavior change process of adults with Type 2 diabetes. From a methodological viewpoint, my choice proved to be instrumental in allowing me as the practitioner researcher to: 1) explore in great detail each experience, including my own, individually and collectively; 2) develop a comprehensive understanding of the behavior change process and the impact of teaching and empowering adults as adult learners; and 3) the effect a change in physical activity might have on the perception of quality of life, well-being, and/or health status of those with Type 2 diabetes. Taking the time to describe, decipher, interpret, question, mull over and analyze the data collected throughout this experience has brought me to a point whereby I am prepared to interpret my findings and the participants' of this study to put forth a number of recommendations and suggestions for future research endeavors.

As previously discussed, physical activity is recognized and recommended as part of the treatment protocol for persons with Type 2 diabetes in diabetes education programs. Unfortunately, participants in these programs seldom develop a commitment to regular
activity for a multitude of reasons and thus, are subject to high relapse and attrition rates. As a result, the quality of life they might enjoy is sacrificed. From an educator/health promotion perspective this outcome is unsettling and unacceptable.

Using this research study to design, implement and examine the impact of a strategy oriented education intervention on the behavior change process of adults with Type 2 diabetes provided results indicating change is possible. Examining the first of three fundamental issues addressed in this study provides a starting point from which to reflect on these results and make specific recommendations.

First, I sought to examine the characteristics of a strategy oriented education intervention for adults with Type 2 diabetes who were interested in changing their behavior to adopt and adhere to a more active lifestyle using the transtheoretical model of behavior change. But before I discuss the specific characteristics, I think it important to reflect on the model—the transtheoretical model of behavior change—within which this intervention was postured and its compliments—the empowerment ideology and Pratt’s relational construct of andragogy.

As a health promoter and adult educator, the transtheoretical model of behavior change provided a useable framework to facilitate the acquisition of a positive behavior change in this intervention. The systemic integration of the stages of change, decision balance and processes of change within the model recognized the dynamic nature of the behavior change process yet provided the structure necessary for individuals who relapsed or regressed. It was not like the traditional “medical model” but instead focussed on progressive behavior change—something the intervention participants related to and found
helpful. Identification of the self-reported starting stage of change facilitated the progressive nature of the behavior change since it clearly illustrated the layers and sequence of the change process. Administering the questionnaire prior to the start of the intervention also put the participants in a position of self-determination; thereby, requiring them to take ownership early on for their decision making without a high degree of risk. It subtly initiated our partnership in the intervention process.

Each of the participants was in the contemplation stage of change prior to the start of the intervention. The transition from contemplation to preparation occurred when the participants began the intervention. The transition from preparation to action occurred after the first weekly group meeting when they started using their pedometer to monitor their daily steps. None progressed to the maintenance stage of change because the study was terminated prior to the sixth month which is considered the criterion for this stage.

For future interventions, I would change the length of the study to follow individuals through to their sixth month. After all, the maintenance stage marks the final stage of change. It encompasses enough time for participants to encounter and work their way through a host of obstacles and variations in their routine such as vacation or changes in the weather, and it consolidates the gains attained during the action stage. The intervention participants of this study support this recommendation.

The other change I would make involves the action stage of change. I believe it requires further delineation even if the parameters for lifestyle exercise (e.g., 30 minutes x 5 days or 150 minutes of physical activity per week) are accepted as the criterion for this stage. I believe it's too big of a jump from the "I will" stage to "I am" stage particularly from an emotional/psychological perspective. This is an overt stage—people are watching, there is
risk involved, and those making the behavior change are investing much energy and time in an attempt to gain control over their behavior change. Their self-efficacy, self-concepts, and sense of self-worth are still building and through this process they are learning about and becoming empowered.

Empowerment is fostered through developmental processes. Kieffer (1984) maintains there are four stages of development to produce “a fully mature participatory competence” (cited in Raeburn and Rootman, 1998, p. 72) or empowered individual. I would suggest a similar developmental approach be taken with the action stage of change. The first sub-stage, for instance, as described by Kieffer (1984) would be the era of entry; whereby, individuals with a well developed sense of integrity decide to respond to a self-threat—in this case including physical activity as part of their self-management strategy for Type 2 diabetes. The second sub-stage would be marked as the era of advancement with key elements of mentoring and “social support by peers involved in the same enterprise” (Raeburn and Rootman, 1998, p. 72). In this intervention, recruiting individuals to lead the group walks and designing the curriculum to allow the participants the opportunity to hear each other’s stories, histories and experiences within the weekly group meetings fostered their advancement. The era of incorporation would be the third sub-stage within the action stage of change. In this sub-stage participants are working at capacity on their behavior change within the context of which they are operating. It is assumed they are or have been involved in some sort of organized intervention like the strategy oriented education intervention. In this example, individuals in the intervention were using their pedometers to determine weekly goals and monitor their steps each day to ensure they met their goals; they were calculating their own weekly averages and assessing the appropriateness of their goal setting;
they were advising each other on stepping strategies and sharing their results with their peers; they were recording their stepping results on activity calendars; and they were planning for the end of the weekly group meetings when they would step out on their own. The last sub-stage to be included in the action stage of change would be the era of commitment. Now the skills and competencies required for the behavior change are well established and have been integrated into the person’s lifestyle. Individuals in this sub-stage have “committed themselves to adapting their recent empowerment to continue” proactive...mobilization” (Raeburn and Rootman, 1998, p. 72) of their desired behavior change. They prepare to enter the maintenance stage of change in a more progressive developmental fashion.

For the adult participants requiring more direction and support, the sub-stage approach to the action stage of change would better accommodate their varying needs. For example, future interventions could be designed with four and two optional weeks of weekly group meetings for individuals with higher dependency needs struggling in the sub-stage of advancement. Taking this approach would allow future intervention facilitators to focus more on issues of individuality advocated in Pratt’s relational construct of andragogy during those final two weeks.

Incorporating the proposed sub-stages to the action stage of change would also compliment the materials in the Step by Step manual. As it is now, the intervention manual was compiled to be preparation and action stage appropriate. It is divided into four modules: thinking, feeling, applied and planning. Materials in the modules could be used to compliment the four sub-stages of action.

The intervention participants recommended continued inclusion of the manual in the behavior change process. They did however make a number of suggestions to improve the
usefulness of the *Step by Step* manual. First, they suggested the manual include excerpts of their case studies to illustrate and provide real life examples of the behavior change process. Second, they revised the activity calendar from one month to one week to include: 1) a comment section to replace journal writing; 2) a column for calculating weekly averages instead of percent or number of days goals reached; 3) a section to record glycemic values; and 4) space to record not only a weekly but also a daily goal if necessary (refer to Appendix P). Third, they recommended future participants continue to learn how to calculate their own weekly stepping averages using the information provided on the activity calendars and that they use the weekly goal setting sheets and timed walks to determine SMART goals. They advised me to guide the goal setting but not intercept. Fourth, Brian suggested a formal note on intensity (e.g., JAB and target heart rates) be included rather than just a discussion on the topic. Fifth, they said there should be less emphasis on the written materials except for the work sheets (e.g., weekly goal setting, activity calendar, decision balance) because they enjoyed the experiential process of walking and talking more. They indicated they made minimal reference to the manual after the four weekly group sessions. Lastly, they suggested the data on time spent walking (calculated using the four timed walks and average baseline stepping value) be provided at the end of the four weekly meetings instead of the termination of the study to provide another means to monitor and evaluate daily stepping.

From my own perspective, the *Step by Step* manual worked for this intervention although I would agree with the recommendations put forth by the group. I would also add to the list of recommendations and suggest a detailed review of the manual continue. The intervention participants in this study were fairly homogeneous with a minimum grade twelve education attained by all. Comprehension of the written materials was not
problematic; however, future interventions delivered to the community at large are more likely to include individuals with varied reading skills. Since the average reading level of the population of the United States is estimated between the fifth and tenth grade and comparable in Canada, instruction using written materials should not exceed a grade ten level of reading difficulty (Leichter, Nieman, Moore, Collins and Rhodes, 1981; Herrick et al., 1997). Appropriateness of the Step by Step materials should therefore be assessed using one of the Flesch, FOG or SMOG readability formulas.

There are several other recommendations I would like to make regarding the emergent characteristics of the strategy oriented education intervention. First, continued use of the pedometer, timed group walks and collection of baseline data is a must. The participants of this study told me repeatedly how important their pedometer was for providing objective, concrete feedback throughout the day. Marcus et al. (1996), Herrick et al. (1997) and Armstrong et al. (1993) confirm the importance of using an unobtrusive measuring device that provides objective information on actual exercise behavior. Familiarity with their pedometer and daily step count enabled them to quickly reference their baseline and timed walk results to establish SMART goals each week and adjust daily goals both during the supervised and unsupervised portions of the intervention. Second, I would increase the last group walk by ten minutes to bring the total amount of time for the walk to forty minutes. The participants in this study were disappointed that there wasn’t an incremental increase in the last week as there had been in each of the three weeks prior. Third, future intervention participants should be encouraged and guided carefully to establish a routine of stepping early in the behavior change process. Fourth, future facilitators should be selected based on their physical education, health promotion and adult education
background—not their medical expertise—as was the case in this intervention. After all, the participants know enough about the medical aspect (e.g., medication and diet) of their diabetes. Instead, they need guidance to move them through their behavior change in a way that respects them and their learning style and is delivered to enhance the experiential process of learning in a non-threatening or judgmental manner by someone with an expertise in physical education. Fifth, contrary to much of the literature (Armstrong et al., 1993; Marcus et al., 1996; Marcus et al., 1994) adult participants in future interventions should continue to self-report. This task empowers them as long as they have received the skills, knowledge, practice and tools necessary as part of the behavior change process to enhance not hinder their confidence and self-efficacy doing so. Proper use of the pedometer, for instance, is taught in the first week of this intervention and monitored over the course of the four meetings. Continued use of the pedometer, record keeping, interpretation and weekly review of the stepping results hones the participants’ self-reporting skills thereby making them more trustworthy and reliable. Guided self-reporting also prepares individuals for life post-intervention when they must continue to self-direct their behavior change. Sixth, I would recommend numbers not exceed eight to ten participants per intervention and limit the facilitator “instructional time” to a maximum of 50% of each session to ensure maximum opportunity for sharing and experiential learning by the participants—deemed very important by the adults of this study. I would also spend the same amount of time on the objectives for each module and deliver them in the same sequence. And finally, I would continue to incorporate the processes of change and decision balance in future interventions since it appears that stage-matched interventions focussed on the enhancement of specific experiential and behavioral processes of change may be warranted to accomplish maximal adoption and maintenance of physical activity. (Marcus et al., 1996, p. 200)
Like the Marcus et al. (1996) study, a majority of the ten processes of change were utilized when individuals in this intervention changed their behavior to increase their activity level. Self-reevaluation and social liberation were used predominantly in the early stages of the intervention (e.g., preparation and the first sub-stage of the action stage). Materials in the first two modules of the manual, particularly the decision balance worksheet, were designed and employed to compliment these processes.

Reinforcement management was the least used process of change perhaps because it was viewed as an extrinsic reward mechanism. The participants in this study clearly did not want or need tangible rewards to motivate themselves. They were seeking to achieve a certain quality of life—driven by an intrinsic desire to manage their Type 2 diabetes and age in good health.

More emphasis should be given to stimulus control particularly in the final group session as the participants prepare to continue their behavior change on their own. Participants in this study did not anticipate the impact a number of barriers would have on their stepping despite a module on relapse preparation in the final group session. Inclusion of excerpts from the four case studies in future copies of the Step by Step manual should help to remedy this deficiency.

The helping relationships and counter conditioning processes of change were discussed in each module of the intervention. Typically, the participants were asked to start each session by responding individually to a series of standardized questions that explored their stepping results, stepping strategies or behavioral substitutions, and their helping relationships from the past week. The weekly goal setting worksheet also asked intervention
participants to identify stepping strategies or behavioral substitutions in preparation for the upcoming week.

The second fundamental issue of this study was to evaluate the extent to which a strategy oriented education intervention program designed specifically for adult learners would influence activity levels between the preparation and action stage of behavior change. The results were promising both from a qualitative and quantitative perspective.

First, qualitatively all of the participants in this study reported “feeling better” as a result of their increased activity levels. They described themselves as feeling more in control. Peter, for example, said that by making the walking part of his regular routine it enhanced his sense of control and allowed him to focus on the other aspects of his diabetes (e.g., diet) that he felt still controlled him. In a personal note received after reviewing her case study, Jane told me that her experience in the intervention “really helped [her] to be more aware, and less overwhelmed by the fitness aspect of [her] diabetes.” For others, the experience empowered them to live more actively and resume physical activities they had pursued previously like Brian playing tennis and sailing and Joan swimming and rollerblading with her granddaughter.

Using the pedometer to monitor their progress was also empowering. Used correctly, it provided critical feedback and motivation, in conjunction with the baseline data and timed walks, to SMART goal set. And as they continued to work towards their new behavior change goals, so too did their confidence to adjust goals and evaluate outcomes without relapse as was the case in the summer months of the intervention. To further enhance confidence levels and provide support for those in the action stage of change, the proposed introduction of sub-stages within this stage of change would help. As previously discussed,
tiering the action stage into four sub-stages would reduce the gap between the preparation and action criterion. Translating and providing feedback in minutes of stepping per day in addition to using total steps per day provides another means from which to monitor the success of the behavior change in case participants lose their pedometers or forget to wear them for a day.

Hearing the participants express their desire to continue with the behavior change process at the end of the study speaks to their improved self-efficacy and the importance attributed to their behavior change. Wanting to have their blood pressure, weight, waist girth, resting heart rate and height reassessed in July, 2000 would provide an objective measure of their progress. Their decision to continue with the behavior change also suggests the ease with which they resumed a more active lifestyle. Feedback from the group interview in July confirms this assumption. Therefore, it would seem that lifestyle exercise using an objective measure of activity participation seems to “remove some of the barriers to exercise participation (Reed et al., 1997, p. 64).

Quantitatively, the strategy oriented education intervention helped all of the participants successfully increase their activity level above their respective baseline average (refer to Table 5, 8, 11 and 14). The group mean was eighteen minutes more of stepping per day. Compared to the results of the Tudor-Locke et al. (1999b) report this value is slightly lower (four minutes less per day); however, variations in sample size and method of calculation may account for some of the difference. Different demographics between the two study groups may also have an impact. Being employed versus retired, for example, limits one’s flexibility and time available to incorporate potentially as much physical activity in one’s lifestyle subsequently lowering the saturation point and weekly averages.
To varying degrees, all experienced positive changes in one or more of the assessment items (e.g., resting heart rate, resting blood pressure, waist girth and weight). Assessment results were most improved when taken at the end of the supervised portion of the intervention (week 5). After that, some assessment values (e.g., resting heart rates) continued to improve while others (e.g., waist girth) returned or slightly exceeded baseline values. Glycemic values were not trustworthy enough to include in the analysis.

The third issue of this study examined the effect a strategy oriented education intervention had on diabetes self-management strategies and the perceptions of quality of life, well-being, and/or health status of adults with Type 2 diabetes. In this regard, my observations and experiences in this study would lead me to believe that the self-management strategies evolved because of the participants' desire to achieve or maintain a certain quality of life. Having said this, I would suggest the most significant impact the group intervention had on the adults with Type 2 diabetes was created because of the "connectedness" the participants felt in being part of the intervention. It began when only those with Type 2 diabetes were invited to participate in the strategy oriented education intervention. Then the participants were drawn together because they had been told by their physicians or diabetes educators to use physical activity as a management strategy for their diabetes. The intervention provided an opportunity for them to learn how to change their behavior.

Once in the intervention, the group members felt less isolated in their quest to manage their diabetes by including physical activity in their routine. They now had a venue to share their concerns, fears, frustrations; ask questions, motivate, reassure, and offer social support; as well as learn from each other. In fact, those with more experience were able to guide and
reassure those with less—in effect they mentored one another. The study participants also challenged each other and drew strength from each other’s gains. And with each week the intervention passed, came improved self-confidence and higher self-efficacy. Use of the pedometer and self-determination of weekly goals also contributed to these changes as did feeling better about sleep patterns, smoking less and improved general well-being. Objective assessment of various physical measures particularly during the week following the four weekly group sessions when improvements were most marked enhanced the psychological well-being of the participants. As the assessor, it was obvious they took pride in their accomplishments albeit some more cautiously than others. The success of their behavior change was empowering.

Success was in part due to the ease with which the behavior change was forged. Most significant was the discovery that walking was an acceptable form of physical activity that didn’t require participants to change their clothes or sweat for that matter. They didn’t need a gym membership and weren’t required to follow a detailed prescriptive program either. While in the weekly sessions the participants also learned physical activity done at an appropriate intensity did not have to hurt—it could in fact be enjoyable and fun, they learned the importance of social support and feedback using an unobtrusive measuring device known as a pedometer. They learned how to use the feedback in conjunction with their baseline data, timed walks and guidelines for SMART individualized goal setting to establish and progressively improve their volume of physical activity per week. In essence, they learned how to overcome a number of the perceived barriers listed in the Swift et al. (1995) study to adopt and maintain a routine of physical activity, walking specifically. Thereby, instigating a
potential reduction in the gap between adherence to the medical aspects of Type 2 diabetes treatment and physical activity (Pham et al., 1996).

Through this strategy oriented education process, individuals in the intervention gained a number of other valuable self-management strategies as well to help them maintain their behavior change. They discovered how to plan for relapse and face it rather than deny or avoid it. This enabled them to work through weeks of vacation and warm weather with lower than expected weekly stepping averages rather than succumb to the roadblocks altogether. In addition, some built in a day of rest to their week and disregarded the results of this day when calculating weekly averages so as not to impede their goal setting while others accumulated steps on the days of the week in excess of their daily goal. The purpose in doing this was to offset certain days of the week when they were unable to walk because of travel, meetings or personal commitments so that in the end they still achieved their weekly goal when the total number of steps were averaged for the week.

What also became apparent was the need for some of the participants to vary their intensity when walking because of the time required to achieve the volume of steps in their daily goal. This became known as the saturation point and determining where this point might be for everyone helped create long-term behavior change strategies. Recognition of other forms of physical activity in lieu of actual steps on the pedometer also became an important behavior change strategy particularly as the weather changed and a number of the participants resumed fairly intensive yard work. They sought affirmation that their expenditure of energy was valued so that when on their own in the last three months of the intervention they were able to accept lower weekly averages knowing that what they had done physically was still beneficial to their health.
Future research endeavors:

As the participants of this study have already indicated, future research using this intervention should be extended to one year when the objective measures could be assessed and the participants interviewed again to probe their thoughts, feelings and behavior change experiences. Following them to this point instead of just four months would allow for the potential completion of the stages of change cycle, assuming one or more of the participants made it to the maintenance stage of change. Tracking larger samples for a longer period of time would also allow further exploration of the saturation point concept and provide more data to predict time and number of steps with more certainty.

Using other trained facilitators to deliver the strategy oriented education intervention material, outcomes could be assessed and analyzed for comparative purposes. The combined study results could then be reviewed, compiled and used to predict future behavior change responses and patterns and, in turn, establish evidence based guidelines which to date have been lacking. Materials in the Step by Step manual could be edited to reflect any differences.

As a health educator, I would also be most interested in delivering the intervention to a non-diabetic population, specifically individuals affiliated with organized weight loss groups like Weight Watchers, to determine if the strategy oriented education intervention could be applied universally to facilitate a similar behavior change response as with this study’s diabetic population. A comparison of the two group’s results might reveal how much of an influence being diagnosed with Type 2 diabetes has on the behavior change response—because of the medical intervention, fear and the required lifestyle changes (e.g., diet and medication). I would pursue the investigation using a case study approach again and assess the same physical health parameters (e.g., resting heart rate, resting blood pressure,
waist girth, height and weight) although I would streamline the interview process to focus on the more pronounced issues (e.g., strategies, routines, empowerment, social support) that emerged as a result of this study.

The alternative to this proposal would be to deliver the strategy oriented education intervention in combination with a traditional diabetes education program and compare responses with those individuals who went with the traditional diabetes education program exclusively. Specifically, one might ask if the responses of those who went through the combined program would be different than the responses typified in the literature (Krug et al., 1991; Glasgow et al., 1989; Polly, 1992; Swift et al., 1995) of those who went through the traditional diabetes education program.

Two other possibilities for future research endeavors would be to deliver a modified version of the strategy oriented education intervention: 1) to individuals in the self-reported pre-contemplation stage of change (materials would have to be modified to be stage appropriate) and assess their progress; or 2) take an exercise as compared to a lifestyle approach with some of the participants in a strategy oriented education intervention to explore the outcomes and assess the differences in their short and long-term results and responses to the intervention.

I believe future research is also needed to explore the proposed inclusion of the action sub-stages in the transtheoretical model of behavior change. In particular, I would investigate what, if any criterion, would best denote the four suggested sub-stages of the action stage of change to then determine if the criterion should be measured and assessed quantitatively in addition to qualitatively.
One final research idea that springs forth from the results of this study pertains to the processes of change. In the CPAFLA manual (1997), it is suggested when best to use various processes of change throughout the stages of change. For instance, during the action and maintenance stage of change reinforcement management is suggested. The participants of this study; however, did not utilize it at all; consequently, I question whether the use of the processes of change during specific stages of change might be adopted differently with different populations with different conditions (e.g., adults with and without Type 2 diabetes, adults with Type 2 diabetes and children with Type 1 diabetes, women with and without cardiovascular disease or women and men with cardiovascular disease).

Conclusion:

The intent when using case study analysis is to gather descriptive data to acquire knowledge of a phenomenon. The knowledge is then used to develop conceptual categories to illustrate, support or challenge theoretical assumptions held prior to the data gathering. In this research study, three theoretical constructs—the transtheoretical model of behavior change, Pratt’s relational construct of andragogy and the empowerment ideology—were coupled collectively to design and deliver the strategy oriented education intervention to adults with Type 2 diabetes. The goal was to move the adult participants from the preparation to the action stage of behavior change to incorporate physical activity into their lifestyle as part of their diabetes self-management strategies. Throughout this process, I was interested in learning more about how the participants changed their behavior and how I, as an educator, could work to improve my own practice.

Exploring, interpreting and analyzing the details of the four within case studies, my own case study and the cross-case was time consuming and laborious at times; however, the
process provided me with rich descriptive data that brought me to this point. Figure 7 is the cumulation of my findings and thoughts. This model assimilates the transtheoretical model of behavior change within Pratt’s construct of andragogy to produce a new theoretical construct for behavior change and health promotion.

The revised model houses the four latter stages of change. Precontemplation was excluded because of its “I won’t” approach to behavior change. The four quadrants represent the four stages of change in addition to the different combinations of support and direction required by the learner as outlined previously in Pratt’s original model (refer to Figure 1). The four quadrants are boxed in together to illustrate how the intervention (marked as an arrow) impacts the entire behavior change/health promotion process and to suggest that each new behavior change experience is unique and unto its own. Within the arrow labeled “intervention” it is understood that all intervention materials contained within the Step by Step manual would be employed although manual materials could vary if the intervention was targeting a different behavior change.

Although not cyclical as in the transtheoretical model, progression and relapse is recognized and represented in this model by the line with two arrows at either end instead. The arrows imply movement, forward and backward, along and to either extreme of the behavior change continuum. Including the range for self-efficacy and empowerment diametrically opposed to the range for dependency exposes the inverse relationship of these characteristics as one moves from contemplation and preparation to the action and maintenance stage of change. Also consistent with the transtheoretical model of behavior change, is the amount of direction typically required by those in the contemplation and
Figure 7: Behavior change/health promotion model using andragogy in relation to contemplation intervention.

- High Direction
- Low Support

1. Contemplation
2. Preparation
3. Action:
   - Era of entry
   - Era of advancement
   - Era of incorporation
   - Era of commitment
4. Maintenance

Dependencies:
- Low to High: Dependency
- High to Low: Self-efficacy
- High to Low: Empowerment

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preparation stages of behavior change, as well as those in the action and maintenance stage of behavior change.

One shortcoming of this model is the level of support suggested in the preparation stage of change. As a process of change, the need for support in the early stages is typically high and may never be as low as the model portrays. Regardless, I believe the model in Figure 7 offers a new more comprehensive construct from which to view and deliver behavior change/health promotion interventions particularly for adults. Furthermore, I believe it is a model that has the potential for universal application given the predictability of the behavior change process and the importance of a stage matched intervention delivered to suit the learner’s situational specific state of dependency.

And so to conclude, the inadvertent evolution and application of this behavior change/health promotion using andragogy in relation model guided me in this study to help four individuals with Type 2 diabetes improve their activity level an average of 2127 steps per day as well as improve a number of their health related measures. Concurrently, the same individuals reported a positive change in their quality of life; thus, suggesting the inclusion of physical activity in their daily routine had a positive impact and was a welcome addition to their diabetes self-management strategies.
References


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APPENDICES
To: Fax:  
From: Tracy Gedies Date: 2/04/99  
Re: Bulletin Board – newsletter Pages: 2  
CC:  
☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle  

WANTED:  

Persons interested in making a positive lifestyle change. Eight to ten adults with Type 2 diabetes are needed to participate in a 4 month research study. I am looking for participants who would like to improve their activity level as part of their diabetes self-management. The first month would involve 4 weekly meetings and several interview sessions followed by three months of independent walking. Participants would be asked to monitor the number of steps they take per day. The results of this study are aimed at helping adults living with Type 2 diabetes improve their health and well being. If you would like more information or are interested in participating in this research study, please contact Tracy Gedies...by Friday, February 26, 1999.
Appendix B

Formative Evaluation of a Theory-Based Daily Activity Intervention:

The First Step Program

C. Tudor-Locke 1,2, MSc, A.M. Myers 1,2, PhD, & N.W. Rodger 3, MD, FRCPC

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We wish to acknowledge the financial support of the Canadian Diabetes Association and Bayer Healthcare, the assistance of the staff and educators at the Lawson Diabetes Centre, St. Joseph’s Health Centre, London, Ontario, CANADA, and the insight and assistance of Tracey Geddies in this pilot delivery.
ABSTRACT

TITLE: Formative evaluation of a theory-based daily activity intervention: The First Step Program

OBJECTIVE: To describe the steps taken in implementing and modifying a novel approach to increasing daily physical activity

METHODOLOGY: The First Step Program (developed using aspects of social cognitive theory and pedometer feedback) was piloted with 12 sedentary individuals with Type 2 diabetes. A formative evaluation identified implementation issues and assessed program feasibility and acceptability to deliverers and clients.

RESULTS: Recruitment based on self-reported activity levels was inefficient. Participants were enthusiastic about the program and especially the pedometer. Diabetes educators were accepting but voiced concern over already demanding schedules. Telephone follow-up contacts were less feasible and acceptable to both deliverers and clients.
CONCLUSIONS: The First Step Program is an acceptable and feasible approach to increasing daily physical activity. Recommended modifications include an objective recruitment procedure and postcard follow-up contacts. Successful dissemination likely requires policy changes.
INTRODUCTION

The American Diabetes Association has endorsed the 1996 U.S. Surgeon General's recommendation that all individuals should accumulate 30 minutes or more of moderate intensity exercise on most, if not all days of the week. 2 To date, however, only 2 published studies have examined daily physical activity interventions with individuals with Type 2 diabetes. 3,4 Yamanouchi et al. 3 used a pedometer to monitor 6-8 weeks of increased daily physical activity in a hospital-based population and reported substantial improvements in body weight and insulin sensitivity. Walker et al., 4 meanwhile, instructed participants to walk 60 minutes five days each week for 12 weeks. These authors found dramatic improvements in cardiovascular risk factors, notably body composition measurements and blood lipid profiles, as well as improved fasting glucose levels 4.

Although promising, neither of these studies provide an underlying program or intervention theory to guide clinical application. Program theories are necessary to explain why and how a program may work and to examine and test underlying assumptions. 5,6 The program theory underlying the First Step Program is
Formative evaluation is the systematic study of program models in their early stages of development and delivery, prior to larger-scale implementation, production or dissemination.\(^7\)\(^9\) The objectives of formative evaluation are four-fold: 1) to determine whether a program has been implemented as planned; 2) to assess the feasibility of program delivery; 3) to assess the acceptability of program activities and materials to both deliverers and clients; and, 4) to identify barriers to optimal delivery. Information derived from formative evaluation is used to make decisions concerning implementation, and to modify and guide delivery to optimize benefits in the target population.\(^7\)\(^9\)

This paper describes the formative evaluation of the First Step Program, a new theory-based approach for increasing daily physical activity in individuals with Type 2 diabetes.

PROGRAM DESCRIPTION

The First Step Program is an 8-week program designed to incrementally increase habitual activity levels in sedentary individuals with Type 2 diabetes. The
program is divided into two distinct phases directed at adoption and maintenance, respectively. The adoption phase consists of 4 weekly education and counseling meetings (in a group or one-on-one setting), combined with individual goal-setting and self-monitoring using a pedometer for feedback. The maintenance phase occurs over the subsequent 4-week period with continued individual goal-setting and self-monitoring and limited telephone contact.

Evening meetings (1.5-2 hours in length) were held at the diabetes education centre, a facility familiar to all participants. Facility resources included an education room (containing a conference table and audio-visual equipment) and a gymnasium. Participants received a workbook containing key definitions (physical activity, exercise, physical fitness, and health), recommendations for daily physical activity (30 minutes or more of moderate activity, like brisk walking, on most, if not all days of the week), question and answer tasks to guide cognitive processes, weekly goal-setting worksheets, and calendars to record their accumulated steps/day. Participants were encouraged to attend all meetings; one-on-one sessions are scheduled if this is not possible.

The format of the meetings was repetitive: progress reports, a brief group walk
(10 minutes the first night, 20 the second, and 30 minutes on the last two nights), a discussion session to plan strategies, and personalized goal-setting for the next week. To encourage use of existing support networks, participants were asked who they intended to show their pedometer to and how these individuals might help them succeed in meeting their goals. Participants were also encouraged to bring a support person to the weekly meetings as a guest. Reflecting on their previous week's average pedometer values, the number of steps taken during the timed walk, and the strategies they intended to employ, participants were encouraged to set a new personal daily activity goal (measured in steps/day) each week.

Between sessions, participants were encouraged to wear their pedometers during waking hours and to monitor their activity using a combination of pedometer feedback and daily goals. Personal progress was recorded on calendars as accumulated steps each day. At the end of the week, they tallied the number of days when goals were attained, the total steps taken during the week, and the daily average. These values were entered on their calendars in a weekly summary section.
At the last scheduled session, participants were given a certificate of completion and encouraged to either increase or maintain their new activity levels using the pedometers and calendars for a further month. Two motivational calls from one of program's facilitators were scheduled during the first and third weeks following the final session.

The two facilitators (females in their mid-30's) were doctoral students, one in health studies, and the other in education. Both had previous training in kinesiology and adult education and were experienced educators and program deliverers. Humor was readily incorporated into program content, first names were used, clothing was informal and appropriate for activity, and all participants were encouraged to contribute to discussions.
METHODOLOGY

Group sessions were video- and audio-taped with subjects' permission. The 2 program facilitators took weekly fieldnotes recording observations of the program and participants' informal comments. More formal focus groups were held to explore issues related to adoption and maintenance. Focus groups were held immediately following the first 4 weeks of group meetings (with 6 and 3 participants respectively). Two months post-intervention, after all program contact was completed and pedometers had been returned to the study centre, focus groups were held again (with 6 and 2 participants, respectively). A separate focus group was held with 7 diabetes educators (who had worn pedometers and had participated in their own First Step Program) to assess feasibility of delivery and dissemination. Focus group data were transcribed from video tape, verified by audio tape, and analyzed for content, pattern, and theme using QSR NUD*IST qualitative analysis software.

RESULTS
Eighty-six individuals were identified by manual patient chart review at the participating diabetes education centre. Potential subjects were 40-60 years of age, BMI 28-35, had attended standard diabetes education, and were 3 months to one-year post-diagnosis. Physician consent was obtained prior to contact. Only one physician denied consent (patient was being recruited for another, unrelated study). Telephone screening was used to verify chart information and to establish that persons were either sedentary or under-active (i.e., they did not meet either traditional fitness-based exercise prescription or the more recent activity-based public health messages.12

Two (2%) individuals were excluded due to involvement in formal exercise programs; 44 (51%) were excluded due to self-reported activity levels higher than the public health messages. Two (2%) were excluded due to incorrect diagnosis dates. Thirteen (15%) were lost to contact. Further exclusions were: 1) treated with insulin (n=1); 2) unable to independently climb a set of stairs (n=1); and, 3) documented coronary heart disease, microvascular disease, or autonomic neuropathy (n=2). People with moderate hypertension or controlled hypertension (with medication) were eligible for the study.
In total, 20 (23%) eligible individuals were identified. Eight of these individuals (9% of the original sample) declined to participate citing that they were "too busy" (n=5) or "not interested" (n=3). Twelve unacquainted individuals agreed to participate (recruitment efficiency=14%). Ethical approval was obtained from the University of Western Ontario Review Board for Health Sciences Research Involving Human Subjects.

Two individuals (1 male, 1 female) dropped out before the intervention began ("too busy"), while another female dropped out after attending one session and a one-on-one meeting (citing changes to employment). Nine individuals (3 male, 6 female; age 53±6 years) completed the First Step Program. Seven participants attended all four weekly group meetings. One person re-scheduled 2 one-on-one appointments (due to work conflicts) while another re-scheduled 1 (due to transportation problems). Both of these subjects initiated the re-scheduling process prior to the weekly group meeting.

Participants were enthusiastic about the First Step Program, specifically the facilitated group-based approach, the brief walks, and the personalized goal-
setting. All found the pedometer a novel and useful motivator and source of feedback:

"I have never realized how inactive I was before I started looking at (the pedometer values) and thinking, holy, I did not do very much...now I make a real effort to get out there and walk."

"Every time you think about it, you open up and look at your numbers. You say, Oh my numbers are low. You got to get out there and do it. Without that pedometer I know that I would not have pushed myself as much."

The calendars proved to be both an acceptable monitoring tool and an effective feedback tool. All participants recorded daily step values over a 2-month recording period - there was no missing data:

"You had your bad days and your good days and you could look and see if you were behind. It is right there in front of you all the time. Every morning you look at it...it was gratifying."

Although telephone follow-up contact appeared to be simple and feasible, in reality, several attempts were often necessary outside typical workday hours, a
practice that was not acceptable to the diabetes educators consulted. Only one participant provided a day time contact number, the others preferring to be contacted solely at their residence and in the evenings. When the issue was raised in focus groups, some individuals referred to busy schedules and not wishing to be disturbed by telemarketing approaches.

Consistent with other literature, \(^{13}\) social support, in the form of the initial group meetings (peers and facilitators), but especially from existing support networks, appeared to be an important factor. Five participants brought support people to at least one of the group meetings. Individual social support networks can act to facilitate or inhibit adoption and maintenance of physical activity \(^{13}\). Most participants could relate specific instances of social support from their individual networks: "The more people you told the more people you had helping you...sort of pushing you...not literally but invisibly behind you...sort of cheering you on...I think that's more of a big deal because you told them."

In one case, however, the main support person acted to hinder continued physical activity: "I told (my husband) a bit about it but he teased me. He can't walk...has a bum knee. He's too interested in television," and later: "I've fallen off the wagon. If I want to spend time with him I have to watch TV...I don't walk as much."
Diabetes educators were very positive about the First Step Program and accompanying materials, viewing both as simple and appropriate for sedentary populations. Their concern, however, was scheduling the 4 group meetings (and individual make-up sessions) and follow-up calls into already demanding work commitments.

DISCUSSION

Although the literature suggests that inactivity is prevalent in individuals with Type 2 diabetes,\textsuperscript{14,15} we found that a high proportion of the people we tried to recruit claimed they attained minimal public health recommendations. This finding illustrates the potential misclassification of this population due to recall bias using self-report.\textsuperscript{16}

Recruitment efficiency may be improved using a more objective assessment of physical activity to identify under-active individuals. For instance, pedometer values could be compared with normative data to recruit those who lay below a selected threshold value suggestive of inactivity. We are currently evaluating such
an approach at our centre and the preliminary findings are very encouraging.

Professional follow-up contact has been shown to increase adherence to lifestyle behaviour change; telephone contact specifically is considered a feasible method. Our own experience from this pilot project was not encouraging. The fact that the majority persons preferred to be called outside typical workday hours (and call-backs were often necessary) reduces the acceptability of this contact method for clinicians and educators. Telephone contact may be less necessary for this program given that participants receive frequent pedometer feedback and reinforcement and that they have been trained to access support from their personal networks. Nevertheless, we intend to evaluate alternative methods of follow-up such as postcards.

Despite the optimism associated with the First Step Program, further evaluation is necessary to determine the most feasible methods of dissemination within the existing diabetes education infrastructure. Large scale dissemination is likely contingent on changes to education standards which include physical activity. Currently, diabetes educator competency regarding physical activity education is
considerably lower than for nutrition, medication, and other aspects of diabetes management.\textsuperscript{18}

CONCLUSIONS

The formative evaluation of a novel daily physical activity intervention for individuals with Type 2 diabetes was guided by program theory. The First Step Program is a promising novel initiative that is acceptable to both diabetes educators and their clientele. Recommended modifications include an objective recruitment procedure and further evaluation of methods of follow-up contact. Successful dissemination likely requires policy changes reflecting an acceptance of the important of physical activity in the management of Type 2 diabetes.
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Appendix C

Doctor of Education Thesis Research
The Ontario Institute for Studies in Education at the University of Toronto

USING THE TRANSTHEORETICAL MODEL TO GUIDE ADULTS WITH TYPE 2 DIABETES AS THEY CHANGE THEIR BEHAVIOR TO ADOPT AND ADHERE TO A MORE ACTIVE LIFESTYLE

Adults with Type 2 diabetes are being sought to participate in a research project to explore how adults with Type 2 diabetes change their behavior to adopt and adhere to a more active lifestyle as part of a strategy oriented education intervention. The study will attempt to develop an understanding of what adults with Type 2 diabetes believe about activity, how a strategy oriented education intervention might influence their behavior change, and how those beliefs shape their behavior change to adopt and adhere to a more active lifestyle. I would like to emphasize the purpose of the research project is not to critique how adults with Type 2 diabetes exercise but rather to explore and examine the intricacies of the behavior change.

While numerous studies of exercise interventions among adults with Type 2 diabetes have been completed, few studies have utilized the stages of exercise behavior change as a theoretical basis for exercise interventions (Buxton et al., 1996, p. 250). If you volunteer, you will be asked to:

- Complete the preliminary screening process;
- Complete several preliminary assessments;
- Participate in a series of interviews (two on your own and one with the intervention group) that will each last approximately two hours and consist of a series of open-ended questions related to your experiences. You will be provided with a list of these questions prior to the interviews;
- Attend four weekly meetings as part of the intervention;
- Wear a pedometer for the four months of the study and record your results daily on an activity calendar;
- Keep a journal for the four month period to document your feelings, perspectives, experiences as you move through the intervention process.

The interviews will be recorded and relevant sections will be transcribed for purposes of analysis and comparison. Anonymity will be guaranteed by the following: (a) you will never be identified by your name, (b) all interviews will be coded for later reference, and (c) specific identifying information will be removed from the written reports, for example, place of employment, details of medical condition, (d) the raw data will be stored in a secured archive for two years and then destroyed, (e) access to the data during this two year period will require written authorization by the principal investigator and written consent from the study participants.
You may refuse to answer any questions or questionnaires and you may withdraw at any point in the research process. A copy of your transcribed interview will be made available for you to review and respond to.

If you have any questions and/or wish to volunteer for the research project, please contact me at (a) 452-4103 (business), (b) 485-5201 (residence), (c) gediest@claven.fanshawec.on.ca, or (d) 659-5781 (fax) before February 12, 1999 if at all possible. Should you wish to speak with someone on my thesis committee, I would suggest you contact the Ontario Institute for Studies in Education at the University of Toronto and speak to Dr. Merl Wahlstrom at 416-923-6641 (Ext. 2624) or Dr. Andy Anderson at 416-978-2992.

Sincerely,

Tracy Gedies, Ed. D. candidate
Appendix D

Doctor of Education Thesis Research
The Ontario Institute for Studies in Education at the University of Toronto

USING THE TRANSTHEORETICAL MODEL TO GUIDE ADULTS WITH TYPE 2 DIABETES AS THEY CHANGE THEIR BEHAVIOR TO ADOPT AND ADHERE TO A MORE ACTIVE LIFESTYLE

INFORMED CONSENT

I have read the procedures to be used for this project.

I voluntarily agree to participate in the project by completing the preliminary screening process and preliminary assessments; attending four weekly meetings as part of the intervention; wearing a pedometer for the four months of the study; attending several interview sessions with the principal investigator, Tracy Gedies, keeping a journal throughout the four months of the intervention, and completing several questionnaires. I understand that I may refuse to answer any question(s) or complete any questionnaires and may withdraw my participation at any point in the research process.

As a participant in this study, I understand that anonymity will be guaranteed by the following: (a) I will never be identified by name, (b) specific identifying information will be removed from written reports, for example, place of employment, details of medical condition, (c) the raw data will be stored in a secured archive for two years and then destroyed, (d) access to the data during this two year period will require written authorization by the principal investigator and written consent from me as a study participant.

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Signed: ___________________________ Date: ____________
Appendix E

Just audible breathing

In the article entitled, "Voice, Breathing, and the Control of Exercise Intensity" by Goode et al., (1998), the authors conducted a series of experiments to investigate the hypothesis that if one can "hear their breathing" while exercising the subject will have reached the minimum intensity of exercise for a training effect analogous to 60 to 90% of maximum heart rate. After eight experiments 19 male subjects (mean age 22 years) who were asked to cycle or jog at a pace such that they could "hear their breathing" and continue activity "at the same sound" were found to be exercising at or near their Ventilatory Threshold (VT) with an exercise heart rate above the minimum and below the maximum for a training effect (60 to 90% of maximum heart rate as recommended by the American College of Sport Medicine).

Goode (correspondence, April 30, 1999) also reports that "just audible breathing" (JAB) has been successfully used for controlling exercise intensity and enabling soft tissue injury subjects to increase their distance some 100% in a jog/walk program (from approximately 15 to 30 minutes).
Appendix F

Physical Activity Readiness Questionnaire - PAR-Q (revised 1994)

PAR - Q & YOU

(A Questionnaire for People Aged 15 to 69)

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

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

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

YES NO

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

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

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

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

5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?

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

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

YES to one or more questions

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

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

Find out which community programs are safe and helpful for you.

NO to all questions

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

- start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

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

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

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

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

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

NAME ________________________________

SIGNATURE ____________________________

DATE ________________________________

WITNESS ______________________________

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Société canadienne de physiologie de l'exercice

Supported by: Health Canada Canada

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PAR - Q & YOU

Physical Activity Readiness Questionnaire - PAR-Q (revised 1994)

We know that being physically active provides benefits for all of us. Not being physically active is recognized by the Heart and Stroke Foundation of Canada as one of the four modifiable primary risk factors for coronary heart disease (along with high blood pressure, high blood cholesterol, and smoking). People are physically active for many reasons — play, work, competition, health, creativity, enjoying the outdoors, being with friends. There are also as many ways of being active as there are reasons. What we choose to do depends on our own abilities and desires. No matter what the reason or type of activity, physical activity can improve our well-being and quality of life. Well-being can also be enhanced by integrating physical activity with enjoyable healthy eating and positive self and body image. Together, all three equal VITALITY. So take a fresh approach to living. Check out the VITALITY tips below!

Active Living:
- accumulate 30 minutes or more of moderate physical activity most days of the week
- take the stairs instead of an elevator
- get off the bus early and walk home
- join friends in a sport activity
- take the dog for a walk with the family
- follow a fitness program

Healthy Eating:
- follow Canada's Food Guide to Healthy Eating
- enjoy a variety of foods
- emphasize cereals, breads, other grain products, vegetables and fruit
- choose lower-fat dairy products, leaner meats and foods prepared with little or no fat
- achieve and maintain a healthy body weight by enjoying regular physical activity and healthy eating
- limit salt, alcohol and caffeine
- don't give up foods you enjoy — aim for moderation and variety

Positive Self and Body Image:
- accept who you are and how you look
- remember, a healthy weight range is one that is realistic for your own body make-up (body fat levels should neither be too high nor too low)
- try a new challenge
- compliment yourself
- reflect positively on your abilities
- laugh a lot

Enjoy eating well, being active and feeling good about yourself. That's VITALITY!

FITNESS AND HEALTH PROFESSIONALS MAY BE INTERESTED IN THE INFORMATION BELOW.

The following companion forms are available for doctors' use by contacting the Canadian Society for Exercise Physiology (address below):

The Physical Activity Readiness Medical Examination (PARmed-X) - to be used by doctors with people who answer YES to one or more questions on the PAR-Q.

The Physical Activity Readiness Medical Examination for Pregnancy (PARmed-X for PREGNANCY) - to be used by doctors with pregnant patients who wish to become more active.

References:

To order multiple printed copies of the PAR-Q, please contact
Canadian Society for Exercise Physiology
185 Somerset St. West, Suite 202
Ottawa, Ontario CANADA K2P 0J2
Tel. (613) 234-3755 FAX: (613) 234-3565

The original PAR-Q was developed by the British Columbia Ministry of Health. It has been revised by an Expert Advisory Committee assembled by the Canadian Society for Exercise Physiology and Fitness Canada (1994).

Disponible en français sous le titre « Questionnaire sur l'aptitude à l'activité physique - Q-AAP (révisé 1994) ».

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Société canadienne de physiologie de l'exercice

Supported by: Health Canada

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Appendix G

PARmed-X PHYSICAL ACTIVITY READINESS MEDICAL EXAMINATION

The PARmed-X is a physical activity-specific checklist to be used by a physician with patients who have had positive responses to the Physical Activity Readiness Questionnaire (PAR-Q). In addition, the Conveyance/Referral Form in the PARmed-X can be used to convey clearance for physical activity participation, or to make a referral to a medically-supervised exercise program.

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. The PAR-Q by itself provides adequate screening for the majority of people. However, some individuals may require a medical evaluation and specific advice (exercise prescription) due to one or more positive responses to the PAR-Q.

Following the participant's evaluation by a physician, a physical activity plan should be devised in consultation with a physical activity professional (CSERP-Professional Fitness and Lifestyle Consultant). To assist in this, the following instructions are provided:

PAGE 1: Sections A, B, C, and D should be completed by the participant BEFORE the examination by the physician. The bottom section is to be completed by the examining physician.

PAGES 2 & 3: A checklist of medical conditions requiring special consideration and management.

PAGE 4: Physical Activity Readiness Conveyance/Referral Form - an optional tear-off tab for the physician to convey clearance for physical activity participation, or to make a referral to a medically-supervised exercise program.

<table>
<thead>
<tr>
<th>This section to be completed by the participant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A PERSONAL INFORMATION:</strong></td>
</tr>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>ADDRESS</td>
</tr>
<tr>
<td>TELEPHONE</td>
</tr>
<tr>
<td>BIRTHDATE</td>
</tr>
<tr>
<td>MEDICAL NO.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>This section to be completed by the examining physician</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C RISK FACTORS FOR CARDIOVASCULAR DISEASE:</strong></td>
</tr>
<tr>
<td>Check all that apply</td>
</tr>
<tr>
<td>q Less than 30 minutes of moderate physical activity most days of the week.</td>
</tr>
<tr>
<td>q Currently smoker (tobacco smoking 1 or more times per week).</td>
</tr>
<tr>
<td>q High blood pressure reported by physician after repeated measurements.</td>
</tr>
<tr>
<td>q High cholesterol level reported by physician.</td>
</tr>
<tr>
<td>q Excessive accumulation of fat around waist.</td>
</tr>
<tr>
<td>q Family history of heart disease.</td>
</tr>
</tbody>
</table>

| **PAR-Q: Please indicate the PAR-Q questions to which you answered YES** |
| q 1 Heart condition                                                   |
| q 2 Chest pain during activity                                        |
| q 3 Chest pain at rest                                               |
| q 4 Loss of balance, dizziness                                       |
| q 5 Bone or joint problem                                            |
| q 6 Blood pressure or heart drugs                                    |
| q 7 Other reason:                                                    |

Please note: Many of these risk factors are modifiable. Please refer to page 4 and discuss with your physician.

| **D PHYSICAL ACTIVITY INTENTIONS:**                           |
| What physical activity do you intend to do?                  |

| **E PHYSICAL ACTIVITY READINESS CONVEYANCE/REFERRAL:**        |
| Based upon a current review of health status, I recommend:    |
| q No physical activity                                      |
| q Only a medically-supervised exercise program until further medical clearance |
| q Progressive physical activity                              |
| q with avoidance of:                                        |
| q with inclusion of:                                        |
| q with Physical Therapy:                                    |
| q Unrestricted physical activity — start slowly and build up gradually |

Further Information:
q Attached
q To be forwarded
q Available on request

(CSERP - Canadian Society for Exercise Physiology)
PARmed-X
PHYSICAL ACTIVITY READINESS
MEDICAL EXAMINATION

Following is a checklist of medical conditions for which a degree of precaution and/or special advice should be considered for those who answered "YES" to one or more questions on the PAR-Q, and people over the age of 69. Conditions are grouped by system. Three categories of precautions are provided. Comments under Advice are general, since details and alternatives require clinical judgement in each individual instance.

<table>
<thead>
<tr>
<th>Absolute Contraindications</th>
<th>Relative Contraindications</th>
<th>Special Prescriptive Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent restriction or temporary restriction until condition is treated, stable, and/or past acute phase.</td>
<td>Highly variable. Value of exercise testing and/or program may exceed risk. Activity may be restricted. Desirable to maximize control of condition. Direct or indirect medical supervision of exercise program may be desirable.</td>
<td>Individualized prescriptive advice generally appropriate: + limitations imposed; and/or + special exercises prescribed. May require medical monitoring and/or initial supervision in exercise program.</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q aortic aneurysm (dissecting)</td>
<td>Q aortic aneurysm (moderate)</td>
<td>Q aortic (or pulmonary) aneurysm—mild angiography and other manifestations of coronary insufficiency (e.g., post-surgery)</td>
</tr>
<tr>
<td>Q aortic stenosis (severe)</td>
<td>Q aortic stenosis (severe)</td>
<td>Q aortic stenosis—mild angiography and other manifestations of coronary insufficiency (e.g., post-surgery)</td>
</tr>
<tr>
<td>Q congestive heart failure</td>
<td>Q marked cardiac enlargement</td>
<td>Q cavitary heart disease</td>
</tr>
<tr>
<td>Q crescendo angina</td>
<td>Q supravalvular dysrhythmias (uncontrolled or high rate)</td>
<td>Q atrial fibrillation</td>
</tr>
<tr>
<td>Q myocardial infarction (acute)</td>
<td>Q ventricular ectopic activity (repetitive or frequent)</td>
<td>Q ventricular arrhythmias</td>
</tr>
<tr>
<td>Q myocarditis (active or recent)</td>
<td>Q ventricular aneurysm</td>
<td>Q ventricular aneurysm—uncontrolled or uncontrolled severe (systemic or pulmonary)</td>
</tr>
<tr>
<td>Q pulmonary or systemic embolism—acute</td>
<td>Q hyperentension—uncontrolled or uncontrolled severe (systemic or pulmonary)</td>
<td>Q dysrhythmias—controlled</td>
</tr>
<tr>
<td>Q thrombophlebitis</td>
<td>Q compensated congestive heart failure</td>
<td>Q fixed rate pacemakers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ clinical exercise test may be warranted in selected cases, for specific determination of functional capacity and limitations and precautions (if any).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ slow progression of exercise to levels based on test performance and individual tolerance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ consider individual need for initial conditioning program under medical supervision (indirect or direct).</td>
</tr>
<tr>
<td>Infectious</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q acute infectious disease (regardless of etiology)</td>
<td>Q subacute/chronic/resident infectious diseases (e.g., malaria, others)</td>
<td>Q infectious</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Q HIV</td>
</tr>
<tr>
<td>Metabolic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q uncontrolled metabolic disorders (diabetes mellitus, thyrotoxicosis, myxedema)</td>
<td>Q renal, hepatic &amp; other metabolic insufficiency</td>
<td>Q renal, hepatic &amp; other metabolic insufficiency variable as to status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Q obesity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Q single kidney</td>
</tr>
<tr>
<td>Pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q complicated pregnancy (e.g., twins, hemorrhage, incompetent cervix, etc.)</td>
<td>Q advanced pregnancy (late 3rd trimester)</td>
<td>refer to the &quot;PARmed-X for PREGNANCY&quot;</td>
</tr>
</tbody>
</table>

Advice:

- Intermittent claudication
- Progressive exercise to tolerance
- Hypertension: systolic 160-180; diastolic 105+
- Progressive exercise: care with medications (serum electrolytes; post-exercise syncope; etc.)

References:


The PAR-Q and PARmed-X were developed by the British Columbia Ministry of Health. They have been revised by an Expert Advisory Committee assembled by the Canadian Society for Exercise Physiology and the Fitness Program, Health Canada (1995).

You are encouraged to copy the PARmed-X, but only if you use the entire form.

Disponible en français sous le titre «Évaluation médicale de l'aptitude à l'activité physique [X-AAP]».

Continued on page 3...
<table>
<thead>
<tr>
<th>Condition</th>
<th>Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart attack</td>
<td>Immediate medical attention</td>
</tr>
<tr>
<td>Stroke</td>
<td>Immediate medical attention</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Regular check-ups and medication as prescribed</td>
</tr>
<tr>
<td>Asthma</td>
<td>Carry an inhaler and avoid triggers</td>
</tr>
<tr>
<td>Cancer</td>
<td>Regular check-ups and follow-up appointments</td>
</tr>
</tbody>
</table>

Note to Physical Activity Professionals:

To ensure proper conduct of the programs, make sure to communicate clearly to all participants:

- The importance of medical clearance for participation
- The necessity of adhering to guidelines
- The potential risks and benefits

Always ensure that all participants are informed of the above points before beginning any program.

The following contact information is provided for further assistance:

[Contact Information]
Physical Activity & Lifestyle Advice

We know that being physically active provides benefits for all of us. Physical inactivity is recognized by the Heart and Stroke Foundation of Canada as one of the four modifiable primary risk factors for coronary heart disease (along with high blood pressure, high blood cholesterol, and smoking). Physical activity has also been shown to reduce the incidence of hypertension, colon cancer, maturity onset diabetes mellitus, and osteoporosis. It can also reduce stress and anxiety, relieve depression, and improve self-esteem.

People are physically active for many reasons — play, work, competition, health, creativity, enjoying the outdoors, being with friends. There are also as many ways of being active as there are reasons. What we choose to do depends on our own abilities and desires. No matter what the reason or type of activity, physical activity can improve our well-being and quality of life. Well-being can also be enhanced by integrating physical activity with enjoyable healthy eating and positive self and body image. Together, all three equal VITALITY. So take a fresh approach to living. Check out the VITALITY tips below!

Active Living:
- make meaningful and satisfying physical activities a valued and integral part of daily living
- accumulate 30 minutes or more of moderate physical activity most days of the week
- choose from an endless range of opportunities to be active according to your own abilities and desires:
  - take the stairs instead of an elevator
  - get off the bus early and walk home
  - join friends in a sport activity
  - take the dog for a walk with the family
  - follow a fitness program

Healthy Eating:
- follow Canada’s Food Guide to Healthy Eating
- enjoy a variety of foods
- emphasize cereals, breads, other grain products, vegetables and fruit
- choose lower-fat dairy products, leaner meats and foods prepared with little or no fat
- achieve and maintain a healthy body weight by enjoying regular physical activity and healthy eating
- limit salt, alcohol and caffeine
- don't give up foods you enjoy — aim for moderation and variety

Positive Self and Body Image:
- accept who you are and how you look
- remember, a healthy weight range is one that is realistic for your own body make-up (body fat levels should neither be too high nor too low)
- try a new challenge
- compliment yourself
- reflect positively on your abilities
- laugh a lot

Enjoy eating well, being active and feeling good about yourself. That's VITALITY.

Physical Activity Readiness Conveyance/Referral Form

Based upon a current review of the health status of __________________________________________, I recommend:

☐ No physical activity
☐ Only a medically-supervised exercise program until further medical clearance
☐ Progressive physical activity
  - with avoidance of:__________________________________________________________
  - with inclusion of:__________________________________________________________
  - with Physical Therapy:_____________________________________________________
☐ Unrestricted physical activity — start slowly and build up gradually

___________________________________________ M.D.
(by) ____________________________________ 19

(date)

Further Information:
☐ Attached
☐ To be forwarded
☐ Available on request

Physician/Clinic stamp:
### Client Information Sheet

**Client Information Sheet**

**Date**

**Name of Client**

**Physician**

**Next of Kin**

**Primary Goal:**

**PRE-TEST SCREENING**

<table>
<thead>
<tr>
<th>Q</th>
<th>Not Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?</td>
<td></td>
</tr>
<tr>
<td>2. Do you feel pain in your chest when you do physical activity?</td>
<td></td>
</tr>
<tr>
<td>3. In the past month, have you had chest pain when you were doing physical activity?</td>
<td></td>
</tr>
<tr>
<td>4. Do you lose your balance because of dizziness or do you ever lose consciousness?</td>
<td></td>
</tr>
<tr>
<td>5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?</td>
<td></td>
</tr>
<tr>
<td>6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?</td>
<td></td>
</tr>
<tr>
<td>7. Do you know of any other reason why you should not do physical activity?</td>
<td></td>
</tr>
</tbody>
</table>

**Signed consent form:**

<table>
<thead>
<tr>
<th>Q Signed</th>
<th>Not Q Signed</th>
</tr>
</thead>
</table>

**Observations**

- Pregnancy - ask all females
- Difficulty breathing at rest
- Persistent cough
- Lower extremity swelling
- Currently on medication
- Followed preliminary instructions
  - Q Followed | Not Q Followed |

**Healthy Physical Activity Questionnaire**

**Fantastical Lifestyle Questionnaire**

---

### Resting Heart Rate and Blood Pressure

**Heart Rate**

<table>
<thead>
<tr>
<th>mm Hg</th>
<th>BPM</th>
</tr>
</thead>
</table>

**Systolic**

| mm Hg |

**Diastolic**

| mm Hg |

**HR 2 100**

**YES**

**NO**

---

### Anthropometric Measurements

**Weight (kg)**

| | |

**Height (cm)**

| | |

**BMI (kg/m²)**

| H | UN |

**Waist Girth (cm)**

| H | UN |

**Skinfolds (mm)**

| | Mean Closest |

**Tricep 1st**

| 2nd |

**Bicep 1st**

| 2nd |

**Subscapular 1st**

| 2nd |

**Irac Crest**

| 2nd |

**Medial Gsell**

| 2nd |

---

### Healthy Body Composition

**SO35: Sum of (5) Skinfolds**

| H | UN |

**SO25: Sum of (2) Trunk Skinfolds**

| H | UN |

**BMI and SO55: + _____ points**

**WG and SO25: + _____ points**

---

### Aerobic Fitness

**Modified Canadian Aerobic Fitness Test (mCAFT)**

**Starting Stage**

<table>
<thead>
<tr>
<th></th>
<th>1st Stage</th>
<th>2nd Stage</th>
<th>3rd Stage</th>
<th>4th Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate</td>
<td>90</td>
<td>100</td>
<td>110</td>
<td>120</td>
</tr>
<tr>
<td>Heart Rate Final</td>
<td>140</td>
<td>150</td>
<td>160</td>
<td>170</td>
</tr>
</tbody>
</table>

**Healthy Aerobic Fitness**

**Score:**

**Rating:**

---

### Post Exercise

**Blood Pressure**

<table>
<thead>
<tr>
<th></th>
<th>2:00 - 2:30 min.</th>
<th>3:00 - 4:00 min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Heart Rate**

<table>
<thead>
<tr>
<th></th>
<th>4:00 - 4:30 min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td></td>
</tr>
<tr>
<td>Diastolic</td>
<td></td>
</tr>
</tbody>
</table>

**Muscule-Skeletal Fitness**

**Grip Strength (kg)**

| Right Hand | 1 | Max |
| Left Hand | 2 | Max |

**Combined Right and Left Max**

**Rating:**

---

**Push-up**

| Max Number | Rating |

**Trunk Forward Flexion (cm)**

| Trial 1 |  | Max |
| Trial 2 |  | Max |

**Partial Curl-up**

| (Maximum 25) | Rating |

**Vertical Jump**

| Stand and Reach (cm) |  |  |
| Jump Trial 1 | Max |
| 2 | cm |
| 3 | cm |
| Max Difference |  |

**Rating:**

---

| Leg Power | kg/m/sec | Rating |

---

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Physical activity can include such activities as walking, cycling, swimming, climbing the stairs, dancing, active gardening, walking to work, aerobics, sports, etc. Regular physical activity is 30 minutes of moderate activity accumulated over the day, almost every day OR ... vigorous activity done at least three times per week for 20 minutes each time.

1. Here are a number of statements describing various levels of physical activity. Please select the one which most closely describes your own level:

(Please tick one)

I am not physically active and I do not plan on becoming so in the next six months. □ 1
I am not physically active, but, I have been thinking about becoming so in the next six months. □ 2
I am physically active once in a while, but not regularly. □ 3
I am currently physically active, but have only begun doing so within the last six months. □ 4
I participate in regular physical activity and have done so for more than six months. □ 5

2. (Answer if not currently active)

I was physically active in the past, but not now. □ YES □ NO
STEP BY STEP...

a behavior change guide
to help adults adopt and adhere
to a more active lifestyle
As we begin this program, I can’t help but think of John Davidson, the Londoner and father, who walked across Canada for more than nine months in an effort to raise money and awareness for genetic research. I’ve heard him speak on several occasions and each time am left to wonder how he managed to succeed. He traveled an incredible distance. He claims he’s just an ordinary father who started walking one day because he had a dream—a goal he wanted to achieve. He says it helped to take each day step by step, hour after hour until he reached his destination in Victoria, British Columbia some 3000 kms later. I think he’s an inspiration to all of us.

Your challenge in *Step by Step* is not to walk across Canada but to change your behavior to adopt and adhere to a more active lifestyle as part of your daily routine. Change is the crux of this process. However, someone once told me the only person that likes change is a baby with a wet diaper—the rest of us resist it.

Consequently, *Step by Step* was designed for adults to think, feel and experience their way through this behavior change. The program recognizes behavior change as a process that takes time, persistence, support, SMART goals, sharing, planning and feedback to achieve some degree of success. And so on that note, let us begin our own journeys.
The Thinking Module
# The Thinking Module - Week 1

## Step by Step

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Objective</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• To introduce ourselves</td>
<td>10 min.</td>
</tr>
<tr>
<td></td>
<td>• To introduce study and purpose of subject participation</td>
<td>10 min.</td>
</tr>
<tr>
<td></td>
<td>• To introduce exercise/physical activity/lifestyle in relation to behavior change and Type 2 Diabetes</td>
<td>20 min.</td>
</tr>
<tr>
<td></td>
<td>• To introduce pedometer and take a group walk</td>
<td>10 min.</td>
</tr>
</tbody>
</table>
|        | • To think about behavior change  
  • Focus this week on predisposing factors (positive and negative)  
  • Decision Balance  
  • To discuss strategies and rewards | 30 min. |
|        | • To prepare and plan for week-SMART goal setting | 30 min. |
Beginning is Winning...

Your first session in *Step by Step* is all about thinking. When you are thinking about becoming more active you are preparing for the process of behavior change. You have begun...and beginning is the first step towards winning!

Welcome.
Step by Step...

Is a behavior change program to help you adopt and adhere to a more active lifestyle.

IT IS NOT AN EXERCISE PROGRAM

WHAT does this mean?

Step by Step is a program designed to help adults include physical activity as part of their regular routine. Physical activity can be ANY body movement. In the Step by Step program, you will walk—at your own pace, on your own time, by your own design. However, the first 4 weeks of your activity program will be guided by a facilitator to help you:

- Use your pedometer to record daily activity levels
- Determine weekly goals to improve daily activity levels
- Recognize strategies and rewards that support behavior change
- Establish a support system
- Plan for the future

Step by Step also provides the opportunity to meet with other adults, like yourself, who want to change their behavior to become more physically active too. At each of the 4 weekly meetings, you will share details of your story.
You will problem solve, you will offer support, you will discuss behavior change issues, and you will walk as a group. Feel free to bring a support person with you to the meetings.

So WHY start Step by Step?

In a position statement issued by the American Diabetes Association, 1998 the benefits of exercise and physical activity for the patient with Type 2 Diabetes are listed as substantial. In fact,

recent studies strengthen the importance of long-term exercise programs for the treatment and prevention of this common metabolic abnormality and its complications. (ADA, 1998)

For example, using exercise and physical activity to control weight has been found to guard against heart disease which is the leading cause of diabetes-related deaths. It seems the beneficial effects of exercise on cardiovascular risk are related to improvements in insulin sensitivity. Activity programs have also been found to enhance weight loss especially intra-abdominal fat, “the presence of which has been associated most closely with metabolic abnormalities” (ADA, 1998, p. 6). A reduction in triglyceride-rich VLDL, blood pressure and improved carbohydrate metabolism have also been noted consistently as a result of regular exercise participation (ADA, 1998, p. 5). It was concluded

that maintaining better levels of fitness in this population [Type 2 Diabetics] will lead to less chronic vascular disease and an improved quality of life. (ADA, 1998, p. 8)

The bottom line is...the more active you are the greater the potential health benefits.
HOW do I get started?

The Surgeon General's Report on Physical Activity and Health recommends individuals accumulate 30 minutes of moderate physical activity on most days of the week. That is an ambitious goal but achievable!

To start you off, you need to know where to start. That is why you wore the pedometer for 5 days before the start of the Step by Step program.

- Your average number of steps per day is:_______.

Next you need to know how many steps you take in a 10 minute walk. Record the number of steps on your pedometer now, let’s go for a 10 minute walk and then subtract the difference from the higher value.

1. The number of steps in 10 minutes is:_______.

To find out how many steps you take in 30 minutes

- multiply the number of steps by 3:_______.

So now WHAT?

At this point in the program, this number won’t mean much to you at all; however, by the end of the 4 weeks and hopefully still at the end of 4 months the number of steps you take in 30 minutes will be an important benchmark from which to gauge and possibly adjust your activity level for that day.

In the meanwhile, you should know that in Japan individuals hospitalized with Type 2 Diabetes were told to diet and take 10,000 steps per day as part of their self-management. And you know what, they ended up taking
19,200 steps per day and after 8 weeks lost 17.5 pounds or 8 kilograms.

Your success will be determined by YOU! Each week you will establish a new weekly goal—the more you push the more you have to gain!

_A few last words..._

There are several considerations that are particularly important and specific for you to think about prior to increasing your activity levels. For instance,

- precautionary measures for activity involving the feet should be taken:
  - use silica gel or air midsoles
  - wear polyester or blend (cotton-polyester) socks to prevent blisters
  - keep feet dry to minimize trauma
  - proper footwear is essential
  - monitor feet closely for blisters or other potential damage both before and after exercise

- proper hydration is also essential, as dehydration can effect blood glucose levels and heart function adversely
  - drink fluids 2 hours before activity
  - drink fluids frequently and before you actually feel thirsty to compensate for any losses in sweat

- extra precaution should be taken when active in hot or cold environments

Let's get started.
To participate in this session you need to think reflexively, speak honestly and listen attentively to others in your session. When it is your turn to speak you will be allowed to express yourself for as long or short as you want; otherwise, all you have to do is listen and think. You may pass if you do not feel comfortable with the question asked or are not prepared to answer at that time although you may answer once everyone has had a turn.

Session 1 (predisposing factors):

For Individuals with Type 2 Diabetes to answer:

1. What past experiences (good and bad) motivated you to participate in this program?

2. How do you think your past experiences will influence the success of your current behavior change?

3. In the past, how important was it for you to be physically active? How do you see this changing in the near future?

4. How confident are you in your decision to become physically active and remain that way? Please explain.
# Decision Balance Sheet

## Step by Step

<table>
<thead>
<tr>
<th>For becoming more active:</th>
<th>Will gain</th>
<th>For becoming more active:</th>
<th>Will lose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Decision Balance – March, 1999

© Tracy Geddes
Strategies and Rewards

Step by Step

The Thinking Module

1. Identify a variety of strategies to overcome the negative predisposing factors discussed during the *Stepping into an Active Lifestyle* session

Which strategies would work for you?

2. Identify a variety of rewards to reinforce the positive predisposing factors discussed during the *Stepping into an Active Lifestyle* session

Which rewards would work for you?
SMART

Goal setting
## WEEKLY GOAL-SETTING

**Step by Step**

**Date:**
This week I took _____ steps in ______ minutes

<table>
<thead>
<tr>
<th>My average daily steps/day for last week was:</th>
<th>______</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will increase this by:</td>
<td>+ ______ (steps/day)</td>
</tr>
<tr>
<td>My new daily goal is:</td>
<td>= ______ (steps/day)</td>
</tr>
</tbody>
</table>

1) Identify one or two strategies you will use to successfully achieve your new daily goal:

2) How confident are you that you can stick to your daily activity program for this week?

<table>
<thead>
<tr>
<th>0%</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all confident</td>
<td>Moderately confident</td>
<td>Completely confident</td>
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</tbody>
</table>

3) Reflect on your answer to question 2 and explain your selection.
**Activity Calendar**

MONTH: _____________

Instructions:
- At the start of each week identify your daily activity goal: steps/day you hope to achieve.
- Write in the number of steps you take according to your pedometer. If you don't wear the pedometer, count 0.
- Star the boxes for each day of the week you achieve your goal.
- At the end of each week determine the total number of steps taken and then the average for the week.
- You may want to record your sugar levels on the calendar as well.

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
<th>Total steps</th>
<th>Daily average</th>
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</thead>
<tbody>
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</tbody>
</table>
Step by Step

Please share your experiences:

1. For me, the most enjoyable part of the session this evening was...

2. For me, the most frustrating part of the session this evening was...

3. For me, the most interesting part of the session this evening was...

4. For me, the most confusing part of the session this evening was...

5. For me, the most uncomfortable part of the session this evening was...

6. For me, the most challenging part of the session this evening was...

7. For me, I would like more of ______ in the following sessions because...

8. For me, I would like less of ______ in the following sessions because...
The Feeling Module
<table>
<thead>
<tr>
<th>Task</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>To re-introduce ourselves and reflect on theme for the week</td>
<td>5 min.</td>
</tr>
<tr>
<td>To identify new issues for this week’s meeting</td>
<td></td>
</tr>
<tr>
<td>To review last week’s activities – Step by Step (weekly report)</td>
<td>30 min.</td>
</tr>
<tr>
<td>Share details of activity calendar</td>
<td></td>
</tr>
<tr>
<td>To increase time of group walk</td>
<td>20 min.</td>
</tr>
<tr>
<td>To discuss behavior change model</td>
<td>30 min.</td>
</tr>
<tr>
<td>Focus this week on enabling factors (positive and negative)</td>
<td></td>
</tr>
<tr>
<td>To discuss issues related to motivation and commitment</td>
<td>10 min.</td>
</tr>
<tr>
<td>To prepare and plan for week-SMART goal setting</td>
<td>20 min.</td>
</tr>
</tbody>
</table>
Whatever you conceive and believe, you can achieve.

After your first week of active living, you may feel like you are walking a tight rope. After all, becoming more active may be relatively new to you. It requires a change in your behavior that may make you feel excited, nervous, uncertain, rejuvenated.

It's your story, tell us!
STEEPING INTO AN ACTIVE LIFESTYLE
Step by Step

Session 2 (enabling factors):

For Individuals with Type 2 Diabetes to answer:

1. Describe a behavior you changed any time in your life before you started Step by Step. What helped you succeed?

2. What skills and abilities do you have that are going to help you increase your daily activity?

3. Describe how your self-esteem or your feelings about yourself will help or hinder you in becoming more active.

For Support Group to answer:

1. Describe what it was like living with the person you are supporting while he or she made a previous behavior change.

2. What skills and abilities do you have that are going to support the current behavior change?

3. Describe how your self-esteem or your feelings about yourself will help or hinder the person you are supporting become more active.
WEEKLY GOAL-SETTING

Step by Step

Date:
This week I took _____ steps in ______ minutes

<table>
<thead>
<tr>
<th>My average daily steps/day for last week was:</th>
<th>______</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will increase this by:</td>
<td>+ ______</td>
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<tr>
<td>(steps/day)</td>
<td></td>
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<tr>
<td>My new daily goal is:</td>
<td>= ______</td>
</tr>
<tr>
<td>(steps/day)</td>
<td></td>
</tr>
</tbody>
</table>

1) Identify one or two strategies you will use to successfully achieve your new daily goal:

2) How confident are you that you can stick to your daily activity program for this week?

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<tr>
<th>0%</th>
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<th>40</th>
<th>50</th>
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<th>70</th>
<th>80</th>
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<th>100%</th>
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<td>Not at all confident</td>
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3) Reflect on your answer to question 2 and explain your selection.
Activity Calendar

MONTH: ____________

Instructions:
- At the start of each week identify your daily activity goal: steps/day you hope to achieve.
- Write in the number of steps you take according to your pedometer. If you don't wear the pedometer, count 0.
- Star the boxes for each day of the week you achieve your goal.
- At the end of each week determine the total number of steps taken and then the average for the week.
- You may want to record your sugar levels on the calendar as well.

<table>
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<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
<th>Total steps</th>
<th>average</th>
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</tbody>
</table>
Please share your experiences:

How would you rate the following:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td></td>
<td></td>
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<tr>
<td>Quality of instruction</td>
<td></td>
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<tr>
<td>Standard of written materials</td>
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<tr>
<td>Facilities</td>
<td></td>
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<tr>
<td>Opportunity for discussion</td>
<td></td>
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<tr>
<td>Personal assistance</td>
<td></td>
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</tbody>
</table>

What did you hope to achieve from this week’s meeting?

Did you achieve this?

Which part of the meeting was most helpful?
The Applied Module
## The Applied Module - Week 3

<table>
<thead>
<tr>
<th>Item</th>
<th>Objectives</th>
<th>Time (min)</th>
</tr>
</thead>
</table>
| Week 3 | - To review last week's activities  
- To identify new issues for this week's meeting  
- To review last week's activities – Step by Step (weekly report)  
- Share details of activity calendar  
- To increase time of group walk  
  - Take resting HR to prepare group for discussion on intensity and duration  
- To discuss behavior change model  
  - Focus this week on reinforcing factors (positive and negative)  
- To discuss HR max and target HR zones in relation to duration and intensity changes  
  - Use energy expenditure table from CPAFLA to illustrate  
- To review benefits of active living for adults with Type 2 Diabetes  
- To prepare and plan for next week – SMART goal setting | 5  
20  
30  
20  
15  
5  
10 |
There are no simple solutions, only intelligent choices.

Every extra step you take in your day, in the week, in your life is a choice. Intelligent choices are made because you have thought, felt and experienced life. Behavior change is a process that requires you to make intelligent choices.

You decide.
STEPPING INTO AN ACTIVE LIFESTYLE

Step by Step

Session 3 (reinforcing factors):

For Individuals with Type 2 Diabetes to answer:

1. What strategies have helped you remember to look at your pedometer throughout the day?

2. When you look at your pedometer and see the number of steps taken, what do you do?

3. How have you made being more active fun, enjoyable, rewarding?

4. How has your confidence in being more active changed since the first session?

5. What kind of positive feedback would you like to get after having successfully increased your activity goals in the first month?

6. In 6 months, let's assume you are still stepping lots. How will you recognize your success?
**APPENDIX E**

<table>
<thead>
<tr>
<th>Activity</th>
<th>50</th>
<th>59</th>
<th>68</th>
<th>77</th>
<th>86</th>
<th>95</th>
</tr>
</thead>
<tbody>
<tr>
<td>badminton</td>
<td>4.9</td>
<td>5.7</td>
<td>6.6</td>
<td>7.5</td>
<td>8.3</td>
<td>9.2</td>
</tr>
<tr>
<td>basketball</td>
<td>6.9</td>
<td>8.1</td>
<td>9.4</td>
<td>10.6</td>
<td>11.9</td>
<td>13.1</td>
</tr>
<tr>
<td>canoeing (leisure)</td>
<td>2.2</td>
<td>2.6</td>
<td>3.0</td>
<td>3.4</td>
<td>3.8</td>
<td>4.2</td>
</tr>
<tr>
<td>circuit training</td>
<td>9.3</td>
<td>10.9</td>
<td>12.6</td>
<td>14.2</td>
<td>15.9</td>
<td>17.6</td>
</tr>
<tr>
<td>cycling (15.7 km/h)</td>
<td>5.0</td>
<td>5.9</td>
<td>6.8</td>
<td>7.7</td>
<td>8.9</td>
<td>9.5</td>
</tr>
<tr>
<td>dancing (choreographed/vigorous)</td>
<td>8.4</td>
<td>9.9</td>
<td>11.4</td>
<td>13.4</td>
<td>14.4</td>
<td>16.0</td>
</tr>
<tr>
<td>exercise-to-music (moderate)</td>
<td>5.4</td>
<td>6.4</td>
<td>7.3</td>
<td>8.3</td>
<td>9.3</td>
<td>10.3</td>
</tr>
<tr>
<td>field hockey</td>
<td>6.7</td>
<td>7.9</td>
<td>9.1</td>
<td>10.3</td>
<td>11.5</td>
<td>12.7</td>
</tr>
<tr>
<td>golf (no cart)</td>
<td>4.3</td>
<td>5.0</td>
<td>5.8</td>
<td>6.5</td>
<td>7.3</td>
<td>8.1</td>
</tr>
<tr>
<td>running (5.6 min/km)</td>
<td>9.7</td>
<td>11.4</td>
<td>13.1</td>
<td>14.9</td>
<td>16.6</td>
<td>18.3</td>
</tr>
<tr>
<td>running (3.8 min/km)</td>
<td>13.9</td>
<td>15.6</td>
<td>17.3</td>
<td>19.1</td>
<td>20.8</td>
<td>22.5</td>
</tr>
<tr>
<td>skiing-x-c (moderate speed)</td>
<td>6.0</td>
<td>7.0</td>
<td>8.1</td>
<td>9.2</td>
<td>10.2</td>
<td>11.3</td>
</tr>
<tr>
<td>squash</td>
<td>10.6</td>
<td>12.5</td>
<td>14.4</td>
<td>16.3</td>
<td>18.2</td>
<td>20.1</td>
</tr>
<tr>
<td>swimming (crawl, slow)</td>
<td>6.4</td>
<td>7.2</td>
<td>8.7</td>
<td>9.9</td>
<td>11.0</td>
<td>12.2</td>
</tr>
<tr>
<td>tennis</td>
<td>5.5</td>
<td>6.4</td>
<td>7.4</td>
<td>8.4</td>
<td>9.4</td>
<td>10.4</td>
</tr>
<tr>
<td>volleyball</td>
<td>2.5</td>
<td>3.0</td>
<td>3.4</td>
<td>3.9</td>
<td>4.3</td>
<td>4.8</td>
</tr>
<tr>
<td>walking – flat (comfortable pace)</td>
<td>4.0</td>
<td>4.7</td>
<td>5.4</td>
<td>6.2</td>
<td>6.9</td>
<td>7.6</td>
</tr>
</tbody>
</table>

* Energy Expenditure can be expressed in either kilocalories or kilojoules. For conversion purposes, 1 kcal = 4.2 kJ.

DIABETES ON THE NET

Use iTools.com for locating information on the Web.

It has two search functions: Research It (will chase down peoples' name, companies, etc); Find It (will chase down by subject, keywords, etc.)

Click on FIND IT! - then in top box type in Diabetes..... and hit Find It.
It will use the Alta Vista site for its first search, as noted under "keyword"

It says that there are 821,990 pages listed that relate to the subject Diabetes

The two sites below have information and Links to various interesting pages as well!

American Diabetes Association: www.diabetes.org/default.asp

Canadian Diabetes Association: www.diabetes.ca


StartingTo Exercise: http://members.xoom.com/_XOOM/diabetis/cfouri.htm
# WEEKLY GOAL-SETTING

**Step by Step**

**Date:**
This week I took _____ steps in ______ minutes

<table>
<thead>
<tr>
<th>My average daily steps/day for last week was:</th>
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<tbody>
<tr>
<td>I will increase this by:</td>
<td>+ _____ (steps/day)</td>
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<tr>
<td>My new daily goal is:</td>
<td>= _____ (steps/day)</td>
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1) Identify one or two strategies you will use to successfully achieve your new daily goal:

2) How confident are you that you can stick to your daily activity program for this week?

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<tr>
<td></td>
<td>Not at all confident</td>
<td>Moderately confident</td>
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3) Reflect on your answer to question 2 and explain your selection.
Activity Calendar

MONTH: ____________

Instructions:
- At the start of each week identify your daily activity goal: steps/day you hope to achieve.
- Write in the number of steps you take according to your pedometer. If you don’t wear the pedometer, count 0.
- Star the boxes for each day of the week you achieve your goal.
- At the end of each week determine the total number of steps taken and then the average for the week.
- You may want to record your sugar levels on the calendar as well.

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<tr>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
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<th>Total steps</th>
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</table>
Please share your experiences:

How would you rate the following:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent</th>
<th>Good</th>
<th>Average</th>
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<tr>
<td>Organization</td>
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<td>Quality of instruction</td>
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<td>Facilities</td>
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<td>Opportunity for discussion</td>
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<tr>
<td>Personal assistance</td>
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</table>

What did you hope to achieve from this week's meeting?

Did you achieve this?

Which part of the meeting was most helpful?
The Planning Module
**The Planning Module - Week 4**

<table>
<thead>
<tr>
<th>Date</th>
<th>Objectives</th>
<th>Time Limit</th>
</tr>
</thead>
</table>
| Week 4 | • To review last week’s activities  
• To identify new issues for this week’s meeting and to discuss issues relevant to the next phase of the intervention  
  • Weekly goal setting sheets  
  • Activity calendars  
  • Glycemic records  
  • Interview  
  • Reassessment  
  • Journals  
  • Follow-up phone calls/visits  
• To review last week’s activities – Step by Step (weekly report)  
• Share details of activity calendar  
• To complete group walk  
• To discuss stepping out on your own – revisit Decision Balance, motivation and commitment  
• To prepare and plan for the next phase of the intervention | 15 min.  
20 min.  
30 min.  
30 min.  
15 min. |
“I skate to where I think the puck will be.” (W. Gretzky)

As you finish Step by Step, remember the words of “the Great One”...a great hockey player because he looked ahead. He envisioned the future. He planned his path. You, too, can and should do the same if you want to continue your success. This behavior change is for life!
How confident are you that you’ll keep up your activity level during the next three months?

- Not confident at all
- Not very confident
- Somewhat confident
- Confident
- Very confident

What situations do you think will make it tough for you to keep up your activity levels?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

How will you prepare for the next three months? What strategies will you use to increase your chances of being successful?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
SMART Goal setting
WEEKLY GOAL-SETTING

Step by Step

Date:
This week I took ______ steps in ______ minutes

<table>
<thead>
<tr>
<th>My average daily steps/day for last week was:</th>
<th>______</th>
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<tbody>
<tr>
<td>I will increase this by:</td>
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<tr>
<td></td>
<td>(steps/day)</td>
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<tr>
<td>My new daily goal is:</td>
<td>= ______</td>
</tr>
<tr>
<td></td>
<td>(steps/day)</td>
</tr>
</tbody>
</table>

1) Identify one or two strategies you will use to successfully achieve your new daily goal:

2) How confident are you that you can stick to your daily activity program for this week?

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<th>0%</th>
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</tbody>
</table>

3) Reflect on your answer to question 2 and explain your selection.
**Activity Calendar**

**MONTH:** ____________

**Instructions:**
- At the start of each week identify your daily activity goal: steps/day you hope to achieve.
- Write in the number of steps you take according to your pedometer. If you don't wear the pedometer, count 0.
- Star the boxes for each day of the week you achieve your goal.
- At the end of each week determine the total number of steps taken and then the average for the week.
- You may want to record your sugar levels on the calendar as well.

<table>
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<tr>
<th>Goal Steps</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
<th>Total steps</th>
<th>day average</th>
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</tbody>
</table>
Would you recommend Step by Step to family and friends if they were looking for a program to help them become more active on a daily basis?

Please explain:
Appendix K

STRATEGY ORIENTED EDUCATION INTERVENTION PROGRAM
SELF-ASSESSMENT SURVEY

The purpose of this survey is to determine your state of learning dependency so that appropriate support and direction may be provided.

Name: ____________________________________________

Please take a moment to complete the following questions.

### Part A:
Score your answers using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. I am unsure I have the skills necessary to make daily activity part of my lifestyle.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

   **Comments:**

2. I am not very confident in my ability to make decisions that will help me meet my daily activity goals.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</table>

   **Comments:**
3. I am unsure of my commitment to achieve my daily activity goals.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tr>
<td>1</td>
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</table>

Comments:

4. I need my progress to be closely monitored, my practice guided and feedback provided on my performance continuously.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tbody>
<tr>
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</table>

Comments:

5. I have organized my present life needs (i.e., job, family, leisure) to accommodate my participation in this project.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tbody>
<tr>
<td>1</td>
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Comments:

6. As I prepare to participate in this group session, I am afraid I will feel less confident in my abilities.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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Comments:
Appendix L

Doctor of Education Thesis Research
The Ontario Institute for Studies in Education at the University of Toronto

INTERVIEW #1

You have been provided with a copy of the questions for our first interview. They offer a starting point from which to begin our exchange; however, ample opportunity will be provided for spontaneous dialogue and sharing. Please review the questions prior to the interview date to help formulate your responses. Feel free to create questions of your own. We will discuss when we meet. Your comments and responses from this interview may be pursued further in subsequent interviews.

As a reminder, the interviews will be recorded and transcribed. Once transcribed, I will provide a copy of the interview so that you can review, clarify, and / or respond further if you so desire.

Categories of questions:

A) Personal data
   - Personal history
   - Diabetes details
   - Activity experiences prior to intervention
   - Expectations
B) Andragogical issues
C) Stages of change issues
D) Intervention strategies/processes of change
E) Outcomes expectations and issues

A) Personal data

   - Personal history:

   1) What is your age?

   2) What is the highest level of education you have achieved?

   3) What is your current occupation?

   4) Have you had other occupations?
5) With respect to your activity levels, how have your job responsibilities changed over the years?

6) Do you currently have people in your life who will be involved/offer their support to you during this study? What will their role be?

7) Are you currently satisfied with your quality of life, well-being, health status?

8) What changes would you like to make?

• Diabetes details

9) When were you diagnosed with Type 2 diabetes?

10) Do you have a family history of Type 2 diabetes?

11) How do you manage your diabetes currently? How often do you measure your sugars?

12) Do you feel you are in control of your diabetes or that it controls you?

13) How has being diagnosed with Type 2 diabetes changed your lifestyle, your quality of life, well-being?

14) Have you taken or participated in any workshops/courses/intervention programs for diabetes before?

15) If yes, how long has it been since the course. Please describe the course. If you can recall, could you describe the content?

• Activity experiences prior to intervention

16) What is “exercise” to you?

17) Do you like to be active/exercise?
18) How do you feel about exercising?
19) How active are you currently?
20) When are you most active (e.g. At your job, home on weekends, etc.)?
21) How many steps would you think you take now in one day?
22) Based on your current activity level, how intense or difficult or demanding would you say your activity is (e.g. Can you hear yourself breathe? Do you sweat?)
23) Were you more or less active prior to developing Type 2 diabetes?
24) What has changed to alter your activity levels since being diagnosed?
25) When you were more active what did you like about being active (e.g. How did it make you feel)?
26) When you were more active what did you dislike about being active active (e.g. How did it make you feel)?
27) What is your perception of those who exercise?
28) What do you like to do that requires physical effort?
29) Was physical activity ever mentioned/discussed as part of your diabetes management when first diagnosed? Describe.
30) Has physical activity been mentioned/discussed as part of your diabetes management recently?
31) Have you tried including activity into your lifestyle as part of your diabetes management before? Describe the experience.
32) Given that this research study is about activity and Type 2 Diabetes, what are you prepared to do with respect to your own activity levels as part of this intervention?

• *Expectations*
33) Have you ever participated in a diabetes research study before? Describe the experience. What did you like or dislike about the study?

34) How have you prepared for your participation in this intervention?

35) Why would you like to become more active?

36) Are there any specific topics you like to discuss at the meetings?

37) Are you comfortable committing to the four month timeline of this research study?

38) Do you have any preconceived expectations of the intervention?

39) What skills, abilities (personal characteristics) do you have that might be useful to help you increase your activity levels?

40) Do you have any questions about the intervention?

B) Andragogical issues:

41) Have you participated in any workshops/courses lately?

42) As a participant/learner what did you like best about the way you were instructed?

43) As a participant/learner what did you like least about the way you were instructed?

44) How would you like to learn in this intervention?

45) How do you think you learn best?

46) Is there anything in particular that you would prefer the facilitator of the intervention do or not do/include or not include?

47) How confident are you going into this study that you can change your behavior to become more active? (Reference to a scale of 1 to 10).
48) How committed are you going into this study that can change your behavior to increase your activity level? (Reference to a scale of 1 to 10).

49a) How much support do you anticipate you will need to be successful?

49b) What kind of support would be most beneficial to help you change your behavior to increase your activity level?

50) What kind of feedback would be most useful to help you change your behavior to increase your activity level?

C) Stages of change issues

51) What stage of change did you place yourself in?

52) Why did you select this stage of change?

53) Your stage of change is categorized as precontemplator / contemplator / preparation. How does this label/category relate to you and your lifestyle?

54) How does this label of behavior change make you feel?

55) If you were not participating in this study, do you think you would have selected the same stage of change? Why or why not?

D) Intervention strategies/processes of change

56) Have you ever tried to change a behavior in the past?

57) Were you successful? Why or why not?

58) What did you do to help yourself through the change?

59) What did you try that worked?

60) What did you try that didn’t work?
61) How did you monitor your progression?

62) Do you ever self-reflect? If so, what form of self-evaluation do you use?

63) What motivates you?

64) If you accomplish something, how do you like to reward yourself?

65) Have you ever written in a journal before?

66) Why do you think you've been asked to write in a journal as part of this study?

E) Outcomes expectations and issues

68) What do you hope to achieve by participating in this study?

69) How hard do you expect to work at this behavior change?

70) What physical changes do you anticipate your body will go through as you increase your activity level?

71) How difficult do you expect it will be for you to change your behavior and become more active?

72) Are you a good goal setter?

73) Have you ever received any direction with respect to good goal setting?

74) How do you think your ability to goal set will influence your behavior change of becoming more active?

75) As a participant in this intervention, what are your short term goals?

76) As a participant in this intervention, what are your long term goals?

77) Do you believe you can succeed at this behavior change given your long term goals? Why or why not?

78) What are your expectations of the facilitator?
79) How do you think changing your behavior to become more active might change your quality of life, well-being, health status or diabetes management?

- Additional questions or comments:
Appendix M

Doctor of Education Thesis Research
The Ontario Institute for Studies in Education at the University of Toronto

INTERVIEW #2

You have been provided with a copy of the questions for our second interview. They offer a starting point from which to begin our exchange; however, ample opportunity will be provided for spontaneous dialogue and sharing. Please review the questions prior to the interview date to help formulate your responses. Feel free to create questions of your own. We will discuss when we meet. Your comments and responses from this interview may be pursued further in the final interview.

As a reminder, the interview will be recorded and transcribed. Once transcribed, I will provide a copy of the interview so that you can review, clarify, and/or respond further if you so desire.

Categories of questions:

A. Expectation issues
B. Behavior change issues
C. Content issues
D. Andragogical issues

A. Expectation issues:

1. Did this intervention meet your expectations? Please explain.

2. Why would you recommend this program to family or friends?

3. What was the most appealing part of this behavior change process?

4. What was the least appealing part of this behavior change process?

5. How was this intervention similar to any of formal or informal physical activity programs you’ve tried before?

6. How did this intervention differ from any of formal or informal physical activity programs you’ve tried before?
7. How difficult has it been for you to change your behavior and become more active in the last 4 weeks?

8. How hard have you had to work at this behavior change?

9. How did you feel the first night when you heard this intervention was not an exercise program?

10. How did you feel about having to complete the preliminary screening and assessment items (e.g. PAR-Q, PARmed-X, Stages of change questionnaire)? Was it too much? Restrictive? Intrusive?

11. How did you feel taking this intervention with your work co-horts? Was it an advantage/hindrance? Were they any issues or concerns, special considerations, privacy issues that occurred or that should be considered for future interventions?

12. You are now in the action phase of the stages of change. How does this label make you feel?

13. Now that you have completed the 4 weekly meetings, what are your long term physical activity goals?

14. How do you think changing your behavior to become more active has changed or will continue to change your quality of life, well-being, health status or diabetes management?

B. Behavior change issues:

15. How many steps have you increased (on a weekly basis) since you started the intervention 4 weeks ago?

16. How does this make you feel?
17. What physical changes/responses have you experienced as a result of taking more steps (e.g. sore muscles, sweating)?

18. What do you see as your “saturation point” when you feel you can step no more because of lifestyle restrictions?

19. What are you prepared to do then?

20. Describe the significance of wearing the pedometer.

21. Are there any advantages/limitations to wearing the pedometer?

22. Do you think you would be able to continue your active lifestyle without the pedometer? Would you like to keep the pedometer at the end of the 4 months?

23. Do you think you could have achieved this same success/the same behavior change on your own? Why or why not?

24. Do you feel any differently as a result of increasing your activity levels?

25. Do you think your assessment results will be different this time? If so, what changes do you expect / hope to see?

26. How will you feel if there are no overt changes at this time to your weight, BP, resting HR or waist girth? Will this influence your progression? Please explain.

27. How has becoming more active impacted your ability to perform day to day activities?

28. Has making this change to become more active changed your perspective on leading an active lifestyle? Explain.

C. Content issues:

29. What topics did we discuss that you felt were most helpful?

30. What topics did we discuss that you felt were least helpful?
31. Was the intervention program too short, too long, just right (4 weeks x 2 hours)?
32. What did you think of the weekly themes? Would you make any changes?
33. What did you think of the Decision Balance sheet? Would you make any changes to it?
34. How do you feel about the usefulness of writing in the journals? Please explain.
35. Were the 2 information articles included in the manual useful? Understandable?
   Did you read them? Should they stay or go?
36. Have you referenced any of the web sites yet? Do you think they should be included in the manual?
37. What did you think of the weekly goal setting sheet (e.g. was there enough direction, was it easy to read and follow)? Would you make any changes to it?
38. What did you think of the group walks? Would you make any changes?
39. How do you feel about using the treadmill? Did the demonstration help? Do you think you would use the treadmills in the Fitness Centre now?
40. What did you think of the activity calendar? Would you make any changes to it?
41. What did you think of the discussion time that typically followed the group walk?
   Would you make any changes to it (e.g. was there enough time allocated for you to talk and share as compared to the facilitator)?
42. Do you think it makes a difference when an intervention like this is scheduled with respect to the time of year (e.g. would it have made a difference if we had started in November and you were attempting to step more in the snow)?
43. What did you think about having to do your own goal setting? What changes, if any, did you go through with respect to your goal setting?
44. What did you learn about SMART goal setting?

45. How have the 4 weekly meetings prepared you for the next 3 months?

D. Andragogical issues:

46. You mentioned in the first interview that you liked to learn by doing. Was there enough opportunity provided for experiential learning (examples?)?

47. How did this intervention differ in process/delivery/method from any of the other diabetes education sessions you’ve attended before?

48. Who would be most appropriate to instruct/deliver this type of program?

49. Were you satisfied with the method of instruction?

50. What changes would you suggest?

51. How has your confidence level changed over the 4 weeks?

52. How confident are you going on your own for the 3 months that you can stick with your behavior change of being more active? (Reference to a scale of 1 to 10).

53. How committed are you going on your own for the 3 months of the study that can that you can stick with your behavior change of being more active? (Reference to a scale of 1 to 10).

54. How have the 4 weekly meetings prepared you to continue being active over the next 3 months of this study?

55. How have you re-organized your life to fit in this behavior change?

56. What would help you the most as a follow-up to the 4 week group sessions? (e.g. Are the 2 phone calls enough?)
Personalized questions for each of the study participants:

**OISE 101:**

1. I read in your journal that you wanted to call me right after our first weekly meeting. Why didn’t you call me? What was it about?

2. What did you want to ask about the “gym”? 

3. During the first meeting, you set yourself a new weekly goal of 3000 more steps per day. What was your reaction to that goal setting? What would you have done if I had intervened and suggested that you reconsider your goal? Should I have said anything then?

4. You mentioned in the early part of the first interview that you hoped you offer support to your mother as she began Weight Watchers? How are you doing?

5. Boredom is an issue for you? How are you doing with it so far?

6. Motivation is also an issue for you. How are you doing with it so far?

7. In the past, you’ve indicated that your commitment varies. How much time does it typically take for you to relapse? How are you doing so far in comparison?

8. Explain “relatively easy.”
Personalized questions for each of the study participants:

**OISE 102:**

1. Why haven't you asked me to “bitch” at you yet? Should I?

2. What changes have you noticed with respect to your insulin and sugar levels as a result of becoming more active?

3. How is trying to stop nail biting and becoming more active as a behavior change different? Same?

4. Compare your bike experience to the Step by Step Program.
Personalized questions for each of the study participants:

**OISE 103:**

1. Have you found some answers throughout this intervention?
2. Have you achieved more of a sense of control from this intervention?
3. Explain the connection between “thinking and walking?”
4. What do attribute the difference to when you walk outside as compared to inside and the total number of steps (e.g. outside = more steps).
5. How are you making out with your intensity changes? Heart rate monitoring?
6. How has your frustration level changed since the 2nd meeting?
7. Have you found out anymore on stress and sugar levels?
8. Have you realized how much of a positive influence you have been to your intervention co-horts?
Personalized questions for each of the study participants:

**OISE104:**

1. When you had the back injury, how did that affect your progress stepping?
2. What have you done since your back injury?
3. What do you think you missed by not being able to attend any of the group sessions? Do you think that impacted your success at stepping?
4. What have you learned from quitting drinking that has or will help you continue with this behavior change?
5. When reviewing your manual, you did not complete your weekly goal setting sheets or wrote very little in your journals, why is that? Will you make an effort to do this for the next 3 months of the study?

When reviewing your activity calendar and your goal setting that we completed last week together, I noticed that your daily average number of steps far exceeds your weekly goal setting. Why is that? Why haven’t you increased your goal setting to match what you are actually accomplishing? When do you plan to do this? Do you realize what the others in this group are using as they weekly goals now as compared to when they started this program? How do this make you feel?
Appendix N

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INTERVIEW #3

You have been provided with a copy of the questions for the third and final interview. The questions offer a starting point from which to begin our exchange; however, ample opportunity will be provided for spontaneous dialogue and sharing. Please review the questions prior to the interview date to help formulate your responses. Feel free to create questions of your own. We will discuss when we meet.

As a reminder, the interview will be recorded and transcribed. Once transcribed, I will provide a copy of the interview so that you can review, clarify, and / or respond further if you so desire.

Categories of questions:

A. Intervention strategies/processes of change
B. Stages of change
C. Andragogical issues
D. Outcome issues

A. Intervention strategies/processes of change

1. Describe your behavior change journey from the beginning to the end of this study. For example, comment on some of the trials and tribulations, high-lites, unexpected outcomes, challenges etc.?

2. How did you use the intervention to change your behavior? How did you go about making the change (e.g. what strategies worked best, what approach did you take)?

350
3. What variables of the intervention were particularly influential in supporting your behavior change—first in the contemplation stage and then in the action stage? How will the intervention help you sustain your behavior change?

4. If you fear you will relapse, what else should/could be done? What would help?

5. How did your motivation change as you progressed with your behavior change through the 4 weekly meetings to the 3 months on your own? What motivated you most with this behavior change?

6. How did your confidence change as you progressed with your behavior change through the 4 weekly meetings to the 3 months on your own?

7. For those of you who sustained your activity level during the 3 months on your own, what did you do different than the rest? What influenced your success?

8. What intervention strategies were most effective in promoting an increase in daily physical activity—first in the contemplation stage and then in the action stage (e.g. continuing with group walk after 4 weekly meetings)?

9. What kind of reinforcement did you use to help you succeed?

10. What kind of help did you seek out to facilitate your success?

11. How did you control the variables in your life that were working against you when you were trying to be more active?

12. Did you use any form of counter conditioning (e.g. positive self-talk, role models, pictures, visual images)?

13. If nothing, what would you suggest (e.g. should future participants have to earn their pedometer at the end of the study by sustaining a certain level of activity from start to finish)?
14. I believe you have all adopted a more active lifestyle as a result of this study, do you think you will continue to adhere to a more active lifestyle now that the study is over?

15. When planning an intervention like this we discussed seasonal influences on several occasions, describe how the summer/vacation has influenced your progress? What do you predict will happen to your activity patterns in the fall/winter? What will you do to prepare for the seasonal changes?

B. Stages of change—contemplation to action

16. Describe your activity practices as you moved from contemplation to action in this study (e.g. did you establish a pattern, did a pattern evolve with time, are you still searching for a pattern)?

17. Were there any special considerations or problems related to the increased activity level?

18. How might the strategy oriented education intervention program for contemplators differ if delivered to a non-diabetic population?

19. By definition, moving to the maintenance stage means having continued an active lifestyle for at least 6 months. Do you see yourself there at 6 months? Describe your activity patterns at that time (e.g. will your activities include more than just walking)?

20. How has your definition or perception of what it means to have an active lifestyle changed after participating in this intervention?

C. Andragogical issues:

21. How did this intervention cater to your needs as an adult learner?
22. How did your ability to self-direct change over the course of the intervention? 
   What influenced this change?
23. Can you think of any other changes or modifications to the content of the 
   intervention that would better suit the learning needs of future participants?
24. How did this intervention empower (enable) you to make your behavior change? 
   How did empowering help you move from contemplation to action?
25. Can you suggest any other ways the educational materials could/should be 
   used/modified over the course of the strategy oriented education intervention 
   program to better suit your learning needs?
26. In the future, what should facilitators be sure to include in the delivery of this 
   intervention a) during the weekly meetings; b) to prepare you for continued 
   success?
27. One of the questions I will be asked in my defense, is how I can I determine the 
   reliability and the validity of the results of this study. How would you respond?

D. Outcome issues

28. To what extent did this intervention program increase your daily physical 
   activity? Refer to your step calculations.
29. Reflect on your initial goals when you started this intervention. Were you 
   successful? Please explain your answer.
30. What lifestyle changes were noted as you changed your behavior to increase your 
   activity level?
31. Have you noticed any other changes in your behavior as a result of your participation in this intervention (e.g. has your behavior change been a springboard for other lifestyle changes)?

32. Is the pedometer limiting in this sense when it is unable to recognize other forms of physical activity? How does this make you feel?

33. How has your quality of life changed with the increase in activity?

34. How have these changes influenced your family’s quality of life?

35. What role did your family play throughout this behavior change? Did your support person(s) role change with time?

36. You said at the end of the 4 weeks, that you would recommend this program to others? Do you still feel the same way? Please explain.

37. Where should the direction of this program go from here? Who else should be involved in this process?

38. Do you think this program has value for other individuals—diabetic or otherwise? Please explain.

39. If you were to make any final recommendations regarding this program, what would they be?

40. When it comes time for me to write the final report, would you be interested in proof-reading the drafts and making additional comments?

Any additional comments or questions:
Appendix O

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The Ontario Institute for Studies in Education at the University of Toronto

USING THE TRANSTHEORETICAL MODEL TO GUIDE ADULTS WITH TYPE 2 DIABETES AS THEY CHANGE THEIR BEHAVIOR TO ADOPT AND ADHERE TO A MORE ACTIVE LIFESTYLE

Case study 101

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**USING THE TRANSTHEORETICAL MODEL TO GUIDE ADULTS WITH TYPE 2 DIABETES AS THEY CHANGE THEIR BEHAVIOR TO ADOPT AND ADHERE TO A MORE ACTIVE LIFESTYLE**

Case study 102

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USING THE TRANSTHEORETICAL MODEL TO GUIDE ADULTS WITH TYPE 2 DIABETES AS THEY CHANGE THEIR BEHAVIOR TO ADOPT AND ADHERE TO A MORE ACTIVE LIFESTYLE

Case study 103

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<td>Stages of change</td>
<td>3 - preparation</td>
<td>4 - Action</td>
<td>4 - Action</td>
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USING THE TRANSTHEORETICAL MODEL TO GUIDE ADULTS WITH TYPE 2 DIABETES AS THEY CHANGE THEIR BEHAVIOR TO ADOPT AND ADHERE TO A MORE ACTIVE LIFESTYLE

Case study 104

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<td>Resting BP (mmHg)</td>
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<td>3 – preparation</td>
<td>4 – action</td>
<td>4 – action</td>
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| Resting BP (mmHg) | 132/90          | 126/82    | 144/94   |
| Level of physical activity |  |  |
| Waist girth (cm)  | 96.5            | 96.0      | 95.8     |
| BMI               | 28.3            | 28.5      | 28.4     |
| Glycemic control  | Rec’d April 12/99 | Rec’d May 19/99 | Rec’d July 29/99 |
| Activity calendar | Rec’d May 19/99 | Rec’d July 29/99 | Rec’d July 29/99 |
| Stages of change  | 3 – preparation | 4 – action| 4 – action |

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Activity Calendar

MONTH: ___________  WEEK: ___________

Instructions:
- At the start of each week identify your activity goal: steps/day or week you hope to achieve.
- Write in the number of steps you take according to your pedometer. If you don't wear the pedometer, count 0.
- Star the boxes for each day of the week you achieve your goal.
- At the end of each week determine the total number of steps taken and then the average for the week.

| Goal: Weekly or daily | | | | | | | |
|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Number of steps taken| | | | | | |
| | **O** | **O** | **O** | **O** | **O** | **O** |
| Glycemic values | | | | | | |
| Journal comments | | | | | | |
Raw Data: Glycemic values and steps/day for case study 101-104 over 16 weeks

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<th>Week 2</th>
<th>Week 3</th>
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| Steps/day       | 13672  | 12753  | 13484  | 11821  | 6350   | 13140  | 12003  | 12158  |
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|                 | 8746   | 10188  | 12478  | 12831  | 8871   | 6110   | 8643   | 12225  |
|                 | 10078  | 8762   | 12746  | 12502  | 10449  | 12500  | 11250  | 6677   |
|                 | 15678  | 10094  | 8170   | 5783   | 10011  | 7780   | 0      | 6500   |
|                 | 4003   | 13100  | 9055   | 10756  | 13511  | 5200   | 5714   | 2789   |
|                 | 9520   | 17145  | 15319  | 12022  | 14471  | 8130   | 12005  | 11162  |
| Sum/week        | 70379  | 83542  | 85549  | 80695  | 70251  | 52860  | 61635  | 62691  |
| Average/wk      | 10054.143 | 11934.571 | 12221.286 | 11527.857 | 10035.857 | 7551.4286 | 8805 | 8955.8571 |
Raw Data: Glycemic values and steps/day for case study 101-104 over 16 weeks

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| 0      | 6689    | 3365    | 0       | 8800    | 9250    | 8809    | 12111   |
| 3376   | 0       | 5142    | 12699   | 3400    | 2068    | 12554   | 0       |
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| 74148  | 33839   | 56776   | 41837   | 58633   | 55177   | 67150   | 57321   |
| 10592.571 | 4834.1429 | 8110.8571 | 5976.7143 | 8376.1429 | 7882.4286 | 9592.857 | 11464.2 |
Raw Data: Glycemic values and steps/day for case study 101-104 over 16 weeks

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| 8213 | 3320 | 8001 | 11352 | 12613 | 16003 | 15616 | 11170 |
| 7940 | 0 | 14018 | 15003 | 13709 | 15273 | 14839 | 15601 |
| 12405 | 3480 | 4817 | 7968 | 13453 | 14005 | 12385 | 11593 |
| 7816 | 3210 | 9459 | 12706 | 12251 | 13621 | 11937 | 7005 |
| 9237 | 4735 | 9129 | 1389 | 11698 | 13728 | 10241 | 6817 |
| 15801 | 10641 | 7734 | 10772 | 12913 | 12180 | 12592 | 12815 |

| Sum/week | 69818 | 36395 | 61309 | 68086 | 88257 | 98962 | 90613 | 75204 |
| Average/wk | 9974 | 5199.2857 | 8758.4286 | 9726.5714 | 12608.143 | 14137.429 | 12944.714 | 10743.429 |
### Raw Data: Glycemic values and steps/day for case study 101-104 over 16 weeks

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