USE OF SOCIAL-COGNITIVE THEORIES IN THE STUDY OF PHYSICAL ACTIVITY AND FIBROMYALGIA: SELF-EFFICACY THEORY AND THE THEORY OF PLANNED BEHAVIOUR

By

S. Nicole Culos-Reed

A thesis
Presented to the University of Waterloo
in the fulfillment of the
thesis requirement for the degree of
Doctor of Philosophy
in Kinesiology

Waterloo, Ontario, Canada, 2000

National Library of Canada
Acquisitions and Bibliographic Services
395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale du Canada
Acquisitions et services bibliographiques
395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

0-612-53490-1

Canada

The University of Waterloo requires the signatures of all persons using or photocopying this thesis. Please sign below, and give address and date.

Abstract

Using self-efficacy theory (Bandura, 1986, 1997) and the theory of planned behaviour (Ajzen, 1985, 1991) as theoretical frameworks, the primary objectives of the series of studies in this dissertation were to (a) determine the relationship between activity level, efficacy, and indices of well-being in Study 1; (b) identify the usefulness of the theory of planned behaviour, and in particular perceived behavioural control or self-efficacy, for predicting physical activity intentions and behaviour in Study 2; and (c) investigate an intervention designed to manipulate social cognitive constructs within the theory of planned behaviour in Study 3. All three studies examined individuals with Fibromyalgia (FM). FM is a chronic disease that is characterized by widespread pain and accompanying fatigue, which fluctuates over time. Previous literature has highlighted the importance of efficacy for functioning more effectively with this condition, however very little of this work has been guided by theory. Utilizing the framework of self-efficacy theory (Bandura, 1997) in Study 1, FM participants reported their efficacy for being physically active and for coping with their FM symptoms, as well as their physical activity levels and functional ability level. Both types of efficacy predicted physical activity frequency and functional ability status. Specifically, the more active FM individuals and those who functioned better on a daily basis had higher levels of efficacy or confidence in their ability to both be active and cope with their FM pain. This study provided the first examination of efficacy in relation to a frequency measure of physical activity and supports the physical activity literature findings for both healthy and symptomatic populations.

The purpose of Study 2 was to examine additional social cognitive predictors of physical activity frequency. The theory of planned behaviour (Ajzen, 1985) provided the framework to assess perceived behavioural control (efficacy) along with affective (attitude) and social (subjective norm) components for predicting physical activity intentions and behaviour. This prospective design revealed that physical activity intentions were predicted by perceived behavioural control, while both intentions and perceived behavioural control predicted physical activity behaviour. These results are supportive of the direct hypothesis of the TPB. While these results are again supportive of the general physical activity literature, the relative weaker roles of both attitude and subjective norm were somewhat surprising. In particular, the weaker role of attitude was inconsistent with past physical activity research both in healthy and diseased populations.

Study 3 attempted to further examine the importance of these three TPB variables for understanding physical activity and FM in an intervention-based design. Utilizing a group discussion format, attitudes, perceived behavioural control, and subjective norm towards physical activity were targeted within "positive" and "negative" conditions. The results revealed that this short-term intervention was effective at changing all three targeted variables. Specifically, at the post-manipulation measurement, FM individuals in the positive condition had significantly higher attitudes, perceived behavioural control, and subjective norm towards physical activity compared to the FM individuals in the negative condition.

Together, the results of this series of three studies support the importance of perceived behavioural control for understanding physical activity involvement in FM individuals. Additional social cognitive variables, including affective or social factors

may also play an important role, however it is apparent that conceptual and measurement issues must be addressed in future research. Utilizing a strong theoretical framework will aid the progression of FM and physical activity research and will ultimately enhance future interventions.

Acknowledgements

First, thanks to my Committee for their valuable feedback and input. I appreciate the time given by Dr. Gaston Godin, Dr. Kim Dawson, and Dr. Pat Smith. Special thanks to Dr. Kathleen Martin for her help and encouragement along the way. And finally, to my advisor, Dr. Larry Brawley -- words can not say how much your wisdom, guidance, and support has meant to me during my studies. You continue to astound me with your knowledge and I truly appreciate the level of friendship that we have developed. Here's to many more years of learning and sharing knowledge.

To all of my friends that have been there for me throughout this journey. From home, UBC, Oregon, and Waterloo – you are all important to me and have made this experience much more worthwhile. You all know what you mean to me, so most simply, "thanks".

My family has been truly more supportive than I think anyone could have asked for. Mom and Dad, I owe this all to you. Todd, Adam, and Karla – you can finally tell folks that I'm done (yeah!). Many of my other relatives have played special roles and I thank you too for your love and support.

Finally, to Andrew...thanks for your love, friendship, understanding, and patience. I know what this means to you too – I'll finally be bringing home a paycheque!!

Table of Contents

USE OF SOCIAL COGNITIVE THEORIES IN THE STUDY OF PHYSICAL ACTIVITY AND FIBROMYALGIA: SELF-EFFICACY THEORY AND THE THEORY OF PLANNED BEHAVIOUR

	Page
Title Page	i
Author's Declaration	ii
Borrowers' Page	iii
Abstract	iv
Acknowledgements	vii
Table of Contents	viii
List of Tables	xiii
List of Figures	xv
General Introduction	1
Fibromyalgia	3
Self-Efficacy Theory	9
Reviews of the Self-Efficacy Physical Activity Literature	10
The Theory of Planned Behaviour	12
Reviews of the Theory of Planned Behaviour Physical Activity Literature	15
Conceptual, Measurement, and Analysis Issues	16
Summary	17
Study One	19
Abstract	19
Introduction	20
Methods	24
Procedure	24
Measures	24
Demographic Variables	24
Physical Activity	25

Study One continued:

Fibromyalgia Symptoms 26
Fibromyalgia Impact Questionnaire 27
Self-Efficacy for Physical Activity 27
Self-Efficacy for FM Pain and Other Symptoms 28
Health-Related Quality of Life 29
Participants 30
Statistical Analysis 32
Results 33
Scale Reliabilities 33
Physical Activity 33
Discriminant Function Analyses 36
Physical Activity 36
Functional Ability 37
Discussion 38
Efficacy 38
Health-Related Quality of Life 40
Fibromyalgia Symptoms 41
Strengths and Limitations 41
Future Research 43

Study Two 44
Abstract 44
Introduction 45
The Theory of Planned Behaviour 45
Measurement and Analysis Issues 49
Scale Specificity and Correspondence 49
Perceived Behavioural Control Measurement 50
Analysis of Mediation 51
Prediction of Physical Activity 51
Methods 52
Procedure 52
Measures – Time 1 Questionnaire 54
Demographic Variables 54
Physical Activity 54
Theory of Planned Behaviour Variables 55
Attitude 56
Subjective Norm 57
Perceived Behavioural Control 58
Behavioural Intention 58
Behaviour 59
Fibromyalgia Variables 59
Fibromyalgia Impact Questionnaire 59
Fibromyalgia Symptoms 59
Fibromyalgia Pain and Symptom Efficacy 61

Study Two Continued:
Health-Related Quality of Life 61
Measures – Time 2 Questionnaire 62
Theory of Planned Behaviour Variables 62
Fibromyalgia Variables 63
Participants 63
Statistical Analysis 66
Results 70
Time 1 70
Scale Reliabilities 70
Theory of Planned Behaviour Concurrent Tests 70
Time 2 74
Scale Reliabilities 74
Theory of Planned Behaviour Concurrent Tests 75
Prospective Tests of the Theory of Planned Behaviour 81
Discussion 84
Theoretical Implications 84
Fibromyalgia Implications 87
Strengths and Limitations 88
Future Research 90

Study Three 92
Abstract 92
Introduction 93
Theoretically Based Intervention 94
Measurement Considerations 96
Summary 97
Methods 97
Procedure 97
Subjects 98
Design 98
Rationale for the Design 99
The Manipulation 100
Common Aspects in each Condition 100
Positive Condition 103
Negative Condition 103
Manipulation Check 103
Measures 105
Pre-Manipulation Questionnaire 105
Demographics 105
Physical Activity 106
Theory of Planned Behaviour Variables 107
Attitude 107
Subjective Norm 108
Perceived Behavioural Control 109
Behavioural Intention 109

Study Three Continued:
Fibromyalgia Variables 110
Fibromyalgia Impact Questionnaire 110
Fibromyalgia Symptoms 110
Fibromyalgia Symptom Efficacy 111
Additional Variables 111
Public Self-Consciousness 112
Optimism/Pessimism Scale 113
Measures – Post-Manipulation Questionnaire 113
Behavioural Intention Measures 113
Participants 114
Statistical Analysis 116
Results 119
Scale Reliabilities 119
Factor Analyses 120
Descriptive Statistics 121
Multivariate Analysis of Variance – Theory of Planned Behaviour Primary Hypotheses 125
Pre-Manipulation 125
Post-Manipulation 127
Secondary Analyses 133
Theory of Planned Behaviour Prediction Hypotheses 133
Discussion 135
Theoretical Implications 136
Theory-Based Intervention 137
Theoretical Measurement Considerations 138
Fibromyalgia Implications 140
Strengths and Limitations 142
Future Research 144

General Discussion 146
Study One 147
Study Two 147
Study Three 151
Theoretical Relevance 153
Theoretical Measurement 154
Strengths and Limitations 155
Future Research 156
Theoretical Issues 156
Fibromyalgia Issues 158

References 160

Appendices 176

A	Study One:	Questionnaire	176
		Information letter, Recruitment Poster/Letter	189
B	Study One:	Scale Reliabilities	192
C	Study Two:	Questionnaire – Time One	194
		Questionnaire – Time Two	208
		Materials – Instructions, Recruitment poster/letter (script)	220
D	Study Two:	Scale Reliabilities – Time One	224
E	Study Two:	Theory of Planned Behaviour Descriptive Results – Time One	226
F	Study Two:	Scale Reliabilities – Time Two	228
G	Study Two:	Theory of Planned Behaviour Descriptive Results – Time Two	230
H	Study Two:	Hierarchical Multiple Regression Analyses with Social Support	232
I	Study Three:	Descriptives For Each Condition – Pre-Manipulation	234
J	Study Three:	Questionnaire – Pre-Manipulation	236
		Questionnaire – Post-Manipulation	245
		Materials – Positive & Negative Focus Group Discussion Scripts	253
		Participant Information Letter & Informed Consent	260
		Recruitment Poster	265
K	Study Three:	Physical Activity Thoughts – Pre- & Post-Manipulation	267
L	Study Three:	Scale Reliabilities – Pre-Manipulation	269
M	Study Three:	Scale Reliabilities – Post-Manipulation	271
N	Study Three:	Factor Analyses – Pre- & Post-Manipulation	273

List of Tables

Table	Title	Page
1	Participant Demographic and Symptom Variables	31
2	The Means, Standard Deviations, and Correlations for Selected Demographic, Physical, and Psychological Variables	35
3	The Means (Standard Deviations) and Univariate Statistics for the Discriminating Variables of Physical Activity Level	37
4	The Means (Standard Deviations) and Univariate Statistics for the Discriminating Variables of Functional Status	38
5	Time 1 FM Participants' Demographic, Physical Activity, and Symptom Variables	65
6	Time 1 Physical Activity Behaviour and Intention	66
7	Hierarchical Multiple Regression Analyses Steps to Test the Mediation of Intent on Behaviour	68
8	Time 1 Descriptives for the TPB Constructs	71
9	Time 1 Bivariate Correlations Between Primary Variables for the Physically Active Participants	72
10	Time 1 Prediction of Physical Activity Intention Using Hierarchical Multiple Regression Analyses	74
11	Time 2 Descriptives for the TPB Constructs and Exercise Behaviour	76
12	Time 2 Bivariate Correlations Between Primary Variables for the Physically Active Participants	77
13	Time 2 Prediction of Physical Activity Intention and Behaviour Using Hierarchical Multiple Regression Analyses	81
14	Prospective Prediction of Physical Activity Intention and Behaviour Using Hierarchical Multiple Regression Analyses	83
15	Targeted TPB Constructs in the Positive and Negative Conditions	101
16	Average Frequency of the Facilitator's Feedback Responses in the Positive and Negative Conditions	104
17	The Fourteen Attitude Pairs Reflecting Experiential and Factual Attitudes	108
18	Pre-Manipulation Values for Demographic Variables for the Entire Sample	116
19	Pre-Manipulation Bivariate Correlations Between Primary Variables for the Entire Sample	122
20	Pre-Manipulation Descriptives for the TPB Variables for the Entire Sample and for Participants Within Each Condition	126
21	Pre-Manipulation MANOVA on the TPB Variables	127
22	Post-Manipulation Descriptives for the TPB Variables for Participants Within Each Condition	128
23	Post-Manipulation Bivariate Correlations Between Primary Variables for the Entire Sample	129
24	Post-Manipulation MANOVA on the TPB Variables	132
25	Alternative Behavioural Intention Measure Values	133

Table	Title	Page
26	Order of the Hierarchical Multiple Regression Analysis to Test the TPB Concurrent Hypotheses at Pre- and Post-Manipulation	134
27	Pre- and Post-Manipulation Concurrent Prediction of Physical Activity Intention	135

List of Figures

Figure	Title	Page
1	The Theory of Planned Behaviour	15

General Introduction

For both healthy and chronically diseased individuals, the self-regulation of health behaviour is suggested as central to initiating and motivating actions to promote a healthy lifestyle and prevent disease (Bandura, 1986). One of the central aspects of the process of self-regulation is the perception of control. Indeed, control is necessary for successful initiation and maintenance of a number of health behaviours (e.g., physical activity, healthy eating, or safe sexual practices; see review by Godin & Kok, 1996). The health behaviour of physical activity provides the opportunity to examine self-regulation and issues of control in particular. As a behaviour that is not always under one's volitional control (e.g., in diseased populations many factors may influence activity involvement), participation in physical activity relies heavily on the presence of control within the individual. The importance of control to physical activity is also highlighted in cases of non-adherence. For example, when control becomes diminished, lapses in an individual's physical activity program occur and may eventually lead to complete non-adherence, or a physically inactive lifestyle (Dishman, 1988).

From a public health perspective, inactivity is as great a risk factor as smoking (Craig, 1998). Although increased physical activity is one remedy for the risk-related effects of inactivity, motivating the previously sedentary to initiate and maintain activity or the moderately active individual to increase physical activity remains a problem. Dishman's (1988) work has revealed that in normal or asymptomatic populations, adherence to physical activity programs drops to approximately 50% within the first six months. Meichenbaum and Turk (1987) also highlight the problems seen in adherence to health behaviour in general (including physical activity), and have suggested a number of

determinants (i.e., personal, environmental, or task) that may be related to the problem of non-adherence.

While adherence to physical activity is a huge problem within healthy or asymptomatic populations, this adherence issue becomes even more complex when one is dealing with a symptomatic or unhealthy population. Specifically, failure to self-regulate or control adherence to physical activity may be related to specific, personal physical determinants among the chronically diseased. Indeed, physical limitations could restrict the control of exercise among those who could obviously benefit from a regular program of physical activity. In particular, the physical symptomatology of the disease per se may constrain activity, even when the participants are motivated, perceive the benefits, and have a supportive environment to promote the physical activity behaviour. The role of control thus becomes even more central to determining the initiation and continued motivation of adhering to the health behaviour of physical activity for chronically diseased populations (Bandura, 1986; Maddux, Brawley, & Boykin, 1995). For example, if individuals do not perceive to have control over their activities of daily living because of their chronic condition, the odds of having control over being physically active are diminished. Alternatively, if the individuals' control is enhanced, this may be reflected in greater involvement in a physical activity program and the accrual of important benefits (e.g., improvement in health-related quality of life -- HRQL).

One such chronic disease where issues of control are paramount is Fibromyalgia (FM). FM patients have to struggle with a host of unpredictably occurring symptoms, ranging from global pain, specific tenderpoint pain, and extreme fatigue to cognitive disturbances, balance problems, and gastrointestinal disorders. Thus, the control of

systematic physical activity, when real barriers such as chronic pain and fatigue are present, represents a major challenge for FM patients. Interestingly, physical activity is a recommended treatment for FM. To thus understand the dilemma faced by the FM individuals who receive this treatment recommendation to improve their health, a brief review of the characteristics of the disease is instructive.

Fibromyalgia

FM is a condition characterized by widespread nonarticular musculoskeletal pain, tenderness upon palpation in a minimum of 11 of the 18 tenderpoints, and pain in all 4 quadrants of the body (Wolfe et al., 1990). Numerous other symptoms may also be associated with this syndrome, including but not limited to sleep disturbances and the resulting fatigue, irritable bowel syndrome, cognitive disturbances, and numbness and tingling in the extremities (Hauswirth, Bigatti, & Cronan, 1998; Wolfe et al., 1990). Individuals may experience extreme fluctuations in both the type and severity of their FM symptoms over time (Elrod, 1997) which may enhance their uncertainty in how to most effectively cope with this condition. It is estimated that as many as 3.9% of the population (approximately 3 million individuals, the vast majority of which are women) may suffer from this condition (Wolfe, Ross, Anderson, Russell, & Hebert, 1995), and it may affect up to 20% of patients seen in rheumatology clinics (Keefe & Caldwell, 1997). The Arthritis Society (1999) rates FM as the second most common arthritis-related condition. Although research of late has been devoted to determining the etiology, the diagnosis of FM still lacks a definitive laboratory test. Uncertainty regarding the causal mechanisms exists, resulting in highly variable treatment from individual to individual. Patients may engage in multiple treatments consisting of prescribed medications,

massage therapy, physiotherapy, chiropractic care, alternative medicines, relaxation techniques, exercise, and various other programs of care (Huyser, Buckelew, Hewitt, & Johnson, 1997; Nicassio, Schuman, Kim, Cordova, & Weisman, 1997a; Nicassio, Radojevic, Weisman, Schuman, Kim, Schoenfeld-Smith, & Krall, 1997b). This variability in the type and success of treatment reflects a situation of uncertainty for numerous individuals, where objective control is unclear. Ultimately, this has negative implications for the individual's adaptation and adjustment to functioning effectively with FM.

Of the numerous advocated treatments, the use of physical activity appears to provide viable potential as a mechanism for coping with FM because it provides individuals with an enhanced sense of control over their symptoms generally, and their pain and fatigue, specifically (Buckelew, Murray, Hewett, Johnson, & Huyser, 1995). Due to the widespread clinical recommendation for the use of physical activity as a viable treatment (Elrod, 1997), there has been a recent increase in investigations that have examined the benefit that FM patients' experience by engaging in physical activity (Bennett et al., 1995; Burckhardt, Mannerkorpi, Hedenberg, & Bjelle, 1993; Gowans, deHueck, Voss, & Richardson, 1998; Huyser et al., 1997; Keel, Bodoky, Gerhard, & Muller, 1998; McCain, Bell, Mai, & Halliday, 1988; Martin, Nutting, Macintosh, Edworthy, Butterwick, & Cook, 1996; Mengshoel, Forseth, Haugen, Walle-Hanse, & Forre, 1995a; Mengshoel, Vollestad, & Forre, 1995b; Meyer & Lemley, in press; Natvig, Bruusgaard, & Eriksen, 1998; Norregaard, Lykkegaard, Mehlsen, & Danneskiold-Samsoe, 1997; Turk, Okifuji, Sinclair, & Starz, 1998a; Turk, Okifuji, Sinclair, & Starz, 1998b; Verstappen, van Santen-Hoeufft, Bolwijn, van der Linden, & Kuipers, 1997;

Wigers, 1996). This research does reflect that positive psychological correlates, such as well-being and increased confidence in performing activities of daily living (i.e., a form of perceived control; Bandura, 1997; Skinner, 1996), are associated with participation. These findings are interesting given that the bulk of this same research reports that patients often experience little reduction in actual FM physical symptoms from their adherence to regular physical activity (i.e., no substantial decrease in tenderpoint pain or fatigue ratings), although the perception of improvement in these physical measures often occurs. Improvement in physical fitness outcomes (i.e., peak VO^2 max, decreased resting heart rate) has also been found, suggesting that improving the physical fitness capabilities of those with FM is not necessarily limited by their condition.

Further support for physical activity as a beneficial treatment option comes from a recent review of the efficacy of treatment interventions for FM. Researchers compared categories of both pharmacological and nonpharmacological interventions in a meta-analysis that consisted of 49 studies and over 2000 participants (Rossy, Buckelew, Dorr, Hagglund, Thayer, McIntosh, Hewett, & Johnson, 1999). Nonpharmacological treatments included physical activity, cognitive behavioural therapy, or a combination of the two (no attempt was made to examine the independent effects of physical activity alone). The results revealed that nonpharmacological treatment appears to be more efficacious in improving *self-report* of FM symptoms and functional ability than does a pharmacological treatment alone.

A second review of self-management programs for FM specifically examined the efficacy of physical exercise training programs (Sandstrom & Keefe, 1998). Their results support exercise training as a means of improving fitness outcomes (e.g., work capacity,

dynamic endurance), tenderpoint threshold, and some measures of psychological distress. Finally, a variety of descriptive, correlational studies also suggest that physical activity is associated with improved coping with FM symptoms (Buckelew et al., 1995; Mengshoel et al., 1995b, Natvig et al., 1998; Wigers, 1996). This research clearly shows a positive relationship between physical activity and psychological variables (i.e., efficacy, depression, HRQL). It is apparent that physical activity may play an important role in coping with both the physical and psychological manifestations of FM.

The theoretical construct that has received the most attention within the FM and physical activity literature has been self-efficacy (Buckelew et al., 1995; Buckelew, Conway, Parker, Deuser, Read, Witty, Hewett, Minor, Johnson, VanMale, McINtosh, Nigh, & Kay, 1998). In the Rossy and colleagues (1999) review of 49 intervention-based studies, 17 examined nonpharmacological treatments (including physically-based, psychologically-based, or a combination of the two). Of these 17, only 7 indicated either an educational or a cognitive-behavioural treatment, of which self-efficacy was a component in all seven studies. Overall, the results concerning self-efficacy are indicative of support for this construct in relation to physical activity. Specifically, higher self-efficacy in those with FM is associated with a greater tendency to be physically active, whereas lower self-efficacy is associated with less active FM individuals.

The nature of FM as a fluctuating chronic condition presents individuals with consistent but variable types of challenges to their perceived behavioural control. If perceived behavioural control is conceptualized as self-efficacy, the challenges FM presents to personal efficacy provides the opportunity to investigate psychological and physical adjustment as a function of efficacy beliefs. For example, if an individual with

FM has high confidence (i.e., efficacy) in their abilities to handle day-to-day activities, FM flare-ups, or specific pain symptoms, their overall well-being and their HRQL may be enhanced (Rejeski, Brawley, & Shumaker, 1996). Likewise, if the individuals are low in their efficacy to handle their disease symptoms or activities of daily living, they would be less likely to be well-adapted and experience a lower overall sense of well-being or HRQL. Physical activity may provide one means of enhancing an individual's efficacy to cope more effectively with their FM. While the research to date is supportive of the role of efficacy in functioning more effectively with FM, there have been few systematically guided investigations of this important construct (note the exception of the research by Buckelew and colleagues, 1995, 1998). This may be due to the fact that very little of this FM research on physical activity has been placed within a theoretical framework.

From a theoretical perspective, various models or theories have been used to examine issues of perceived behavioural control within the realm of health behaviours. Indeed perceived behavioural control has been conceptualized in many different ways. For example, Skinner's (1996) recent review indicates that there are over 100 different terms that have been used to conceptualize control. Examples of theories that contain a control element and that have been used to examine health behaviour include the health belief model (Becker, 1974), protection motivation theory (Maddux & Rogers, 1983), the transtheoretical model (Prochaska & DiClemente, 1983), the theory of planned behaviour (TPB: Ajzen, 1985) and self-efficacy theory (SET: Bandura, 1986). Some of the most common conceptualizations of perceived behavioural control include difficulty measures, the interaction of control beliefs and perceived power, locus of control, and self-efficacy.

It is not the purpose of the present thesis to resolve the conceptual debate regarding all the conceptual elements of perceived behavioural control.

Two theories that have been suggested to be compatible, although they are rarely used in conjunction, are the TPB and SET (Weinstein, 1996). Each assumes that human beings are goal-directed, capable of rational decision-making, forethought and planning. Thus, people are capable of self-regulating their own actions. Central also to both of these theories is the issue of perceived behavioural control (Bandura, 1997; Dawson, Gyurcsik, Culos-Reed, & Brawley, in press; Maddux et al., 1995). The SET and TPB have also been the most frequently used to examine social psychological issues of adherence to physical activity. Much of the literature, however, concerns the initiation of and adherence to physical activity in asymptomatic, or healthy populations. By comparison, more limited attention has been paid to chronically diseased individuals for whom physical activity is prescribed as part of their treatment regimen.

The purpose of the following series of studies was to examine the relationship between perceived behavioural control and physical activity within individuals who experience the chronic pain condition of FM. The first study was designed to extend the previous research that has found a positive relationship between perceived behavioural control (i.e., measured as self-efficacy) and physical activity. The second study examined other variables in addition to self-efficacy by utilizing the theoretical framework provided by the TPB. Finally, the third study addressed the effects of a cognitive-affective intervention in changing theoretical mediators in the TPB. The remainder of this introduction focuses upon the background and rationale for the use of the theories in which perceived control was examined.

Self Efficacy Theory

Self-efficacy theory (SET: Bandura, 1986; 1997) has been frequently applied to the investigation of health behaviours. The two core constructs of SET are self-efficacy and outcome expectations. Specifically, outcome expectations are defined as beliefs concerning the likely consequences that a specific behaviour produces (Bandura, 1986; 1997). According to self-efficacy theory, outcome expectations may take three major forms: a) physical outcomes of the behaviour, b) social outcomes of the behaviour, and c) self-evaluative reactions to the behaviour. Each of these expectations may be either positive or negative and thus serve as either incentives or disincentives of behavioral performance. Outcome expectations are assumed to add to behavioural prediction when efficacy, or perceived behavioural control, is not high (i.e., when it is moderate and variable).

Self-efficacy is defined as beliefs in one's skills and abilities to organize and execute necessary courses of action that are required to perform a given behaviour (Bandura, 1997). Efficacy beliefs are thus hypothesized to influence behaviour through a) the choice of activity; b) the amount of effort exerted in the activity; and c) the amount of persistence exhibited in the face of obstacles and failures. For example, individuals who are efficacious in their skills and abilities in a particular behavioural domain will likely choose to engage in the behaviour and exert greater effort and persistence compared to individuals who lack efficacy. In addition to influencing behaviour, efficacy beliefs are hypothesized to influence individuals' affect, thought patterns, and motivation. For example, individuals with high efficacy in a particular domain will likely experience

more positive affect, set higher goals, and have higher motivation to engage in a behaviour compared to individuals who lack efficacy.

According to self-efficacy theory, there are four main determinants capable of altering self-efficacy beliefs: (a) enactive mastery experiences, (b) vicarious experiences, (c) verbal persuasion, and (d) physiological and affective states (Bandura, 1997). The first and most influential determinant of self-efficacy is mastery experiences that are obtained through performance accomplishments. Mastery experiences are so influential because they provide direct evidence of one's ability to successfully carry out effective courses of action. Second, vicarious experiences are obtained through modeling. The extent to which vicarious experiences influence self-efficacy depends on the individual's perceived similarity to the model. That is, the more similar the model is perceived to be, the more that self-efficacy will be influenced. Third, verbal persuasion reflects approaches used to convince individuals that they possess the capabilities to succeed in a given domain. Fourth, physiological and affective states produce somatic information that individuals rely upon when appraising their self-efficacy in a given domain.

Reviews of the SET Physical Activity Literature

Recent narrative reviews of self-efficacy and exercise behaviour indicate a robust relationship between efficacy and physical activity behaviour, with small to moderate effect sizes in most cases (Bandura, 1997; Culos-Reed, Brawley, & Gyurcsik, in press; McAuley, 1994; McAuley & Courneya, 1993; McAuley & Mihalko, 1998). To date, no meta-analytical reviews have been conducted on self-efficacy studies in the exercise domain. Despite this lack of statistical summarization of effect sizes, the narrative reviews indicate support for self-efficacy as both a determinant and an outcome of

exercise/physical activity behaviour. Specifically, three reviews report that self-efficacy influences exercise adherence in various populations, including asymptomatic or diseased populations, although its impact varies over time (Bandura, 1997; McAuley & Courneya, 1993; McAuley & Mihalko, 1998). For example, McAuley and Mihalko (1998) report that self-efficacy exerts the greatest impact on adherence when individuals are initiating a regular exercise program or attempting long-term maintenance of regular exercise. Interestingly, some of the most consistent findings regarding efficacy and physical activity come from symptomatic populations (Bandura, 1997).

As previously mentioned, very little of the FM and physical activity research has been conducted within any theoretical framework. However, of the limited research on this chronically diseased population, the most consistent "theoretically"-based studies have examined self-efficacy, as conceptualized within SET, as one of several outcome variables (Buckelew et al., 1995, 1998; Burckhardt et al., 1993; Gowans et al., 1998). In other words, the relationship between physical activity and FM with regard to FM symptoms, fitness level, psychological factors (i.e., depression) and confidence in coping (i.e., efficacy measures) was examined. All four of these studies examined self-efficacy for coping with FM pain, symptoms, and functioning as measured by the Arthritis Self-Efficacy Scale (Lorig, Chastain, Ung, Shoor, & Holman, 1989). In each case, a higher level of self-efficacy was evident in the physically active groups. Specifically, self-efficacy within all three subscales was improved in the correlational design (Buckelew et al., 1995) while efficacy for the two subscales of controlling FM pain and other symptoms was improved by an activity program in the Gowans and colleagues (1998) study. Self-efficacy for function was improved in the other two intervention-based

designs (Buckelew et al., 1998; Burckhardt et al., 1993). This limited amount of research is positive regarding the relationship between activity and efficacy, and deserves further examination within future work.

The Theory of Planned Behaviour

The Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) was developed to explain volitional, or freely chosen, behaviour. The TRA provided the framework for the development of the Theory of Planned Behaviour (TPB: Ajzen, 1985), which differs only with the addition of the perceived behavioural control component. Within the TRA, intentions are the immediate and sole determinant of behaviour. Intentions mediate the effect of the other TPB variables upon behaviour. The determinants of intentions are one's attitude about performing the specific actions and the influence of normative social forces (i.e., subjective norms) upon the individual performing the specific behaviour. These two factors are weighted because their impact on behavioural intention is a function of factors such as the individual's experience and the situational constraints. For example, the specific social context (e.g., physical activity in a cardiac rehabilitation setting), the proximity of the action in time (e.g., immediate or in future), and the particular aspect of the activity (e.g., the specific exercise or other health behaviour) are all proposed to vary the weighted influence of both attitude and subjective norm on the individual's intention to attempt an activity (e.g., exercise).

The first determinant of intentions, attitudes (i.e., the individual's affective feelings), are a function of beliefs concerning the perceived consequences of performing a behaviour and a personal evaluation of these consequences. For example, an individual who regularly engages in physical activity may believe that exercise is important for

staying healthy and highly values this healthy lifestyle. The second determinant of intentions, subjective norms (i.e., the social pressures to behave in a specific manner), are a function of the perceived expectations of salient others (i.e., referred to as normative beliefs) and the motivation to comply with these expectations. In essence, it is an outcome expectation (Maddux et al., 1995). For example, if an individual believes that their spouse wants them to remain active and they value the opinion of their spouse, subjective norm for exercising will be high and thus will positively influence intentions. Within the original TRA, both objective and subjective control are assumed to be high, and thus in examining behaviours with this model, it must be assumed (rather than measured) that control is high. Indeed, Ajzen (1985) notes that when control is high, the TRA operates like the TPB.

The TPB (Ajzen, 1985, 1991) is an extension of the TRA (Ajzen & Fishbien, 1980) with the addition of a single factor, perceived behavioural control (see Figure 1). The purpose of the addition of perceived behavioural control within the TPB was to provide an actual measurement of the control element, taking into account both real and perceived limitations to performing the behaviour. This enabled researchers to move from an attitudinal-based theory (e.g., attitude -- action) focused only on volitional behaviour, to examining non-volitional behaviours, or those not completely under the individual's control.

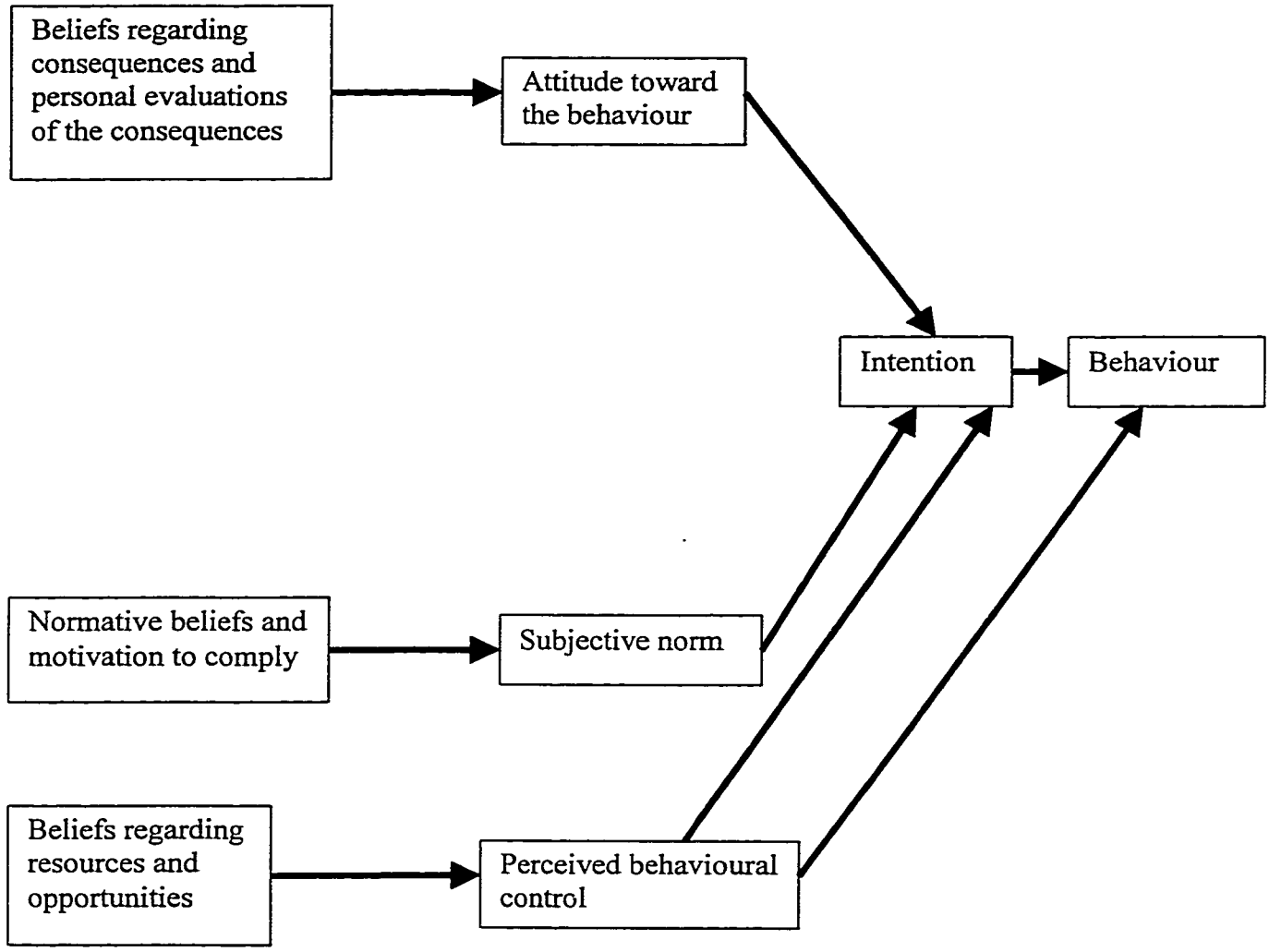
According to Ajzen (1991), perceived behavioural control is thus conceptualized as one's belief regarding how easy or difficult performance of the behaviour is likely to be. Underlying this conceptualization are individuals' beliefs about their resources and capabilities. Ajzen (1991), as well as others (cf. McAuley & Mihalko, 1998), has

suggested that self-efficacy (Bandura, 1997) can be used as an indicant of perceived behavioural control, although there are other conceptualizations and measures that have been used (see Armitage & Connor, 1999; Connor & Armitage, 1998). However, the conceptualization and measurement of perceived behavioural control as self-efficacy underscores the conceptual overlap and theoretical compatibility between SET and the TPB.

Perceived behavioural control is viewed not only as an indirect predictor of behaviour via intentions, but also as a direct predictor of behaviour. It is hypothesized that there is a direct link between perceived behavioural control and behaviour for non-volitional behaviours, where the individual may face real or perceived limitations to carrying out the behaviour. In the exercise context, if the individual's perceived behavioural control is high, the exercise behaviour is more likely to be performed. In contrast, when perceived control is low, the exercise behaviour is not likely to occur. Perceived behavioural control is in turn influenced by control beliefs and by the perceived power of a particular control factor to facilitate or inhibit performance of the behaviour. Similar to the influence of attitude and subjective norm on intentions, the precursors of perceived behavioural control are weighted and thus have an indirect weighted influence on behavioural intention and behaviour.

Figure 1.

The Theory of Planned Behaviour.



Reviews of the TPB Physical Activity Literature

While both the TRA and the TPB have been used within the physical activity domain, the TPB with its inclusion of the perceived behavioural control component provides a more reliable examination of the correlates and predictors of physical activity intentions and behaviour. A number of reviews have examined the research within

exercise or physical activity domains that has been conducted within the past 20 years utilizing the TPB as a conceptual framework (Ajzen, 1991; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997; Sutton, 1998). The reviews, which are of primarily two types, statistical and conceptual, offer overwhelming support for the TPB as a useful framework for examining physical activity or exercise behaviours. On average, the TPB variables of attitude, subjective norm, and perceived behavioural control explain anywhere from 40-60% of the variance in behavioural intentions, and 20-40% of the variance in behaviour. Within the support for the overall model, the TPB components that have received the strongest support in the physical activity setting are perceived behavioural control and attitude. Whether this is largely due to the setting, the subjects, the type of behaviour being studied, or the nature of the measurement of these variables remains unclear.

Conceptual, Measurement and Analysis Issues

Regardless of the consistent support of either SET or the TPB for predicting exercise intentions and behaviour, researchers continue to scrutinize the theories and advocate improvements. More specifically, some of the research has violated theoretical and measurement assumptions of the theories, thus jeopardizing the validity and reliability of the physical activity findings (cf. Courneya & McAuley, 1993; McAuley & Mihalko, 1998). For example, perhaps the single most important consideration that should be adhered to when conducting research within either theoretical framework is the operationalization and measurement of the core theoretical constructs (see reviews and descriptions by Brawley & Rodgers, 1993; Godin, 1993; Godin & Kok, 1996; Hausenblas et al., 1997). In general, it is important to define the action, context, type,

and time elements of the behaviour under investigation (Godin, 1993; McAuley & Mihalko, 1998; Sutton, 1998). The aforementioned reviews of the physical activity literature highlight two potential problems that occur when improper operationalization and measurement occur. First, the researcher may not be measuring what the theoretical construct proposes to measure. For example, including a perceived barriers measure such as "I do not like the way I feel when I exercise" may really be an indicator of the affective component of attitude and not of perceived behavioural control within the TPB. Within the SET, measurement of efficacy that is not specific to the behaviour under investigation violates issues of correspondence.

The second problem that can arise from improper operationalization of the variables is that two different variables may be measuring the same thing. For example, if perceived behavioural control is operationalized as "I am determined to exercise three times per week for the next four weeks" and intention is operationalized as "I intend to try to exercise three times per week for the next four weeks" or "I will exercise three times per week for the next four weeks" a legitimate question can be raised with respect to the similarity of measurement.

Summary

Issues of perceived behavioural control are important to consider when examining adherence to a variety of health behaviours, including physical activity. Within healthy, or asymptomatic populations, efficacy is strongly related to performance of a regular program of physical activity, and thus should be an important factor to consider when examining declining participation rates (Dishman, 1994). When we examine physical activity within symptomatic, or chronic disease populations, issues of perceived

behavioural control become even more important. Indeed, in reports of the correlates of physical activity in studies of special (i.e., elderly) or chronic diseased populations (McAuley & Kuttola, 1998; Schwartz, 1998), symptoms and health issues feature prominently as challenges to overcome. This is perhaps best highlighted by Bandura (1997), who notes that health behaviour change would be trivially easy if there were not so many obstacles to overcome. Within the FM population, physical activity has been strongly advocated as an important aspect of successful treatment. In order for the benefits of a regular program of physical activity to be realized, however, the individual with FM must experience perceived control over being physically active while dealing with the challenges inherent to this chronic disease. Only when control is increased will there be an increased probability that the benefits of the treatment of physical activity will also accrue. The purpose of the first study was to expand upon the previous FM and physical activity research by addressing methodological issues while examining the relationship between self-efficacy and physical activity in a sample of individuals with FM.

Study 1

Abstract

Objective: To determine whether those individuals with fibromyalgia (FM) who are more physically active differ in various psychosocial characteristics (i.e., self-efficacy, HRQL) compared to those who are less active, and do those who function better on a daily basis also differ on these characteristics than their less able counterparts.

Methods: The predominantly female sample (n=86) consisted of individuals medically diagnosed with FM. Measures included symptom variables, physical activity frequency and intensity, daily functioning, HRQL, and efficacy for physical activity, FM pain, and for other FM symptoms.

Results: Discriminant function analyses to predict physical activity status and functional ability status were significant. The variables of physical activity efficacy, pain efficacy, and the physical HRQL component were the best predictors.

Conclusion: Support for the importance of perceived control as well as HRQL for engaging in higher levels of physical activity and daily functioning was demonstrated. Future research must continue to examine psychosocial factors that impact functioning for individuals with FM.

Introduction

The importance of self-efficacy, or perceived behavioural control, in the health domain has been highlighted by a number of researchers (Bandura, 1997; McAuley & Mihalko, 1998; Skinner, 1996). Within the health behaviour of physical activity or exercise, self-efficacy has been implicated in initiation, adherence, and non-adherence behaviours (Bandura, 1997). Specifically, enhanced efficacy is associated with trying new programs of physical activity and maintaining the programs once begun. On the other hand, low efficacy is associated with decreased adherence and higher rates of dropout in the physical activity domain. Beyond these participation behaviours, efficacy is also associated with a host of additional beneficial outcomes, such as improved physical fitness, better daily functioning, higher sense of well-being and quality of life, and better coping. These benefits that are associated with enhanced self-efficacy are more pronounced in those who have more to gain, such as in populations with chronic physical conditions, including FM.

According to Social Cognitive Theory, and specifically Self-Efficacy Theory (Bandura, 1986), efficacy expectations are the individual's beliefs in his/her capabilities to perform specific actions. The importance of this sense of personal control, or self-efficacy, is illustrated by the psychological benefits afforded by physical activity for FM populations. In their examination of physical activity, Buckelew and colleagues (1995) found that the greatest predictor of decreased impairment on the physical activities measure was self-efficacy in the ability to cope with FM pain, functioning, and other symptoms. Efficacy was measured with the FM-adapted Arthritis Self-Efficacy scale (ASES; Lorig, et al., 1989), which contains the three subscales of efficacy for physical

functioning, pain, and controlling other symptoms. Thus, to the extent that individuals had more confidence in their ability to cope with their FM pain, other symptoms, and physical functions, the more likely they were to be less impaired on a measure of physical activity. A second study on FM and physical activity by Buckelew and colleagues (1998) found that treatment interventions (including an exercise component) improved self-efficacy for physical functioning, but did not improve efficacy for the other two ASE scales (i.e., for pain and other FM symptoms)

While increased symptom coping efficacy may be an important variable for predicting physical activity involvement in the FM population, more is known about self-efficacy and physical activity relative to other related chronic diseases (e.g., arthritis). For example, research has shown that self-efficacy moderates the effect of treatments on the physical performance of knee osteoarthritis (OA) patients (Rejeski, Ettinger, Martin, & Morgan, 1998). In other words, a treatment had a more positive impact on physical performance if the individual's efficacy to be active was high than if their efficacy was low. As well, Lorig and Holmann (1993) observed that enhancing self-efficacy coping beliefs aided pain reduction and increased physical activity levels in a sample of arthritic patients. Together, these results suggest that self-efficacy impacts upon the individual's ability to participate in spite of negative physical symptoms. These positive findings suggest important implications for the treatment of FM, as programs designed to enhance self-efficacy and physical activity in both arthritic and fibromyalgic populations have been successful (e.g., Buckelew et al., 1998; O'Leary, Shoor, Lorig, and Holman, 1988). If the positive outcomes of increased efficacy and physical activity can be produced with FM patients to the same extent as these outcomes have been observed for arthritis

patients, the potential impact on the individual's quality of life and coping abilities may be substantial.

As well as positively impacting an individual's level of daily functioning, physical activity may also beneficially impact one's health-related quality of life (HRQL). In a review by Rejeski and colleagues (1996), HRQL is defined as a multidimensional concept that involves participants' subjective appraisals of function. Their review highlights the importance of physical activity for enhancing an individual's HRQL, and that within arthritic populations (including an FM sample), there is a strong positive association between physical activity and enhanced HRQL. HRQL has not been examined rigorously as an outcome variable in FM-related research (Buckelew et al., 1995).

While the results of earlier research have been promising with respect to the relationship observed between self-efficacy and physical activity, some limitations are evident with respect to the measurement of physical activity. Specifically, in the studies by Buckelew and colleagues (1995, 1998), their use of the physical activity subscale from the Arthritis Impact Measurement Scale (AIMS: Meenan, Gertman, & Mason, 1980) did not provide an estimate of an individual's frequency of physical activity. As a treatment classification or outcome, physical activity is typically measured as the individual's frequency of physical activity. The AIMS, on the other hand, estimates the impact FM has on an individual's ability to engage in daily physical activities such as walking, bending, or lifting. Thus, physical activity frequency was never assessed in the Buckelew and colleagues studies and this limits the comparison of the study results with previous research that has estimated the frequency of physical activity in either healthy or

symptomatic populations (Courneya & McAuley, 1994; DuCharme & Brawley, 1995; Brawley & Rodgers, 1993).

An additional measurement problem in this earlier research is that the efficacy measure wasn't correspondent, or compatible, to the criterion of physical activity. Specifically, in the studies by Buckelew and colleagues (1995, 1998), efficacy was measured for FM pain, functioning, and other symptoms, while the criterion was a daily functioning measure of physical activity. None of the efficacy measures are strictly correspondent to this criterion. Of the three, the FM daily functioning efficacy most closely matches the physical activity functioning criterion, but even this is not as specific as has been advocated. Efficacy measures must be specific to the domains of functioning (McAuley & Mihalko, 1998). In other words, if one is interested in measuring actual physical activity (i.e., a frequency measure), the efficacy measure must "match" the physical activity measurement (i.e., efficacy scale items must concern confidence for physical activity frequency, not daily functioning).

The primary purpose of the present study was to thus determine if (a) FM individuals who are more physically active differ in various psychosocial characteristics (specifically, efficacy and HRQL) from those who are less active, and (b) if those who function better on a daily basis differ from their less able counterparts with respect to those same psychosocial characteristics. Based upon self-efficacy theory as well as the results and suggestions from previous FM research, it was hypothesized that FM symptoms, health-related quality of life, efficacy for pain management, and efficacy for physical activity would be related to (a) the level of participation in actual physical activity and (b) the functional status of FM individuals. The proposed relationships were

examined using more specific measures for assessing both physical activity level and self-efficacy for physical activity participation.

Methods

Procedure

Participants were recruited from numerous sources, including local support groups (primary source), massage, chiropractic and health clinics. Volunteers also responded to posters soliciting FM participants for a study. These posters were displayed in university and physical activity complexes as well as local health clubs. Subjects who agreed to participate in the study were informed of the voluntary and confidential nature of the study prior to completing the questionnaire. Approximately 80% of the total sample was drawn from support groups, while the remaining 20% of participants responded to the displayed posters or were referred from the various clinics.

Measures

Demographic variables. A series of demographic and descriptive variables consisting of age, gender, educational level, employment type, income level and brief medical history (i.e., time since the individuals first noticed FM symptoms and time since their FM diagnosis by a medical professional) were obtained (see Appendix A for the Study 1 materials). Among these were inclusion criteria in which participants had to indicate that they were medically diagnosed with FM and that FM had to be their primary health concern. This ensured that our results would pertain to the relationship between physical activity and FM and not be confounded by interactions with other chronic illnesses (e.g., arthritis, clinical depression).

Physical activity. Activity frequency over the last 6 months, the level of activity intensity, the type, and the reason for activity were assessed. Physical activity was defined according to the following intensities: low = light housework, easy walking; moderate = heavy yard or house work, walking moderately fast; and vigorous = fast walking, hard physical activity. These levels are the suggested conventions for grading the work intensity of various types of physical activity as proposed by the American College of Sports Medicine (ACSM) position statement on physical activity levels (Mazzeo, Cavanagh, Evans, Fiatarone, Hagberg, McAuley, & Startzell, 1998). The decision to measure physical activity in this way also allowed for the classification of the low activity levels of FM participants, most of whom would not engage in traditional exercise classes or exercise at high intensities. Previous research with special populations (i.e., arthritic or fibromyalgic individuals) has often defined physical activity according to the individual's ability to engage in daily activities (e.g., Buckelew et al., 1995; 1998). The present physical activity measure took into account the limited physical activity involvement of the FM participants, within dose-response conventions proposed in recent consensus statements about the effects of physical activity on morbidity and mortality for diseased and normal individuals. Physical activity frequency was thus assessed by having subjects indicate the number of times one engaged in physical activity during their typical week, over the past 6 months (0, less than 2, or 3 times per week). Physical activity intensity (according to ACSM definitions) was classified as either the "low", "moderate", or "vigorous" intensity that participants reported as characteristic of their usual physical activity session. Subjects also indicated

the reasons for and types of physical activity in which they engaged for purposes of describing the physical activity patterns of this sample.

FM symptoms. Pain was assessed with a Visual Analogue Scale (VAS), which has been found valid and reliable in previous FM research (Bigatti, Cronan, Gallager, & Cronan, 1998). The VAS uses a 10-cm line, with 0 indicating "no pain" and 10 indicating "pain as bad as it could be". Subjects indicated their level of pain by placing a mark somewhere on the line between the two endpoints.

Sleep and fatigue were measured with 6 items developed by Potts and Silverman (1990) for use with FM populations. Four items measured sleep problems and two items measured the resulting fatigue. Subjects indicated the frequency with which they experienced various sleep problems, such as difficulty falling asleep at night, during their typical week. After scoring for directional consistency (i.e., reverse scoring the necessary items), the items were summed and averaged to provide a total sleep disorder index. Higher scores were indicative of more severe sleep problems. These sleep items have shown adequate reliability and validity in past research (Potts & Silverman, 1990).

Due to the limited resources and non-clinical scope of the present study, tenderpoints were assessed by self-report based on the tenderpoint schematic diagram developed by Wolfe et al (1990). Individuals assess their perception of the severity of pain (low, moderate, severe) in each of the 18 tenderpoint areas which are noted on a visual total body display. Areas are then added to provide a total index of self-reported tenderpoint pain score. Research examining the validity of the self-report of tenderpoints, which is one of the central elements for a FM diagnosis, has been supportive of this self-reported tenderpoint diagram methodology (Finckh, Morabia,

Deluze, & Vischer, 1998). Pain severity ratings using the self-report tenderpoint diagram has been found to correlate highly with more objective physician-based assessments (i.e., dolorimeter pressure readings: Finckh et al., 1998).

Fibromyalgia impact questionnaire (FIQ). Functional ability was assessed using the ten FIQ (Burckhardt, Clark, & Bennett, 1991) items that measure how an individual's FM symptoms impact on their daily functions in a typical week (the first FIQ subscale). The items were summed and divided by the total number of completed items for each individual to give a total functional ability score. Previous research has shown adequate reliability of this measure (Burckhardt et al., 1991). The FIQ is commonly used throughout FM research as an indicant of functional ability (Bigatti et al., 1998; Hauswirth, Bigatti, & Cronan, 1998). Higher scores are reflective of worse daily functioning. The remaining items of the FIQ were not used in the present study in order to reduce subject burden.

Self-efficacy for physical activity. In order to be consistent with the physical activity measure, self-efficacy was assessed with respect to physical activity frequency. Twelve items for the frequency, intensity, and duration of the activity were assessed, based upon the recommendations of McAuley and Mihalko (1998). Self-efficacy for frequency was assessed as the individual's confidence to engage in physical activity sessions 3 or 5 times per week, at graded durations and levels of intensity. Intensity was assessed as the individual's confidence to engage in physical activity sessions of light, moderate, and vigorous intensities. Within each intensity level, graded duration and frequencies were applied. Finally, duration was assessed as the individuals' confidence in their ability to engage in physical activity sessions lasting 15 or 30 minutes, with

various intensities and frequencies. All items were scored on 0-10 scales, with anchors of 0 "can not do at all", 4-5 "moderately certain I can do", and 10 "completely certain I can do". An example item is "I can exercise at a low intensity for 15 minutes three times per week".

Analyses of pilot data[1] revealed that confidence to engage in physical activity at vigorous intensities and higher frequencies (e.g., 5 times per week) was very low and endorsed by very few participants. FM participants emphasized that this amount and intensity of activity was not realistic and would not generate reliable responses in future administrations of the efficacy measure. Thus, based on the frequency distributions of the scores on the three components of physical activity in the present sample, a composite physical efficacy score was created including items assessing low intensity exercise (at all durations and frequencies), and moderate intensity exercise of all durations but limited to three times per week. This composite score excluded the items assessing any vigorous intensity exercise and any moderate intensity exercise at high frequencies (i.e., five times per week) that were not deemed applicable for FM individuals by virtue of our pilot test. After excluding nonapplicable items, the final physical activity efficacy measure consisted of 7 items.

Self-efficacy for FM pain and other symptoms. The Arthritis Self-Efficacy subscales for physical pain and other symptoms (Lorig et al., 1989) were used to assess how certain individuals were that they could control their FM pain and other symptoms. Both of these subscales have been used in previous FM research and have been shown to be both valid and reliable (Buckelew et al., 1995, 1998). The pain subscale consisted of 5

[1] A sample of active FM participants (n = 12) completed the activity measures to ensure that the measures were capturing the necessary elements of activity level for this group.

items concerning how confident the individual was that they could control their FM pain. Each item was rated on a 10 to 100-point scale, with 10 being "very uncertain", and 100 being "very certain". In a similar fashion, the other symptoms subscale consisted of 6 items concerning how confident the individual was that they could control different FM symptoms, such as fatigue and depression. Each item was again rated on the same 10 to 100-point scale. The third subscale, a measure of physical function, was not included because a more specific physical activity self-efficacy was used in the present study. The principle of greater specificity of self-efficacy measurement advocated in a major review was the rationale for this decision (McAuley & Mihalko, 1998).

Health-related quality of life (hrql). Participants completed the SF-12 (Short Form of the Rand-36) (Ware, Kosinski, & Keller, 1995), a health inventory designed to assess how one's health impacts on the physical, mental and social aspects of one's life. As such, it measures one's perceptions of HRQL. Items consist of both Likert-scale and dichotomous (yes/no) responses. The SF-12 is composed of physical and mental health subscales (PCS and MCS, respectively), containing the eight concepts of physical functioning, physical role limitations, bodily pain, general health, vitality, social functioning, emotional role limitations, and mental health. The SF-12 is used extensively as an HRQL measure, and has demonstrated both validity and reliability (Ware et al., 1995). Compilation of data using the SF-12 has also produced norms for average and special populations (e.g., diabetes, heart disease). For example, the general US female population has a mean of 49.11 (PCS) and 49.42 (MCS). In the present FM sample, scores of 29.76 (PCS) and 40.40 (MCS) fall well below the 25th percentile for both subscales. The FM scores actually compare to the 25th percentile norms for the general

US seniors population, aged 75 years and older. The use of the SF-12 subscales therefore also allowed for comparison to both healthy as well as other symptomatic populations.

Participants

The sample consisted of 86 individuals who had been medically diagnosed with FM for an average of 5.6 years, but who had experienced variable FM symptoms for a longer average period of 13.8 years. The sample was predominantly female (96.5%), with a mean age of 49 years (SD = 11.04). Seventy percent of the sample was married and 46.5% had high school education while 46.6% had at least some post-secondary education (i.e., college, trade schools, university).

FM condition severity is typically characterized by various symptoms, such as sleep disorders, fatigue, and tenderpoints. For this sample, the average sleep disorder level (indicative also of fatigue) was 3.04 (SD = .45) on a 4-point scale, with higher scores reflective of more sleep disruption and increased fatigue. Self-reported tenderpoint severity was moderate, measuring 29.45 (SD = 8.87) on a scale from 0, no tenderpoint pain, to 54, the highest possible tenderpoint severity (i.e., all 18 tenderpoints rated very painful). All participants endorsed a minimum of 16 tenderpoints, with most indicating at least some pain in all 18. In addition, pain rating on a visual analogue scale (VAS) was 6.70 (SD = 1.8) on a 0-10 scale, indicating a fairly high level of overall perceived pain. Participant demographics can be seen in Table 1.

Table 1.

Participant Demographic and Symptom Variables.

Variable	n	%	Mean (SD)
Age	86	100	49.13 (11.04)
Gender – female	83	96.5	
male	2	2.3	
Educational level			
Highschool	40	46.5	
Trade school	15	17.4	
Some university	15	17.4	
University degree	10	11.6	
Graduate degree	4	4.7	
Marital status			
Married	60	70	
Single	12	14	
Divorced	10	11.6	
Annual yearly income			
Less than $20,000	15	17.5	
$20 - $39 999	26	30.2	
$40 - $60,000	18	21	
Greater than $60,000	13	15	
Time since diagnosis	85		5.64 (4.12)
Time with symptoms	82		13.89 (10.56)

Statistical Analysis

In order to determine if various psychosocial variables (i.e., symptoms, coping with symptoms, HRQL) were differentially characteristic of individuals who (a) engaged in more activity and (b) were higher in functional ability, an analysis of extreme groups was undertaken using the statistical package provided by SPSS. The rationale for this approach to analysis was that if some characteristics were typical of FM individuals as a function of their physical activity or daily functioning ability, their detection would be most likely in those individuals most extreme in this activity and these abilities. If individual characteristics could not discriminate those FM participants who were most extreme, it would be unlikely that hypothesized relationships existed.

The extreme groups method produces a more conservative test of the hypotheses because statistical power is reduced when only the extremes are analyzed. For the examination of extreme groups, the upper and lower aspects of the (a) physical activity distribution, and (b) the functional ability (FIQ) distribution were used. More specifically, physical activity level (i.e., a categorical variable) formed the less frequent exercisers (<2x/wk) and the more frequent exercisers (3x/wk). Functional ability extremes were determined by conducting a percentile split (top and bottom 40%) on the daily function measure (FIQ). The categorization of physical activity obviously sorted participants into groups. However, groups derived from an interval scale measure (i.e., the FIQ) must differ significantly on that measure to show that two truly different groups exist. A between-groups t-test verified that the two groups differed significantly in their daily functional ability ($t=13.24$, $p \leq .001$). Thus, further analyses of the extreme groups proceeded with respect to this variable.

Discriminant function analyses (DFA) were used to determine which variables would best discriminate between (a) individuals of varying physical activity levels, and (b) individuals of different levels of functional ability (FIQ measure). The predictor variables entered into both DFA's included efficacy for physical activity, efficacy for pain and other symptom management (adapted Arthritis Self-Efficacy subscales), FM physical symptoms (pain, sleep, and tenderpoint score), and the SF12, a health-related quality of life measure.

Results

Scale Reliabilities

The alpha levels for the questionnaire scales that were included in the subsequent analyses can be seen in Appendix B. All scales achieved an acceptable alpha level (i.e., above .70), ranging from a low of .80 for the FIQ scale, to a high of .96 for the physical activity efficacy scale. The only exception was the sleep/fatigue scale, which had an unacceptably low alpha of .55. However, the sleep scale was not used in either DFA, as the discriminant function analyses groups did not statistically differ on this variable.

Physical Activity

Of the total sample ($n = 86$) that met the study inclusion criteria, 79 individuals were classified as either sporadically active (<2x/wk: $n = 42$) or regularly active (3x/wk: $n = 37$). The seven inactive participants were not included in subsequent analyses, as the study focus was on physically active individuals. Descriptive data and the correlational analyses for this entire sample of classified individuals can be seen in Table 2. The majority of subjects engaged in multiple types of physical activity (89%), with the most common being cardiovascular activities (94%), relaxation activities (73%), and

strengthening activities (48%). Subjects also had multiple reasons for engaging in activity, with the most common responses including to cope with FM, enjoyment, and because it was medically recommended.

Table 2.

The Means, Standard Deviations, and Correlations for Selected Demographic, Physical, and Psychological Variables.

VARIABLE	1	2	3	4	5	6	7	8	9
Mean	4.88	4.73	5.05	29.96	40.48	6.69	3.03	5.57	13.99
Standard Deviation	2.85	1.96	2.02	6.43	10.52	1.66	0.45	4.16	10.67
1. PA Efficacy	_								
2. Pain Efficacy	.600**	_							
3. Symptom Efficacy	.495**	.826**	_						
4. SF12 Physical	.483**	.248*	.265*	_					
5. SF12 Mental	.292*	.511**	.599**	-.105	_				
6. Pain	-.193	-.386**	-.470**	-.350**	.274*	_			
7. Sleep	-.340**	-.410**	-.428**	-.262*	-.238*	.366**	_		
8. Time since Diagnosed	-.122	.107	.217	-.019	.221	-.151	-.084	_	
9. FIQ[2]	-.419**	-.285*	-.412**	-.355**	-.326*	.291*	.338*	-.020	_

Note. $n = 79$. * $p \leq .05$ **, $p \leq .01$. PA = Physical Activity, SF12 = Short Form-12. Shaded areas represent multicollinearity. The scale ranges were 1) 0-10, 2) 0-10, 3) 0-10, 4) 0-100, 5)0-100, 6) 0-10, 7) 1-4, and 9) 1-4.

[2] The FIQ is scored with higher scores reflecting less daily physical functioning ability.

Due to the multicollinearity evident between the two Arthritis Self-Efficacy subscales of pain and other symptom efficacy, further analyses included only the pain efficacy subscale. The decision was made to include this pain subscale rather than the other symptoms efficacy subscale because of the more specific symptom nature of the items in the pain subscale and because pain is the primary distinguishing symptom of FM. The high correlation between the two subscales is likely due to the elements of pain control that the other symptom efficacy items include.

Discriminant Function Analyses

As a first step, both sets of extreme groups were examined to determine if they differed with respect to demographics or symptomatology. DFA analyses on these general descriptive covariates revealed that neither the self-reported symptom variables (i.e., pain, sleep disorder, tenderpoint count) nor the demographic variables (i.e., age, gender, education, SES) discriminated between a) the two physical activity groups or b) the two functional ability groups. Thus, these variables were excluded from the predictive models for each set of extreme groups.

Subsequent DFA's for each pair of extreme groups thus utilized the hypothesized predictors of physical activity efficacy, pain efficacy, and the SF12 physical and mental component subscales. Statistical assumptions associated with the DFA procedure were examined for both of the subsequent analyses and were not violated (i.e., all normality assumptions were met), allowing the analyses to proceed (Tabachnick & Fidell, 1996).

Physical activity. The first DFA to predict physical activity status was significant (Wilks lambda = .711, $p < .0001$). Level of physical activity was best discriminated by physical activity efficacy, pain efficacy, and the physical component subscale of the

SF12. Thus, those more active in their physical activity participation also had much greater efficacy to exercise, to control their pain due to FM, and had better physical HRQL than their relatively less active FM counterparts. The SF12 mental subscale approached significance ($p = .08$). The descriptive and univariate statistics for the discriminating variables can be seen in Table 3.

Table 3.

The Means (Standard Deviations) and Univariate Statistics for the Discriminating Variables of Physical Activity Level.

Variables	Physical Activity Level		Wilks' (p)	Canonical Coefficient
	≤2x/week	≥3x/week		
PA Efficacy	3.61 (2.64)	6.63 (2.33)	.729 (.0001)	.742
SF12 Physical	27.87 (5.43)	32.28 (7.26)	.890 (.005)	.265
Pain Efficacy	4.16 (1.92)	5.60 (1.63)	.860 (.002)	.181
SF12 Mental	37.61 (10.33)	41.93 (9.98)	.956 (.08)	.087

Note. $n = 79$. PA = Physical Activity, SF12 = Short Form-12. The scale ranges were PA and Pain Efficacy (0-10), SF12 Physical and Mental (0-100).

Functional ability. The second DFA to predict functional status (high functional ability group, $n = 26$, low functional ability group, $n = 29$) was also significant (Wilks lambda = .815, $p = .03$). Functional ability level was best discriminated by physical activity efficacy and the SF12 physical component subscale. Thus, those with greater functional ability in their daily tasks had greater efficacy to exercise and better physical HRQL than their less able FM counterparts. The descriptive and univariate statistics for the discriminating variables can be seen in Table 4.

Table 4.

The Means (Standard Deviations) and Univariate Statistics for the Discriminating Variables of Functional Status.

Variables	Functional Ability Status		Wilks' (p)	Canonical Coefficient
	Low	High		
PA Efficacy	4.34 (2.68)	6.52 (2.81)	.859 (.005)	.606
SF12 Physical	28.82 (6.04)	32.79 (6.50)	.906 (.02)	.505
Pain Efficacy	4.35 (1.78)	5.35 (2.15)	.938 (.06)	-.236
SF12 Mental	37.09 (8.94)	42.05 (10.66)	.938 (.06)	.498

Note. n = 55. PA = Physical Activity, SF12 = Short Form-12. The scale ranges were PA and Pain Efficacy (0-10), SF12 Physical and Mental (0-100).

Discussion

Efficacy

In agreement with earlier FM and general health research, the results of the present study suggest that greater perceived control, as measured by self-efficacy, is strongly related to greater levels of physical activity. Specifically, confidence in one's ability to engage in physical activity as well as in one's ability to control FM pain, is related to level of participation in physical activity. This finding provides support for the relationship between self-regulatory beliefs and mastery of physical activity among FM individuals. Active individuals were above the midpoint of the scale reflecting a more positive efficacy strength whereas sporadically active individuals suffered from lower confidence in their ability to engage in low level and moderate activity.

Not surprisingly, level of functional ability was also related to one's level of physical activity efficacy. When an individual feels confident in their ability to engage in

physical activity, various movement-related tasks of daily living that require less physical effort (i.e., shopping, walking a few blocks) are also perceived as manageable. While pain efficacy was not significantly related, examination of the predictors revealed a similar trend (i.e., higher functional ability associated with increased confidence to cope with pain).

These results support and extend previous work examining self-efficacy within arthritic (Rejeski & Shumaker, 1994; Rejeski et al., 1998) and FM populations (Buckelew, Murray, Hewett, Johnson, & Huyser, 1994; Buckelew et al., 1995, 1998; Huyser et al., 1997;,Lorig & Holman, 1993; O'Leary et al., 1988). In particular, Buckelew and colleagues have demonstrated that efficacy for pain, for other symptoms, and for function (i.e., the three arthritis self-efficacy subscales) predicted less pain behaviour (1994) and less perceived impairment in physical activity (1995). The present findings add to and improve upon previous results because physical activity was measured according to a recognized consensus definition (i.e., ACSM definition: Mazzeo et al., 1998). This contrasts with the previous FM studies which used a "daily functioning" measure as an activity assessment (i.e., the AIMS physical functioning subscale). Thus, although findings in the present study agree with earlier results, direct comparisons between the levels of physical activity should be made with caution because of the differences in measurement. The use of an actual frequency measure of physical activity extends the previous FM research on physical activity and allows comparison to physical activity results that focus on activity dosage and psychosocial correlates found in the literature on health, exercise and disease (Deuster, 1996; van Baar, Assendelft, Dekker, Oostendorp, & Bijlsma, 1999).

The present results regarding physical activity and the efficacy of FM individuals compares well to the relationship observed between efficacy and physical activity in the general health and disease literature. For example, positive relationships between physical activity and efficacy for coping with pain have been observed in OA (Rejeski et al., 1998) and FM (Buckelew et al., 1998) populations. The relationships observed between pain coping efficacy and physical activity, and also between physical activity efficacy and engagement in actual physical activity continue to support previous health and disease evidence (Bandura, 1986). Self-efficacy is implicated in exercise adherence in both diseased and asymptomatic populations, and thus has important implications for the management of a chronic disease such as FM.

Health-Related Quality of Life (HRQL)

The finding that HRQL is also related to physical activity level confirms results found for chronic disease in a recent review (Rejeski et al., 1996). Research has shown a positive relationship between HRQL and function (Rejeski et al., 1998) and between HRQL and physical activity (Rejeski & Mihalko, in press). In chronic disease populations, HRQL may be an even more important outcome than actual symptom reduction because it represents the satisfaction with those functions that an individual values. Thus, although FM individuals did not report any differences in their symptoms across different activity groups, they did differ in their HRQL. Specifically, HRQL helped to discriminate FM individuals who were more and less active and those who were more or less functionally able. More frequent FM exercisers and those with a higher functional ability status had a higher HRQL score, indicating they perceived themselves as less limited in their physical abilities than their less able peers.

FM Symptoms

As previously mentioned, in contrast to earlier research, the measurement of FM symptoms (i.e., pain, sleep, and self-reported tenderpoint ratings) did not significantly discriminate between either the physical activity or functional ability groups. The majority of previous research investigations (Buckelew et al., 1998; McCain, Bell, Mai, & Halliday, 1988; Natvig, Bruusgaard, & Eriksen, 1998; Turk, Okifuji, Sinclair, & Starz, 1998b) have focused upon the very physical nature of FM. The present results, however, reflect the importance of the relationship between control beliefs and HRQL relative to one's functioning. While symptomatology is important, the FM individual's perception of control and quality of life may be psychosocial indicants that reflect the variability in physical activity and day to day function beyond that which is associated with the chronic symptoms of FM.

Strengths and Limitations

Although the results of the present study are encouraging, they must be considered relative to the study limitations. Foremost of these is the cross-sectional nature of the data, which does not allow the suggestion of efficacy as a causal mechanism for increasing activity frequency or improving functional ability. Second, the self-selected nature of the study participants also limits the generalizability to the larger FM population. It may be that the study participants represent a more motivated segment of the FM population. On the other hand, this sample is representative of the FM clinical population as revealed by the measurement of their self-reported symptomatology.

However, these limitations should not overshadow the strengths of the study. First, measurement of physical activity according to known physical activity conventions

(i.e., known to encourage health on the basis of epidemiological evidence) provides a more accurate picture of the activity-efficacy relationship in FM individuals. Second, the operationalization of physical activity efficacy was made correspondent to the activity measurement (i.e., in terms of frequency). This also represents an improvement over previous FM research which used a more generalized measure of activity. Bandura (1986) and McAuley and Mihalko (1998) have noted the importance of measuring efficacy specific to exercise behaviour in their reviews of the exercise efficacy literature. Finally, the use of the SF-12 represents a valid, reliable, and widely used measurement of HRQL, capturing both the physical and mental components of one's perceived HRQL. Attention to the improved measurement of both efficacy and HRQL were two of the important elements for future research highlighted in a recent review of HRQL and physical activity in normal and chronically diseased populations (Rejeski & Mihalko, in press).

Last, the importance of basing a priori hypotheses on a strong theoretical foundation represents a contrast with earlier FM studies. The vast majority of previous FM research has been largely atheoretical. Studies that have examined self-efficacy have taken the first step towards investigating FM from a theoretical perspective, however they have not been based entirely on a theoretical framework, such as social cognitive theory (Bandura, 1986). Utilizing a theoretical perspective will help the FM research progress in a systematic manner (Baranowski, Lin, Wetter, Resnicow, & Hearn, 1997; Brawley & Culos-Reed, in press). In the intervention research literature on physical activity as a treatment for disease or health promotion, the identification of theoretically-based

mediating variables that cause improved outcomes is central in evaluating intervention success (Baranowski et al., 1997; Baranowski, Anderson, & Carmack, 1998).

Future Research

Future research must continue to examine FM from a psychosocial perspective in order to attempt to better understand the role physical activity plays in helping individuals to cope psychologically with this chronic condition. A recent review highlights the importance of physical activity as a nonpharmacological treatment for FM (Rossy et al., 1999). Utilizing measures of physical activity that reflect consensus conventions (i.e., ACSM activity levels) and attempting to remedy the measurement of both psychological and physical outcomes should help to improve the research on the role of physical activity in coping with FM. Finally, the importance of self-efficacy should continue to be examined as a mediator of the beneficial effects of physical activity and/or as a mechanism that influences the adherence of FM individuals to physical activity as a treatment. Physical activity and behaviour change interventions designed to enhance efficacy for physical activity and for coping with FM pain may ultimately promote an enhanced health-related quality of life in individuals with FM.

Study Two

Abstract

Objective: To prospectively examine the relationship between physical activity patterns and psychosocial predictors in a sample of individuals with fibromyalgia (FM). The theory of planned behaviour (TPB: Ajzen, 1985) provided the framework for this investigation.

Methods: The sample consisted of 68 participants who tracked their physical activity over a 1-month period, completing baseline and endpoint questionnaires. All of the core theoretical variables were measured specific to the target behaviour of physical activity.

Results: A series of hierarchical multiple regression analyses were run to test both the concurrent and prospective hypotheses postulated by the TPB. The results supported the predictive ability of the TPB, and in particular, the strong role of the perceived behavioural control component (as measured by self-efficacy).

Conclusions: This study represents the first use of the TPB within the FM literature, and results offer support for the hypothesized direct path from perceived behavioural control to behavioural intention as well as to actual physical activity behaviour.

Introduction

The relationship between efficacy and the health behaviour of physical activity has been supported in both healthy and symptomatic populations (Bandura, 1997). The Study 1 finding that efficacy correlates with physical activity in individuals with FM supports previous work by Buckelew and colleagues (1995, 1998). Physical activity is a prescription for many individuals with FM, yet having to deal with their many variable symptoms, including pain and fatigue, means that individuals must possess sufficiently high levels of perceived behavioural control in order to engage in physical activity, maintain it, and thereby achieve some treatment success. While the results of Study 1 are positive and promising, the simple correlational design and measurement of only one social cognitive variable may be limiting our understanding of what motivates the physical activity of FM individuals. As discussed in the general introduction, very little of the FM-based research has utilized a theoretical perspective to hypothesize about the efficacy-activity relationship. Baranowski and colleagues (1997) have suggested that utilizing a theoretical perspective is integral for linking systematic research from prediction of a behaviour to intervention with a behaviour. Therefore, the purpose of Study 2 was to expand the study of the psychological determinants of physical activity by using the TPB. In order to appreciate the rationale for the choice of this theory, the following background may be instructive.

The Theory of Planned Behaviour

As previously discussed, the TPB states that there are three predictors of behavioural intention: attitude, subjective norm, and perceived behavioural control. Behavioural intentions, in turn, predict one's actual behaviour and are considered to be

mediators of the influence of the three social cognitive variables on behaviour. The TPB also states that perceived behavioural control may be a direct predictor of behaviour. Both of these paths to predicting behaviour can be seen in Figure 1.

While there has been support for perceived behavioural control (i.e., as conceptualized as efficacy) within FM populations, support for the prediction of behaviour by the TPB variables of attitude and subjective norm comes from an examination of physical activity research on individuals with other chronic diseases, as well as healthy but sedentary, and active individuals. For example, the role of attitude for enhancing physical activity intentions in cancer has been documented (Courneya & Friedenreich, 1997a; Courneya et al., 1999). As well, in reviews of the TPB and TRA, attitude emerged as an important contributor to the prediction of both intentions and behaviour (Godin & Sheppard, 1990; Hausenblas et al., 1997).

Similarly, social support from family and friends is consistently related to physical activity (Dishman & Sallis, 1994). A review of the relationship between social influence and exercise, however, revealed only a small to moderate positive effect of social influence on exercise behaviour (Carron, Hausenblas, & Mack, 1996). Research on social support within chronic disease populations indicates that this factor is related to successful coping with the chronic disease (e.g., Gregoire, Kalogeropoulos, & Corcos, 1997; Roberson-Nay, Rohan, Dubbert, Fowler, Catz, & Godding, 2000). The role of significant others may also impact other social cognitive variables, such as perceived behavioural control. For example, in a classic study of coronary heart disease patients (Taylor, Bandura, Ewart, Miller, & DeBusk, 1985), the role of spouses was strongly related to successful rehabilitation. Specifically, spouses who were more aware of the

demands of exercise via their own participation in a stress test were more supportive of their partners, which translated into higher efficacy and better cardiac efficiency for the rehabilitation patients months later in the program.

Within the TPB research on physical activity, however, subjective norm has generally been a weak predictor (Hausenblas et al., 1997). A number of reasons for subjective norm's weaker role in the prediction of physical activity intentions and behaviour have been offered, including measurement issues and the domain of behaviour under investigation. Specifically, within the multiplicative construct of subjective norm, critics have suggested that the motivation to comply component limits the total construct's relationship to the other TPB variables (cf. Ajzen, 1991). Despite this criticism, very little of the research has utilized an alternative conceptualization of the subjective norm component of the TPB (cf. DeVries, Backbier, Kok, & Dijkstra, 1995). The second issue, regarding the weak relationship between subjective norm and intentions or behaviour may be due to the area of behaviour under study. Support for this idea comes from the stronger role of subjective norm for other health behaviours, such as contraceptive practices (i.e., condom use) in HIV populations (cf. Godin & Kok, 1996).

TPB-based research conducted within other chronic disease or special populations (cancer: Courneya & Friedenreich, 1997a, 1999; Courneya, Friedenreich, Arthur, & Bobick, 1999; elderly: Courneya, 1995; Michels & Kugler, 1998; heart disease: Godin, Valois, Jobin, & Ross, 1991; pregnant women: Godin, Valois, & LePage, 1993; Godin, Vezina, & Leclerc, 1989) supports the use of the TPB for the prediction of numerous health behaviours, including physical activity. Perceived behavioural control emerges as the strongest predictor of behavioural intentions, while both attitude and subjective norm

appear to vary from study to study. However, the vast majority of the TPB research on the health behaviour of physical activity has been conducted on the general population (see reviews by Godin, 1993; Godin & Kok, 1996; Hausenblas et al., 1997; Sutton, 1998). The TPB consistently shows that all three of the core variables (i.e., attitudes, subjective norm, and perceived behavioural control) are positively associated with activity level to varying degrees (Hausenblas et al., 1997). Specifically, the review by Hausenblas and colleagues highlighted the importance of the perceived control construct, which had a large effect size with both exercise behaviour (ES = 1.01) and exercise intention (ES = 0.97). Attitudes as measured within research on the TRA also had a large effect size with intention (ES = 1.22) and behaviour (ES = 0.84), while the effect size between subjective norm and intention was noticeably smaller (ES = 0.56) and almost negligent between subjective norm and behaviour (ES = 0.18).

Thus, the TPB provides a number of key variables that are likely to be important factors to help individuals with FM cope with their physical and psychological symptoms by engaging in physical activity. First, perceived behavioural control is a consistently strong predictor of both physical activity intentions and behaviour (Hausenblas et al., 1997), and it is an important predictor of functional ability in FM (when operationalized as self-efficacy: Buckelew et al., 1995, 1998). Second, the attitude component is also important for individuals with a chronic disease (cf. Courneya & Friedenreich, 1999). While the third factor, subjective norm, has been the least supported component relative to physical activity (Hausenblas et al., 1997), the TPB states that the three predictors are weighted, and their contribution to prediction depends upon the behaviour and the population under investigation. Thus, one might expect that this social pressure factor

would play a stronger role for a chronic disease population such as FM. Finally, proximal goals and motivational desire are encapsulated within the behavioural intention variable. The TPB suggests that the stronger an individual's intention to perform a specific behaviour, the more likely that behaviour will actually occur.

Measurement and Analysis Issues

Despite the supportive results for the TPB relative to the adoption and maintenance of physical activity, a number of theoretical and conceptual issues have been raised about this research. These issues become important measurement and analysis considerations when utilizing the theory to predict physical activity behaviour in a specific population. Some of these issues include a) measurement correspondence between the TPB variables and behavioural variables (Courneya, 1994; Courneya & McAuley, 1993), b) the role of additional variables within the TPB to aid prediction of intentions and behaviour (Ajzen, 1991; Biddle, Goudas, & Page, 1994; Conner & Armitage, 1998; Norman & Smith, 1995; Theodorakis, 1994), c) the conceptualization and associated measurement of core variables (Ajzen, 1991; Courneya & McAuley, 1993; Sparks, Guthrie, & Shepherd, 1997), and d) analysis issues (Ajzen, 1991; Baron & Kenny, 1986; McAuley & Mihalko, 1998; Randall & Wolff, 1994). Three issues that were the focus of attention for measurement in the present study are briefly outlined.

Scale specificity and correspondence. A key to correctly examining the utility of the TPB lies in the operationalization and measurement of the core variables. Of utmost importance is the necessary degree of specificity within the measures with respect to the target, time, context, and action elements. Each of the variables of attitude, perceived behavioural control, subjective norm, behavioural intention, and behaviour, must be

measuring the same level of specificity and correspond to the dependent behavioural variable. Scale correspondence in regard to the behavioural intention and behaviour variables of the TPB (Ajzen & Fishbien, 1980; Courneya & McAuley, 1993) is also of considerable importance for prediction. Researchers tend to "mix" format types and thereby not achieve the necessary measurement correspondence (Courneya & McAuley, 1993). Courneya and McAuley (1993) suggest employing the continuous-open method for assessing both intention and behaviour (see Study 2 Questionnaire items for behavioural intention and behaviour for this scaling format). While it is acknowledged that this format poses potential problems for the theory and may limit the prediction of behavioural intention and behaviour from the three predictors, it is an issue which remains under debate (Sutton, 1998; Conner & Armitage, 1998). A study explicitly examining this debate is necessary before strict guidelines can be formulated.

Perceived behavioural control measurement. The measurement of perceived behavioural control is the TPB variable that has by far received the most attention (Sparks, Guthrie, & Shepherd, 1997). While the original measurement of perceived behavioural control utilized a perceived barriers measure (Ajzen, 1985; Ajzen & Madden, 1986), Ajzen (1991) later notes that perceived behavioural control as conceptualized within the TPB is related most closely to Bandura's notion of self-efficacy. Other conceptualizations that are less frequently used include a direct assessment of control over the behaviour in question or an external versus internal assessment of control (cf. Armitage & Connor, 1999). A concern raised with the use of the two most common conceptualizations for perceived behavioural control (i.e., efficacy and barriers) is that they are likely to be interpreted differently by respondents. Specifically, some

behaviours may be seen as being under one's volitional control (the efficacy measure), but are difficult to carry out (the barriers measure). Thus, very different results would be obtained depending on the nature of the perceived behavioural control measurement.

Analysis of mediation. Finally, the TPB hypothesis of intention as a mediator of the relationship between perceived behavioural control and actual behaviour is conceptually discussed but has not been statistically tested in the physical activity research utilizing procedures that isolate the effect of the mediator. Baron and Kenny (1986) provide an excellent discussion of the conceptual distinction between mediation and moderation, and suggest the appropriate statistical procedures necessary to determine mediation. If intention is truly a mediator of the effects of the other TPB variables on behaviour, intention will capture the lion's share of the variance in predicting behaviour and the remaining TPB variables would not contribute significant variance to the model's prediction of behaviour. Various criteria about the relationships between the variables included in the mediation model must also be confirmed in order for a test of mediation to occur (i.e., significant independent relationships between the predictors and the dependent variable).

Prediction of Physical Activity

The purpose of Study 2 was to thus examine the TPB hypotheses within a prospective design. Based on knowledge of previous TPB research examining physical activity within both chronic disease and healthy populations, the specific hypotheses were as follows. It was hypothesized that perceived behavioural control would be the strongest predictor of behavioural intentions at both the start of the study (Time 1) and at the conclusion of the study (Time 2) (i.e., the concurrent tests) and from Time 1 to Time 2

(i.e., the prospective test). Both attitudes and subjective norms would add significantly to the multiple regressions for the concurrent tests. It was hypothesized that behavioural intention would be a significant predictor of behaviour for both the concurrent and prospective tests. In the tests of mediation, it was hypothesized that behavioural intention would be supported as a mediator of the influence of the other TPB variables on behaviour. Failing support for this hypothesis, it was predicted that perceived behavioural control would directly predict behaviour.

Methods

Procedure

Participants were recruited from numerous sources, including local support groups, physical activity centres, as well as massage, chiropractic and health clinics. Volunteers also responded to posters soliciting FM participants for a study. These posters were displayed in university and physical activity complexes as well as local health clubs. Subjects who agreed to participate in the study were informed of the voluntary and confidential nature of the study prior to completing the questionnaires. Approximately 80% of the total sample was drawn from support groups, while the remaining participants responded to the displayed posters or were referred from the various clinics.

Once recruited into the study, participants were mailed the complete study package, which consisted of an information letter, study consent form, the two questionnaires along with self-addressed stamped envelopes, and a calendar to track their physical activity over a 1-month period (see Appendices C1 - C5). Upon receiving the package, participants completed and mailed-in the study consent form and the baseline

questionnaire (Time 1; Appendix C1). They then followed with a 1-month tracking of their daily physical activity on a calendar provided to them. At the end of this 1-month period, participants again completed a questionnaire (Time 2; Appendix C2) which they mailed back to the researcher along with their completed physical activity calendar.

A number of efforts were made in an attempt to enhance retention from Time 1 to Time 2. First, individuals were phoned one week after the package had been mailed out as a reminder to complete and send-in their Time 1 questionnaire and consent form. If the package with the Time 1 questionnaire was not received within a week of their first phone call, a second call was made. One more week was given to mail in their Time 1 questionnaire, after which point the individual was removed from the participant list. Of the 90 study packages mailed, 71 returned their completed Time 1 questionnaire (79%). It is important to note that each participant's 1-month tracking of their physical activity then began on the date that they indicated they had completed the Time 1 questionnaire. They were asked to write their end-date (i.e., 1-month later) on their Time 2 questionnaire at the start of their involvement.

The second attempt to enhance Time 2 retention was a phone call targeted for the third week of their study involvement. During this phone call, they were reminded that they were to complete their Time 2 questionnaire and mail it back, along with their completed physical activity calendar, within the next week/at the end of their 1-month period. Another phone call was made during the end of the fourth week of their involvement as a reminder to complete and mail in their Time 2 questionnaire. If their Time 2 package was not received within 1 week of their targeted end date, a final phone call was made in an attempt to solicit this final questionnaire. Of the 71 that completed

Time 1 questionnaires, 61 also completed Time 2, for a participation rate of 86%. This procedure yielded a very high participation rate because an effort was made within each phone call to ensure that the participant returned the completed questionnaire to the investigator.

Measures -- Time 1 Questionnaire

All of the items that follow are presented in detail in Appendices C1 and C2.

Demographic variables. A series of demographic and descriptive variables consisting of age, gender, educational level, employment type, income level and brief medical history (i.e., time since the individuals first noticed FM symptoms and time since their FM diagnosis by a medical professional) were obtained. Among these were inclusion criteria in which participants had to indicate (self-report) that they were medically diagnosed with FM and that FM had to be their primary health concern. Again, this ensured that our results would pertain to the relationship between physical activity and FM and not be confounded by interactions with other chronic illnesses (e.g., arthritis, clinical depression).

Physical activity. A physical activity calendar was provided for each participant to help track activity over the 1-month study period. This tracking tool would then help the participants more accurately recall their past activity when answering the Time 2 questionnaire items. On the Time 1 questionnaire, physical activity level was assessed by asking participants to indicate if they had a) not been active, b) were sporadically active (i.e., less than two times per week), or c) regularly active (i.e., two or more times per week) over the past two months. This was taken as indicative of their current physical activity level. These physical activity categories were based upon current fitness

recommendations (i.e., Mazzeo et al., 1998) as well as the limited physical activity levels that are characteristic of FM individuals. For descriptive purposes, participants were also asked to indicate the intensity of their physical activity sessions (low, slow walking; moderate, brisk walking; or vigorous, fast walking) and the type of activity in which they most commonly engaged (i.e., cardiovascular, strengthening, stretching, or a combination).

Theory of Planned Behaviour Variables.

All of the TPB variables were measured with respect to the individual's physical activity involvement over the next four weeks (one month). This specificity in the measurement ensured that the core theoretical variables were correspondent to the physical activity intention and behaviour criterion measures. Unless otherwise mentioned, all scale scores were the average of the items in a particular scale.

The application of the TPB to this unique group also necessitated some population specific measurement requirements. This necessity arose as a result of work conducted within the first study and in measurement elicitation pilot work, where disease-related aspects of performing physical activity were made clear. First, the scaling formats all utilized the unipolar scoring (e.g., 1-7), which was the easiest to comprehend by this sample as determined by pilot testing (versus bipolar scoring, e.g., -3 to +3). Ajzen (1991) also suggests that there is nothing within the TPB per se to suggest that bipolar scoring is necessary. As well, within the action context of the TPB items, individuals were asked to refer to their "favorite" physical activity. This served to direct the participants' focus back to the physical activity which motivated them most and in which they would most regularly engage. In addition, this recall cue is important for individuals

in which transient memory problems are a concern, as in this FM sample. For individuals with FM, "favorite" does not necessarily imply that they view the activity favorably, or more positively. Instead, it refers to their most common activity that can be performed on a regular basis in the face of potentially dealing with their FM symptoms. Finally, in an effort to reduce subject burden, only the direct-method of assessing TPB items was used, unless otherwise indicated.

Attitude. Both the indirect and direct measures of the attitude variable were assessed. The direct measure consisted of six attitude items presented on a semantic differential scale, assessing both the potentially positive and negative aspects of physical activity (e.g., pleasant/unpleasant, useful/useless). Each item was preceded by the stem, "Each week over the next month, engaging in your favorite physical activity regularly will be". The items were all scored from 1 to 7, with higher scores reflecting more positive attitudes towards physical activity. The indirect measure of attitudes assessed both the behavioural belief and outcome evaluation components of this variable. The eight items were preceded by the stem, "Each week over the next month, engaging in my favorite physical activity regularly will help me". The behavioural belief component of each item assessed the belief that being regularly physically active would help with different aspects of living with FM, while the outcome evaluation assessed the likelihood of this belief being realized via regular physical activity. Each behavioural belief was scored on a 7 point scale ranging from "extremely unlikely" to "extremely likely", while each outcome evaluation was scored on a 7 point scale ranging from "extremely undesirable" to "extremely desirable". In both cases, higher scores are reflective of more positive behavioural beliefs and higher outcome evaluations. The indirect attitude items

were developed after an initial elicitation period with a group of currently active FM individuals (n = 12). Both the direct and indirect measurements of attitude used in the present sample are consistent with earlier TPB research (Courneya & Friedenreich, 1997a, 1997b).

Subjective norm. The direct measure of subjective norm included a 1-item measure of each of the normative belief and motivation to comply components of the concept. Each item was scored on a 7-point Likert scale, ranging from "completely disagree" to "completely agree", with higher scores being reflective of higher subjective norms. This two-item measure of subjective norm is consistent with previous TPB research (Norman & Connor, 1996). A second assessment of subjective norm was made with a social support measure adapted from the Social Support Provisions Scale (Cutrona & Russell, 1987). Past research reviews have found that subjective norm has a weaker relationship with both intentions and behaviour than either attitudes or perceived behavioural control (Carron, Hausenblas, & Mack, 1996; Hausenblas et al., 1997). The decision was thus made to include the present social support scale, which has been found to be both valid and reliable in previous research (cf. Cutrona & Russell, 1987). This provided an *alternative comparison* to the traditional direct subjective norm measure, not a replacement to the usual indirect measure of subjective norm that assess a series of beliefs and evaluations regarding significant others. Five *types* of social support were thus assessed, including guidance, alliance, motivational, social integration and instrumental support. The reassurance of worth category of support was not included in the present study. The social support items were preceded by the stem, "How important are the following types of support for helping you to regularly engage in your favorite

physical activity each week over the next month", and each item was scored on a 7-point Likert scale ranging from "extremely unimportant" to "extremely important". Higher scores were reflective of social support being more important to the individual for engaging in regular physical activity.

Perceived behavioural control. Physical activity efficacy was assessed in terms of both the frequency and intensity of activity over the next month. The four frequency items, proceeded by the stem, "How confident are you that you can engage in your favorite physical activity the following number of times each week over the next month" assessed being physically active from 1-4 times per week. The intensity items, proceeded by the stem, "How confident are you that you can regularly engage in your favorite physical activity each week over the next month" assessed activity of a low, moderate, or variable-moderate plus intense level. All of the efficacy items were scored on a 0-10 confidence scale, with higher scores reflecting increased physical activity efficacy. The efficacy for physical activity frequency was used in the subsequent analyses because it was correspondent to both the behavioural intention and behaviour measures.

Behavioural intention. A single item to assess behavioural intention was "During the next 4 weeks, I will regularly engage in my favorite physical activity(s) _____ times each week". A single item assessment of intention is widely used in the TPB research (Ajzen, 1991). Participants filled in the number of times they would be active each week, and then also rated the strength of their intention on a 9-point scale, ranging from "definitely will not" to "definitely will". Higher scores were reflective of stronger behavioural intentions. Only the behaviour intention frequency assessment (not the strength of intention) was used in the subsequent analyses. This measure was thus

compatible in terms of the specificity requirements to the predictors of attitude, efficacy (for frequency), and subjective norm. As well, intention (as a goal) was utilized rather than an expectation (i.e., a likelihood) because the TPB constructs are better predictors of an intention rather than an expectation measure (Courneya & McAuley, 1993).

Behaviour. A behavioural measure taken at Time 2 was used as the dependent measure to be examined with the TPB Time 1 variables, and will be subsequently discussed.

Fibromyalgia Variables

Fibromyalgia impact questionnaire (FIQ). Functional ability was assessed using the ten FIQ (Burckhardt, Clark, & Bennett, 1991) items that measure how an individual's FM symptoms impact on their daily functions in a typical week (the first FIQ subscale). The items were summed and divided by the total number of completed items for each individual to give a total functional ability score. Previous research has shown adequate reliability of this measure (Burckhardt et al., 1991). The FIQ is commonly used throughout FM research as an indicant of functional ability (Bigatti, Cronan, Gallager, & Cronan, 1998; Hauswirth, Bigatti, & Cronan, 1998). The remaining items of the FIQ were not used in the present study in order to reduce subject burden and because they were not directly relevant. Scoring was reversed on this scale so that higher scores would be reflective of better daily functioning (note: this is in contrast to Study 1, in which higher scores were reflective of worse daily functioning).

FM symptoms. Pain was assessed with a Visual Analogue Scale (VAS), which has been found valid and reliable in previous FM research (Bigatti, Cronan, Gallager, & Cronan, 1998). The VAS uses a 10-cm line, with 0 indicating "no pain" and 10

indicating "pain as bad as it could be". Subjects indicated their level of pain by placing a mark somewhere on the line between the two endpoints.

Sleep and fatigue were measured with 6 items developed by Potts and Silverman (1990) for use with FM populations. Four items measured sleep problems and two items measured the resulting fatigue. Subjects indicated the frequency with which they experienced various sleep problems, such as difficulty falling asleep at night, during their typical week. After scoring for directional consistency (i.e., reverse scoring the necessary items), the items were summed and averaged to provide a total sleep disorder index. Higher scores were indicative of more severe sleep problems. Although this sleep and fatigue scale did not achieve an acceptable level of reliability in Study 1, these items have shown adequate reliability and validity in past research (Potts & Silverman, 1990). It was thus decided to retain these items because of the importance of sleep and fatigue symptomatology for individuals with FM.

Due to the limited resources and non-clinical scope of the present study, tenderpoints were assessed by diagram on The Regional Pain Score, developed and modified by Finckh and colleagues (1998). Individuals assess their perception of the severity of pain in each of 21 tenderpoint areas which are noted on a visual total body display. The pain level is indicated with the following scale: 0 = no pain, 1 = slight pain, 2 = moderate pain, 3 = tenable pain, 4 = severe pain, and 5 = unbearable pain. Areas are then added to provide a total index of self-reported tenderpoint pain score. Research examining the validity of the self-report of tenderpoints, which is one of the central elements for a FM diagnosis, has been supportive of this self-reported tenderpoint diagram methodology. Pain severity ratings using the self-report tenderpoint diagram

have been found to correlate highly with more objective physician-based assessments (i.e., dolorimeter pressure readings: Finckh et al., 1998).

FM pain and symptom efficacy. The Arthritis Self-Efficacy subscales for physical pain and other symptoms (Lorig et al., 1989) were used to assess how certain individuals were that they could control their FM pain and other symptoms. Both of these subscales have been used in previous FM research and have been shown to be both valid and reliable (Buckelew et al., 1995, 1998). The pain subscale consisted of 5 items concerning how confident the individual was that they could control their FM pain. Each item was rated on a 10 to 100-point scale, with 10 being "very uncertain", and 100 being "very certain". In a similar fashion, the other symptoms subscale consisted of 6 items concerning how confident the individual was that they could control different FM symptoms, such as fatigue and depression. Each item was again rated on the same 10 to 100-point scale. The third subscale, a measure of physical function, was not included because a more specific physical activity self-efficacy was used in the present study. Once again, the principle of greater specificity of self-efficacy measurement advocated in the McAuley and Mihalko (1998) review was the rationale for this decision.

Health-related quality of life (hrql). Participants completed the SF-12 (Short Form of the Rand-36) (Ware et al., 1995), a health inventory designed to assess how one's health impacts on the physical, mental and social aspects of one's life. As such, it measures one's perceptions of HRQL. Items consist of both Likert-scale and dichotomous (yes/no) responses. The SF-12 is composed of physical and mental health component subscales (PCS and MCS, respectively), containing the eight concepts of physical functioning, physical role limitations, bodily pain, general health, vitality, social

functioning, emotional role limitations, and mental health. The SF-12 is used extensively as an HRQL measure, and has demonstrated both validity and reliability (Ware et al., 1995). Compilation of data using the SF-12 has also produced norms for average and special populations (e.g., diabetes, heart disease). For example, the general US female population has a mean of 49.11 (PCS) and 49.42 (MCS). In the present FM sample, scores of 31.44 (PCS) and 42.31 (MCS) fall below the 25th percentile for both subscales. Similar to the Study 1 results, the FM scores actually compare to the 25th percentile norms for the general US seniors population, aged 75 years and older. The use of the SF-12 subscales therefore also allowed for a comparison to both healthy and asymptomatic populations.

Measures – Time 2 Questionnaire

TPB variables. Similar to the Time 1 measurement, the TPB variables of attitude (direct only), subjective norm (and the social support measure), efficacy for physical activity frequency and intensity, and behavioural intention were assessed. In addition, a 1-item measure of behaviour was taken. Participants were asked to fill in the appropriate number of times for the statement, "I regularly engaged in my favorite physical activity(s) _____ times each week during the past month". The behaviour measure at Time 2 thus corresponds to the behavioural intention measure taken at Time 1 (cf., Courneya & McAuley, 1996) and was used in the prospective analyses. Individuals were encouraged to utilize their calendar as a reminder of their activity involvement in the past month when completing the Time 2 behaviour measure.

An additional measure of behaviour taken at Time 2 included an assessment of activity sessions, durations, and intensities over the past 7 days. These three items

specifically were, "Over the past 7 days, I engaged in physical activity _____ times"; "Over the past 7 days, my average session of physical activity lasted about ____ minutes"; and "Over the past 7 days, my average session of physical activity was of what intensity" (circled 1 response of either low, moderate, or vigorous).

FM variables. The remainder of the questionnaire was identical to the Time 1 questionnaire, including the assessment of FM pain, sleep, tenderpoints, daily functioning (FIQ), HRQL (SF-12), and efficacy for coping with FM pain and symptoms.

Participants

At Time 1, 71 participants completed the questionnaire, of which 68 could be classified into 1 of the 2 physical activity categories (i.e., 3 indicated they were completely inactive). The Time 1 analyses are thus reported for the 68 physically active participants. At Time 2, 61 participants (59 of whom were active) completed the questionnaire, for a study retention rate of 86% over the 1-month period. Only the active individuals were included in the subsequent analyses as this thesis is focused upon active individuals with FM.

The average age of the participants was 50 years (SD = 10.6), and the vast majority were again female (93%). The individuals had been medically diagnosed with FM for an average of 6.2 years, but had experienced variable FM symptoms for a longer average period of 14.3 years. Eighty percent of the sample was married and the SES distribution was normal, with the majority in the low to middle SES range.

FM condition severity is typically characterized by various symptoms, such as sleep disorders, fatigue, depression, and tenderpoints. For this sample, the average sleep disorder level (indicative of fatigue) was 2.89 (SD =.5) on a 4-point scale, with higher

scores reflective of more sleep disruption and increased fatigue. Self-reported tenderpoint severity was moderate, measuring 2.44 (SD =.70) on a scale from 0, no tenderpoint pain to 5, unbearable tenderpoint pain. In addition, pain rating on a visual analogue scale (VAS) was 6.20 (SD =1.8) on a 0-10 scale, indicating a fairly high level of overall perceived pain. The participant demographics can be seen in Table 5.

Table 5.

Time 1 FM Participants' Demographic, Physical Activity, and Symptom Variables.

Variable	n	Percent	Mean (SD)
Age			49.69 (10.62)
Gender			
Female	63	92.6	
Male	5	7.4	
Annual yearly income			
Less than $20,000	12	20.3	
$20 - $39 999	19	32.2	
$40 - $60 000	13	22	
Greater than $60,00	15	25.4	
Marital status			
Married	54	79.4	
Single	10	14.7	
Divorced	3	4.4	
Time with symptoms (years)			14.31 (10.69)
Time since diagnosis (years)			6.23 (4.64)
VAS-pain			6.09 (1.78)
Sleep Disorder			2.87 (.51)
FIQ			2.86 (.55)

Note: VAS = visual analogue scale, FIQ = FM Impact Questionnaire. VAS-pain scored on a 0-10 scale, FIQ and Sleep Disorder scored on a 1-4 scale.

The current sample had very similar activity levels and intensities as compared to the Study 1 population (see Table 6). Only three individuals in the current sample indicated that they were completely inactive, and the majority of the participants were active at either low or moderate intensities.

Table 6.

Time 1 Physical Activity Behaviour and Intensity.

Behaviour (Past PA)	n
< 2x/week	30
>2x/week	38
Physical Activity Intensity	
Low	34
Moderate	30
High	4

Note: PA = Physical Activity. The physical activity reported represents activity that occurred in the past two months, prior to study onset.

Statistical Analysis

The principle hypotheses concerning the TPB were tested using separate hierarchical multiple regression analyses (HMRA). Regression analyses are consistent with the theoretical tenets of the TPB (i.e., to test prediction of intention and behaviour: Ajzen, 1991) and have been advocated as the test of choice (Courneya & Friedenreich, 1997a). One exception to the measures analyzed was that only the single item measure of behaviour recall, not the 7-day recall, was used in the analyses.

A series of multiple regression analyses are also necessary to test the mediational hypothesis proposed by the TPB (Baron & Kenny, 1986). At Time 1, however, only the concurrent TPB hypothesis involving the regression of behavioural intentions on efficacy, then attitude, and finally the composite measure of subjective norm and motivation could be examined, as no behaviour measure was assessed.

A series of HMRA were next conducted on the Time 2 data, also testing the concurrent hypotheses of the TPB. The first HMRA involved regressing behavioural intention on efficacy, then attitude, and finally the composite measure of subjective norm and motivation to comply. In the second HMRA, behaviour was regressed on efficacy, attitude, and subjective norm/motivation to comply. Finally, the third HMRA involved regressing behaviour on behavioural intention, efficacy, attitude, and subjective norm/motivation to comply.

Finally, a series of multiple regression analyses were conducted to test the prospective hypotheses of the TPB. Specifically, how well would the Time 1 TPB variables predict behavioural intention and behaviour at Time 2? The series of multiple regression analyses for the Time 1, Time 2, and the prospective tests can be seen in Table 7.

Table 7.

Hierarchical Multiple Regression Analyses Steps to Test the Mediation of Intent on Behaviour.

Time 1 Concurrent Test: HMRA Steps

1. Efficacy, Attitude, SNMC → Behavioural Intention

Time 2 Concurrent Tests: HMRA Steps

1. Efficacy, Attitude, SNMC → Behavioural Intention
2. Efficacy, Attitude, SNMC → Behaviour
3. Behavioural Intention, Efficacy, Attitude, SNMC → Behaviour

Time 1 to Time 2 Prospective Tests: HMRA Steps

1. Efficacy1, Attitude1, SNMC1 → Behavioural Intention2
2. Efficacy1, Attitude1, SNMC1 → Behaviour
3. Behavioural Intention1, Efficacy1, Attitude1, SNMC1 → Behaviour

Note: SNMC = subjective norm x motivation to comply. 1 = Time 1, 2 = Time 2.

Prior to conducting any of the statistical analyses, the data were examined for missing data, outliers, skewness and kurtosis (i.e., normality assumptions) at both Time 1 and Time 2. Missing data was replaced according to the guidelines provided by Tabachnik and Fidell (1996) -- the group mean was used if an entire scale was missing for a participant, while the participant's mean was used if any single item(s) was missing on a particular scale for which they had at least one score. Across the sample there was minimal missing data (less than 5%), and the pattern of missing data was random. However, replacing the missing data resulted in a complete data set, thereby enhancing

the power to detect differences in any further analyses. The disadvantage in terms of reduced sample variability leads to a more conservative estimation of the results.

The procedures outlined by Tabachnik and Fidell (1996) were also followed when checking and adjusting for outliers, skewness, and kurtosis. In terms of outliers, only 2 were identified. In both cases the outliers remained in the data set but steps were taken to ensure their impact was minimized. As recommended by Tabachnik and Fidell (1996), the scores were transformed so that they were less deviant. The extreme scores were adjusted to be one unit more than the next most extreme score. The remainder of the analyses were then performed with these changes on the outliers.

A number of variables at Time 1 and Time 2 were also skewed in either a positive or a negative direction. However, the vast majority of these variables were ancillary to the primary hypotheses and thus no attempt was made to adjust the variable. For those variables that were to be included in further analyses, Tabachnik and Fidell (1996) suggest transforming the scores to reduce the skewness (i.e., log transformations). Upon initial examination of the variables, two were identified as positively skewed at both Time 1 and Time 2 -- behavioural intention and subjective norm. Log transformations did not improve the skewness of either variable. However, the composite measure of subjective norm (i.e., subjective norm x motivation to comply) was not skewed, therefore this composite variable (SNMC) was used in all subsequent analyses. The second variable, behavioural intention, was only minimally positively skewed at both times, and because the transformations did not improve on the original variable, it was decided to leave it unchanged in all further analyses.

Results

Time 1

Scale Reliabilities

The Cronbach alpha levels for the questionnaire scales at Time 1 that were included in the subsequent analyses can be seen in Appendix D. All scale coefficients were in excess of .70. The attitude scale involved the deletion of 1 item (the attitude that physical activity is painful) because of a low inter-item correlation. This resulted in an increase of the scale alpha from .76 to .82. The alphas of the scales ranged from a low of .70 for the sleep disorder scale to a high of .93 for the indirect attitudinal outcome evaluations component.

TPB Concurrent Tests

TPB descriptives for the entire sample can be seen in Appendix E, and the TPB constructs used in the subsequent HMRA can be seen in Table 8. The HMRA to test the TPB concurrent hypotheses at Time 1 consisted of attitude, subjective norm, and perceived behavioural control (efficacy) for physical activity frequency as the predictors. The correlations between the indices of physical activity and the TPB constructs can be seen in Table 9.

Table 8.

Time 1 Descriptives for the TPB Constructs.

Exercise Variable	Mean	SD
Attitude	5.53	1.02
Subjective Norm * Motivation to Comply (SNMC)	26.54	12.43
PBC (PA Efficacy Frequency)	6.82	2.62
Behavioural Intention	3.56	1.64

Note. n = 68. PBC = Perceived behavioural control, PA = Physical Activity. The scale ranges were: Attitude (1-7), SNMC (1-49), PBC (0-10). Behavioural Intention was scored on a continuous-open scale.

Table 9.

Time 1 Bivariate Correlations Between Primary Variables for the Physically Active Participants.

Variable	2	3	4	5	6	7	8	9	10	11	12
1. Attitude-direct#	.512**	.360**	.185	.274*	.131	.229	.480**	.422**	.293*	.429**	.229
2. Att Expec	_	.645**	.386**	.360**	.393**	.263*	.369**	.434**	.132	.286*	.225
3. Att Value		_	.419**	.325**	.479**	.170	.304*	.399**	.141	.152	.311**
4. SN-total#			_	.745**	.924**	.171	.133	.078	.211	.173	.004
5. SN				_	.499**	.192	.036	.092	.036	.192	.140
6. MC					_	.208	.125	.062	.202	.106	-.008
7. Social Support						_	-.217	-.164	-.239*	-.072	-.245*
8. Efficacy–Freq#							_	.710**	.654**	.569**	.377**
9. Efficacy-Intens								_	.397**	.481**	.650**
10. BI#									_	.463**	.193
11. Past PA										_	.332**
12. PA-Intens											_

Note: n = 68. # = Variables used in subsequent HMRA's; Att Expec = Indirect Attitude Expectation measure; Att Value = Indirect Attitude Value measure; SN-total = Composite measure of Subjective Norm x Motivation to Comply; SN = Subjective Norm; MC = Motivation to Comply; Efficacy-Freq = Efficacy for physical activity of varying frequencies; Efficacy-Intens = Efficacy for physical activity of varying intensities; BI = Physical Activity Behavioural Intention; Behaviour = Past Physical Activity; PA-Intens = Physical Activity Intensity of usual sessions. The scale ranges were: All Attitude measures (1-7), all Subjective Norm (1-7), all Efficacy (-0-10), Past PA (categorical, 1 or 2)PA-intensity (categorical, 1-3).

* = $p < .05$, ** = $p < .01$

In the HMRA, physical activity intention was regressed on efficacy (perceived behavioural control), followed by attitudes, and finally the subjective norm x motivation to comply (SNMC) variable. Physical activity efficacy was the only significant predictor that accounted for the variance in behavioural intention. No additional contribution was made to the model by the entry of the other two TPB variables. See Table 10 for a summary of the regression results.

Table 10.

Time 1 Prediction of Physical Activity Intention Using Hierarchical Multiple Regression Analyses.

Predictor	R	R^2	Adj. R^2	R^2 ch	p
Prediction of Intention					
1. Efficacy	.654	.428	.419	.428	.0001
2. Attitude	.655	.428	.411	.001	.801
3. SNMC	.667	.445	.419	.017	.170

Note: n = 68. SNMC = Subjective Norm x Motivation to Comply. The scale ranges were: Efficacy (0-10), Attitude (1-7), and SNMC (1-49).

Time 2

Scale Reliabilities

The Cronbach's alpha levels for the questionnaire scales at Time 2 can be seen in Appendix F. All scales coefficients were in excess of .70. One item was deleted from the attitude scale (the attitude that physical activity is painful) in order to maintain consistency of scale content in the measurement from Time 1 to Time 2. The alphas of

the scales ranged from a low of .82 for the attitude scale to a high of .92 for the physical activity efficacy (frequency) scale.

TPB Concurrent Tests

The rationale for conducting these concurrent tests of the TPB model with Time 2 behaviour is to allow for a comparison of these results to those reported in previous physical activity TPB literature (cf. Hausenblas et al., 1997). However, one criticism of this literature is that the TPB variables have predicted *past* physical activity participation, rather than predicting behaviour that occurred subsequent to the measures. In essence, this relationship is non-correspondent because the TPB variables are measured with the future in mind (i.e., my attitude towards participating in physical activity two to three times per week for the next four weeks), whereas the behaviour is recalled for the weeks that occurred prior to the measurement of other TPB variables. Therefore, although the present results are comparable to those found in the previous literature, they should be interpreted with some caution for this reason.

Although the measure of behaviour was taken at the same time for these concurrent tests, it is really most correspondent to the Time 1 TPB measures because it concerns the recall of behaviour over the *previous* month. Given these cautions, the most appropriate test of the mediational hypotheses of the TPB are the prospective procedures that follow the Time 2 concurrent results.

TPB descriptives for the entire sample can be seen in Appendix G, and the TPB constructs used in the subsequent HMRA's can be seen in Table 11. The HMRA to test the TPB concurrent hypotheses at Time 2 consisted of attitude, subjective norm, and perceived behavioural control (efficacy) for physical activity as the predictors

Table 12

Time 2 Bivariate Correlations Between Primary Variables for the Physically Active Participants.

Variable	2	3	4	5	6	7	8	9	10	11
1. Attitude-direct	.358**	.446**	.214	-.033	.384**	.422**	.231	.262*	.242	.255*
2. SN-total*	_	.689**	.903**	.376**	-.213	.120	-.008	.049	-.081	-.072
3. SN		_	.401**	.323*	.019	.143	-.025	-.022	.057	-.052
4. MC			_	.347**	-.119	.125	.001	.073	-.132	-.079
5. Social Support				_	-.213	.113	-.194	-.075	.024	-.325*
6. Efficacy–Freq*					_	.689**	.601**	.616**	.493**	.659**
7. Efficacy-Intens						_	.405**	.602**	.555**	.429**
8. BI*							_	.682**	.188	.892**
9. PA-past 7 days								_	.892**	.697**
10. PA-Intensity									_	.254*
11. Behaviour										_

Note: n = 59. * = Variables used in subsequent HMRA's; SN-total = Composite measure of Subjective Norm x Motivation to Comply; SN = Subjective Norm; MC = Motivation to Comply; Efficacy-Freq = Efficacy for physical activity of varying frequencies; Efficacy-Intens = Efficacy for physical activity of varying intensities; BI = Physical Activity Behavioural Intention per week; PA-past 7 days = Physical Activity times per week over the past 7 days; PA-Intens = Physical Activity Intensity of usual sessions over past 7 days; Behaviour = Physical Activity times per week. The scale ranges were: All Attitude measures (1-7), all Subjective Norm (1-7), all Efficacy (0-10), Past PA (categorical, 1 or 2)PA-intensity (categorical, 1-3).

Shaded items indicate multicollinearity.

= items used in subsequent analyses

* = $p < .05$

** = $p < .01$

The Time 2 HMRA's were conducted in the following sequence. The first HMRA involved regressing behavioural intention on perceived behavioural control, attitude, and subjective norm. The second HMRA involved regressing behaviour on the same set of predictors. Finally in the third HMRA, behaviour was regressed on behavioural intention, perceived behavioural control, attitude, and subjective norm. In the first HMRA, perceived behavioural control was the only significant predictor (R^2 change = .36, $p < .001$), accounting for approximately 36% of the variance in behavioural intention. The second HMRA involved regressing behaviour on perceived behavioural control, attitude, and subjective norm. This too was significant, with perceived behavioural control again the only significant predictor of behaviour (R^2 change = .435, $p < .001$). Finally, the third HMRA to predict behaviour including behavioural intention as a predictor, was significant, with behavioural intention and perceived behavioural control accounting for almost 82% of the variance. Behavioural intention accounted for approximately 80% of this variance (R^2 change = .799, $p < .001$), while perceived behavioural control accounted for an additional 3% of the variance (R^2 change = .027, $p < .005$). Neither attitude nor the subjective norm components accounted for any significant amount of variance. A summary of the Time 2 regression results can be seen in Table 13.

While this series of HMRA's allowed for an examination of the mediational hypotheses as proposed by the TPB, the concurrent tests are not the strongest test for mediation. Given this, the results did not support Ajzen's (1991) proposed mediational hypothesis, but did provide support for the alternative hypothesis that PBC is a direct predictor of behaviour. Recall, however, the caveat previously mentioned at the

beginning of the discussion of the concurrent results regarding the appropriate correspondence of behaviour to the Time 1 variables rather than Time 2. This temporal sequence used for concurrent prediction violates the prediction to future behaviour requirement of the TPB. Thus, these results, like those using a similar procedure in the past literature, should be viewed with caution.

Table 13.

Time 2 Prediction of Physical Activity Intention and Behaviour Using Hierarchical Multiple Regression Analyses.

Predictor	R	R^2	Adj. R^2	R^2 ch	p
Prediction of Intention					
1. Efficacy	.601	.361	.350	.361	.000
2. Attitude	.601	.361	.339	.000	.948
3. SNMC	.603	.364	.329	.003	.632
Prediction of Behaviour					
1. Efficacy	.659	.435	.425	.435	.000
2. Attitude	.660	.435	.415	.000	.883
3. SNMC	.660	.436	.405	.001	.817
Prediction of Behaviour					
1. Behavioural Intention	.694	.799	.795	.799	.000
2. Efficacy	.909	.826	.819	.027	.005
3. Attitude	.909	.826	.816	.000	.921
4. SNMC	.910	.829	.816	.003	.329

Note: n = 59. The scale ranges were: Efficacy (0-10), Attitude (1-7), SNMC (1-49). Behavioural Intention and Behaviour were assessed for number of times per week on continuous-open scales.

Prospective Tests of the TPB

The final set of HMRA's to test the prospective TPB hypotheses involved an examination of the Time 1 variables as predictors of behavioural intention and behaviour

at Time 2. This is the prospective test of the TPB predictions regarding the proposed relationships amongst the constructs, as it involves utilizing the TPB variables to predict future intention and behaviour over a 1-month period. Similar to the HMRA's conducted at Time 2, a series of three regressions were conducted to examine both the proposed mediational role of behavioural intention and the direct role of perceived behavioural control. In the first HMRA, behavioural intention at Time 2 was regressed on the Time 1 variables of perceived behavioural control, attitude, and subjective norm. This HMRA was significant. Perceived behavioural control was the only significant predictor (R^2 change = .182, $p < .001$).

The second prospective HMRA involved regressing recalled behaviour at Time 2 on the Time 1 variables of efficacy, attitude, and subjective norm. This regression was also significant, with perceived behavioural control again the only significant predictor (R^2 change = .260, $p < .001$). The final HMRA involved regressing recalled behaviour at Time 2 on the Time 1 variables of behavioural intention, perceived behavioural control, attitude, and subjective norm. It was significant, with both behavioural intention (R^2 change = .173, $p < .001$) and perceived behavioural control (R^2 change = .106, $p = .005$) accounting for a significant amount of the variance in behaviour. Similar to the Time 2 HMRA testing the concurrent hypotheses, the proposed mediational hypothesis was not supported. However, the alternative hypothesis that PBC is a direct predictor of behaviour was supported. A summary of the prospective regression results can be seen in Table 14.

Table 14.

Prospective Prediction of Physical Activity Intention and Behaviour Using Hierarchical Multiple Regression Analyses.

Predictor	R	R^2	Adj. R^2	R^2 ch	p
Prediction of Intention					
1. Efficacy	.427	.182	.168	.182	.0001
2. Attitude	.427	.182	.154	.000	.968
3. SNMC	.451	.204	.161	.021	.228
Prediction of Behaviour					
1. Efficacy	.510	.260	.248	.260	.0001
2. Attitude	.511	.261	.236	.001	.815
3. SNMC	.539	.290	.253	.029	.132
Prediction of Behaviour					
1. Behavioural Intention	.416	.173	.159	.173	.0001
2. Efficacy	.528	.279	.254	.106	.005
3. Attitude	.530	.280	.242	.001	.766
4. SNMC	.549	.301	.252	.021	.199

Note: n = 59. The scale ranges were: Efficacy (0-10), Attitude (1-7), SNMC (1-49). Behavioural Intention and Behaviour were assessed for number of times per week on continuous-open scales.

Discussion

Theoretical Implications

The results from Study 2 provide support for the use of the perceived behavioural control (as measured by self-efficacy) and the behavioural intention aspects of the TPB in the prediction of physical activity behaviour of FM individuals. In particular, the perceived behavioural control component of the theory was a strong predictor of both behavioural intention and physical activity behaviour. Behavioural intention was also a significant predictor of physical activity behaviour, both in the concurrent and in the prospective regression analyses.

A prospective test of the role of intention as a mediator of the influence of attitude, perceived behavioural control, and subjective norm on behaviour was not significant (cf. Baron & Kenny, 1986). As a mediator, behavioural intention would account for the significant and sole prediction of behaviour in a hierarchical test of the TPB model (i.e., intention entered first). However, the present results did reveal that efficacy was a direct, significant predictor of physical activity behaviour, even after controlling for the contribution of behavioural intention. This finding supports Ajzen's (1985, 1991) hypothesis about the potential direct influence of perceived behavioural control on behaviour. Furthermore, the finding that perceived behavioural control and intention predict future behaviour is consistent with past exercise research (cf. Hausenblas et al., 1997). Lastly, the independent prediction of physical activity intentions and behaviour by perceived behavioural control agrees with both past research within the FM research (Buckelew et al., 1995, 1998) as well as that in the TPB literature on asymptomatic exercisers (Hausenblas et al., 1997).

Contrary to expectations, neither attitude nor subjective norm emerged as significant predictors of either physical activity intentions or behaviour. Given the exercise-related support for attitude as a predictor of physical activity intentions, this result was somewhat surprising (cf. Godin & Kok, 1996; Hausenblas et al., 1997). The lack of a predictive role for the attitude component to behavioural intention may be due in part to the relative lack of variability evident in this measure. Specifically, the average score on the attitude scale was moderately positive, scoring above 5.5 on a 7-point scale. However, there was a relatively small standard deviation in the data in comparison to that evident for the other constructs. Thus, while the present sample of FM individuals rate the experience of physical activity as quite positive, the lack of variability in the responses likely limited the attitude component from contributing any unique variance to the prediction of either the more variable behavioural intention or behaviour measures. A potential reason for this scoring on the attitude measure may be due to the inclusion of "favorite" in the attitude measurement stem. This may have unintentionally cued individuals into focusing on positive aspects of activity, and thereby reduced the variability in this measure.

The fact that subjective norm did not predict intentions is less surprising given the similar findings in previous exercise research (Hausenblas et al., 1997). In this behavioural domain, subjective norm has consistently failed to contribute to the prediction of physical activity intentions in any substantive way. Some have suggested that this may be due in part to the limiting of positive associations with other TPB components by the motivation to comply construct (Courneya & Friedenreich, 1999). Thus, some researchers are applying a single item measure of subjective norm by

utilizing only the normative belief component. In the present study, however, issues of data normality (i.e., skewness) limited the ability to examine a single-item subjective norm measure, and thus the traditional composite construct was employed.

The second measure of social support which utilized the Social Provisions Scale (Cutrona & Russell, 1987) did not receive support as a viable alternative for use in the present study. Examination of the correlations with the other TPB variables indicated non-significant relationships and in cases where a significant relationship existed, negative relationships were revealed contrary to expectations. HMRA's in which this social support measure was substituted for the subjective norm measure also indicated that it did not significantly add to the prediction of behavioural intention or behaviour (see Appendix H). Further work must be continued to examine how best to assess subjective norm in future research (DeVries et al., 1995).

Finally, behavioural intention emerged as an important predictor of behaviour, both concurrently and prospectively. In the case of the concurrent prediction at Time 2, a large proportion of the variance in physical activity behaviour was explained by behavioural intention, however caution in the interpretation of this result is warranted (i.e., non-correspondent measure between the TPB variables at Time 2 and the behaviour measure at Time 2). The prospective test of prediction (i.e., Time 1 TPB variables predicting Time 2 recalled physical activity over the past month) revealed behavioural intention as a significant predictor, however it was not supported as a mediator (i.e., perceived behavioural control significantly added to the prediction of behaviour).

FM Implications

The disease of FM is characterized by multifaceted symptomatology that is chronic yet erratic in its manifestations. Psychologically, FM individuals must cope with their unpredictable physical state and accompanying issues of fatigue and transitory depression (Elrod, 1997). This state of affairs is physically unpredictable and challenging for the individual, particularly with respect to activities of daily living and being physically active. Specifically, these physical and mental challenges may have a potential impact on the individual's perceived behavioural control over being physically active, an important nonpharmacological treatment behaviour for the health of individuals who struggle with FM (Rossy et al., 1999).

Results of earlier research have shown that efficacy for controlling one's FM pain, symptoms, and daily functioning are important factors for improved daily functional ability (Buckelew et al., 1995, 1998). The results of Study 1 also indicated that efficacy to engage in physical activity was associated with actual physical activity behaviour. The results of the present study again highlight the importance of perceived behavioural control (as measured by self-efficacy) for this FM sample. Those individuals who perceived greater control over engaging in physical activity were more likely to take part in actual physical activity behaviour. From a coping perspective for FM individuals, physical activity has been advocated as a means of recapturing control of their daily lives. Active individuals with FM are also more likely to be able to regularly engage in the activities of daily living and thus achieve necessary functional independence and experience a positive health-related quality of life.

Considering the chronic condition of the present sample, it is surprising that neither attitudes nor subjective norm emerged as important predictors. One might expect that both of these variables would be important predictors of activity because FM participants are known to vary in their affect for physical function and to rely upon social support as a means of coping (Gallagher, Cronan, Cronan, & Bigatti, 1999). The participants in the present study had above average scores on both of these variables, indicating that they had both positive attitudes and had the support of others for their activity involvement. It is noteworthy that the subjective norm-behavioural intention relationship might have been significant in some of the regressions ($p = .10$) if tested with a larger sample size. The uniformly consistent and positive attitude toward activity but yet low relationship with behavioural intention is very surprising. Recent research by Courneya and colleagues (1997b, 1999) with another specific population (i.e., cancer, whose symptoms are also unpredictable) has found that attitude is a significant predictor of exercise intentions. The possibility that the relatively low variability in the present attitude measure may not parallel the variability in behavioural intention may be an explanation for the non-significant results. A closer look at the attitude component of the TPB is necessary in future work within FM and physical activity. An examination of differences in attitudes towards physical activity between active and inactive FM individuals may also provide greater variability in the attitude measure and thus aid in the prediction of physical activity intentions.

Strengths and Limitations

The present study has a number of design and measurement strengths. First, the prospective design is an improvement over the demonstration of concurrent relationships

alone as has been characteristic of previous FM research. Although causality can not be inferred, the temporal ordering of the variables provides stronger evidence of the influence of the social cognitive variables on later behavioural intentions and behaviour. Second, an examination of the variables within the TPB (versus perceived behavioural control alone) provides stronger support for perceived behavioural control's relationship to physical activity within this sample, because it was tested relative to other constructs (versus the relationship observed in Study 1). Once again, the role of perceived behavioural control was highlighted as an important factor for physical activity participation.

The measurement of the TPB variables were also strengths of Study 2. They were operationalized in the present study based on earlier research and recommendations (Ajzen, 1991; Courneya & Friedenreich, 1997a; Courneya & McAuley, 1993). It appears that an efficacy assessment of perceived behavioural control is valid for predicting behaviour for this sample, however future work must continue to examine the measures of both attitude and in particular, subjective norm, to determine if they are sensitive to the perceptions and experiences of FM individuals. As well, utilizing the recommendations of Courneya and McAuley (1993) regarding the correspondent measurement of behavioural intention and behaviour appeared to be useful in detecting a relationship between these two variables. However, as noted earlier, this may attenuate the relationship between the other TPB constructs (attitude, perceived behavioural control, and subjective norm) with behavioural intention and behaviour. This is another potential factor for the non-significant relationships between attitude and behavioural intention as well as between subjective norm and behavioural intention.

Despite these strengths, there are a number of limitations which also need to be taken into account in the interpretation of the results. First is the self-selected nature of the current sample which obviously limits the ability to generalize the current results to a broader FM population. However, the assessment of FM symptomatology in the current sample does indicate that they are similar to FM samples used in earlier research (Buckelew et al., 1995, 1998; Gowans et al., 1998). A second limitation lies in the sample size of the present study. Beyond the significant contributions of perceived behavioural control and behavioural intention, additional contributions to the prediction of behaviour by the other components of the TPB model were not significant. These added predictors reduced the power of the small sample, thereby limiting the ability of the other variables in the model to account for additional variance. In addition, although large enough to adequately examine the data (cf. Cohen, 1992), the relatively small sample precluded the ability to conduct subgroup analyses based upon different levels of activity of FM individuals without raising concerns about power to detect effects.

Future Research

As this study represents the first step utilizing the TPB to examine the relationship between physical activity and FM, there would seem to be multiple opportunities to examine its utility. The present study provides a solid theoretical foundation on which to build successive investigations of both a correlational and intervention-based nature. The majority of the past research on physical activity and FM has been intervention-focused and mainly athoeretical. There is a need to "take a step back" and continue to conduct systematic, theoretically based research. While perceived behavioural control has been supported as an important correlate and predictor of

physical activity, little research has examined additional, related factors. This type of systematic research is an important step if we eventually hope to develop cognitive-behavioural change interventions for physical activity (Baranowski et al., 1997). The more theoretically based correlates and mediators of physical activity that can be identified and then related to intervention outcomes, the greater the probability that intervention effects will be more substantial (cf. Baranowski et al, 1997). Thus, variables such as attitude and subjective norm should continue to be investigated as possibly important determinants of activity involvement.

Based on the research to date within FM, efficacy (i.e., perceived behavioural control) for being physically active and for coping with symptoms (Buckelew et al., 1995, 1998) are viable components that can be targeted for change in an intervention. As other variables (e.g., moderators) are identified as important, these too could be the focus of targeted change in intervention-based designs. As an initial step toward the future research goals suggested above, TPB variables amenable to change and thought to be important for motivating physical activity could be manipulated (cf. Maddux et al., 1995). Such a manipulation would constitute an initial test of a theoretically based strategy for intervention.

Study Three

Abstract

Objective: To impact change in the core TPB variables of attitude, perceived behavioural control, subjective norm, and behavioural intention via an affective intervention.

Methods: A positive or negative discussion on physical activity for FM was preceded with a baseline measure of the core TPB variables and demographics (pre-manipulation), and then followed-up with an assessment of the core TPB variables (post-manipulation).

Results: There were no significant differences between the two groups pre-manipulation on any of the variables of interest, although there was a trend for the negative group to initially be higher (i.e., more positive) on all of the core theoretical variables. Participants in the positive condition were significantly higher post-manipulation on the TPB variables of attitude, perceived behavioural control, and subjective norm.

Conclusion: A short-term affective intervention based upon the TPB can change core theoretical variables that are known to be important predictors of an individual's physical activity intentions and behaviour.

Introduction

Individuals with FM must struggle with the myriad of physical and psychological symptoms of their condition (Wolfe et al., 1995). One of the more consistently recommended treatment options to deal with these symptoms is a regular program of physical activity. While the results have been variable with respect to improvement in the FM physical symptoms, a more consistent finding is that *perceptions* of improvement and increased confidence in daily functioning result from these physical activity programs (Rossy et al., 1999). In particular, one variable that has consistently shown to be enhanced by a regular program of activity is perceived behavioural control or efficacy. In the previous literature, as well as in Studies 1 and 2, those individuals who are more active are more confident in their abilities to pursue physical activity (Studies 1 and 2) and to cope with their symptoms (Buckelew et al., 1995, 1998). However, beyond the relationship demonstrated between activity involvement and perceived behavioural control, little is known about other predictors or correlates of physical activity for individuals with FM.

One potentially important variable related to physical activity participation is the nature of the physical activity environment. Specifically, is a more positive and supportive social environment towards physical activity more likely to encourage involvement than a negative and non-supportive environment? For a chronic disease such as FM, social support may come from many areas, such as family, medical advisors, friends, and coworkers. In addition, the many FM support groups have, as their goal, provision of information and feedback for this variable and sometimes frustrating condition. A number of these support groups are active in South Western Ontario.

The investigator has had the opportunity to attend numerous FM support group meetings in Waterloo County (including Guelph, Waterloo, Fergus, Kitchener, and Stratford support groups) to both participate in and simply observe the social interactions within the groups. A striking characteristic of these meetings is that the majority tend to dwell on the problems rather than the solutions facing individuals with FM. With such a focus, the meetings tended to become very negative, downbeat, and in the words of the participants' themselves, "general bitch sessions". In the past two years, two Waterloo County support groups have actually closed due primarily to the participant perception that the meetings were overly negative and therefore did not help. Given the Ontario Fibromyalgia Association (OFA) support group mandate to provide a supportive environment for those with FM, the current situation raises an interesting question. Specifically, although social support is generally considered to be a positive factor in the chronic disease literature, one wonders if the type of support provided by these FM support groups was still beneficial?

Theoretically Based Intervention

In this particular situation, the general negative focus of many FM support group meetings provides the motivation for an intervention to manipulate and change the social environment. If the social experience of support groups can be focused upon the benefits of a recommendation, how to carry out the recommendation, and the support for these actions, the motivation to change behaviour may be enhanced. While perceived behavioural control is a known contributing factor to the relationship between physical activity and FM, little is known about the role of either the affective or social factors which may also influence physical activity involvement for those with FM. The TPB

provides a strong theoretical framework to examine and influence three variables -- perceived behavioural control, attitude, and subjective norm -- and has been recommended as a viable framework for conducting interventions (Baranowski et al., 1997). The variables within the theory are thought to be determined through social experiences and thus are potentially amenable to change (cf. Brawley, 1993; Brawley & Culos-Reed, in press).

Therefore, the intervention in Study 3 was based on the TPB and was an attempt to manipulate the core TPB variables. Specifically, the manipulation focused upon an individual's thoughts and feelings towards using physical activity as a means of treatment and of coping more effectively with FM. The nature of the manipulation was either a *positive* or *negative* discussion group, with a focus towards being physically active for individuals with FM. As such, the attitude component of the TPB was targeted for both the positive and negative condition. Specifically, the manipulation to create a positive (affective) environment was focused upon, producing positive changes in attitudes, while a manipulation encouraging a primarily negative (affective) environment (i.e., the more normal state of affairs for the group) was geared to maintain or create negative changes in attitudes. Within the TPB, attitudes may be defined and measured as an affectively oriented variable. In addition to this affective focus, specific discussion items within each condition were targeted to specifically influence the perceived behavioural control and subjective norm aspects of the TPB. Thus, although the intervention manipulation was primarily of an affective nature, it was expected to influence change in all of the variables within the TPB.

According to Olson and Zanna (1993), attitudes are more likely to be changed when the individual hearing a message is motivated to change and is able to do so. In the present study, a message regarding physical activity participation in relation to FM was presented to a self-selected group of FM individuals (i.e., individuals who wish to attend the support group meetings). These individuals were both motivated to be physically active (from a health perspective, activity is highly recommended as a treatment option for those with FM) and in the majority of cases, were able to be active (i.e., symptoms are not so debilitating as to physically prevent them from engaging in physical activity).

Measurement Considerations

In order to assess the effects of the intervention, a number of TPB measurement issues were also addressed. Although perceived behavioural control accounts for substantial explained variance when predicting nonvolitional behaviours, the weaker results for the other TPB variables in Study 2 was somewhat perplexing. Within those possibilities that could account for weak results, the measurement of the key variables represents one alternative. For example, Ajzen (1991) has suggested that the traditional measurement of the subjective norm construct limits its ability to predict behavioural intention. Recent work has suggested that a single-item measurement of the subjective norm component (i.e., no motivation to comply assessed) may be sufficient (Courneya & Friedenreich, 1999). This was addressed in the present study.

Regarding the conceptualization of attitude, it may be that the traditional measurement may not be capturing enough of the variability in expressed attitudes. This was evident in the attitude measure in Study 2. Recently, Smith (1995) examined the effectiveness of expanding the attitude measure to include two components -- a factual

attitude component and an experiential attitude component. This research supported the use of experiential evaluations of attitudes as better predictors of physical activity intentions and behaviours. Earlier work had also found that the experiential evaluations were more predictive of both intentions (Godin, 1987) and behaviour (Ajzen & Timko, 1986) in the health domain. Accordingly, the present study examined both factual and experiential items as predictors of physical activity intentions and behaviour for those with FM.

Summary

The purpose of this third study was to attempt to manipulate the social environment of an FM support group and determine if changes in the core social cognitive variables of the TPB could be obtained. Specifically, it was hypothesized that the positive manipulation would foster positive changes in the TPB components of attitude, perceived behavioural control, and subjective norm. The negative manipulation, on the other hand, was hypothesized to maintain or diminish the TPB variables of attitude, perceived behavioural control, and subjective norm. Given the short-term nature of the manipulation, it was unknown whether there would be an impact on behavioural intention for future involvement in regular physical activity.

Methods

Procedure

Participants were recruited from numerous sources in South Western Ontario, including local support groups as well as massage, chiropractic and health clinics. Volunteers also responded to posters soliciting FM participants for a study. These posters were displayed in university and physical activity complexes as well as local

health clubs. Subjects who agreed to participate in the study were informed of the voluntary and confidential nature of the study prior to signing up for the discussion. Approximately 80% of the total sample was again drawn from support groups, while the remaining participants responded to the displayed posters or were referred from the various clinics[3].

Subjects

A total of 64 individuals participated in the two discussions (34 in the positive condition and 30 in the negative condition). There were no significant differences between the two conditions at Time 1 on any of the demographic, symptom, or theoretical variables, thus the sample was analyzed as a whole (see Appendix I for descriptive analyses for the two groups separately). The average age of the participants was 48.5 years (SD = 10.45), and the vast majority were female (95%). The individuals had been medically diagnosed with FM for an average of 8 years, but had experienced variable FM symptoms for a longer average period of 12.3 years.

Design

A between groups design was utilized, where one group participated in the positive condition and the second group participated in the negative condition. Due to design constraints, it was not possible to randomly assign participants to each condition. Rather, the meeting sites were randomly assigned by municipality (i.e., Guelph or Waterloo) to either the positive or negative condition, respectively. Individuals therefore participated in the meeting that was of closest geographic proximity and thus most

[3] Due to the unique sample, recruitment of subjects in South Western Ontario required drawing on the same municipalities. Although all three studies occurred in the same area and therefore had some participant overlap, studies were conducted a minimum of 6 months apart. This time gap between studies plus the memory issues associated with FM mitigate against any confounding effects of one study upon another.

convenient for them to attend. Each site represented individuals from surrounding areas (e.g., Waterloo meeting had participants from Stratford, Kitchener, and Waterloo; Guelph meeting had participants from Fergus, Elora, Guelph, and Hamilton).

Rationale for the Design

A number of existing social support groups are active in South Western Ontario. Their mandate is to provide a supportive environment where individuals can engage in discussions and receive information regarding issues pertinent to FM. An ideal examination of the role of social support and the affective environment in an experimental setting would involve the comparison of three groups -- a positive condition, a negative condition, and a control group condition. However, both recruitment and ethical constraints limited the ability to conduct this test. Specifically, the finite number of FM individuals in the local areas that would be able and willing to attend a meeting limited the sample size that would be necessary for the three conditions. As well, the nature of the control group condition provided some ethical issues to consider. Given that the participants are FM *patients*, a waitlist control is unethical. And a control group discussion condition of a *relevant* FM discussion topic that would not impact any of the measured TPB variables was also not feasible.

Given these restraints, the best option was deemed to be a between group design in which one condition received the positive manipulation and the second condition received the negative manipulation. In reality, this corresponded to a comparison of the norm seen in support groups (i.e., the negative condition) to an enhanced positive condition.

The Manipulation

Participants were recruited to participate in a discussion on FM and physical activity. During the recruitment phase, the participants were made aware that this discussion was part of a research project and that they would have the opportunity (voluntary) to complete some questionnaires. Once signed up for the focus group discussion on FM and physical activity, the participants were called as a reminder of the meeting time and place one week prior to the discussion night. A second reminder phone call was placed to each participant on the day of the discussion.

Upon their arrival, participants were required to sign-in and were given the first questionnaire (Pre-manipulation; Appendix J1). The vast majority of the participants at each meeting completed the questionnaires (34/38 positive meetings; 30/33 negative meeting). Reasons for not completing the questionnaire included that they would not be present for the entire meeting, they were too tired to complete it, or they were not interested in being part of the research (i.e., were attending only for the information). Participants were given approximately 15-20 minutes to complete this first questionnaire.

Common Aspects in Each Condition

After completing the first questionnaire and the consent form, the discussion on physical activity began. Participants were told that due to time constraints, the focus of the discussion was to centre on either the positive aspects of physical activity for those with FM, or on the negative aspects of physical activity for those with FM. Each discussion lasted approximately 30-40 minutes and was scripted to be the same within each condition. Appendix J3 provides an outline of the discussion in each condition (positive and negative). Each discussion issue was designed to draw forth responses that

would include an affective component (i.e., make the positive or negative aspect of the answer salient). As well, a number of questions were designed to impact the individuals' *confidence* in their ability to be physically active. Beyond these commonalties within each question, the focus of the 10 questions in the discussion targeted different aspects of the TPB. Specifically, 2 questions focussed primarily on impacting the TPB variable of attitudes[4], 4 questions impacted efficacy, and 4 questions impacted subjective norm, or the role of significant others. Table 15 shows each question and the primary TPB construct that was targeted for change.

Table 15.

Targeted TPB Constructs in the Positive and Negative Conditions.

Question	Targeted TPB Construct
1. General benefits/barriers of regular PA	Attitude
2. Pos/Neg. implications of regular PA for FM	Attitude
3. Pos/Neg. impact of PA on one's job	Subjective Norm
4. Pos/Neg. impact of PA on one's social life	Subjective Norm
5. Pos/Neg. impact of PA on one's family	Subjective Norm
6. Pos/Neg. impact of PA on one's friends	Subjective Norm
7. How does regular PA improve/worsen FM	Efficacy
8. Benefits/Barriers to starting PA	Efficacy (Attitude)
9. Benefits/Barriers to maintaining PA	Efficacy (Attitude)
10. How/Barriers to re-start after a lapse	Efficacy

[4] The attitude component was also targeted in each question by focusing either on the positive or negative (affective) responses to each question.

Upon completion of the discussion, participants were asked (voluntary) to complete a second questionnaire that contained all of the key variables targeted to be impacted by the manipulation (Post-manipulation; Appendix J2). Participants were given approximately 15 minutes to complete this second questionnaire. After the data had been collected, the meeting was completed with a question and answer period with a panel that consisted of a researcher (NCR) and two medical doctors who are well known within the FM community. The purpose of inviting the doctors to attend was to enhance participant attendance for the research phase of the evening. Recruitment materials (i.e., posters and phone calls) advertised that both doctors would be attending the meeting to participate in a question and answer period following the main discussion on physical activity. Both doctors are popular speakers, knowledgeable on the topic of FM, and would be a draw for participants to attend the meeting. None of the discussion after completion of the second questionnaire was considered part of the research project and therefore was not scripted or taped.

Initially, a follow-up assessment for study participants was scheduled for one week after the discussion group meeting. However, after one week few participants agreed to complete this final questionnaire and thus data regarding any lasting influence of the manipulation is not available. Reasons for not completing this final questionnaire were primarily that the participants were too busy at the time of the call. Participants were debriefed during this follow-up contact, either over the phone or in person. Individuals were made aware that the purpose of the focus group discussion was actually to impact their attitude, confidence and support towards being physically active. Participants in each condition were told that there were of course both positives and

negatives to being physically active, and were given the opportunity to receive a handout on physical activity and FM that highlighted both the pros and cons that had been discussed in each meeting. These handouts were also made available to the local support groups from which the majority of the participants were drawn.

Positive Condition

In the positive condition, participants were asked to focus their comments and discussion solely on the positive implications/aspects of physical activity for those with FM. Each question was designed to draw forth a positive affective component as well as highlight the "how-to" of being physically active to enhance their efficacy (if appropriate for the question) (see Appendix J3).

Negative Condition

In the negative condition, participants were asked to focus their comments and discussion solely on the negative implications/aspects of physical activity for those with FM. Each question was designed to draw forth a negative affective component as well as highlight the barriers impeding being physically active to diminish their efficacy (if appropriate for the question) (see Appendix J3).

Manipulation Check

As well as the scripted discussion, the facilitator's role was also scripted in terms of responses to the ensuing discussion. In this fashion, the facilitator's role in each condition remained similar and relatively neutral, thus ensuring that the changes in any of the theoretical variables was a result of the participants' discussion per se and not due to variable feedback from the facilitator in each condition. A manipulation check was performed by videotaping the discussions and having two independent raters review the

facilitator's behaviour regarding the key elements of the manipulation. These results can be seen in Table 16. Three categories of responses were coded. The first, verbal feedback, included such comments as "nice point", "excellent", or "right". The second category, non-verbal feedback, included actions such as laughter, smiling, or nodding the head. Finally, the third category consisted of verbal prompts. These were facilitating comments or cues given during lulls in the meeting in an attempt to encourage further discussion.

Although in general there was fairly equal verbal feedback, there was greater nonverbal feedback in the positive condition. This was largely a function of the laughter and smiles which were much more prevalent in the positive condition. It is interesting to note that there was a higher frequency of verbal prompts, designed to elicit participation, in the positive condition. The negative condition participants had plenty to say regarding the drawbacks of physical activity, while the participants in the positive condition had to be encouraged to share their remarks regarding the benefits of physical activity.

Table 16.

Average Frequency of the Facilitator's Feedback Responses in the Positive and Negative Conditions.

Category of Response	Positive Condition (n)	Negative Condition (n)
1. Verbal Feedback	80	70
2. Non-Verbal Feedback	45	25
3. Verbal Prompts	59.5	33.5

The discussions in both conditions were videotaped not only to serve as a manipulation check on the facilitator's behaviour, but the videotaping also served to heighten the participants' commitment to the views they shared during the discussion (Leake, Friend, & Wadhwa, 1999). The participants were told that the discussions were being videotaped for a number of reasons. First, to ensure that all of the relevant information that was shared during the discussion would be recalled when the researcher (NCR) did future work on physical activity and FM. The second reason provide for videotaping the sessions was that portions of the videotape would be used to compile an exercise video for newly diagnosed individuals with FM[5]. It was felt that both of these reasons would increase the participants' commitment to the views that they shared during the discussion. Increased public commitment to an individual's viewpoint is thought to motivate the maintenance of these views. Participants were asked if they objected to having the sessions videotaped and were given the option of sitting "outside" of the taping area. However, none of the participants objected to the taping. Two cameras were thus used in each meeting (one focused on the facilitator, and one focused upon the participants).

Measures

Pre-Manipulation Questionnaire

Demographics. A series of demographic and descriptive variables consisting of age, gender, and brief medical history (i.e., time since the individuals first noticed FM symptoms and time since their FM diagnosis by a medical professional) were obtained. Each participant had to indicate that they had been medically diagnosed in order to ensure

[5] This video may be developed for future research. Participants have given their consent to be a part of the video via their participation in the present study.

that the results would pertain to FM and not be confounded with other conditions. Additional demographics (e.g., similar to those obtained in Studies 1 and 2, such as educational level or SES) were not obtained because the current participants were drawn from the same sources as the earlier two studies and thus the information would have been redundant.

Physical activity. Similar to Study 2, physical activity was defined for participants as "any planned exertion aimed at improving or maintaining your physical fitness and health"; regular physical activity was defined as "activity occurring 2 or more times each week". Individuals were asked to indicate how physically active they had been over the past 2 months (completely inactive; sporadically active; or regularly active), as well as the average duration of each physical activity session (in minutes) and their usual level of exertion or degree of effort (scored from 0 = normal, 5 = strong, to 10 = max). This exertion measure comes from the Paffenbarger Physical Activity Questionnaire (Paffenbarger, Wing, & Hyde, 1978) which is a widely used instrument of physical activity recall. The past physical activity measure provided their behaviour assessment pre-manipulation while the duration and exertion measures provided descriptive information regarding the typical FM physical activity session.

Along with these descriptives of the physical activity sessions, participants were asked to indicate the thoughts they had right now regarding "participating in regular physical activity in the next two weeks". After indicating a thought, participants also indicated how important each thought was for influencing their decision to participate in regular physical activity (rated on a 0-10 scale, with 0 being "not at all important" to 10 being "very important"). This thought assessment was used to determine if the

manipulation impacted the nature of their thoughts. It was hypothesized that the nature of the thoughts pre-manipulation would be mixed (i.e., both positive and negative) and would not significantly differ in their nature between the two groups. Post-manipulation, it was hypothesized that the positive group would recall more positive than negative aspects of physical activity that would be reflected in their thought content, while the reverse would be true for the negative group (see results in Appendix K).

TPB Variables

Attitude. The attitude measure in Study 2 used a combination of both experiential and factual attitude items. Perhaps this combination was responsible for the lack of contribution by the attitude component to the prediction of physical activity intentions and behaviour. Specifically, familiarity of all participants with the factual items of the attitude scale may have decreased the variability in the measure (i.e., even individuals with FM *know* that physical activity is good for them). Use of experiential attitude items may better distinguish between those who do and do not *like* physical activity. Therefore, fourteen items assessed individuals feelings (direct measure only) about engaging in regular physical activity each week over the next two weeks. Each adjective pair was scored on a 7-point semantic differential scale, with higher scores reflective of more positive attitudes. The attitude items reflected the two hypothesized dimensions of attitudes (Smith, 1995) -- experiential attitudes and factual attitudes. The experiential attitudes reflected those aspects of physical activity that individuals feel, such as "pleasant" or "interesting". The factual attitudes reflected more known facts about activity, such as physical activity is "healthy" or "wise". The attitude pairs within each subscale can be seen in Table 17.

Table 17.

The Fourteen Attitude Pairs Reflecting Experiential and Factual Attitudes.

Experiential Attitudes:	Factual Attitudes:
1. Interesting/Uninteresting	1. Healthy/Unhealthy
2. Enjoyable/Unenjoyable	2. Worthwhile/Not Worthwhile
3. Fun/Chore	3. Useful/Useless
4. Pleasant/Unpleasant	4. Good Idea/Bad Idea
5. Stimulating/Dull	5. Positive/Negative
6. Treat/Obligation	6. Wise/Foolish
7. Convenient/Unconvenient	7. Beneficial/Not Beneficial

Subjective norm. In the present study, both subjective norm and motivation to comply were assessed with single items. However, the motivation to comply item was re-worded to decrease the perception that significant others are *controlling or pressuring* one's behaviours (Ajzen, 1991). Thus, this item assessed the *extent of motivation individuals had* for engaging in activities that they thought others thought they should do. A direct measure of subjective norms was obtained from the participants' responses to a single item that asked them to rate on a 7-point Likert scale, the extent to which most people who were important to them (e.g., spouse, parent, friend, therapists) think that they should engage in regular physical activity each week over the next two weeks (1 = strongly disagree, 7 = strongly agree). The participants' motivation to comply with what significant others think they should do was assessed with a single item rated on a 7-point Likert scale, with 1 reflecting that they were "motivated very little" to do what important

others think they should do, and 7 reflecting that they were "highly motivated" to do what important others think they should do.

Perceived behavioural control. Two efficacy scales, assessing a skills and a coping efficacy, were utilized to examine the participants' confidence in their ability to engage in regular physical activity each week over the next two weeks. These scales are consistent with earlier research by Ajzen (1991) and recommendations made by McAuley & Mihalko (1998). The coping efficacy consisted of three items that assessed the individual's confidence in being physically active in the face of their FM symptoms, when they were fatigued, and when they experienced severe tenderpoint pain. Each item was scored on a 11-point Likert scale, with 0 representing "not at all confident" and 10 "completely confident". The second skills efficacy scale consisted of four items that assessed the individual's confidence to use certain skills to balance their physical activity with their FM symptoms (i.e., planning a rest, scheduling time, utilizing coping strategies, and pacing). Each item was again scored on a 11-point Likert scale, with 0 representing "not at all confident" and 10 "completely confident". The items in both scales were designed to reflect common problems, challenges, and planning that FM individuals must consider concerning physical activity. The protocol for measure development was consistent with that recommended for physical activity by McAuley and Mihalko (1998).

Behavioural intention. Intention was measured with a single item that stated "During the next two weeks, I will engage in physical activity at least ___ times each week". Participants filled-in the number of times they would be physically active and then indicated the extent or strength of this intention on a 9-point scale (1 = definitely

will not, 9 = definitely will). Similar to Study 2, only the frequency of intention was used in the subsequent analyses. This 1-item protocol is consistent with the TPB research (Ajzen, 1991) and follows the guidelines regarding intention-behavior correspondence (Courneya & McAuley, 1995; Sutton, 1998). Although the behavioural intention measure does not contain the specific reference to "2 times per week" that is included in the other TPB constructs, a note prior to the intention measure reminds participants that "regular physical activity means participating at least 2 times each week".

Fibromyalgia Variables

Fibromyalgia impact questionnaire (FIQ). Functional ability was assessed using the ten FIQ (Burckhardt, Clark, & Bennett, 1991) items that measure how an individual's FM symptoms impact on their daily functions in a typical week (the first FIQ subscale). The items were summed and divided by the total number of items for each individual to give a total functional ability score. Previous research has shown adequate reliability of this measure (Burckhardt et al., 1991). The FIQ is commonly used throughout FM research as an indicant of functional ability (Bigatti, Cronan, Gallager, & Cronan, 1998; Hauswirth, Bigatti, & Cronan, 1998).

FM symptoms. Pain was assessed with a Visual Analogue Scale (VAS), which has been found valid and reliable in previous FM research (Bigatti, Cronan, Gallager, & Cronan, 1998). The VAS uses a 10-cm line, with 0 indicating "no pain" and 10 indicating "pain as bad as it could be". Participants indicated their level of pain by placing a mark somewhere on the line between the two endpoints.

Fatigue was assessed with a VAS, with the endpoints reflecting "no fatigue" (0) and "extreme fatigue" (10). This method of assessing fatigue is common in the FM

literature (Burckhardt, Clark, & Bennett, 1991; Wolfe, Anderson, Harkness, Bennett, Caro, Goldenberg, Russell, & Yunus, 1997) and aids in the reduction of subject burden.

Tenderpoint pain was also assessed with two visual analogue scales. The first VAS rated the individuals' perception of the pain severity of their most common tenderpoints during their typical week, while the second VAS rated their perception of the pain severity of their least common tenderpoints during their typical week. Previous research has utilized VAS tenderpoint measures with adequate reliability and validity (Finckh, Morabia, Deluze, & Vischer, 1998). The use of the VAS for the FM tenderpoint assessment also helps to reduce subject burden.

FM symptom efficacy. The Arthritis Self-Efficacy subscale for other symptoms (Lorig, Chastain, Ung, Shoor, & Holman, 1989) was used to assess how certain individuals were that they could control their FM symptoms. This subscale has been used in Studies 1 and 2 as well as in previous FM research and has been shown to be both valid and reliable (Buckelew et al., 1995; Buckelew et al., 1998). The other symptoms subscale consisted of 6 items concerning how confident the individual was that they could control different FM symptoms, such as fatigue, pain, and depression. Each item was rated on a 10 to 100-point scale, with higher scores reflecting greater confidence or efficacy. Rather than retaining the pain subscale as in the previous studies, the other symptom scale was employed to provide a broader assessment of the FM symptoms that would likely be impacted by physical activity.

Additional Measures

The following two scales were used to check on between group differences at pre-manipulation. The first scale measuring public self-consciousness was included to

determine that the groups would not respond differentially to the presence of the video and the participation in a public discussion. If, for example, individuals in the positive condition were higher on this trait-like quality, the videotaping and the discussions themselves might increase their desire to respond positively. It would then be this difference in the level of public self-consciousness that would be responsible for the changes in the core theoretical variables, and not the manipulation per se.

The second scale, measuring the trait quality of optimism or pessimism, was included to ensure that the participants in the two conditions did not significantly differ on this trait at pre-manipulation. If, for example, the negative group was naturally more pessimistic than the positive group to begin with, this trait rather than the manipulation per se might be responsible for the scores on the core theoretical variables.

Public self-consciousness. (Fenigstein, Scheier, & Buss, 1975). A 7-item scale was used to assess an individual's level of public self-consciousness. Subjects rated the 7-item PSC on a 5-point Likert scale, with 1 being "the statement is not at all characteristic of me" and 5, "the statement is extremely characteristic of me". The items reflect both thoughts and behaviors regarding public presentation. For example, representative public self-consciousness items are "I'm concerned about the way I present myself", or "One of the last things I do before I leave my house is look in the mirror". This scale was included in the present study to describe the sample and to ensure that there were no significant differences between the participants in the two conditions on this presentational variable. The mean scores for the two groups were 3.48 (positive group) and 3.34 (negative group). A t-test indicated no significant difference between the two groups.

Optimism/pessimism scale. This 12-item scale assessed participants' tendency to be optimistic or pessimistic as a general behaviour trait. Each item is scored on a 0-4 scale, with 0 representing "strongly disagree" and 4 representing "strongly agree". Items 3, 8, 9, and 12 are reversed scored, so that higher items reflect a more optimistic attitude. This scale was included in the present study for both descriptive purposes and to ensure that participants in the two conditions did not significantly differ on this trait quality (i.e., participants in the positive discussion weren't more optimistic to begin with than those in the negative discussion). The mean scores for the two groups were 2.25 (positive group) and 2.28 (negative group). A t-test indicated no significant difference between the two groups on this trait.

Measures -- Post-Manipulation Questionnaire

The post-manipulation questionnaire was identical to the pre-manipulation questionnaire except for the exclusion of the demographics, public self-consciousness, and optimism/pessimism scale post-manipulation. The only other difference between the two questionnaires was the inclusion of a series of behavioural intention measures post-manipulation.

Behavioural intention measures. A series of three behavioural intentions were assessed. These were assessed post-manipulation as an additional means of determining the extent to which the manipulation altered attitudes and thereby influenced the participants' intentions to perform future behaviours related to the attitude. Thus, these additional intention measures served as intentions about "multiple-act" criteria (actions that reflect the overall class of behaviour, physical activity) -- if the primary intention for physical activity wasn't influenced, perhaps intentions for other related behaviours would

manifest themselves (Fishbien and Ajzen, 1975). For example, instead of the primary intention of engaging in more frequent physical activity, a related intention that might be influenced would be the intent to engage in future focus group discussions on physical activity (i.e., an instance related to the overall class of actions). It was expected that those in the positive condition would agree to complete more future behaviours than those who had participated in the negative condition. The first measure assessed the behaviour of attending a future focus group session in the upcoming month to further discuss the role of physical activity for FM. Participants indicated the strength on a 0-10 scale, with 0 representing "definitely will not attend" and 10 representing "definitely will attend". The second behaviour measure assessed the participants' intention to complete a future telephone interview regarding the role of physical activity for FM. The strength of this behaviour was assessed in the same fashion as the first measure. Finally, a third behaviour assessed if they would be interested in receiving summary points from the discussion. In all cases, commitment to the behaviour was assessed by having the participant complete their name and phone number (or mailing address for the third behaviour). Completing the necessary information indicated increased commitment.

Participants

FM condition severity is typically characterized by various symptoms, such as general pain, fatigue, and specific tenderpoint pain. For this sample, the average fatigue level on the VAS was 6.78 (SD = 2.14) on a 0-10 point scale, with higher scores reflective of more fatigue. Self-reported pain on the VAS was 6.70 (SD = 1.82), indicative of moderately high levels of perceived pain. Finally, the most common tenderpoints perceived pain score on the VAS was 7.13 (SD = 1.48), while the least

common tenderpoints perceived pain score was 4.00 (SD = 2.05). These scores indicate that common tenderpoints are perceived as quite painful, while uncommon tenderpoints are perceived as only minimally to moderately painful. Another indicator of functioning with FM comes from a measure of activities of daily living in the FIQ. In the present sample, the average FM score for the entire sample was 2.67 (SD = .62), which indicates a moderate level of perceived daily functioning and is similar to previous research on FM samples (Buckelew et al., 1995). Participant demographics and FM symptomatology can be seen in Table 18.

Table 18.

Pre-Manipulation Values for Demographic Variables for the Entire Sample.

Variable	Mean (SD)
Age	48.47 (10.45)
Gender	
Female	n = 61 (95.3%)
Male	n = 3 (4.7%)
Time with symptoms	12.28 (9.62)
Time since diagnosis	8.01 (5.95)
Most common TP	7.13 (1.48)
Least common TP	4.00 (2.05)
VAS-pain	6.70 (1.82)
VAS-fatigue	6.78 (2.14)

Note. n = 64. TP = Tenderpoints, VAS = Visual Analogue Scale, SD = Standard Deviation. Age, Time with symptoms, and since diagnosis in years. All other scales from 0-10

Statistical Analysis

The principle hypotheses concerning the impact of the manipulation (i.e., the positive or negative focus of the discussion) were tested with a multivariate analysis of variance (MANOVA). This statistical procedure allows for the simultaneous examination of group differences on a number of dependent variables. In this case, the between group variable was the condition (positive or negative) of the focus group discussion, while the dependent variables were the TPB constructs of attitudes, subjective

norms, and perceived behavioural control. MANOVA's were conducted at both pre-manipulation and at post-manipulation. The analysis was performed pre-manipulation to ensure that the groups were not significantly different on any of the core theoretical variables prior to the manipulation.

Prior to conducting any of the statistical analyses, the data was examined for missing data, outliers, skewness and kurtosis (i.e., normality assumptions) at both pre- and post-manipulation. Missing data was replaced according to the guidelines provided by Tabachnik and Fidell (1996) -- the group mean was used if an entire scale was missing for a participant, while the participant's mean was used if any single item(s) was missing on a particular scale for which they had at least one score. There was minimal missing data in the present sample (less than 3%), suggesting that the data was missing in a random pattern. However, replacing the missing data resulted in a complete data set, thereby enhancing the power to detect differences in any further analyses. The disadvantage in terms of reduced sample variability leads to a more conservative estimation of the results.

The procedures outlined by Tabachnik and Fidell (1996) were also followed when checking and adjusting for outliers, skewness, and kurtosis. In terms of outliers, three were identified. In each case, the outlier remained in the data set but steps were taken to ensure that its impact was minimized. As recommended by Tabachnik and Fidell (1996), the score was changed so that it was less deviant. The extreme score was adjusted to be one unit more than the next most extreme score. Specifically, for subjective norm, a score of 1 was changed to 2, making it 1 score lower than the next lowest score. For behavioural intention, a score of 12 was changed to 8, resulting in it being 1 score higher

than the next highest score (7). And finally, the strength measure of behavioural intention was changed from 1 to 3 in two cases. The remainder of the analyses were then performed with these changed outliers.

A number of variables pre- and post-manipulation were also skewed in either a positive or a negative direction. Skewness is determined by dividing the skewness by the standard error of the skewness. Results above or below two are considered positively or negatively skewed, respectively. The vast majority of these skewed variables were either ancillary to the primary hypotheses or were demographic characteristics of the sample, and thus no attempt was made to adjust the variable. For example, gender was skewed as the sample was predominantly female, however no transformation could be made on this variable. For those variables that could be changed and were to be included in further analyses, Tabachnik and Fidell (1996) suggest transforming the scores to reduce the skewness (i.e., log transformations). Upon initial examination of the variables, three were identified as positively skewed pre-manipulation -- behavioural intention, subjective norm, and the factual attitude construct. Log transformations improved the skewness of only the behavioural intention variable, and thus the newly created logBI variable was used in all subsequent analyses. For the subjective norm construct, the composite measure of subjective norm (i.e., subjective norm x motivation to comply) was not skewed, therefore this composite variable (SNMC) was used in all subsequent analyses. Finally, because the factual attitude scale was negatively skewed, further analyses use only the total attitude scale, which was not skewed.

At post-manipulation, the variables were again examined for both skewness and kurtosis, this time separately by condition. This analysis revealed differences between

the two conditions on variables that were skewed. Specifically, for the negative condition, both subjective norm and behavioural intention were skewed. The composite subjective norm/motivation to comply variable, however, was not skewed so it was again used in the analyses. Behavioural intention was improved with a log transformation, and thus similar to pre-manipulation, the newly created logBI at post-manipulation was used in subsequent analyses. For the positive condition, both behavioural intention and the total attitude scale were skewed. The attitude log transformation did not improve upon the small skewness evident, thus the total scale was retained for further analyses. Similar to the negative condition, logBI was used in all subsequent analyses to replace the highly skewed original behavioural intention measure.

Results

Scale Reliabilities

The alpha levels for the questionnaire scales pre-manipulation that were included in the subsequent analyses can be seen in Appendix L. All scales achieved acceptable alpha levels (i.e., above .70). The attitude scale involved the deletion of 1 item (the attitude that physical activity is an obligation/treat, item 13) because of low inter-item correlations. As well, the mean of this item was well below the next lowest mean of the items within this scale (3.9 versus 4.4). This deletion resulted in a slight increase in the alpha from .90 to .93.

The alpha levels for the questionnaire scales post-manipulation that were included in the subsequent analyses can be seen in Appendix M. All scales achieved a significant alpha level (i.e., above .70). In order to remain consistent between pre- and post-manipulation, the attitude scale involved the deletion of 1 item (the attitude that physical

activity is an obligation/treat, item 13). This resulted in only a slight increase in the alpha (.91 to .93). As well as conducting scale reliabilities for the entire sample post-manipulation, the scales were examined within each group (positive or negative focus). Again, all of the scales were reliable above .70 (see Appendix M).

Factor Analyses

The attitude scale pre-manipulation was factor analyzed to determine whether subsequent analyses should include two separate scales. A factor analysis was run with Varimax rotation. The results for the attitude scale did not reveal a clear two structure factor as anticipated (see Appendix N). Rather, three components were extracted with eigenvalues greater than 1, accounting for 79.3% of the variance. However, there was not a clear delineation between the three factors. The analysis conducted post-manipulation revealed a similar pattern (see Appendix N). The results again revealed a three component structure at Time 2 for the attitude scale that accounted for approximately 83% of the variance. Given the similarity with the first analysis of the scale, the use of the total scale was maintained as the measure of attitude. This also served to increase the power of the analyses by reducing the number of dependent variables in the MANOVA.

The second factor analysis pre- and post-manipulation involved the efficacy items (see Appendix N). The items were conceptually grouped into two efficacy scales -- efficacy to cope with one's FM symptoms in order to be physically active (three items) and efficacy to use various skills in order to regularly engage in physical activity (four items). The factor analysis was run with Varimax rotation, and the results revealed related groups of items for the efficacy to cope with symptoms and the efficacy to use

skills for managing exercise. Pre-manipulation, each related factor accounted for 64.2% and 17% of the variance, respectively. Post-manipulation, these related items loaded as 1 factor, accounting for 71.1% of the variance. Given the similar conceptual nature of the items and that FM individuals might have to both cope and apply skills to adhere to exercise, the items were maintained as one overall efficacy scale in subsequent analyses.

Descriptive Statistics

The bivariate correlations for the variables included in subsequent MANOVA's can be seen in Table 19. As expected, there are strong correlations between the two attitude subscales (experiential and factual) and the total attitude scale, the two efficacy subscales (to cope with FM symptoms to be active and to use one's skills to be active) and the total efficacy scale, as well as the composite subjective norm scale and the two constructs of subjective norm and motivation to comply. The subscales themselves, while related, do not reflect the same degree of relationship, indicating a degree of uniqueness in what they are measuring (different aspects of attitude, efficacy, and subjective norm, respectively). The subjective norm construct is the only TPB variable that does not correlate strongly with any of the other TPB constructs. Examination of its composite parts -- subjective norm and motivation to comply -- reveals that it is the motivation to comply component which may be limiting the total construct's (i.e., SNMC) correlation with the other variables. The subjective norm component is positively correlated with all of the other TPB variables except for efficacy to use skills to be active, while the motivation to comply component is only positively correlated with subjective norm.

Table 19.

Pre-Manipulation Bivariate Correlations Between Primary Variables for the Entire Sample

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Attitude-total	_	.905**	.878**	.265*	.488**	.008	.351**	.245	.372**	.320**	.065
2. Factual Att		_	.592**	.296*	.520**	-.001	.417**	.331**	.409**	.230	.016
3. Experiential Att			_	.170	.340**	.016	.196	.094	.246	.349**	.104
4. SN-total[1]				_	.773**	.878**	.177	.169	.149	.225	.241
5. SN					_	.436**	.284*	.283*	.226	.252*	.288*
6. MC						_	.016	.055	-.022	.142	.211
7. Efficacy–total							_	.877**	.904**	.454**	.364**
8. Efficacy-do PA								_	.588**	.372**	.457**
9. Efficacy-skills									_	.434**	.207
10. BI										_	.251*
11. Behaviour[2]											_

Note. n = 64. 1. The subjective norm construct is the composite measure of subjective norm x motivation to comply. 2. The behaviour measure is the participants' past physical activity (sporadically active or regularly active). Att = attitudes, SN =

subjective norm, MC = motivation to comply, PA = physical activity, BI = behavioural intention. Shaded areas represent correlations between subscales and their corresponding total scale (evidence of singularity).

*$p < .05$. **$p < .01$

Multivariate Analysis of Variance -- TPB Primary Hypotheses

Pre-Manipulation

Descriptive analyses for the entire sample, as well as for participants within each condition, can be seen in Table 20. The pre-manipulation MANOVA revealed that there were no significant differences between the individuals assigned to either the positive or negative focus discussions, F (4, 59) = .260, Wilks' Lambda = .983, p = .902 (see Table 21). The normality assumptions of a MANOVA were met (i.e., nonsignificant Levene's and Box's tests).

Table 20.

Pre-Manipulation Descriptives for the TPB Variables for the Entire Sample and for Participants Within Each Condition.

Item	Mean (Standard Deviation)		
	Entire Sample	Negative Gp	Positive Gp
Attitude*	5.23 (1.07)	5.35 (1.04)	5.12 (1.10)
Factual	5.60 (1.18)	5.79 (.98)	5.44 (1.32)
Experiential	4.78 (1.22)	4.69 (1.31)	4.47 (1.13)
Efficacy*	5.57 (2.01)	5.65 (2.05)	5.50 (1.99)
Cope with symptoms to do PA	1.68 (2.47)	4.82 (2.56)	4.55 (2.42)
Use skills to do PA	6.24 (2.09)	6.28 (2.10)	6.21 (2.11)
SNMC*	27.37 (12.40)	28.16 (14.37)	26.67 (10.53)
Subjective Norm	5.69 (1.49)	5.90 (1.42)	5.50 (1.54)
Motivation to Comply	4.65 (1.47)	4.59 (1.69)	4.70 (1.27)
Behavioural Intention	3.07 (1.73)	3.29 (1.85)	2.87 (1.60)
LogBI*	.43 (.21)	.45 (.24)	.41 (.18)

Note. n = 64 for the entire sample (34 and 30 for the positive and negative groups, respectively). * = variables that were used in subsequent analyses. PA = physical activity, SNMC = subjective norm x motivation to comply composite measure, LogBI = transformed behavioural intention variable. Scale ranges were: Attitude (1-7), Efficacy (0-10), SNMC (1-49), Subjective Norm and Motivation to Comply (1-7). Behavioural Intention was frequency per week on a continuous-open measure.

Table 21.

Pre-Manipulation MANOVA on the TPB Variables.

Source	SS	df	MS	F	Significance
Attitude	.837	1	.837	.729	.396
Efficacy	.380	1	.380	.093	.762
SNMC	35.68	1	35.68	.229	.634
BI	2.55	1	2.55	.559	.457
Error		62			

Note. n = 64. SS = Sum of Squares, df = degrees of freedom, MS = Mean Square, SNMC = subjective norm x motivation to comply composite score, BI = (log) behavioural intention. Scale ranges were Attitude (1-7), Efficacy (0-10), SNMC (1-49). BI was measured as frequency per week on a continuous-open measure.

Post-Manipulation

Descriptive statistics for the participants in each condition post-manipulation can be seen in Table 22 and the correlations between the TPB theoretical constructs can be seen in Table 23.

Table 22.

Post-Manipulation Descriptives for the TPB Variables for Participants Within Each Condition.

Item	Condition	
	Negative	Positive
Attitude*	4.95 (1.03)	5.45 (1.12)
Factual	5.19 (1.16)	5.72 (1.33)
Experiential	4.67 (1.12)	5.13 (1.09)
Efficacy*	5.36 (2.11)	5.79 (2.13)
Cope with symptoms to do PA	5.05 (2.54)	5.25 (2.74)
Use skills to do PA	5.59 (2.08)	6.21 (1.92)
SNMC*	25.95 (14.11)	26.35 (14.03)
Subjective Norm	5.21 (1.78)	5.41 (1.52)
Motivation to Comply	4.71 (1.62)	4.59 (1.65)
Behavioural Intention	3.37 (1.89)	2.91 (1.48)
LogBI*	.46 (.24)	.43 (.17)

Note. n = 63. * = variables that were used in subsequent analyses. PA = physical activity, SNMC = subjective norm x motivation to comply composite measure, LogBI = transformed behavioural intention variable. Scale ranges were: Attitude (1-7), Efficacy (0-10), SNMC (1-49), Subjective Norm and Motivation to Comply (1-7). Behavioural Intention was frequency per week on a continuous-open measure.

Table 23.

Post-Manipulation Bivariate Correlations Between Primary Variables for the Entire Sample.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Attitude-total	_	.939**	.889**	.341*	.374**	.201	.496**	.438**	.485**	.364**	.237
2. Factual Att		_	.677**	.359**	.402**	.216	.500**	.461**	.470**	.304*	.235
3. Experiential Att			_	.253*	.265*	.141	.394**	.322*	.411**	.374*	.194
4. SN-total[1]				_	.840**	.878**	.499**	.520**	.410**	.209	.209
5. SN					_	.552**	.593**	.591**	.513**	.257*	.103
6. MC						_	.388**	.394**	.330**	.140	.224
7. Efficacy–total							_	.930**	.932**	.417**	.261*
8. Efficacy-do PA								_	.733**	.368**	.291*
9. Efficacy-skills									_	.408**	.195
10. BI										_	.261*
11. Behaviour[2]											_

Note. n = 63. 1. The subjective norm construct is the composite measure of subjective norm x motivation to comply. 2. The behaviour measure is the participants' past physical activity (sporadically active or regularly active) measured at Time 1.

Att = attitudes, SN = subjective norm, MC = motivation to comply, PA = physical activity, BI = (log)behavioural intention. Shaded areas represent correlations between subscales and their corresponding total scale (evidence of multicollinearity).

*$p < .05$. **$p < .01$.

The bivariate correlations for the entire sample post-manipulation reflect few changes in the TPB variables. Specifically, the variable SNMC which was not correlated with the other variables pre-manipulation, is now significantly correlated with all of the other TPB variables, except for behaviour. In addition, multicollinearity (i.e., $\underline{r} > .70$) is evident between the two efficacy subscales of doing physical activity and using skills. However, this is not of a concern given that the two scales are not used in the same analysis.

The post-manipulation MANOVA consisted of the TPB variables of attitude, efficacy, SNMC, and behavioural intention post-manipulation as the dependent variables, condition (positive or negative) as the independent variable, and the TPB pre-manipulation variables of attitude, efficacy, SNMC, and behavioural intention entered as covariates. This allows for the examination of group change due to the manipulation, taking into account the pre-manipulation scores. The MANOVA to test the effects of the group manipulation was significant, $\underline{F}$ (8, 114) = 12.12, Wilks' Lambda = .292, $\underline{p}$ = .0001. Examination of the follow-up univariate tests revealed that there were significant differences between the two conditions on all of the TPB variables post-manipulation with the exception of behavioural intention (attitude, efficacy, SNMC; see Table 24).

Table 24.

Post-Manipulation MANOVA on the TPB Variables.

Source	SS	df	MS	F	Significance
Model					
Attitude	5.69	1	5.69	7.13	.01
Efficacy	16.84	1	16.84	6.10	.02
SNMC	590.63	1	590.63	4.88	.03
BI	3.17	1	3.17	1.10	.29
Error		60			

Note: n = 63. SNMC= subjective norm x motivation to comply, BI= behavioural intention.

Examination of the behavioural intention measures post-manipulation revealed similar scores between the positive and negative conditions. Similar to the measure of physical activity intention, the negative group indicated slightly stronger behavioural intentions to engage in both future focus group sessions as well as to discuss physical activity with a researcher over the phone. The indicant of behavioural commitment (i.e., having the individuals record their name and phone number or mailing address) was also very similar between the two groups. These behavioural intentions are reasonable first steps to assess for the type of manipulation conducted (cf. Brawley & Rodgers, 1993; Olson & Zanna, 1997). The scores on these behavioural intention measures can be seen in Table 25.

Table 25.

Alternative Behavioural Intention Measure Values -- Post-Manipulation.

Condition	BI-1 (Mean, SD)	BI-2 (Mean, SD)	BI-3 (n)
Positive	5.46 (3.1)	6.58 (3.1)	72*
			30**
Negative	6.31 (3.5)	7.32 (3.7)	69*
			18**

Note: BI-1 = behavioural intention to attend future focus group session (0-10 strength of intention scale); BI-2 = behavioural intention to talk to a researcher on the phone (0 – 10 strength of intention scale); BI-3 = indicant of behavioural commitment by providing name and number/mailing address; SD = Standard Deviation.

* = provided information, ** = did not provide information.

Secondary Analyses

TPB Prediction Hypotheses

To test the TPB hypotheses of the prediction of behavioural intention with the constructs of attitude, efficacy, and subjective norm, a series of hierarchical multiple regression analyses (HMRA's) were conducted. Only the concurrent HMRA's at both pre- and post-manipulation were examined, as conducting a prospective test from pre- to post-manipulation does not make any logical sense given the affective manipulation that occurred. In the HMRA's presented below, physical activity intention (logBI) was regressed on efficacy, followed by attitudes, and finally the subjective norm x motivation to comply (SNMC) variable (both pre- and post-manipulation). No additional HMRA's could be examined regarding the prediction of physical activity behaviour because of

non-correspondence issues between intention and behaviour (i.e., the behaviour assessment was for past physical activity while the intention assessed future physical activity intentions). An outline of the HMRA steps can be seen in Table 26.

Table 26.

Order of the Hierarchical Regression Analysis to Test the TPB Concurrent Hypotheses Pre- and Post-Manipulation.

Behavioural Intention regressed on:
1. Efficacy
2. Attitude
3. Subjective Norm x Motivation to Comply

The first regression pre-manipulation was significant, with physical activity efficacy as the only significant predictor to account for the variance in behavioural intention. This result is supportive of the TPB and replicates the findings from Study 2. The second regression to predict physical activity intentions post-manipulation was also significant. Again, perceived behavioural control was the only significant predictor of the variance in intention. The pre- and post-manipulation HMRA results can be seen in Table 27.

Table 27.

Pre- and Post-Manipulation Concurrent Prediction of Physical Activity Intention.

Predictor	R	R^2	Adj. R^2	R^2 ch	p
Time 1:					
Prediction of Intention					
1. Efficacy	.520	.271	.259	.271	.0001
2. Attitude	.544	.296	.273	.025	.146
3. SNMC	.546	.298	.263	.003	.645
Time 2:					
Prediction of Intention					
1. Efficacy	.417	.174	.160	.174	.001
2. Attitude	.455	.207	.180	.033	.120
3. SNMC	.455	.207	.167	.000	.855

Note: n = 64 at Time 1, 63 at Time 2. SNMC=subjective norm x motivation to comply

Discussion

The results from Study 3 indicate that a short-term intervention designed to target change in the social cognitive variables within the TPB was effective. Specifically, a primarily affective manipulation that focused upon either the positive or negative implications of being physically active for individuals with FM, successfully changed scores on the TPB measures of attitude, perceived behavioural control, and subjective norm. The between-group analyses indicated that respondents in the positive condition increased their scores on all three variables while respondents exposed to the negative condition (i.e., similar to the "standard care" type of support group) maintained or

decreased their scores from pre- to post-manipulation. The only TPB variable which did not differ between the two conditions was behavioural intention, which maintained a relatively steady value from pre- to post-manipulation in both conditions.

Theoretical Implications

The TPB states that the three variables of attitude, perceived behavioural control, and subjective norm will predict behavioural intention, which in turn will predict behaviour. As a theory used to understand the health behaviour of physical activity, the TPB has received support from studies of healthy (Godin & Kok, 1996) and symptomatic individuals (Courneya & Friedenreich, 1999) as well as individuals from special populations (Godin et al., 1993). The results of Study 3 indicate that an intervention that focused upon changing the attitude of FM support group attendees towards physical activity was effective in influencing not only the TPB variable of attitude but also perceived behavioural control and subjective norm. None of the behavioural intentions for physical activity, future focus group attendance, or future phone discussions with researchers were influenced by the manipulation.

The failure of the manipulation to influence the behavioural intention variables may be due to the unique nature of this FM sample. Specifically, these FM individuals are interested in research and want to contribute to fostering knowledge about successfully coping with FM, (e.g., engaging in physical activity). The alternative explanation for the absence of a difference between the two conditions is that relevant proximal goals that are sensitive to change as a result of the short-term manipulation may not have been identified and measured. Given further study, perhaps a more relevant behavioural intention that would be responsive to the affective manipulation might, for

example, involve individuals returning for a first-time physical activity peer-guided session to learn how to be active with FM.

Theory-Based Intervention

The primarily affective manipulation was designed to influence an individual's attitude either positively or negatively towards physical activity as a treatment for FM. Although the overall affective tone of the discussion (i.e., either positive or negative) was systematically geared toward influencing attitude, specific discussion items also targeted perceived behavioural control and subjective norm. For example, perceived behavioural control was targeted in items that asked the participants to discuss how to be active on a daily basis (positive discussion) or what barriers kept them from being active on a daily basis (negative discussion). Subjective norm was also targeted in specific items that facilitated the discussion of the importance of significant others for promoting physical activity (positive discussion) or how significant others were barriers to being physically active (negative discussion). As well as these specific items, the group discussion format also encouraged the participants to think about the support they did (positive condition) or did not (negative condition) receive from others to be physically active for the benefit of their FM. Specifically, by being in a social environment where others with FM espouse support for being active (positive condition) or support for not being involved or the difficulty of involvement (negative condition), an individual may change their social cognitions about physical activity. The results suggest that the positive social environment did encourage change while the negative environment decreased perceptions and social cognitions.

Theoretical Measurement Considerations

In Study 3, attention was given to a number of TPB measurement modifications that have been suggested in the TPB literature. First, an attempt was made to enlarge the attitude measurement so that both experiential and factual attitudes was assessed. It has been suggested that more variability within an attitude assessment will be captured by items that reflect experiential or affective evaluations rather than items that reflect factual evaluations. The factor analysis of the measure did not support a two-component model (cf. Smith, 1995) at either pre- or post-manipulation. Thus, the subsequent analyses were conducted with the total attitude scale. An examination of the means of the two scales reveals that the factual attitudes were rated higher (i.e., more positively) than the experiential attitudes at both pre- and post-manipulation in both conditions. In other words, it may be that FM individuals knew that physical activity was good for them (the factual attitude evaluation) but did not necessarily enjoy or like the experience of being physically active (the experiential attitude evaluation).

A second measurement modification involved the motivation to comply component of the subjective norm measure. Specifically, the single-item was reworded to reflect more of a sense of *motivation* to do what significant others want or encourage, and less of a sense of having to *comply* or feel *pressured* to do what these significant others want. This change was an attempt to take into account earlier recommendations that the motivation to comply component limited the associations between subjective norm and the other TPB variables, including behavioural intention (Ajzen, 1991). However, the results of the present study did not indicate that this modification improved subjective norm's (i.e., the composite measure's) relationship with the other TPB

variables. An examination of the correlations between subjective norm, motivation to comply, and the other TPB variables revealed nonsignificant correlations between motivation to comply and TPB variables, but mainly significant correlations between the subjective norm component and the TPB variables. Thus, it does appear that it is the motivation to comply component which is the limiting factor, and a different motivation to comply measure may be needed. An alternative may be the utilization of a single-item subjective norm measure in future research (cf. Courneya & Friedenreich, 1999). Finally, it could also be that the self-selected FM individuals at these support meetings are not those individuals who are most influenced by others. By definition, their attendance at meetings suggests they may be self-motivated to do something about their FM.

The third and final measurement modification to the use of efficacy as the perceived behavioural control measure was the inclusion of items to reflect both symptom coping efficacy and activity management efficacy specific to individuals with FM. Although factor analyses revealed two distinct components before the intervention, only one component was evident at post-manipulation. Thus, a total efficacy scale score was utilized in the subsequent analyses. However, examination of the scale means revealed that regardless of the change in either condition, activity management efficacy was always higher than symptom coping efficacy. It may be that individuals were more confident in their ability to utilize activity management skills, such as pacing their physical energy to be active, than they were to cope with the often debilitating symptoms of FM which may limit their ability to be active (i.e., pain and fatigue). Although not the primary focus of this study, future research should continue to examine perceived behavioural control as a multifaceted variable in order to determine which types of

efficacy are most important for predicting physical activity intentions and behaviour of FM individuals.

The influence of perceived behavioural control was also evident once again in the hierarchical multiple regression results. At both pre and post-manipulation, perceived behavioural control emerged as the major predictor of behavioural intention. The variance in behavioural intention accounted for by perceived behavioural control was 26% at pre-manipulation and 16% at post-manipulation, which is lower than ranges for R^2 reported in major reviews (Godin & Kok, 1996). However, these effect sizes are medium to large when Cohen's conventions for effect sizes are considered (1992). These R^2 differ from those typically reported for asymptomatic exercisers perhaps due to the symptomatic nature of this FM sample. The variance accounted for by attitude, however, did show some evidence of contribution to the model in an analysis of the whole sample. This was the case both before and after the manipulation ($p = .10$), indicating a stronger relationship with behavioural intention than in the previous studies. Separate multiple regressions conducted for each intervention condition indicated that both perceived behavioural control and attitude were significant predictors of behavioural intention for the negative condition while perceived behavioural control alone was a significant predictor for the positive condition. Future research should continue to explore the association between attitude and physical activity intentions in individuals with FM in an effort to increase knowledge that can be applied to future FM interventions.

FM Implications

If a short-term manipulation can reliably produce immediate changes in a number of social cognitive constructs, there may be a number of implications for physical activity

interventions with individuals with FM. First, the positive changes in attitude, subjective norm, and perceived behavioural control for being active are important with respect to motivating these individuals to incorporate physical activity into their daily lifestyle. Research has continually shown the importance of physical activity for maintaining a healthy lifestyle, and its importance as a treatment option for individuals with FM is widely touted (Wolfe et al., 1999). Within both healthy and symptomatic populations, the affective, social, and control elements that have been assessed within the TPB components are known to be important factors associated with engaging in physical activity (Hausenblas et al., 1997; Godin & Kok, 1996).

The affective (i.e., positive or negative) focus of the present manipulation also has applied implications for clinicians working with individuals with FM. Specifically, if it is the case that the affective tone of a discussion can have an impact on key social cognitive variables, such as attitudes, this intervention may not only be useful for altering perceptions about physical activity, but also about a number of other health behaviours, such as compliance to a pharmacological treatment (Meichenbaum & Turk, 1987). The clinicians working within FM support groups should thus be aware of the impact the affective tone of any discussion may have and of the repercussions of a negative tone/environment. Clinicians working specifically within physical activity interventions should also be mindful of the influence of the social environment and the potential implication for adherence.

Finally, an important implication from the present study that is of particular relevance to FM is the role of support groups. Indeed, part of the rationale for this intervention came from witnessing a primarily negative affective tone at many of the FM

support group meetings in South Western Ontario. The present results support the notion that the social environment does influence social cognitions which are known to motivate behaviour. Given this information, FM support groups should strive to maintain a positive focus in their presentation of information to their participants.

Strengths and Limitations

The strengths of the present study are found in attempts to a) base an intervention on theory, b) improve measurement, and c) verify and control aspects of the manipulation. First, the manipulation itself was grounded within a theory, impacting key variables that are known to be important factors theorized to motivate health behaviours such as physical activity (Hausenblas et al., 1997). The rationale behind the intervention was thus supported by a strong framework as suggested by Baranowski and colleagues (1997). The use of a theoretical framework also provided for measurement of the key variables using well-validated and reliable principles associated with the theory. These procedures were used to attempt to ensure that measures would be sensitive to detect change in the variables of interest if the manipulation produced a change.

Second, care was taken within the manipulation protocol to target the core theoretical variables for change. The overall affective tone, the group setting, the videotaping, and the key discussion questions were all planned to influence the TPB variables. Third, the scripted facilitator's role and the manipulation checks on the discussion via videotape provided assurances that the changes were due to the discussion content and tone. Further, they confirmed that the discussion content and facilitator's behaviour were consistently applied in both conditions, other than the content and

behaviour specifically manipulated in each condition. The random assignment of sites to condition was also a strength of the design.

Despite these strengths, there are also a number of limitations to the present study that should be taken into account when interpreting the findings. First, an optimal design would have included a control group in which to compare the effects of the manipulation. However, given the limited availability of FM support groups and individual volunteers, this was not a viable option. The negative condition was also considered as "standard care" although the negative manipulation was applied in a more controlled fashion than was the case in the negative meeting perspectives observed in South Western Ontario support groups. A second concern was the small sample size within each condition. A number of tactics were taken to increase the sample size, and given the available participants that were targeted, the turnout for each condition was considered very good. Finally, because the participants were responding in a group and were being videotaped, one possible hypothesis could be that they were responding in a socially desirable manner. However, all questionnaires were completed individually and with full assurance of anonymity. Participants therefore had no need to present themselves in a socially desirable fashion, as there was no advantage, from a self-presentational point of view, to such a presentation on the anonymous questionnaire. The videotaping aspect of the manipulation created a circumstance of public commitment to all individuals participating in the discussion. Public commitment has been shown to motivate individuals to act in a manner consistent with their public statements. Thus, individuals who publicly ascribe to positive aspects of physical activity will continue to do so in subsequent actions, and individuals who ascribe to negative aspects will also continue to

do so. Social desirability hypothesis, on the other hand, would argue for those individuals in the negative condition to give positive responses that would be consistent with their pre-manipulation values. In other words, no differences would have existed between the two conditions. However, differences were observed between the conditions, refuting the social desirability argument.

Future Research

The present study lays the groundwork for both future interventions and a return to systematic, theoretically-based research on the relationship between FM and physical activity. However, future research should continue to examine the role attitude and subjective norm have in relation to physical activity for FM individuals. As well, intervention-based research should focus on impacting these key variables in efforts to enhance physical activity involvement. Focusing solely on the physical activity component of the interventions may be lessening the likelihood of accruing benefits from adherence. An intervention, on the other hand, that impacts change in attitude, subjective norm, and perceived behavioural control *along with* implementing a physical activity program is likely to be more successful. And the eventual outcome of this line of research is to successfully promote physical activity programs for individuals with FM as a means of improving their sense of well-being and quality of life.

Finally, future research should continue to examine the nature of the interventions in order to determine which aspects of the manipulation are key for impacting change in the targeted theoretical variables. Although the present manipulation was primarily affective, all three TPB variables were targeted within the question items that were used to generate discussion. We do not know if change in these variables would have also

General Discussion

The present series of studies examined the relationship between perceived behavioural control and physical activity within Fibromyalgia. Past research in FM has consistently found a positive association between efficacy (an index of perceived behavioural control) and physical activity or exercise (Buckelew et al., 1995, 1998; Burckhardt et al., 1998). This conceptualization and measurement of perceived behavioural control as efficacy is supported in the literature (Bandura, 1997; Skinner, 1996). On the basis of both clinical and scientific evidence, the use of physical activity as one part of a treatment for FM has lead to a "cautious optimism" amongst clinicians who work with individuals with FM. Physical activity has been widely recommended as a nonpharmacological treatment option to aid both the physical and psychological symptoms associated with FM (Rossy et al., 1999). However, an examination of this past research from a psychological perspective reveals that very little of this work is guided by any systematic application of theory. Indeed, the vast majority of the physical activity and FM research consists of intervention studies, which are in turn based on only a handful of correlational studies. This state of affairs is in direct contrast to recommendations made for systematic research progress as a means of developing the strongest interventions (Baranowski et al., 1997). Specifically, Baranowski and colleagues highlight the need to move from well-supported, theoretically-based descriptive, correlational research to interventions which apply this knowledge. The purpose of the three studies in this dissertation was to begin this systematic approach by examining physical activity and FM utilizing well-supported theories in which perceived behavioural control is a central component.

Study 1. The first study utilized a simple correlational design to examine the relationship between perceived behavioural control, conceptualized as self-efficacy, and frequency of participation in physical activity. Earlier research within FM had both conceptualized and measured physical activity in terms of daily function (i.e., assessing activities of daily living with the fibromyalgia impact questionnaire), thereby restricting our understanding of the range of physical activity of which FM individuals perceive they were capable. This also limits the comparison between the FM research and other research on physical activity in either healthy or symptomatic populations (i.e., arthritis: Rejeski et al., 1996).

The use of a frequency measure of physical activity participation was consistent with current recommendations on the amount of activity necessary for health benefits (Mazzeo et al., 1998) and with treatment recommendations (Deuster, 1998). The results of Study 1 were consistent with the research on both healthy and symptomatic populations which reflects a strong positive relationship between efficacy and physical activity. In this first study, a higher level of efficacy for engaging in physical activity and for coping with FM symptoms was associated with a higher level of participation in low to moderate levels of physical activity. Also, consistent with the past research conducted on FM was the finding that daily functioning was associated with efficacy. Better daily functioning was associated with higher levels of efficacy for both engaging in physical activity and for coping with one's FM symptoms.

Study 2. In the second study, the Theory of Planned Behaviour (TPB) was utilized, as it allows for the examination of not only perceived behavioural control (as conceptualized and measured as self-efficacy) of physical activity, but also an affective

reaction to activity via the assessment of attitude and a social influence component through the assessment of subjective norm. Lastly, the TPB affords the opportunity to examine immediate physical activity goals as assessed by behavioural intentions, and finally, the relationship of these variables to the behaviour of physical activity. Together, the variables within the TPB provide a more comprehensive examination of psychological factors that are relevant to one treatment (i.e., physical activity) for individuals with FM than has been the case in previous research. This second study is the first examination of the TPB within an FM population and thus provides the basis for developing a series of theoretically-based research projects.

Tests of the TPB supported its prediction of behavioural intention and behaviour, with perceived behavioural control as the variable contributing most to that prediction for behavioural intention (prospectively). Both behavioural intention and perceived behavioural control were the major predictors of behaviour (both concurrently and prospectively). The prospective regression analyses allowed for an examination of both the hypothesized mediator (behavioural intention) and direct (perceived behavioural control) prediction of behaviour as proposed by the TPB. The present results supported the direct hypothesis -- that perceived behavioural control directly predicted behaviour. Behavioural intention was also a significant predictor, adding to the overall model prediction of behaviour. These results are consistent with earlier TPB research on physical activity, which has consistently found that perceived behavioural control emerges as the strongest predictor of behavioural intention (Hausenblas et al., 1997). However, more recent research on other chronic diseases (e.g., cancer) has found that the TPB variable of attitude emerges as a predictor of behavioural intention (Courneya &

Friedenreich, 1997a, 1999). Given the nature of the current sample, it is somewhat surprising that neither attitude nor subjective norm for being physically active emerged as predictors of physical activity intention.

Overall, the results of this second study again provided support for the relationship between perceived behavioural control and physical activity for individuals with FM. Given the nature of FM as a highly variable and fluctuating condition, the importance of this relationship between perceived behavioural control and physical activity is not surprising. Both the physical and psychological symptoms of FM fluctuate over time, increasing the demands on the FM individual's daily coping abilities. While successful engagement in physical activity serves to enhance perceived behavioural control over these symptoms, a sufficient level of control is necessary before participation will actually occur. Given that most individuals with FM struggle to maintain regular physical activity despite being well-aware of the potential benefits, the resulting variability in the perceived behavioural control measure is predictive of future physical activity intentions and behaviour.

A number of measurement issues may also be factors that help to explain the findings in the second study regarding the weaker predictive effects of both attitude and subjective norm. Specifically, the responses to the attitude measure did not appear to reflect much variability (i.e., most individuals were favorable in their perception of the personal benefits of physical activity) which may partly explain the weak relationship with the greater variation in responses to behavioural intentions toward participation in physical activity.

Subjective norm appears to consistently be a weak predictor of physical activity intentions for most physical activity samples (Hausenblas et al., 1997). This may be due to the behaviour being predicted (i.e., what important others think isn't regarded as important for being physically active). For example, subjective norm is a stronger predictor for other health behaviours (i.e., contraceptive use). A second possibility for the weak role of subjective norm may be the self-selected nature of the sample. Specifically, members of support groups may not view others as strong *motivators* of personal behaviour. Finally, an issue with this construct is the measurement of the motivation to comply component. Researchers have suggested utilizing either a single-item measure of subjective norm rather than the traditional multiplicative construct (Ajzen, 1991; Courneya & Friedenreich, 1999) or a different measure altogether (i.e., social support). Future research must continue to examine these issues to adequately determine the role of subjective norm in the prediction of physical activity intentions.

Finally, a core hypothesis in the use of this theory has to do with the relationship between behavioural intention and behaviour, thus a brief synopsis of this measurement debate is instructive. While Courneya and McAuley (1993) advocate the use of continuous-open measures for the assessment of both behavioural intention and behaviour, they recognize that the application of the TPB using this protocol may potentially become "unwieldy". The theory requires that behavioural intention and behaviour should be measured as dichotomous variables so that the predictors can be related to each "yes/no" behaviour. By contrast, utilizing continuous-open measures for behavioural intention and behaviour would then require the examination of attitude, perceived behavioural control, and subjective norm for all of the behavioural options

(e.g., attitude for behaving 1 time a week, 2 times a week, 3 times a week; self-efficacy for behaving once, twice, three times a week, etc.), because each is considered a different behaviour.

This issue, however, remains a debate that has yet to be empirically examined in the physical activity literature. A study on this important measurement issue is required. However, as the focus of the present thesis was on applying the TPB to better understand the role of physical activity for FM, it was decided to utilize the measures of intention and behaviour as continuous-open assessments in an effort to enhance the predictive relationship between intention and behaviour. It would have been unreasonable, especially in terms of subject burden, to also assess each TPB construct (i.e., attitude, perceived behavioural control, and subjective norm) separately for each behaviour.

Study 3. In the third study, the TPB was again utilized as a framework to investigate the effects of an affectively-based intervention. The rationale for this third study was two-fold. First, as previously mentioned, the research on physical activity and FM has been largely intervention-based designs examining the efficacy of physical activity as a treatment option for the relief or management of FM symptoms and improvement of daily function (Rossy et al., 1999). Primary outcomes have focussed upon the physical outcomes, such as reduced FM pain, fatigue, or improved fitness. Very few of these same studies have examined the psychological impact of a physical activity intervention. However, the handful of descriptive correlational studies on physical activity and FM have shown consistent support for the relationship between efficacy and physical activity. To date, there has been little attempt to "bridge" this gap between the descriptive and intervention-based research. Specifically, in the intervention-based

designs, efficacy has not been targeted for change in order to promote higher levels of physical activity or functional independence.

The second part of the rationale for Study 3 came from personal interactions within FM support groups and elicitations necessary to develop measures for Study 2. It was evident that the tone of these groups was largely negative, focusing on the problems and drawbacks associated with having FM. This negative focus appeared to be in contrast to a positive viewpoint of coping that social support groups are assumed to provide. These experiences raised the question of whether the FM support groups are actually helpful and provide individuals with a supportive, positive, "can-do" attitude, or whether they inadvertently contribute to a climate encouraging or maintaining physical inactivity.

The manipulation in the third study was designed to influence the TPB variables of attitude, perceived behavioural control, and subjective norm. If change could be induced by a short-term planned discussion that was highly positive about physical activity, future interventions for those with FM could incorporate a cognitively-oriented component as a precursor to the actual exercise intervention. The results of Study 3 indicated that the manipulation was effective at inducing initial change in all three TPB variables. Specifically, individuals in the positive condition experienced increases in their attitudes towards physical activity, their perceived behavioural control over engaging in low to moderate levels of physical activity, and in their subjective norm (i.e., perceived social support) for being physically active. Individuals in the negative condition experienced slight decreases in these same variables.

Care was taken in this third study to ensure that the TPB variables were measured correctly in order to test the model and be sensitive to change. Manipulation checks were also conducted to ensure any change was due to the manipulation per se and not to extraneous factors. The measurement of the TPB variables included an assessment of two types of attitudes (factual and experiential), two types of perceived behavioural control (efficacy to cope and efficacy to use skills to manage exercising within the lifestyle limited by this chronic disease), and two items to reflect subjective norm and motivation to comply. The manipulation checks involved reviewing the videotapes of the facilitator's role to determine that the behaviour was consistent in each condition.

Theoretical Relevance

Perceived behavioural control is known to be both an important correlate and predictor of physical activity intentions and behaviour (Hausenblas et al., 1997). Two theories that have been widely used to examine this relationship are self-efficacy theory (Bandura, 1986) and the theory of planned behaviour (Ajzen, 1985). There is considerable overlap in the primary constructs within each theory. Indeed, Ajzen (1991) has recommended that the perceived behavioural control component of the TPB be conceptualized according to Bandura's measurement of self-efficacy. Findings from the two theories are consistently supportive of the importance of perceived behavioural control in predicting behaviour. For research conducted on individuals with FM, there is consistent support for a strong relationship between greater efficacy/perceived behavioural control and a more physically active lifestyle. Given the variable symptomatology and treatment of this chronic condition, perceived control is likely to be an important component of coping more effectively. The research findings from

Buckelew and associates (1995, 1998) provide support that individuals who function better on a daily basis with their FM physical symptoms do have a higher level of efficacy.

The examination of the influence of other social cognitive variables (i.e., attitude, subjective norm, and behavioural intention) in addition to perceived behavioural control was offered by considering their relationship to physical activity (a recommended part of FM treatment). The TPB predicted both behavioural intention and behaviour, and both perceived behavioural control and behavioural intention were the primary contributors to the relationship. This latter result in particular increases our knowledge about individuals with FM, in that both perceived behavioural control and the proximal goal expressed via behavioural intention are related to involvement in physical activity. Thus, the TPB result has offered more to our understanding of this motivated behaviour in people with FM. The manipulation in Study 3 indicated that these key TPB variables can be manipulated and positively influenced. Because TPB variables are known to be important predictors of physical activity in both general (cf. Hausenblas et al., 1997) and specific populations (i.e., cancer: Courneya & Friedenreich, 1999), these variables deserve further study at both the basic research and intervention research levels for the chronic disease of FM.

Theoretical Measurement

A number of TPB measurement issues were also addressed in the present studies. These included perceived behavioural control being conceptualized and measured with an efficacy assessment, attitudes as assessed with factual and experiential-evaluative scales, and subjective norm as assessed by a motivational support rather than a pressure to

comply measure. In addition to the measurement of these predictor variables, both the behavioural intention and behaviour measures were assessed specific to time, action, target and context elements and were correspondent to one another (cf. Courneya & McAuley, 1993).

In regard to individuals with FM for whom being able to cope and function effectively is so important to their ever-changing condition, the TPB provides a useful framework in which to investigate the role of physical activity. All of its variables are relevant and important to assessing health behaviours for a variety of symptomatic and asymptomatic individuals (Maddux, Brawley, & Boykin, 1995). Results of Studies 2 and 3 extend the generality in using the TPB to predict motivated behaviour.

Strengths and Limitations

One strength of this series of dissertation studies is the use of well-supported theoretical frameworks that guided the planning and the formulation of the hypotheses (i.e., self-efficacy: Bandura, 1997; theory of planned behaviour: Ajzen, 1985). Use of a theoretical framework is important relative to research concerning FM and physical activity because there has been relatively little research examining psychological factors in general, and this work has been mostly atheoretical. The use of the TPB in the present research extended the previous research that has examined self-efficacy and physical activity with FM by including the additional social cognitive variables of attitudes and subjective norm.

The present research also provided a more thorough examination of psychological factors in relation to the physical activity involvement of FM individuals. This is in contrast to the bulk of the FM and physical activity research that has focused on physical

FM symptoms both as predictors and outcomes of activity involvement. A second strength is the use of a systematic progression of research designs (i.e., concurrent, prospective, and intervention). The first study, utilizing a concurrent correlational design detected a relationship between efficacy and physical activity in FM individuals. The second study, utilizing a prospective correlational design, allowed for the prediction of future physical activity behaviour in FM individuals. Finally, the third study involved a theoretically-based intervention to create change in core psychological variables that are known predictors of physical activity involvement.

Despite these strengths, the findings should be considered relative to the study limitations. First, the findings are based upon self-selected FM samples. The majority of the participants were drawn from support groups, thus limiting the ability to generalize these results to randomly selected FM samples. However, the assessment of FM symptomatology in each study at least supports the case that the participants were representative of the FM condition. Although the self-report of FM symptomatology is not as optimal as a clinical diagnosis, it is recognized as a reliable research method in the literature and in major reviews (Rossy et al., 1999; Wolfe et al., 1999).

Future Research

Theoretical Issues

While a strong theoretical framework has been established for examining the relationship between physical activity and FM, this only represents the beginning of a potential series of investigations directed toward interventions that may improve the perceived behavioural control of individuals with FM. Without a known cause for FM, having multiple treatment options to help individuals control their condition remains

important and integral to successfully living and coping with this chronic disease. Based upon the results of the three studies, it is apparent that perceived behavioural control (as measured by self-efficacy) may be an important factor in understanding whether physical activity is useful as a lifestyle management strategy for successful coping with FM. Across the three studies, the different measures of self-efficacy as an indicant of perceived behavioural control were all related to behavioural intentions and behaviour, suggesting that more than one aspect of self-efficacy (e.g., intensity, duration, frequency; coping with symptoms and exercise; using skills to manage symptoms in order to be active) may need to be considered when examining FM and physical activity.

Future work on the perceived behavioural control component of the theory of planned behaviour should attempt to examine whether any change in this mediator variable produces adherence behaviours (e.g., regular moderate level of physical activity) that lead to health outcomes (Baranowski et al., 1998). Enhancing an FM individual's perception of control over being active may not only increase their physical activity participation, but may also improve their daily functioning and their perception of coping with physical symptoms (Rossy et al., 1999). Utilizing the TPB, future research must also continue to examine the roles of attitude and subjective norm in motivating physical activity participation in FM individuals. Once clear findings have been established, interventions designed to influence the affective or social environment can be attempted in order to increase levels of physical activity.

A concurrent goal of this research should be the continued examination of conceptual and measurement issues of the TPB. Although the measurement of perceived behavioural control (as efficacy) is well-supported (Ajzen, 1991; Bandura, 1997), the

results of the present series of studies highlight the need to develop sound measurements of the additional attitude and subjective norm components of the TPB. Researchers should also continue to examine the debate regarding the correspondence pertaining to the measurement of behavioural intention and behaviour in future research (Courneya & McAuley, 1993).

Fibromyalgia Issues

Achieving cardiovascular, weight loss health outcomes, or reductions in physical symptoms for individuals with FM is unlikely even through participation in regular low levels of physical activity. There is little evidence of reduced morbidity and mortality with activity participation at only low to moderate levels and for relatively short durations (i.e., less than 30 minutes). However, other desirable benefits may be accrued for FM individuals. Physical activity's function as a means of improving their *perception* of their symptoms and ability to cope psychologically is supported (Rossy et al., 1999), as is its relation to better health-related quality of life (Study 1). Their activity involvement may initially serve to aid them in gaining more immediate control over one aspect of their life, which in turn may translate to better coping with their FM on the whole. It is only later, with continued and increased involvement in physical activity, that the physical benefits are likely to be eventually attained (i.e., accumulation of 30 minutes of moderate level physical activity on most days of the week).

Successful promotion and initiation of physical activity programs for individuals with FM is thus highly important (Rossy et al., 1999), with physical activity interventions then targeting these key variables in an effort to enhance adherence. Once initial participation has been achieved and individuals with FM are experiencing initial

psychological benefits, they must be made aware of the longer term benefits of continuing activity participation, including the possibility of eventual improvements in their FM physical symptoms. Once FM individuals are regularly active, dose-response issues must be examined. The challenge will be to identify key means of achieving physical activity maintenance in a group where chronic pain will be the strongest potential disrupter of continued involvement.

References

1. Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl & J. Beckmann (Eds.), Action-control: From cognition to behaviour. (pp. 11-39). Heidelberg: Springer.
2. Ajzen, I. (1991). The theory of planned behaviour. Organizational Behaviour and Human Decision Processes, 50, 179-211.
3. Ajzen, I., & Driver, B.L. (1991). Prediction of leisure participation from behavioural, normative, and control beliefs: An application of the theory of planned behaviour. Leisure Sciences, 13, 185-204.
4. Ajzen, I., & Madden, T.J. (1986). Prediction of goal-directed behaviour: Attitudes, intentions, and perceived behavioural control. Journal of Experimental Social Psychology, 22, 453-474.
5. Ajzen, I., Nicholls, A.J., & Driver, B.L. (1995). Identifying salient beliefs about leisure activities: Frequency of elicitation versus response latency. Journal of Applied Social Psychology, 25, 1391-1410.
6. Ajzen, I., & Timko, C. (1986). Correspondence between health attitudes and behaviour. Journal of Basic and Applied Social Psychology, 7, 259-276.
7. Armitage, C.J., & Conner, M. (1999). The theory of planned behaviour: Assessment of predictive validity and "perceived control". British Journal of Social Psychology, 38, 35-54.
8. Bandura, A.V. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs (NJ): Prentice Hall.

9. Bandura, A.V. (1997). Self-efficacy: The exercise of control. New York: Freeman & Company.

10. Baranowski, T., Lin, L.S., Wetter, D.W., Resnicow, K., & Hearn, M.D. (1997). Theory as mediating variables: Why aren't community interventions working as desired? Annals of Epidemiology, S7, S89-S95.

11. Baranowski, T., Anderson, C., & Carmack, C. (1998). Mediating variable framework in physical activity interventions: How are we doing? How might we do better? American Journal of Preventive Medicine, 15, 266-297.

12. Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology, 51, 1173-1182.

13. Bennett, R.M. (1999). Chronic widespread pain and the fibromyalgia construct. Pain Digest, 9, 292-298.

14. Bennett, R.M., Burckhardt, C.S., Clark, S.R., O'Reilly, C.A., Wiens, A.N., & Campbell, S.M. (1996). Group treatment of fibromyalgia: A 6 month outpatient program. Journal of Rheumatology, 23, 521-528.

15. Biddle, S., Goudas, M., & Page, A. (1994). Social-psychological predictors of self-reported actual and intended physical activity in a university workforce sample. British Journal of Sports Medicine, 28, 160-163.

16. Bigatti, S.M., Cronan, N., Gallager, R.,& Cronan, T.A. (1998, March). A comparison of pain measures used with fibromyalgia patients. Paper presented at the Annual Meeting of the Society of Behavioural Medicine, New Orleans, LA.

17. Brawley, L.R. (1993). The practicality of using social psychological theories for exercise and health research and intervention. Journal of Applied Sport Psychology, 5, 99-115.

18. Brawley L.R., & Culos-Reed S.N. (in press). Studying adherence to therapeutic regimens: Overview, theories, and recommendations. Controlled Clinical Trials.

19. Brawley, L.R., & Rodgers, W.M. (1993). Social-psychological aspects of fitness promotion. In P. Seraganian (Ed.), Exercise psychology: The influence of physical exercise on psychological processes (pp. 254-298). New York, NY: John Wiley & Sons.

20. Buckelew, S.P., Parker, J.C., Keefe, F.J., Deuser, W.E., Crews, T.M., Conway, R., Kay,D.R., & Hewett,J.E. (1994). Self-efficacy and pain behaviour among subjects with fibromyalgia. Pain, 59, 377-384.

21. Buckelew, S.P., Murray, S.E., Hewett, J.E., Johnson, J., & Huyser, B. (1995). Self-efficacy, pain, and physical activity among fibromyalgia subjects. Arthritis Care and Research, 8, 43-50.

22. Buckelew, S.P., Conway, R., Parker, J., Deuser, W.E., Read, J., Witty, T.E., Hewett, J.E., Minor, M., Johnson, J.C., Van Male, L., McIntosh, M.J., Nigh, M., & Kay, D.R. (1998). Biofeedback/relaxation training and exercise interventions for fibromyalgia: A prospective trial. Arthritis Care and Research, 11, 196-209.

23. Burckhardt, C.S., Clark, R., & Bennett, R.M. (1991). The fibromyalgia impact questionnaire: Development and validation. Journal of Rheumatology, 18, 728-733.

24. Burckhardt, C.S., Mannerkorpi, K., Hedenberb, L., Bjelle, A. (1994). A randomized, controlled clinical trial of education and physical training for women with fibromyalgia. Journal of Rheumatology, 21, 714-720.

25. Carron, A.V., Hausenblas, H.A., & Mack, D. (1996). Social influence and exercise: A meta-analysis. Journal of Sport and Exercise Psychology, 18, 1-16.

26. Cohen, J. (1992). A power primer. Psychological Bulletin, 112, 155-159.

27. Conner, M., & Armitage, C.J. (1998). Extending the theory of planned behaviour: A review and avenues for further research. Journal of Applied Social Psychology, 28, 1429-1464.

28. Courneya, K.S. (1994). Predicting repeated behaviour from intention: The issue of scale correspondence. Journal of Applied Social Psychology, 24, 580-594.

29. Courneya, K.S., & Friedenreich, C.M. (1997a). Determinants of exercise during colorectal cancer treatment: An application of the theory of planned behaviour. Oncology Nursing Forum, 24, 1715-1723.

30. Courneya, K.S., & Friedenreich, C.M. (1997b). Relationship between exercise pattern across the cancer experience and current quality of life in colorectal cancer survivors. The Journal of Alternative and Complementary Medicine, 3, 215-226.

31. Courneya, K.S., & Friedenreich, C.M. (1999). Utility of the theory of planned behaviour for understanding exercise during breast cancer treatment. Psycho-Oncology, 8, 112-122.

32. Courneya, K.S., Friedenreich, C.M., Arthur, K., & Bobick, T.M. (1999). Understanding exercise motivation in colorectal cancer patients: A prospective study using the theory of planned behaviour. Rehabilitation Psychology, 44, 68-84.

33. Courneya, K.S., & McAuley, E. (1993). Predicting physical activity from intention: Conceptual and methodological issues. Journal of Sport and Exercise Psychology, 15, 50-62.

34. Courneya, K.S., & McAuley, E. (1994). Are there different determinants of the frequency, intensity, and duration of physical activity? Physical Education and Recreation, 20, 84-90.

35. Courneya, K.S., & McAuley, E. (1995). Cognitive mediators of the social influence-exercise adherence relationship: A test of the theory of planned behaviour. Journal of Behavioural Medicine, 18, 499-515.

36. Craig, C. (1998). Physical activity and the renewal of the health system: New findings. Canadian Fitness and Lifestyle Research Institute.

37. Culos-Reed, S.N., Brawley, L.R., & Gyurcisk, N.C. (in press). Theoretical approaches to exercise psychology. In R.N. Singer, H.A. Hausenblas, & C. Janelle (Eds.), Handbook of Sport Psychology (2nd Edition). John Wiley & Sons.

38. Cutrona, C.E., & Russell, D.W. (1987). The provisions of social relationships and adaptation to stress. In (Ed.), Advances in Personal Relationships (Vol.1), (pp. 37-67). JAI Press.

39. Dawson, K.A., Gyurcsik, N.C., Culos-Reed, S.N., & Brawley, L.R. (in press). Perceived control: A construct bridging theories of motivated behaviour. In G.C. Roberts (Ed.), Advances in motivation in sport and exercise. Champaign, IL: Human Kinetics.

40. Deuster, P.A. (1996). Exercise in the prevention and treatment of chronic disorders. Women's Health Issues, 6, 320-331.

41. DeVries, H., Backbier, E., Kok, G., & Dijkstra, M. (1995). The impact of social influences in the context of attitude, self-efficacy, intention, and previous behaviour as predictors of smoking onset. Journal of Applied Social Psychology, 25, 237-257.

42. Dishman, R.K. (Ed.). (1988). Exercise adherence: Its impact on public health. Champaign, IL: Human Kinetics.

43. Dishman, R.K. (Ed.). (1994). Advances in exercise adherence. Champaign, IL: Human Kinetics.

44. Dishman, R.K., & Sallis, J.F. (1994). Determinants and interventions for physical activity and exercise. In C. Bouchard, R.J. Shephard, & T. Stephens (Eds.), Physical activity, fitness, and health. International proceedings and consensus statement (pp. 214-238). Champaign, IL: Human Kinetics.

45. Ducharme, K.A., & Brawley, L.R. (1995). Predicting the intentions and behaviour of exercise initiates using two forms of self-efficacy. Journal of Behavioural Medicine, 18, 479-497.

46. Elrod, J.M. (1997). Reversing fibromyalgia: How to treat and overcome fibromyalgia and other arthrtis-related diseases. Woodland Publishing: Pleasant Grove, UT.

47. Fenigstein, A., Scheier, M.F., & Buss, A.H. (1975). Public and private self-consciousness: Assessment and theory. Journal of Consulting and Clinical Psychology, 43, 522-527.

48. Finckh, A., Morabia, A., Deluze, C., & Vischer, T. (1998). Validation of questionnaire-based response criteria of treatment efficacy in the fibromyalgia syndrome. Arthritis Care and Research, 11, 116-123.

49. Fishbien, M., & Ajzen, I. (Eds.). (1975). Belief, attitude, intention, and behaviour: An introduction to theory and research. Reading, MA: Addison-Wesley.

50. Gallagher, R.A., Cronan, N., Cronan, T.A., & Bigatti, S.M. (1999). Social support satisfaction among osteoarthritis and fibromyalgia patients. Annals of Behavioural Medicine (supp.), S053.

51. Godin, G. (1987). Importance of the emotional aspect of attitude to predict intention. Psychological Reports, 61, 719-723.

52. Godin, G. (1993). The theories of reasoned action and planned behaviour: Overview of findings, emerging research problems and usefulness for exercise promotion. Journal of Applied Sport Psychology, 5, 141-157.

53. Godin, G., & Kok, G. (1996). The theory of planned behaviour: A review of its applications to health-related behaviours. American Journal of Health Promotion, 11, 87-98.

54. Godin, G., & Shephard, R.J. (1990). Use of attitude-behaviour models in exercise promotion. Sports Medicine, 10, 103-121.

55. Godin, G., Valois, P., & LePage, L. (1993). The pattern of influence of perceived behavioural control upon exercising behaviour: An application of Ajzen's theory of planned behaviour. Journal of Behavioural Medicine, 16, 81-102.

56. Godin, G., Valois, P., Jobin, J., & Ross, A. (1991). Prediction of intention to exercise of individuals who have suffered form coronary heart disease. Journal of Clinical Psychology, 47, 762-772.

57. Godin, G., Vezina, L., & LeClerc, O. (1989). Factors influencing intentions of pregnanat women to exercise after giving birth. Public Health Reports, 104, 188-195.

58. Gowans, S.E., deHeuck, A., Voss, S., & Richardson, M. (1998). A randomized, controlled trial of exercise and education for individuals with fibromyalgia. Arthritis Care and Research, 12, 120-128.

59. Gregoire, I., Kalogeropoulos, D., & Corcos, J. (1997). The effectiveness of a professionally led support group for men with prostate cancer. Urologic Nursing, 17, 58-66.

60. Hausenblas, H.A., Carron, A.V., & Mack, D.E. (1997). Application of the theories of reasoned action and planned behaviour to exercise behaviour: A meta-analysis. Journal of Sport and Exercise Psychology, 19, 36-51.

61. Hauswirth, H.B., Bigatti, S.M., & Cronan, T.A. (1998, March). Predictors of depression among people with fibromyalgia. Paper presented at the Annual Meeting of the Society of Behavioural Medicine. New Orleans, LA.

62. Huyser, B., Buckelew, S.P., Hewett, J.E., & Johnson, J.C. (1997). Factors affecting adherence to rehabilitation interventions for individuals with fibromyalgia. Rehabilitation Psychology, 42, 75-91.

63. Keefe, F.J., & Caldwell D.S. (1997). Cognitive behavioural control of arthritis pain. Advances in Rheumatology, 81, 277-290.

64. Keel, P.J., Bodoky, C., Gerhard, U., & Muller, W. (1998). Comparison of integrated group therapy and group relaxation training for fibromyalgia. The Clinical Journal of Pain, 14, 232-238.

65. Leake, R., Friend, R., & Wadhwa, N. (1999). Improving adjustment to chronic illness through strategic self-presentation: An experimental study on a renal dialysis unit. Health Psychology, 18, 54-62.

66. Lorig, K., Chastain, R.L., Ung, E., Shoor, S., & Holman, H.R. (1989). Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. Arthritis and Rheumatology, 32, 37-44.

67. Lorig, K., & Holman, H. (1993). Arthritis self-management studies: A twelve year review. Health Education Quarterly, 20, 17-28.

68. McAuley, E. (1994). Physical activity and psychosocial outcomes. In C. Bouchard, R.J. Shephard, & T. Stephens (Eds.), Physical activity, fitness, and health. International proceedings and consensus statement (pp. 551-568). Champaign, IL: Human Kinetics.

69. McAuley, E., & Courneya, K.S. (1993). Adherence to exercise and physical activity as health-promoting behaviors: Attitudinal and self-efficacy influences. Applied and Preventive Psychology, 2, 65-77.

70. McAuley, E., & Katula, J. (1998). Physical activity interventions in the elderly: Influence on physical health and psychological function. In R. Schulz, G. Maddox, & M.P. Lawton (Eds.), Annual Review of Gerontology and Geriatrics, 18, (pp. 111-154). New York, NY: Springer Publishing.

71. McAuley, E., & Mihalko, S. (1998). Measuring exercise-related self-efficacy. In J. L. Duda (Ed.), Advances in sport and exercise psychology measurement. (pp. 371-390), Morgan Town, WV.

72. McCain, G.A., Bell, D.A., Mai, F.M., & Halliday, P.D. (1988). A controlled study of the effects of a supervised cardiovascular fitness training program on the manifestations of primary fibromyalgia. Arthritis and Rheumatology, 31,1135-1141.

73. McCain, G.A., Reynolds, W.J., Romano, T.J., Russell I.J., & Sheon, R.P. (1990). The American college of rheumatology 1990 criteria for the classification of fibromyalgia: Report of the multicenter criteria committee. Arthritis and Rheumatology, 33, 160-172.

74. Maddux, J.E., Brawley, L.R., & Boykin, A. (1995). Self-efficacy and healthy behaviour: Prevention, promotion, and detection. In J.E. Maddux (Ed.), Self-efficacy, adaptation, and adjustment: Theory, research, and application (pp. 173-202). New York, NY: Plenum Press.

75. Maddux, J.E., & Rogers, R.W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. Journal of Experimental Social Psychology, 19, 469-479.

76. Martin, L., Nutting, A., Macintosh, B.R., Edworthy, S.M., Butterwick, D., & Cook, J. (1996). An exercise program in the treatment of fibromyalgia. Journal of Rheumatology, 23, 1050-1053.

77. Mazzeo, R.S., Cavanagh ,P., Evans,W.J., Fiatarone, M., Hagberg, J., McAuley, E., Startzell, J. (1998). Exercise and physical activity for older adults: American college of sports medicine position stand. Medicine and Science in Sports and Exercise, 30, 992-1008.

78. Meenan, R.F., Gertman, P.M., & Mason, J.H. (1980). Measuring health status in arthritis: The arthritis impact measurement scales. Arthritis and Rheumatology, 23, 146-152.

79. Meichenbaum, D., & Turk, D.C. (1987). Facilitating treatment adherence: A practitioner's guidebook. New York, NY: Plenum Press.

80. Mengshoel, A.M., Forseth, K.O., Haugen, M., Walle-Hanse, R., & Forre, O. (1995a). Multidisciplinary approach to fibromyalgia: A pilot study. Clinical Rheumatology, 14, 165-170.

81. Mengshoel, A.M., Vollestad, N.K., & Forre, O. (1995b). Pain and fatigue induced by exercise in fibromyalgia patients and sedentary healthy subjects. Clinical and Experimental Rheumatology, 13, 477-482.

82. Meyer, B.B., & Lemley, K.J. (in press). Utilizing exercise to affect the symptomology of fibromyalgia: A pilot study. Medicine and Science in Sports and Exercise.

83. Michels, T.C., & Kugler, J.P. (1998). Predicting exercise in older americans: Using the theory of planned behaviour. Military Medicine, 8, 524-529.

84. Natvig, B., Bruusgaard, D., & Eriksen, W. (1998). Physical leisure activity level and physical fitness among women with fibromyalgia. Scandanavian Journal of Rhematology, 27, 337-341.

85. Nicassio, P.M., Schuman, C., Kim J., Cordova, A., & Weisman, M.H. (1997a). Psychosocial factors associated with complementary treatment use in fibromyalgia. Journal of Rheumatology, 24, 2008-2013.

86. Nicassio, P.M., Radojevic, V., Weisman, M.H., Schuman ,C., Kim, J., Schoenfeld-Smith, K., & Krall, T. (1997b). A comparison of behavioural and educational interventions for fibromyalgia. Journal of Rheumatology, 24, 2000-2007.

87. Norman, P., & Conner, M. (1996). Predicting health-check attendance among prior attenders and nonattenders: The role of prior behaviour in the theory of planned behaviour. Journal of Applied Social Psychology, 26, 1010-1026.

88. Norman, P., & Smith, L. (1995). The theory of planned behaviour and exercise: An investigation into the role of prior behaviour, behavioural intentions, and attitude variability. European Journal of Social Psychology, 25, 403-415.

89. Norregaard, J., Lykkegaard, J.J., Mehlsen, J., & Danneskiold-Samsoe, B. (1997). Exercise training in treatment of fibromyalgia. Journal of Musculoskeletal Pain, 5, 71-79.

90. O'Leary, A., Shoor, S., Lorig, K., & Holman, H.R. (1988). A cognitive-behavioural treatment for rheumatoid arthritis. Health Psychology, 7, 527-544.

91. Olson, J.M., & Zanna, M.P. (1993). Attitudes and attitude change. Annual Review of Psychology, 44, 117-154.

92. Paffenbarger, R.S., Wing, A.L., & Hyde, R.T. (1978). Physical activity as an index of heart attack risk in college alumni. American Journal of Epidemiology, 108, 161-175.

93. Potts, M.K., & Silverman, S.L. (1990). The importance of aspects of treatment for fibromyalgia (fibrositis). Arthritis Care and Research, 3, 11-18.

94. Prochaska, J.O., & DiClemente, C.C. (1983). Stages and processes of self-change in smoking: Toward an integrative model of change. Journal of Consulting and Clinical Psychology, 51, 390-395.

95. Randall, D.M., & Wolff, J.A. (1994). The time interval in the intention-behaviour relationship: Meta-analysis. British Journal of Social Psychology, 33, 405-418.

96. Rejeski, W.J., Ettinger, W.H., Martin, K., & Morgan, T. (1998). Treating disability in knee osteoarthritis with exercise therapy: A central role for self-efficacy and pain. Arthritis Care and Research, 11, 94-101.

97. Rejeski, W.J., Brawley, L.R., Shumaker, S. (1996). Physical activity and health-related quality of life. Exercise and Sport Science Reviews, 24, 71-108.

98. Rejeski, W.J., & Mihalko, S. (in press). Physical activity and quality of life in older adults. Journal of Gerontology.

99. Rejeski,W.J., & Shumaker, S. (1994). Knee osteoarthritis and health-related quality of life. Medicine and Science in Sports and Exercise, 26, 1441-1445.

100. Roberson-Nay, R., Rohan, K.J., Dubbert, P.M., Fowler, J., Catz, S., & Godding, P.R. (2000). Social support as a predictor of perceived mental and physical health in prostate cancer. Annals of Behavioural Medicine, 22, (Supp.), S055.

101. Rodgers, W.M., & Brawley, L.R. (1993). Using both self-efficacy theory and the theory of planned behaviour to discriminate adherers an dropouts from structured programs. Journal of Applied Sport Psychology, 5, 195-206.

102. Rossy, L.A., Buckelew, S.P., Dorr, N., Hagglund, K.J., Thayer, J.F., McIntosh, M.J., Hewett, J.E., & Johnson, J.C. (1999). A meta-analysis of fibromyalgia treatment interventions. Annals of Behavioural Medicine, 21, 180-191.

103. Sandstrom, M.J., & Keefe, F.J. (1998). Self-management of fibromyalgia: The role of formal coping skills training and physical exercise training programs. Arthritis Care and Research, 11, 432-447.

104. Schwartz, A.L. (1998). Patterns of exercise and fatigue in physically active cancer survivors. Oncology Nursing Forum, 25, 485-491.

105. Skinner, E.A. (1996). A guide to constructs of control. Journal of Personality and Social Psychology, 71, 549-570.

106. Smith, P.M. (1995). Integration of the theories of reasoned action, planned behaviour, and self-efficacy in the prediction of exercise behaviour. Unpublished doctoral dissertation, University of Waterloo. Waterloo, ON.

107. Sparks, P., Guthrie, C.A., & Shepherd, R. (1997). The dimensional structure of the perceived behavioural control construct. Journal of Applied Social Psychology, 27, 418-438.

108. Sutton, S. (1998). Predicting and explaining intentions and behaviour: How well are we doing? Journal of Applied Social Psychology, 28, 1317-1338.

109. Tabachnik, B.G., & Fidell, L.S. (1996). Using multivariate statistics (3rd edition). New York, NY: HarperCollins College Publishers.

110. Taylor, C.B., Bandura, A.V., Ewart, C.K., Miller, N.H., & DeBusk, R.F. (1985). Exercise testing to enhance wives' confidence in their husbands' cardiac capabilities soon after clinically uncomplicated acute myocardial infarction. American Journal of Cardiology, 55, 635-638.

111. The Arthritis Society. (1999). www.thearthritissociety.org.

112. Theodorakis, Y. (1994). Planned behaviour, attitude strength, role identity, and the prediction of exercise behaviour. The Sport Psychologist, 8, 149-165.

113. Turk, D.C., Okifuji, A., Sinclair, J.D., & Starz, T.W. (1998a). Differential responses by psychosocial subgroups of fibromyalgia syndrome patients to an interdisciplinary treatment. Arthritis Care and Research, 11, 397-404.

114. Turk, D.C., Okifuji, A., Sinclair, J.D., & Starz, T.W. (1998b). Interdisciplinary treatment for fibromyalgia syndrome: Clinical and statistical significance. Arthritis Care and Research, 11, 186-195.

115. van Baar, M.E., Assendelft, W.J.J., Dekker, J., Oostendorp, R.A.B., & Bijlsma, J.W.J. (1999). Effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee. Arthritis and Rheumatism, 42, 1361-1369.

116. Verstappen, F.T.J., van Santen-Hoeuftt, H.M.S., Bolwijn, P.H., van der Linden, S., & Kuipers, H. (1997). Effects of a group activity program for fibromyalgia patients on physical fitness and well being. Journal of Muscle Pain, 5, 17-28.

117. Ware, J.E., Kosinski, M., & Keller, S.D. (1995). SF-12: How to score the SF-12 physical and mental health summary scales. Rand Corporation; The Health Institute; New England Medical Center, Boston, MA.

118. Weinstein, N.D. (1993). Testing four competing theories of health-protective behaviour. Health Psychology, 12, 324-333.

119. Wigers,S.H. (1996). Fibromyalgia outcome: The predictive values of symptom duration, physical activity, disability pension, and critical life events – a 4.5 year prospective study. Journal of Psychosomatic Research, 41, 235-243.

120. Wolfe, F., Anderson, J., Harkness, D., Bennett, R.M., Caro, X.J., Goldenberg, D.L., Russell, I.J., & Yunus, M.B. (1997). Health status and disease severity in fibromyalgia. Arthritis and Rheumatism, 40, 1571-1579.

121. Wolfe, F., Smythe, H.A., Yunus, M.B., Bennett, R.M., Bombardier, C., Goldenberg, D.L., Tugwell, P., Campbell, S.M., Franklin, C.M., Gatter, R.A., Hamaty, D., Lessard, J., Lichtbroun, A.S., Masi, A.T., McCain, G.A., Reynolds, W.J., Romano, T.J., Russell, I.J., Sheon, R.P. (1990). The American college of rheumatology 1990 criteria for the classification of fibromyalgia: Report of the multicenter criteria committee. Arthritis and Rheumatology, 33, 160-172.

122. Wolfe, F., Ross, K., Anderson, J., Russell, I.J., & Hebert, L. (1995). The prevention and characteristics of fibromyalgia in the general population. Arthritis and Rheumatology, 38, 19-28.

Appendix A

Study One Materials

Appendix A1

Questionnaire

* Indicates that the items were used to collect data for a study that was unrelated to the dissertation.

Fibromyalgia Questionnaire

Please complete every question. Your responses are completely confidential and are very important to us.

A) Background Information:

1. **Age:** _____ years

2. **Gender**: female _____ male _____

3. **Educational Level**: (please check one)
   high school _____ trade school _____ some university _____
   university degree _____ graduate degree _____

4. **Marital Status**: (please check one)
   Single _____ Separated _____

   Married _____ Widowed _____ Divorced _____

5. **Household Income Per Year**: (please check one)
   <10,000 ____ 40,000-59,999 ____ >100,000 ____
   10,000-19,999 ____ 60,000-79,999 ____
   20,000-39,999 ____ 80,000-99,999 ____

6. **Time since you first noticed your FMS symptoms:** _____ (mos/yrs)

7. **Time since FMS diagnosis by your doctor:** _____ (mos/yrs)

B) Physical Activity:

1. **How physically active have you been over the past 6 months?** (please check one)
   Completely Inactive _____ Sporadically Active (< 2x/week) _____
   Regularly Active (3x/week) _____

   ****IF YOU ARE COMPLETELY INACTIVE, SKIP THE REMAINING PHYSICAL ACTIVITY QUESTIONS, AND GO TO SECTION C (PG.5)****

2. **What is your level of physical activity exertion (i.e., how hard do you exercise)?** (please check one)
   Low = light physical activity, such as walking slowly, doing light work around your home or yard: _____
   Moderate = walking moderately fast, heavy yard work: _____
   Vigorous = hard physical activity, such as fast walking: _____

3. How confident are you that you could complete the following levels of physical activity during a typical week:

1. Engage in **15-minute sessions** of **light** physical activity **3 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

2. Engage in **15-minute sessions** of **light** physical activity **5 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

3. Engage in **30-minute sessions** of **light** physical activity **3 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

4. Engage in **30-minute sessions** of **light** physical activity **5 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

5. Engage in **15-minute sessions** of **moderate** physical activity **3 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

6. Engage in **15-minute sessions** of **moderate** physical activity **5 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

7. Engage in **30-minute sessions** of **moderate** physical activity **3 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

8. Engage in **30-minute sessions** of **moderate** physical activity **5 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

9. Engage in **15-minute sessions** of **vigorous** physical activity **3 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

10. Engage in **15-minute sessions** of **vigorous** physical activity **5 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

11. Engage in **30-minute sessions** of **vigorous** physical activity **3 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

12. Engage in **30-minute sessions** of **vigorous** physical activity **5 times per week.**

0	1	2	3	4	5	6	7	8	9	10
Can not do at all				Moderately certain I can do					Completely certain I can do	

4. **Types of physical activity you engage in**: (please check as many as apply)
   Cardiovascular (i.e., walking) _____ Relaxation (i.e., meditation) _____
   Toning (i.e., weights) _____ Stretching (i.e., yoga) _____

5. **Why do you engage in physical activity?** (please check as many as apply)
   To help cope with my FMS symptoms _____
   Because I enjoy being physically active _____
   Because physical activity is a regular part of my lifestyle _____
   Because my doctor/clinician advised me to _____

C) <u>Daily Functions</u>:

The following items are concerned with how your FMS symptoms affect your daily functions. Please check one item for each question, and keep in mind the previous week when answering the following. If the item does not apply to yourself (i.e., your partner does all of the shopping), please check N/A (not applicable).

During the past week, how often were you able to:

1. Do the shopping (i.e., for groceries).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

2. Prepare the meals (i.e., make dinner).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

3. Do the laundry.
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

4. Wash the dishes.
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

5. Vacuum your home.
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

6. Make the bed(s).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

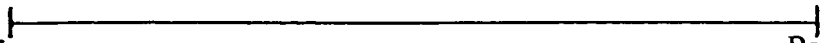
7. Walk several blocks (i.e., around your neighbourhood, at the mall).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

8. Do some yard work (i.e., weed the garden, cut the lawn).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

9. Drive your car.
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

10. Socialize with your friends or family.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

D) <u>Pain</u>:
Using the following line, please rate your pain from your FMS symptoms **during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the extent of your pain:



No Pain Pain as bad as it could be

E) In the following questions, we would like to know how your FMS pain affects you.

For each of the following questions, please circle the number that corresponds to your certainty that you can <u>now</u> perform the following tasks <u>during a typical week</u>.

1. How certain are you that you can decrease your pain <u>quite a bit</u>?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

2. How certain are you that you can continue most of your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can keep FMS pain from interfering with your sleep?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. How certain are you that you can make a <u>small-to-moderate</u> reduction in your FMS pain by using methods other than taking extra medication?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can make a large reduction in your FMS pain by using methods other than taking extra medication?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

F) In the following questions, we'd like to know how you feel about your ability to control your FMS symptoms.

For each of the following questions, please circle the number that corresponds to the certainty that you can now perform the following activities or tasks during a typical week.

1. How certain are you that you can control your fatigue?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

2. How certain are you that you can regulate your activity so as to be active without aggravating your FMS?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can do something to help yourself feel better if you are feeling blue because of your FMS symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. As compared with other people with FMS like yours, how certain are you that you can manage FMS pain during your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can manage your FMS symptoms so that you can do the things you enjoy?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

6. How certain are you that you can deal with the frustration of your FMS symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

G) Sleep:
Please consider your typical week when answer the following questions.

1. Do you have difficulty falling asleep at night?
   Always _____ Most Times _____ Occasionally _____ Never _____

2. Do you wake up several times during the night?
   Always _____ Most Times _____ Occasionally _____ Never _____

3. Do you wake up earlier than you wish?
   Always _____ Most Times _____ Occasionally _____ Never _____

4. Do you feel rested when you wake up in the morning?
   Always _____ Most Times _____ Occasionally _____ Never _____

5. How often do you feel fatigued during the week (i.e., feel very tired, do not have a lot of energy, etc.)?
   Always _____ Most Times _____ Occasionally _____ Never _____

6. How often have you taken at least 1 rest break (i.e., a nap) during the day because you were fatigued?
   Always _____ Most Times _____ Occasionally _____ Never _____

***H) How do you cope with your FMS?**
The following items assess what you do to cope with your FMS symptoms. For each item, please rate how often you use it during your typical month, and how effective you believe it is by circling the appropriate number.
For example, in a typical month, "always" would mean "weekly" or "daily" (if appropriate); and "sometimes" would mean "bi-weekly". The other numbers (i.e., 2 or 4) would correspond to somewhat less or more frequent of "sometimes", respectively.

1. I exercise to help cope with my FMS symptoms.

1	2	3	4	5
Never		Sometimes		Always

1	2	3	4	5
Not at all Effective		Somewhat Effective		Very Effective

During my typical month:

2. I take prescribed medications to help cope with my FMS symptoms.

1	2	3	4	5
Never		Sometimes		Always

1	2	3	4	5
Not at all Effective		Somewhat Effective		Very Effective

3. I use massage therapy to help cope with my FMS symptoms.

1	2	3	4	5
Never		Sometimes		Always

1	2	3	4	5
Not at all Effective		Somewhat Effective		Very Effective

4. I use physiotherapy to help cope with my FMS symptoms.

1	2	3	4	5
Never		Sometimes		Always

1	2	3	4	5
Not at all Effective		Somewhat Effective		Very Effective

5. I use chiropractic care to help cope with my FMS symptoms.

1	2	3	4	5
Never		Sometimes		Always

1	2	3	4	5
Not at all Effective		Somewhat Effective		Very Effective

6. I use alternative medicine (i.e., acupuncture) to help cope with my FMS symptoms.

1	2	3	4	5
Never		Sometimes		Always

1	2	3	4	5
Not at all Effective		Somewhat Effective		Very Effective

7. I use _____ to help cope with my FMS symptoms.

1	2	3	4	5
Never		Sometimes		Always

1	2	3	4	5
Not at all Effective		Somewhat Effective		Very Effective

***Please indicate your <u>two most important</u> coping strategies that you use <u>most frequently</u> to help deal effectively with your FMS from the list above.**

Strategy 1: _____

Strategy 2: _____

I) <u>Quality of Life</u>:
Consider your overall level of well-being, in relation to your FMS. Here is a picture of a ladder. At the bottom of the ladder is the worst situation you might reasonably expect to have. At the top is the best you might expect to have. The other rungs are in between. Please circle the number that best describes your overall life satisfaction during the <u>past 4 weeks</u>.

9 Best life I could expect to have
8
7
6
5
4
3
2
1 Worst life I could expect to have

J) The following questions ask for your views about your health. Please mark one option for each question. If you are unsure, please give the best answer you can.

1. In general, would you say your health is:
   Excellent _____ Very Good _____ Good _____ Fair _____ Poor _____

The next 2 items are about activities you might do during a typical day. Does <u>your health now limit you</u> in these activities? If so, how much?

	Yes, Limited A Lot	**Yes, Limited A Little**	**No, Not Limited At All**
2. **Moderate activities,** such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	_____	_____	_____

3. Climbing **several** flights of stairs _____ _____ _____

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	YES	NO
4. **Accomplished less** than you would like	_____	_____
5. Were limited in the **kind** of work or other activities	_____	_____

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	YES	NO
6. **Accomplished less** than you would like	_____	_____
7. Didn't do work or other activities as **carefully** as usual	_____	_____

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

1	2	3	4	5
Not at All	A little bit	Moderately	Quite a bit	Extremely

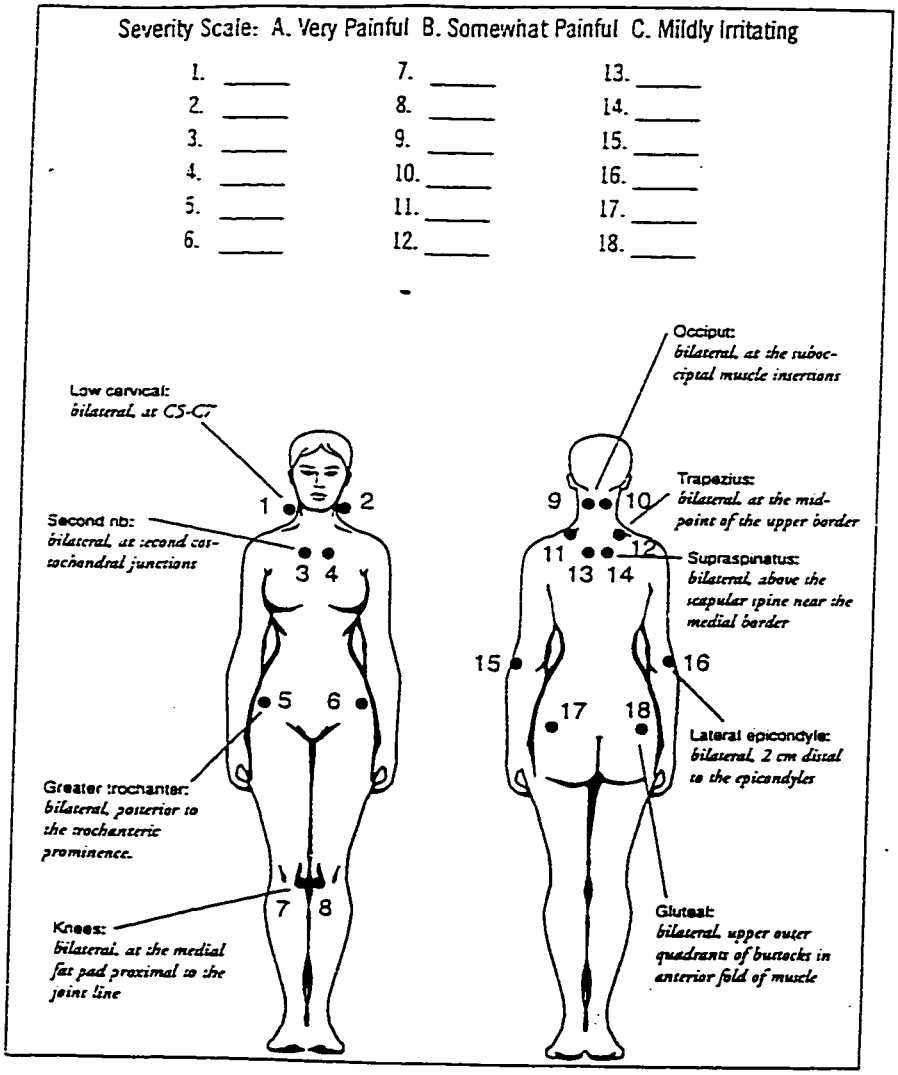
These questions ask about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling how much of the time during the past 4 weeks.

	All of the Time	**Most of the Time**	**A Good bit of the Time**	**Some of the Time**	**A Little of the Time**	**None of the Time**
9. Have you felt calm and peaceful?	_____	_____	_____	_____	_____	_____
10. Did you have a lot of energy?	_____	_____	_____	_____	_____	_____
11. Have you felt down-hearted and blue?	_____	_____	_____	_____	_____	_____

12. During the <u>past 4 weeks</u>, how much of the time has your <u>physical health or emotional problems</u> interfered with your social activities (like visiting with friends, relatives, etc.)?

1	2	3	4	5
All of the Time	Most of the Time	Some of the Time	A little of the Time	None of the Time

K) Below is a diagram indicating the tender point areas that are a source of pain for many individuals with FMS. Every individual's areas and levels of pain may differ. Using the diagram and severity scale below, please indicate which areas are tender points for yourself, keeping in mind the physical pain you normally experience in <u>your typical month</u>, by filling in an "A", "B", or "C" in the appropriate space. If you <u>do not</u> experience any pain in a specified area, please leave the corresponding space blank.



Note: This page will be removed from the Questionnaire

If you would like to receive a summary of the study, please leave your name and contact number (phone or email) below:

Name: _____

Phone/Email: _____

If you would like to be involved in future FMS research conducted by the same researchers at the University of Waterloo and agree to be contacted, please sign below. Even if contacted, you are under no obligation to participate in the research. Thank you.

Yes, I would like to be contacted to participate in future FMS research

_____

Name and Phone Number

THANK YOU!

Appendix A2

Study 1 Materials

Information Letter, Recruitment Poster/Letter

Recruitment Letter:

To Whom It May Concern:

Attached is a letter outlining a portion of my dissertation research that I am conducting with individuals who have been diagnosed with Fibromyalgia (FM). In an attempt to generate a suitably large subject population, I am recruiting from local support groups as well as through medical establishments in both Waterloo and Guelph.

If you support this research, I would appreciate your help in contacting potential FM participants. In particular, I would require on your part a referral of this FM research project to any patients that you may serve. Individuals who are interested may then take a contact number and arrange with myself to fill-out the questionnaire. Upon termination of this study, I will be able to provide you with summary results of our findings.

Thank you for your time and interest in this important research. Please do not hesitate to contact me if you have any questions or concerns.

Sincerely,

S. Nicole Culos-Reed, Ph.D. Candidate
Email: snculos@healthy.uwaterloo.ca
Phone: 885-1211 ext.3151
(519) 763-6723 (h)
Advisor: Dr. L.R. Brawley

ATTENTION!!

DO YOU HAVE FIBROMYALGIA?

ANNOUNCING A STUDY ON FMS BY RESEARCHERS IN THE DEPT. OF KINESIOLOGY AT THE UNIVERSITY OF WATERLOO

PARTICIPANTS ARE NEEDED TO COMPLETE QUESTIONNAIRES (15 MIN)

IF YOU ARE INTERESTED, PLEASE TAKE A CONTACT NUMBER BELOW (LEAVE YOUR NAME AND NUMBER ON THE MESSAGE),
OR SEE _____ FOR A QUESTIONNAIRE

This study has been reviewed and received ethics clearance through the Office of Human Research at the University of Waterloo

---

885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study FM Study 885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study 885-1211 ext. 3153 | FM Study 885-1211

Appendix B

Study 1

Scale Reliabilities

Study 1.

Scale Reliabilities.

Scale	Alpha
Physical Activity Efficacy	.96
Pain Efficacy	.85
Symptom Efficacy	.91
Fibromyalgia Impact Questionnaire	.80
Tenderpoint	.84
Sleep	.55

Appendix C

Study Two Materials

Appendix C1

Time One – Questionnaire

* Indicates that the items were used to collect data for a study that was unrelated to the dissertation.

Fibromyalgia Questionnaire "Time 1 – Start"

Start Date: _____

A) Background Information:

1. **Age:** _____ years

2. **Gender:** female _____ male _____

3. **Educational Level:** (please check one)
   high school _____ trade school _____ some university _____
   university degree _____ graduate degree _____

4. **Marital Status:** (please check one)
   Single _____ Separated _____
   Married _____ Widowed _____
   Divorced _____

5. **Household Income Per Year:** (please check one)
   <10,000 ____ 40,000-59,999 ____ >100,000 ____
   10,000-19,999 ____ 60,000-79,999 ____
   20,000-39,999 ____ 80,000-99,999 ____

6. **Time since you first noticed your FM symptoms:** _____ (mos/yrs)

7. **Time since FM diagnosis by your doctor:** _____ (mos/yrs)

B) Physical Activity:

For the purposes of the present study, we **define physical activity** as any planned physical exertion aimed at improving or maintaining your physical fitness and health (e.g., walking, fitness classes, yardwork).

Regular physical activity is defined as activity occurring **2 or more times each week**. Whether or not you are currently engaging in regular physical activity, **please keep these definitions in mind as you answer the following questions.**

1. **How physically active have you been over the past 2 months?** (please check one)
   Completely Inactive _____ Sporadically Active (< 2x/week) _____
   Regularly Active (2 or more times/week) _____

2. **At what intensity do you exercise?** (please check one)
   Low intensity (i.e., slow walking) _____ Moderate intensity (i.e., brisk walking) ___
   High intensity (i.e., fast walking) _____

3. **What is your favorite, or most common, physical activity that you engage in?**

Please keep this activity in mind as you answer the following physical activity items

4. <u>Each week over the next month</u>, engaging in your favorite physical activity regularly will be:

Enjoyable	1	2	3	4	5	6	7 **Unenjoyable**
Pleasant	1	2	3	4	5	6	7 **Unpleasant**
Painful	1	2	3	4	5	6	7 **Not Painful**
Useless	1	2	3	4	5	6	7 **Useful**
Harmful	1	2	3	4	5	6	7 **Beneficial**
Good	1	2	3	4	5	6	7 **Bad**

5. <u>Each week over the next month</u>, engaging in my favorite physical activity regularly will help me:

a) Get my mind off my pain and FM symptoms

1 2 3 4 5 6 7
Extremely Unlikely Extremely likely

This, to me, is:

1 2 3 4 5 6 7
Extremely Undesirable Extremely Desirable

b) Feel better and improve my well-being

1 2 3 4 5 6 7
Extremely Unlikely Extremely likely

This, to me, is:

1 2 3 4 5 6 7
Extremely Undesirable Extremely Desirable

c) Maintain a more normal lifestyle

1 2 3 4 5 6 7
Extremely Unlikely Extremely likely

This, to me, is:

1 2 3 4 5 6 7
Extremely Undesirable Extremely Desirable

d) Cope with the stress of FM

1	2	3	4	5	6	7
Extremely Unlikely						Extremely likely

This, to me, is:

1	2	3	4	5	6	7
Extremely Undesirable						Extremely Desirable

e) Gain control over my FM symptoms

1	2	3	4	5	6	7
Extremely Unlikely						Extremely likely

This, to me, is:

1	2	3	4	5	6	7
Extremely Undesirable						Extremely Desirable

f) Control my weight

1	2	3	4	5	6	7
Extremely Unlikely						Extremely likely

This, to me, is:

1	2	3	4	5	6	7
Extremely Undesirable						Extremely Desirable

g) Uplift my spirit and give me more energy

1	2	3	4	5	6	7
Extremely Unlikely						Extremely likely

This, to me, is:

1	2	3	4	5	6	7
Extremely Undesirable						Extremely Desirable

h) Improve the quality of my sleep

1	2	3	4	5	6	7
Extremely Unlikely						Extremely likely

This, to me, is:

1	2	3	4	5	6	7
Extremely Undesirable						Extremely Desirable

6. People who are important to me (e.g., spouse, parent, friend) think that I should regularly engage in my favorite physical activity <u>each week over the next month</u>

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

7. I want to do what people who are important to me (see #6) think that I should do

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

8. How important are the following types of support for helping you to regularly engage in your favorite physical activity <u>each week over the next month</u>:

a) Guidance Support– E.g., Someone showing you some physical activity options, such as stretches

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

b) Motivational Support – E.g., Someone encouraging you to engage in physical activity

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

c) Alliance Support – E.g., Having someone join you in your physical activity

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

d) Social Integration – E.g., Making your physical activity a social event, such as by being with friends while you exercise

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

e) Instrumental Support – E.g., Having help with other aspects of your life so that you have time for your physical activity

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

9. How confident are you that you can engage in your favorite physical activity the following number of times <u>each week over the next month</u>:

a) One time per week

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident Moderately Confident Completely Confident

b) Two times per week

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident Moderately Confident Completely Confident

c) Three times per week

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident Moderately Confident Completely Confident

d) Four or more times per week

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

10. How confident are you that you can regularly engage in your favorite physical activity <u>each week over the next month</u>:

a) At a low intensity (i.e., slow walking, light water exercises)

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

b) At a steady moderate intensity (i.e., brisk walking, aerobic exercises)

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

c) At a moderate intensity with some "spurts" of increased intensity (i.e., fast walking, challenging workouts)

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

11. <u>During the next 4 weeks</u>, I will regularly engage in my favorite physical activity(s) _____ times <u>each week</u>.

*	1	2	3	4	5	6	7	8	9
	Definitely <u>Will Not</u>								Definitely <u>Will</u>

C) <u>Daily Functions</u>:

The following items are concerned with how your FM symptoms affect your daily functions. Please check one item for each question, and keep in mind the previous week when answering the following. If the item does not apply to yourself (i.e., your partner does all of the shopping), please check N/A (not applicable).

During the past week, how often were you able to:

1. Do the shopping (i.e., for groceries).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

2. Prepare the meals (i.e., make dinner).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

3. Do the laundry.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

4. Wash the dishes.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

5. Vacuum your home.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

6. Make the bed(s).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

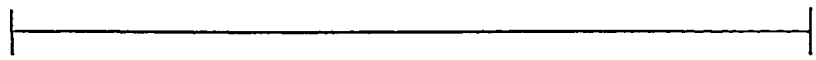
7. Walk several blocks (i.e., around your neighbourhood, at the mall).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

8. Do some yard work (i.e., weed the garden, cut the lawn).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

9. Drive your car.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

10. Socialize with your friends or family.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

D) <u>Pain</u>:
Using the following line, please rate your pain from your FM symptoms **during your typical week**. Place a mark somewhere on or between the two endpoints that indicates the extent of your pain:



No Pain Pain as bad as it could be

E) In the following questions, we would like to know how your FM pain affects you. For each of the following questions, please circle the number that corresponds to your certainty that you can <u>now</u> perform the following tasks <u>during a typical week</u>.

1. How certain are you that you can decrease your pain <u>quite a bit</u>?

10 20 30 40 50 60 70 80 90 100
very uncertain — moderately uncertain — very certain

2. How certain are you that you can continue most of your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can keep FM pain from interfering with your sleep?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. How certain are you that you can make a small-to-moderate reduction in your FM pain by using methods other than taking extra medication?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can make a large reduction in your FM pain by using methods other than taking extra medication?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

F) In the following questions, we'd like to know how you feel about your ability to control your FM symptoms.

For each of the following questions, please circle the number that corresponds to the certainty that you can now perform the following activities or tasks during a typical week.

1. How certain are you that you can control your fatigue?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

2. How certain are you that you can regulate your activity so as to be active without aggravating your FM?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can do something to help yourself feel better if you are feeling blue because of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. As compared with other people with FM like yours, how certain are you that you can manage FM pain during your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can manage your FM symptoms so that you can do the things you enjoy?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

6. How certain are you that you can deal with the frustration of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

G) Sleep:

Please consider your typical week when answering the following questions.

1. Do you have difficulty falling asleep at night?
   Always _____ Most Times _____ Occasionally _____ Never _____

2. Do you wake up several times during the night?
   Always _____ Most Times _____ Occasionally _____ Never _____

3. Do you wake up earlier than you wish?
   Always _____ Most Times _____ Occasionally _____ Never _____

4. Do you feel rested when you wake up in the morning?
   Always _____ Most Times _____ Occasionally _____ Never _____

5. How often do you feel fatigued during the week (i.e., feel very tired, do not have a lot of energy, etc.)?
   Always _____ Most Times _____ Occasionally _____ Never _____

6. How often have you taken at least 1 rest break (i.e., a nap) during the day because you were fatigued?
   Always _____ Most Times _____ Occasionally _____ Never _____

H) The following questions ask for your views about your health. Please mark one option for each question. If you are unsure, please give the best answer you can.

1. In general, would you say your health is:
Excellent _____ Very Good _____ Good _____ Fair _____ Poor _____

The next 2 items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, Limited A Lot	**Yes, Limited A Little**	**No, Not Limited At All**
2. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	_____	_____	_____
3. Climbing **several** flights of stairs	_____	_____	_____

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	YES	**NO**
4. **Accomplished less** than you would like	_____	_____
5. Were limited in the **kind** of work or other activities	_____	_____

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	YES	**NO**
6. **Accomplished less** than you would like	_____	_____
7. Didn't do work or other activities as **carefully** as usual	_____	_____

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

1	2	3	4	5
Not at All	A little bit	Moderately	Quite a bit	Extremely

These questions ask about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling how much of the time during the past 4 weeks.

	All of the Time	**Most of the Time**	**A Good bit of the Time**	**Some of the Time**	**A Little of the Time**	**None of the Time**
9. Have you felt calm and peaceful?	_____	_____	_____	_____	_____	_____

	All of the Time	**Most of the Time**	**A Good bit of the Time**	**Some of the Time**	**A Little of the Time**	**None of the Time**
10. Did you have a lot of energy?	_____	_____	_____	_____	_____	_____

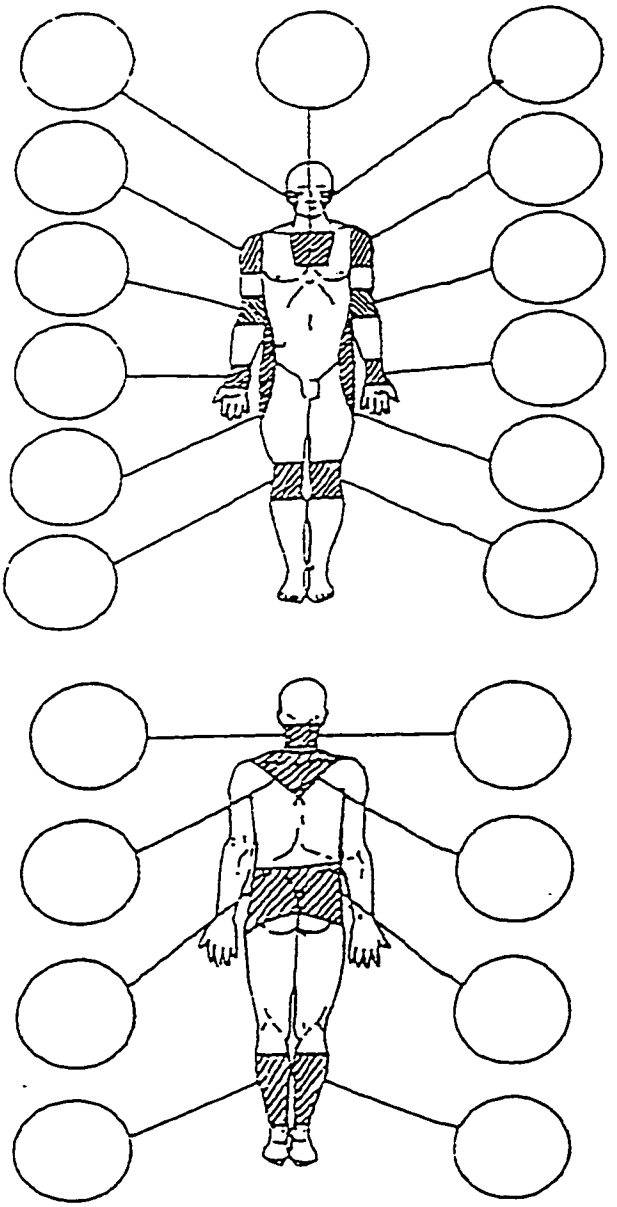
	All of the Time	**Most of the Time**	**A Good bit of the Time**	**Some of the Time**	**A Little of the Time**	**None of the Time**
11. Have you felt down-hearted and blue?	_____	_____	_____	_____	_____	_____

12. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

1	2	3	4	5
All of the Time	Most of the Time	Some of the Time	A little of the Time	None of the Time

I) Below is a diagram indicating the tender point areas that are a source of pain for many individuals with FM. Every individual's areas and levels of pain may differ. Using the diagram and severity scale below, please indicate which areas are tender points for yourself, keeping in mind the physical pain you normally experience in <u>your typical month</u>, by filling in the appropriate number (0-5) in the space provided.

0=no pain 1=slight pain 2=moderate pain 3=tenable pain 4=severe pain 5=unbearable pain



J) * Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the <u>past week</u> by using the scale below and checking the appropriate space.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)

1. I was bothered by things that usually don't bother me.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

2. I did not feel like eating; my appetite was poor.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

3. I felt that I could not shake off the blues even with help from my family.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

4. I felt that I was just as good as other people.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

5. I had trouble keeping my mind on what I was doing.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

6. I felt depressed.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

7. I felt that everything I did was an effort.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

8. I felt hopeful about the future.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

9. I thought my life had been a failure.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

10. I felt fearful.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)

11. My sleep was restless.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

12. I was happy.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

13. I talked less than usual.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

14. I felt lonely.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

15. People were unfriendly.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

16. I enjoyed life.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

17. I had crying spells.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

18. I felt sad.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

19. I felt that people disliked me.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

20. I could not get "going".

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

THANK YOU FOR COMPLETING THE <u>TIME 1</u> QUESTIONNAIRE – PLEASE MAIL IT IN <u>IMMEDIATELY</u> IN THE ENVELOPE PROVIDED.

Appendix C2

Study Two

Time Two – Questionnaire

* Indicates that the items were used to collect data for a study that was unrelated to the dissertation.

Fibromyalgia Questionnaire "Time 2 – Completion"

Completion Date: _____

A) Physical Activity:

For the purposes of the present study, we **define physical activity** as any planned physical exertion aimed at improving or maintaining your physical fitness and health (e.g., walking, fitness classes, yardwork).

Regular physical activity is defined as activity occurring **2 or more times each week.** Whether or not you are currently engaging in regular physical activity, **please keep these definitions in mind as you answer the following questions.**

What is your favorite, or most common, physical activity that you engage in?

_____

Please keep this activity in mind as you answer the following physical activity items.

1. **I regularly engaged in my favorite physical activity(s) _____ times each week during the past month.**

2. **Each week over the next month, engaging in your favorite physical activity regularly will be:**

Enjoyable	1	2	3	4	5	6	7 **Unenjoyable**
Pleasant	1	2	3	4	5	6	7 **Unpleasant**
Painful	1	2	3	4	5	6	7 **Not Painful**
Useless	1	2	3	4	5	6	7 **Useful**
Harmful	1	2	3	4	5	6	7 **Beneficial**
Good	1	2	3	4	5	6	7 **Bad**

3. **People who are important to me (e.g., spouse, friends) think that I should regularly engage in my favorite physical activity each week over the next month**

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

4. **I want to do what people who are important to me (see #3) think that I should do**

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

5. How important are the following types of support for helping you to regularly engage in your favorite physical activity <u>each week over the next month</u>:

a) Guidance Support– E.g., Someone showing you some physical activity options, such as stretches

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

b) Motivational Support – E.g., Someone encouraging you to engage in physical activity

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

c) Alliance Support – E.g., Having someone join you in your physical activity

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

d) Social Integration – E.g., Making your physical activity a social event, such as by being with friends while you exercise

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

e) Instrumental Support – E.g., Having help with other aspects of your life so that you have time for your physical activity

1 2 3 4 5 6 7
Extremely Unimportant Extremely Important

6. How confident are you that you can engage in your favorite physical activity the following number of times <u>each week over the next month</u>:

a) One time per week

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident Moderately Confident Completely Confident

b) Two times per week

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident Moderately Confident Completely Confident

c) Three times per week

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident Moderately Confident Completely Confident

d) Four or more times per week

0	1	2	3	4	5	6	7	8	9
10									
Not at All Confident			Moderately Confident					Completely Confident	

7. How confident are you that you can regularly engage in your favorite physical activity <u>each week over the next month</u>:

d) At a low intensity (i.e., slow walking, light water exercises)

0	1	2	3	4	5	6	7	8	9
10									
Not at All Confident			Moderately Confident					Completely Confident	

e) At a steady moderate intensity (i.e., brisk walking, aerobic exercises)

0	1	2	3	4	5	6	7	8	9
10									
Not at All Confident			Moderately Confident					Completely Confident	

f) At a moderate intensity with some "spurts" of increased intensity (i.e., fast walking, challenging workouts)

0	1	2	3	4	5	6	7	8	9
10									
Not at All Confident			Moderately Confident					Completely Confident	

8. <u>During the next 4 weeks</u>, I will regularly engage in my favorite physical activity(s) _____ times <u>each week</u>.

1	2	3	4	5	6	7	8	9
Definitely <u>Will Not</u>								Definitely <u>Will</u>

B) <u>Daily Functions</u>:

The following items are concerned with how your FMS symptoms affect your daily functions. Please check one item for each question, and keep in mind the previous week when answering the following. If the item does not apply to yourself (i.e., your partner does all of the shopping), please check N/A (not applicable).

During the past week, how often were you able to:

1. Do the shopping (i.e., for groceries).

Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

2. Prepare the meals (i.e., make dinner).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

3. Do the laundry.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

4. Wash the dishes.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

5. Vacuum your home.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

6. Make the bed(s).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

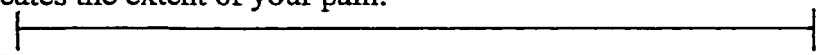
7. Walk several blocks (i.e., around your neighbourhood, at the mall).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

8. Do some yard work (i.e., weed the garden, cut the lawn).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

9. Drive your car.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

10. Socialize with your friends or family.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

C) <u>Pain</u>:
Using the following line, please rate your pain from your FM symptoms **during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the extent of your pain:



No Pain Pain as bad as it could be

D) In the following questions, we would like to know how your FM pain affects you. For each of the following questions, please circle the number that corresponds to your certainty that you can <u>now</u> perform the following tasks <u>during a typical week</u>.

1. How certain are you that you can decrease your pain <u>quite a bit</u>?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

2. How certain are you that you can continue most of your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can keep FM pain from interfering with your sleep?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. How certain are you that you can make a small-to-moderate reduction in your FM pain by using methods other than taking extra medication?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can make a large reduction in your FM pain by using methods other than taking extra medication?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

E) In the following questions, we'd like to know how you feel about your ability to control your FM symptoms.

For each of the following questions, please circle the number that corresponds to the certainty that you can now perform the following activities or tasks during a typical week.

1. How certain are you that you can control your fatigue?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

2. How certain are you that you can regulate your activity so as to be active without aggravating your FM?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can do something to help yourself feel better if you are feeling blue because of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. As compared with other people with FM like yours, how certain are you that you can manage FM pain during your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can manage your FM symptoms so that you can do the things you enjoy?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

6. How certain are you that you can deal with the frustration of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

F) * Over the past 7 days, I engaged in physical activity _____ times.

*** Over the past 7 days, my average session of physical activity lasted about ____ minutes.**

*** Over the past 7 days, my average session of physical activity was of what intensity: (please circle one response only)**
LOW MODERATE VIGOROUS

G) Sleep:

Please consider your typical week when answering the following questions.

1. Do you have difficulty falling asleep at night?
   Always _____ Most Times _____ Occasionally _____ Never _____

2. Do you wake up several times during the night?
   Always _____ Most Times _____ Occasionally _____ Never _____

3. Do you wake up earlier than you wish?
Always _____ Most Times _____ Occasionally _____ Never _____

4. Do you feel rested when you wake up in the morning?
Always _____ Most Times _____ Occasionally _____ Never _____

5. How often do you feel fatigued during the week (i.e., feel very tired, do not have a lot of energy, etc.)?
Always _____ Most Times _____ Occasionally _____ Never _____

6. How often have you taken at least 1 rest break (i.e., a nap) during the day because you were fatigued?
Always _____ Most Times _____ Occasionally _____ Never _____

H) The following questions ask for your views about your health. Please mark one option for each question. If you are unsure, please give the best answer you can.

1. In general, would you say your health is:
Excellent _____ Very Good _____ Good _____ Fair _____ Poor _____

The next 2 items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, Limited A Lot	**Yes, Limited A Little**	**No, Not Limited At All**
2. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	_____	_____	_____
3. Climbing **several** flights of stairs	_____	_____	_____

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	YES	**NO**
4. **Accomplished less** than you would like	_____	_____
5. Were limited in the **kind** of work or other activities	_____	_____

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	YES	**NO**
6. **Accomplished less** than you would like	_____	_____
7. Didn't do work or other activities as **carefully** as usual	_____	_____

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

1	2	3	4	5
Not at All	A little bit	Moderately	Quite a bit	Extremely

These questions ask about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling how much of the time during the past 4 weeks.

	All of the Time	**Most of the Time**	**A Good bit of the Time**	**Some of the Time**	**A Little of the Time**	**None of the Time**
9. Have you felt calm and peaceful?	_____	_____	_____	_____	_____	_____

	All of the Time	**Most of the Time**	**A Good bit of the Time**	**Some of the Time**	**A Little of the Time**	**None of the Time**
10. Did you have a lot of energy?	_____	_____	_____	_____	_____	
11. Have you felt down-hearted and blue?	_____	_____	_____	_____	_____	_____

12. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

1	2	3	4	5
All of the Time	Most of the Time	Some of the Time	A little of the Time	None of the Time

J) * Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past week by using the scale below and checking the appropriate space.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)

1. I was bothered by things that usually don't bother me.

(less than 1 day)	(1-2 days)	(3-4 days)	(5-7 days)

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)

2. I did not feel like eating; my appetite was poor.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

3. I felt that I could not shake off the blues even with help from my family.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

4. I felt that I was just as good as other people.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

5. I had trouble keeping my mind on what I was doing.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

6. I felt depressed.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

7. I felt that everything I did was an effort.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

8. I felt hopeful about the future.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

9. I thought my life had been a failure.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

10. I felt fearful.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

11. My sleep was restless.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

12. I was happy.

_____ (less than 1 day) _____ (1-2 days) _____ (3-4 days) _____ (5-7 days)

13. I talked less than usual.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

14. I felt lonely.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

15. People were unfriendly.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

16. I enjoyed life.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

17. I had crying spells.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

18. I felt sad.

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

19. I felt that people disliked me.

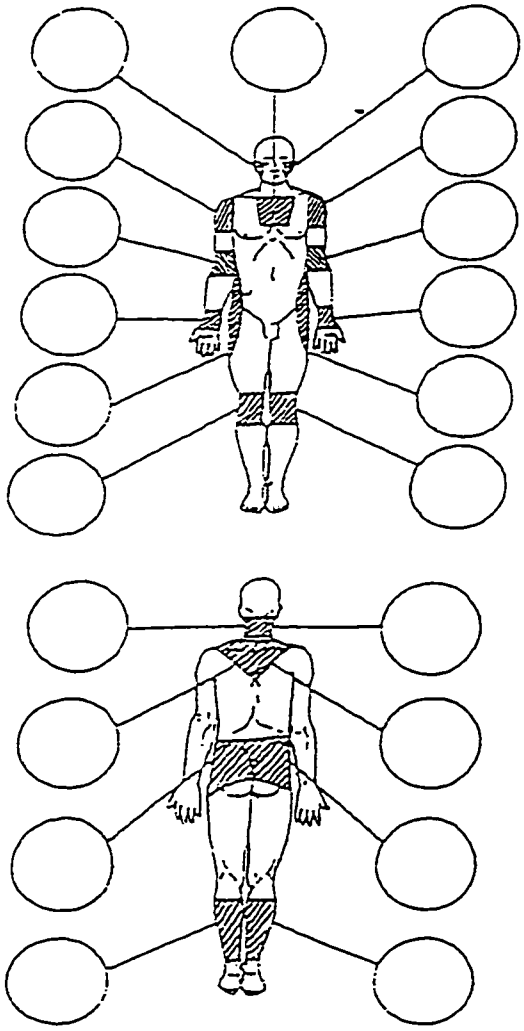
(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

20. I could not get "going".

(less than 1 day) (1-2 days) (3-4 days) (5-7 days)

K) Below is a diagram indicating the tender point areas that are a source of pain for many individuals with FM. Every individual's areas and levels of pain may differ. Using the diagram and severity scale below, please indicate which areas are tender points for yourself, keeping in mind the physical pain you normally experience in <u>your typical month</u>, by filling in the appropriate number (0-5) in the space provided.

0=no pain
1=slight pain
2=moderate pain
3=tenable pain
4=severe pain
5=unbearable pain



THANK YOU FOR COMPLETING THE <u>TIME 2</u> QUESTIONNAIRE – PLEASE MAIL IT IN <u>IMMEDIATELY</u> IN THE ENVELOPE PROVIDED, ALONG WITH YOUR COMPLETED CALENDAR.

Appendix C3

Study Two Materials

Instructions, Recruitment Poster, Recruitment Letter (script)

INSTRUCTIONS

Thank you for participating in this FM research project! This research packet contains information for you on how to complete the materials enclosed. Please take the time to read this carefully, and do not hesitate to contact us if anything is unclear or if you have any questions.

This package includes an information letter, two questionnaires (for Time 1 and Time 2) in their envelopes (stamped and self-addressed for return) and a physical activity calendar.

1. Please read over the information letter carefully and keep it for your reference. Our contact numbers are included on this letter.

2. The two questionnaires are marked "Time 1 – Start" and "Time 2 – Completion". Please fill out the Time 1 questionnaire NOW and return it in the self-addressed stamped envelope that is provided.

3. Please mark on the Time 2 questionnaire NOW the date 1 month (30 days) from NOW. This is to remind you when you should complete the Time 2 questionnaire.

4. DO NOT READ the Time 2 questionnaire now. Please place it in a safe spot and complete it 1 month from now.

5. To help you track your physical activity over the next month, we've included a calendar that you can place somewhere convenient, such as on your fridge. Each day we would like you to write in any physical activity that you do. More complete instructions are included on the back of the calendar. Please take some time now to read over the calendar instructions.

6. 30 Days from now, you will complete the Time 2 questionnaire! We will be contacting you sometime near the end of your involvement to remind you about completing the second questionnaire. The Time 2 questionnaire should be mailed in the self-addressed stamped envelope that is provided, along with your filled-in physical activity calendar.

7. The two questionnaires are very similar. Each should take you about 20-30 minutes to complete, although the second questionnaire is slightly shorter than the first. Please read over the items carefully when you are filling-in the questionnaire, and try to complete it in a quiet environment by yourself.

THANKS AGAIN FOR PARTICIPATING IN THIS IMPORTANT FM RESEARCH PROJECT!!
DO NOT HESITATE TO CONTACT US IF YOU HAVE ANY QUESTIONS.

ATTENTION!!
DO YOU HAVE FIBROMYALGIA?

ANNOUNCING A STUDY ON FM BY RESEARCHERS IN THE DEPT. OF KINESIOLOGY AT THE UNIVERSITY OF WATERLOO

PARTICIPANTS ARE NEEDED TO COMPLETE QUESTIONNAIRES AT TWO TIMES OVER 1 MONTH

IF YOU ARE INTERESTED, PLEASE TAKE A CONTACT NUMBER BELOW (LEAVE YOUR NAME AND NUMBER ON THE MESSAGE)

This study has been reviewed and received ethics clearance through the Office of Human Research at the University of Waterloo

---

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211 ext. 3153

FM Study 885-1211

Script for Subject Recruitment

Email: FM Study 2 Participants Needed!
Dear Study 1 Participants:

By now you should have received the feedback from the FM questionnaire study in which you participated. We hope that you are taking our message to heart and are trying to incorporate physical activity into your daily lifestyle. We know that this is often not easy, especially with FM, but it is very important for your health.

We are now progressing into the second phase of our research and would again like to invite you to participate. Similar to the first study, your involvement requires filling out a questionnaire. It is composed of many of the same items as the first questionnaire, plus some others. The difference in this second study is that the study requires you to complete this questionnaire at two time points – at the start of your involvement and again one month later. If you agree to participate, it is very important that you are willing to complete both questionnaires at the two time points, and log your physical activities for just over one month.

The research package that you will receive contains all of the materials that your participation will require – instructions, two questionnaires with stamped envelopes for return to us, plus a 30-day calendar. We want you to use the calendar to help you remember how much physical activity you are actually doing! It will be a useful tool for you to track your activity and will help you answer the second questionnaire, at the end of your one month involvement. We will, of course, contact you as a reminder to return the second questionnaire near the end of your involvement. We may also contact you two weeks after the study completion to see how your activity is progressing!

We understand that this study does require more commitment on your part. However, this research will provide us with valuable information regarding the association between physical activity and functioning with FM over time. Thus, it will ultimately help us understand more about what FM people, like you, experience! In addition, we have three "incentive prizes" for those who fully complete and return all of the study materials. The first prize is a **FarWest Goretex vest** (retail value $120) (the winner chooses the size and color), and the second and third prizes are **$50 dining certificates** to local restaurants. So not only do you have the opportunity to advance FM knowledge, but also a great chance to win one of these fabulous prizes (total participants will **only** be between 80-100 people, so **your odds are great**!!).

Although our resources are limited, we would like to show our appreciation for your participation by giving everyone who stays with the study an opportunity to win these prizes.

If you are interested in participating in our second FM study, please contact me by email or phone (numbers below). We can clarify any questions you may have and send you the research package (please leave your full name, address, & email/contact numbers). Thank you for your interest and your involvement!

Sincerely,
S. Nicole Culos-Reed, M.S, Ph.D. Candidate
Home: (xxx)xxx-xxxx Email: snculos@healthy.uwaterloo.ca
Dr. Lawrence R. Brawley, Ph.D. Office: (519)885-1211 ext.3153

Appendix D

Study 2

Time 1

Scale Reliabilities

Study Two.

Scale Reliabilities at Time 1.

Scale	Alpha
Attitude	.82
Attitude Precursor:	
Behavioural Belief	.91
Outcome Expectation	.93
Physical Activity Frequency Efficacy	.92
Physical Activity Intensity Efficacy	.79
Social Support Types	.78
Tenderpoints	.89
Sleep Disorder	.70
Fibromyalgia Impact Questionnaire	.85
Depression	.90
Symptom Efficacy	.91
Pain Efficacy	.84

Appendix E

Study Two

Time 1

Theory of Planned Behaviour Descriptive Results

Study Two.

Theory of Planned Behaviour Descriptive Results at Time 1.

Variable (Scale Range)	Mean	Standard Deviation
Attitude (1-7)	5.53	1.02
Behavioural Belief (1-7)	4.84	1.19
Outcome Evaluation (1-7)	5.75	1.34
SNMC	26.54	12.43
Subjective Norm (1-7)	5.66	1.40
Motivation to Comply (1-7)	4.50	1.56
Social Support (1-7)	4.98	1.37
Efficacy – Frequency (1-10)	6.82	2.61
Efficacy – Intensity (1-10)	5.35	2.35
Behavioural Intention (times per week)	3.56	1.64
BI – Confidence (1-9)	7.45	1.44
Behaviour (Past PA, times per week)	2.56	.50
Inactive	$\underline{n} = 3$	
Sporadically Active (<2x/wk)	$\underline{n} = 30$	
Regularly Active (>2x/wk)	$\underline{n} = 38$	
PA Intensity	1.56	.61

Note: SNMC = multiplicative composite of subjective norm x motivation to comply; PA = physical activity. Numbers in brackets reflect the scale ranges in scoring. In all cases, higher scores are more positive. Behaviour (Past PA) scored as 1 = inactive, 2 = sporadically active, 3 = regularly active.

Appendix F

Study Two

Time Two

Scale Reliabilities

Study Two.

Scale Reliabilities at Time Two.

Scale	Alpha
Attitude	.84
Physical Activity Frequency Efficacy	.91
Physical Activity Intensity Efficacy	.71
Social Support Types	.84
Tenderpoints	.92
Sleep Disorder	.71
Fibromyalgia Impact Questionnaire	.87
Depression	.94
Symptom Efficacy	.93
Pain Efficacy	.90

Appendix G

Study Two

Time Two

Theory of Planned Behaviour Descriptive Results

Study Two.

Theory of Planned Behaviour Descriptives at Time Two.

Variable (Scale Range)	Mean	Standard Deviation
Attitude (1-7)	5.63	1.25
SNMC	25.40	13.79
Subjective Norm (1-7)	5.50	1.59
Motivation to Comply (1-7)	4.41	1.80
Social Support (1-7)	4.72	1.51
Efficacy – Frequency (1-10)	7.0	2.54
Efficacy – Intensity (1-10)	5.76	2.18
Behavioural Intention (times per week)	3.96	2.21
BI – Confidence (1-9)	7.32	1.84
Behaviour (times per week)	4.08	2.35
PA Intensity (past 7 days)	1.6	.55
Low	n = 26	
Moderate	n = 32	
Vigorous	n = 2	

Note: SNMC = multiplicative composite of subjective norm x motivation to comply; PA = physical activity. Numbers in brackets reflect the scale ranges in scoring. In all cases, higher scores are more positive. PA Intensity scored as 1 = low, 2 = moderate, 3 = vigorous.

Appendix H

Study Two

Hierarchical Multiple Regression Analyses

With Social Support

Study Two.

Prediction of Physical Activity Intention With Hierarchical Multiple Regression Analyses Involving the Social Support Variable at Time 1 and Time 2 (Concurrent Tests).

Step -- Time 1	R	R^2	Adj. R^2	R^2 ch	p
Prediction of Intention					
1. Efficacy	.654	.428	.419	.428	.000
2. Attitude	.655	.428	.411	.001	.801
3. Social Support	.662	.438	.412	.010	.300
Step -- Time 2					
Prediction of Intention					
1. Efficacy	.601	.361	.350	.361	.000
2. Attitude	.601	.361	.339	.000	.948
3. Social Support	.604	.365	.331	.004	.567

Appendix I

Study Three

Pre-Manipulation

Descriptives For Each Condition

Study Three.

Descriptives For Each Condition at Time One.

Variable	Positive Condition	Negative Condition
	Mean (SD)	Mean (SD)
Attitude (1-7)	5.12 (1.10)	5.35 (1.03)
Experiential (1-7)	4.74 (1.13)	4.83 (1.34)
Factual (1-7)	5.44 (1.32)	5.79 (.98)
Efficacy (0-10)	5.50 (2.0)	5.65 (2.05)
To do PA (0-10)	4.55 (2.42)	4.82 (2.56)
To use skills to cope & do PA	6.21 (2.11)	6.28 (2.1)
SNMC	26.67 (10.53)	28.16 (14.34)
Subjective Norm (1-7)	5.5 (1.54)	5.90 (1.42)
Motivation to Comply (1-7)	4.70 (1.27)	4.59 (1.69)
Behavioural Intention (#/week)	2.87 (1.6)	3.30 (1.85)
Log BI	.41 (.18)	.45 (.24)
Behaviour (Past PA) (#/week)		
Inactive	n = 4	n = 3
Sporadically Active (<2x/wk)	n = 7	n = 9
Regularly Active (>2x/wk)	n = 23	n = 18

Appendix J

Study Three Materials

Appendix J1

Questionnaire -- Pre-Manipulation

* Indicates that the items were used to collect data for a study that was unrelated to the dissertation.

Name:

FM Focus Group Study Questionnaire

A) Background Information:

1. **Age:** _____ years

2. **Gender:** female _____ male _____

3. **Time since you first noticed your FM symptoms:** _____ (mos/yrs)

4. **Time since FM diagnosis by your doctor:** _____ (mos/yrs)

B) Physical Activity:

For the purposes of the present study, we **define physical activity** as any planned physical exertion **aimed at improving or maintaining** your physical fitness and health (e.g., walking, fitness classes, yardwork).

Regular physical activity is defined as activity occurring **2 or more times each week. Please keep these definitions in mind as you answer the following questions.**

1. **How physically active have you been over the past 2 months?** (please check one)
Completely Inactive (no planned activity) ___ Sporadically Active (less than 2 times/week) ___
Regularly Active (2 or more times/week) ___

* When you are exercising in your usual fashion, how would you rate your level of exertion (degree of effort):

0	1	2	3	4	5	6	7	8	9	10
Normal		Weak	Moderate		Strong		Very strong		Very, very strong	Max

2. **Please list 3 thoughts about participating in regular physical activity in the next two weeks that you have right now, and indicate how important (using the 0-10 scale) they are for influencing your decision to participate in physical activity at least 2 times per week in the next 2 weeks:**

Physical Activity Thought	**Importance Rating** (0 ... 5 ... 10; not at all important ... very important)
1. _____	_____
2. _____	_____
3. _____	_____

3. Please answer the following items by circling the number that best indicates how strongly you feel about regular physical activity:

<u>Each week over the next 2 weeks</u>, my engaging in physical activity regularly for 2 or more times each week will be:

Enjoyable	1	2	3	4	5	6	7 **Unenjoyable**
Pleasant	1	2	3	4	5	6	7 **Unpleasant**
Negative	1	2	3	4	5	6	7 **Positive**
Useless	1	2	3	4	5	6	7 **Useful**
Not Beneficial	1	2	3	4	5	6	7 **Beneficial**
Good Idea	1	2	3	4	5	6	7 **Bad Idea**
Healthy	1	2	3	4	5	6	7 **Unhealthy**
Worthwhile	1	2	3	4	5	6	7 **Not Worthwhile**
Wise	1	2	3	4	5	6	7 **Foolish**
Interesting	1	2	3	4	5	6	7 **Uninteresting**
Fun	1	2	3	4	5	6	7 **Chore**
Dull	1	2	3	4	5	6	7 **Stimulating**
Obligation	1	2	3	4	5	6	7 **Treat**
Convenient	1	2	3	4	5	6	7 **Unconvenient**

4. People who are important to me (e.g., spouse, parent, friend, therapists) think that I should regularly engage in physical activity 2 or more times <u>each week over the next 2 weeks</u>

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

5. The extent to which I am <u>motivated</u> by what people who are important to me (see #3) think that I should do

1	2	3	4	5	6	7
Motivated Very Little						Highly Motivated

6. For the following items, please circle the number that best indicates your confidence to do the following:

How confident are you that you can engage in regular physical activity at least 2 times <u>each week over the next 2 weeks</u>:

a) In the face of your FM symptoms:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

b) When you are fatigued:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

c) When you are experiencing severe tenderpoint pain:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

How confident are you that you can apply the following skills that allow you to engage in regular physical activity at least 2 times <u>each week over the next 2 weeks</u>:

a) Planning a rest to deal with your FM symptoms before your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

b) Planning and making time in your weekly schedule for your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

c) Use coping strategies to deal with your FM symptoms before your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

d) Pacing yourself to deal with your FM symptoms both during and after your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

7. **Keeping in mind that regular physical activity means participating at least 2 times each week, please answer the following question:**

   <u>During the next 2 weeks</u>, I will engage in physical activity at least _____ times <u>each week</u>.

1	2	3	4	5	6	7	8	9
Definitely Will Not								Definitely Will

C) **<u>Daily Functions</u>:**

The following items are concerned with how your FM symptoms effect your daily functions. Please check one item for each question, and keep in mind the previous week when answering the following. If the item does not apply to yourself (i.e., your partner does all of the shopping), please check N/A (not applicable).

During the past week, how often were you able to:

1. Do the shopping (i.e., for groceries).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

2. Prepare the meals (i.e., make dinner).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A ____

3. Do the laundry.
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

4. Wash the dishes.
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

5. Vacuum your home.
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

6. Make the bed(s).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

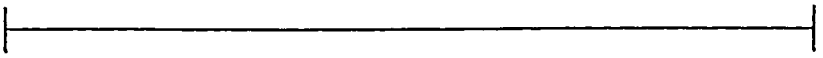
7. Walk several blocks (i.e., around your neighbourhood, at the mall).
   Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

8. Do some yard work (i.e., weed the garden, cut the lawn).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

9. Drive your car.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

10. Socialize with your friends or family.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

D) Pain:
Using the following line, please rate the extent of your pain from your FM symptoms **during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the extent of your pain:



No Pain Pain as bad as it could be

E) In the following questions, we'd like to know how you feel about your ability to control your FM symptoms.
For each of the following questions, please circle the number that corresponds to the certainty that you can now perform the following activities or tasks during a typical week.

1. How certain are you that you can control your fatigue?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

2. How certain are you that you can regulate your activity so as to be active without aggravating your FM?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can do something to help yourself feel better if you are feeling blue because of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. As compared with other people with FM like yours, how certain are you that you can manage FM pain during your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can manage your FM symptoms so that you can do the things you enjoy?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

6. How certain are you that you can deal with the frustration of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

F) Fatigue:

Using the following line, please rate your fatigue **during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the extent of your **fatigue:**

No Fatigue ——————————————— **Extreme Fatigue**

G) Tenderpoint Ratings:

Using the following line, please rate the pain severity of **your most common tenderpoints, during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the severity of your **most common** tenderpoints.

———————————————

No Pain — Pain as bad as it could be

Now rate the pain severity of **your least common tenderpoints, during your typical week.**

———————————————

No Pain — Pain as bad as it could be

H) Please read each item carefully and decide the degree to which the statement is characteristic or true of you. Then place a number between "1" and "5" in the correct space according to the following scale:

1=The statement is not at all characteristic of me
2=The statement is slightly characteristic of me
3=The statement is moderately characteristic of me
4=The statement is very characteristic of me
5=The statement is extremely characteristic of me

1. I'm concerned about my style of doing things. _____
2. I'm concerned about the way I present myself. _____
3. I'm self-conscious about the way I look. _____
4. I usually worry about making a good impression. _____
5. One of the last things I do before I leave my house is look in the mirror. _____
6. I'm concerned about what other people think of me. _____
7. I'm usually aware of my appearance. _____

Answer these questions honestly and accurately. Do not let your answer to one question influence your other answers. **Circle the number** that best **represents how much you agree** with each statement as it generally applies to you.

a) In uncertain times, I usually expect the best.

4	3	2	1	0
strongly agree	agree	neutral	disagree	strongly disagree

b) It's easy for me to relax.

0	1	2	3	4
strongly disagree	disagree	neutral	agree	strongly agree

c) If something can go wrong for me , it will.

4	3	2	1	0
strongly agree	agree	neutral	disagree	strongly disagree

d) I always look on the bright side of things.

0	1	2	3	4
strongly disagree	disagree	neutral	agree	strongly agree

e) I'm always optimistic about my future.

4	3	2	1	0
strongly agree	agree	neutral	disagree	strongly disagree

f) I enjoy my friends a lot.

0	1	2	3	4
strongly disagree	disagree	neutral	agree	strongly agree

g) It's important for me to keep busy.

4	3	2	1	0
strongly agree	agree	neutral	disagree	strongly disagree

h) I hardly ever expect things to go my way.

0	1	2	3	4
strongly disagree	disagree	neutral	agree	strongly agree

i) Things never work out the way I want them to.

4	3	2	1	0
strongly agree	agree	neutral	disagree	strongly disagree

j) I don't get upset too easily.

0	1	2	3	4
strongly disagree	disagree	neutral	agree	strongly agree

k) I'm a believer in the idea that "every cloud has a silver lining"

4	3	2	1	0
strongly agree	agree	neutral	disagree	strongly disagree

l) I rarely count on good things happening to me.

0	1	2	3	4
strongly disagree	disagree	neutral	agree	strongly agree

Appendix J2

Study Three

Questionnaire -- Post-Manipulation

* Indicates that the items were used to collect data for a study that was unrelated to the dissertation.

#

Name:

FM Focus Group Study Questionnaire – 2

A) Please list 3 thoughts about participating in regular physical activity in the next two weeks that you have right now, and indicate how important they are for influencing your decision to participate in physical activity at least 2 times per week in the next 2 weeks:

Physical Activity Thought	Importance Rating 0 ... 5 ... 10 not at all important very important
1. _____	_____
2. _____	_____
3. _____	_____

B) Physical Activity
Please answer the following items by circling the number that best indicates how strongly you feel about taking part in regular physical activity as follows:

1. **Each week over the next 2 weeks, regularly engaging in physical activity 2 or more times each week will be:**

Enjoyable	1	2	3	4	5	6	7 **Unenjoyable**
Pleasant	1	2	3	4	5	6	7 **Unpleasant**
Negative	1	2	3	4	5	6	7 **Positive**
Useless	1	2	3	4	5	6	7 **Useful**
Not Beneficial	1	2	3	4	5	6	7 **Beneficial**
Good Idea	1	2	3	4	5	6	7 **Bad Idea**
Healthy	1	2	3	4	5	6	7 **Unhealthy**
Worthwhile	1	2	3	4	5	6	7 **Not Worthwhile**
Wise	1	2	3	4	5	6	7 **Foolish**
Interesting	1	2	3	4	5	6	7 **Uninteresting**

Fun	1	2	3	4	5	6	7 **Chore**
Dull	1	2	3	4	5	6	7 **Stimulating**
Obligation	1	2	3	4	5	6	7 **Treat**
Convenient	1	2	3	4	5	6	7 **Unconvenient**

2. People who are important to me (e.g., spouse, parent, friend, therapists) think that I should regularly engage in physical activity 2 or more times <u>each week over the next 2 weeks</u>

1 2 3 4 5 6 7
Strongly Disagree Strongly Agree

3. The extent to which I am motivated by what people who are important to me (see #2) think that I should do

1 2 3 4 5 6 7
Motivated Very Little Highly Motivated

4. For the following items, please circle the number that best indicates your confidence to do the following:

How confident are you that you can engage in regular physical activity at least 2 times <u>each week over the next 2 weeks</u>:

a) In the face of your FM symptoms:

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident — Moderately Confident — Completely Confident

b) When you are fatigued:

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident — Moderately Confident — Completely Confident

c) When you are experiencing severe tenderpoint pain:

0 1 2 3 4 5 6 7 8 9 10
Not at All Confident — Moderately Confident — Completely Confident

How confident are you that you can apply the following skills that allow you to engage in regular physical activity at least 2 times <u>each week over the next 2 weeks</u>:

a) Planning a rest to deal with your FM symptoms before your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

b) Planning and making time in your weekly schedule for your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

c) Use coping strategies to deal with your FM symptoms before your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

d) Pacing yourself to deal with your FM symptoms both during and after your activity sessions:

0	1	2	3	4	5	6	7	8	9	10
Not at All Confident				Moderately Confident					Completely Confident	

5. **Keeping in mind that regular physical activity means participating at least 2 times each week, please answer the following question:**

   <u>During the next 2 weeks</u>, I will engage in physical activity at least _____ times <u>each week</u>.

1	2	3	4	5	6	7	8	9
Definitely <u>Will Not</u>								Definitely <u>Will</u>

B) Daily Functions:

The following items are concerned with how your FMS symptoms effect your daily functions. Please check one item for each question, and keep in mind the previous week when answering the following. If the item does not apply to yourself (i.e., your partner does all of the shopping), please check N/A (not applicable).

During the past week, how often were you able to:

1. Do the shopping (i.e., for groceries).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

2. Prepare the meals (i.e., make dinner).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

3. Do the laundry.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

4. Wash the dishes.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

5. Vacuum your home.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

6. Make the bed(s).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

7. Walk several blocks (i.e., around your neighbourhood, at the mall).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

8. Do some yard work (i.e., weed the garden, cut the lawn).
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

9. Drive your car.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

10. Socialize with your friends or family.
Always _____ Most Times _____ Occasionally _____ Never _____ N/A _____

C) Pain:

Using the following line, please rate the extent of your pain from your FM symptoms **during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the extent of your pain:

No Pain — Pain as bad as it could be

D) In the following questions, we'd like to know how you feel about your ability to control your FM symptoms.

For each of the following questions, please circle the number that corresponds to the certainty that you can now perform the following activities or tasks during a typical week.

1. How certain are you that you can control your fatigue?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

2. How certain are you that you can regulate your activity so as to be active without aggravating your FM?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

3. How certain are you that you can do something to help yourself feel better if you are feeling blue because of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

4. As compared with other people with FM like yours, how certain are you that you can manage FM pain during your daily activities?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

5. How certain are you that you can manage your FM symptoms so that you can do the things you enjoy?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

6. How certain are you that you can deal with the frustration of your FM symptoms?

10	20	30	40	50	60	70	80	90	100
very uncertain				moderately uncertain					very certain

E) Fatigue:
Using the following line, please rate your fatigue **during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the extent of your **fatigue:**

No Fatigue ——————————————— Extreme Fatigue

F) Tenderpoint Ratings:
Using the following line, please rate the pain severity of **your most common tenderpoints, during your typical week.** Place a mark somewhere on or between the two endpoints that indicates the severity of your **most common** tenderpoints.

——————————————————

No Pain Pain as bad as it could be

Now rate the pain severity of **your least common tenderpoints, during your typical week.**

——————————————————

No Pain Pain as bad as it could be

G) Learning more about Physical Activity for FM
Please answer each of the following questions by circling the number that best represents your future intentions, and if interested, supply the requested information.

A) I will attend a future FREE focus group session NEXT MONTH at a local fitness club to discuss more information about the role of physical activity in FM (circle 1 number):

0	1	2	3	4	5	6	7	8	9	10
definitely will NOT attend										definitely WILL attend

If you are interested in being contacted for this session, please leave:

1. Name (first and last):_____
2. Phone number:_____

B) I would be willing to talk further in a telephone interview about the role of physical activity in my dealing with FM within the next 2 weeks (circle 1 number):

0	1	2	3	4	5	6	7	8	9	10
definitely will NOT talk										definitely WILL talk

If you are interested in being phoned for more information, please leave:

1. Name (first and last):_____
2. Phone number:_____

C) Yes, I would be interested in receiving the specific summary points that I helped to develop this evening! Please mail them to me at the address below:

Name: _____

Mailing Address: _____

Appendix J3

Study Three Materials

Positive & Negative Focus Group

Discussion Scripts

Discussion Script – Positive

"I would like to establish some guidelines for our discussion this evening so that we can achieve our objectives. The focus tonight will be on the benefits of physical activity. We know that it isn't always easy to do, especially with having FM and all of the symptoms that we must learn to deal with. But there are some individuals with FM, like us here tonight, who do engage in physical activity. So in order to generate the information that we need tonight, we will have to stay on topic. While there might be other valid points that we could bring up, for the purpose of this discussion I will keep bringing us "back on track" to focus on the benefits of physical activity. Is everyone okay with this focus?? (show of hands, please)."

"I'm going to start the evening by simply posing some questions to you. Please participate and answer as honestly as possible, drawing on your own experience to answer the questions. We are, as I stated earlier, going to focus on the benefits of engaging in regular physical activity – how does engaging in physical activity help you? So, the first question is this – a very general one:

1. What are some of the benefits of engaging in regular physical activity for individuals like you, with FM?

(draw on your own experiences; examples-energy, less sore, etc)

2. What are some of the positive implications that a program of regular physical activity can have on the management of FM for individuals like ourselves?

(e.g., decrease cost of alt. Therapies, etc)

We will know discuss the positive impact of physical activity in some more specific areas

3. How does a program of regular physical activity positively impact your job or volunteer work?
   -affective component
   -tangible benefits
   -how-to's
4. How does a program of regular physical activity positively impact your social life?
   -affective component
   -tangible benefits
   -how-to's
5. How does a program of regular physical activity positively impact your family?
   -affective component
   -tangible benefits
   -how-to's
6. How does a program of regular physical activity positively impact your time with friends?
   -affective component
   -tangible benefits
   -how-to's
7. How can a program of regular physical activity make your FM seem better?

(physical and psychological)

   -affective component

-tangible benefits
-how-to's

8. What are the benefits to starting a program of regular physical activity?
   -affective component
   -tangible benefits
   -how-to's
9. What are the benefits of maintaining a program of regular physical activity?
   -affective component
   -tangible benefits
   -how-to's
10. How do you "re-start" if you have a little lapse?
    -affective component
    -tangible benefits
    -how-to's

AFTER BREAK:

"Well, as you can all see from our discussion this past ½ hour, you have suggested ways that making physical activity a regular part of your lifestyle is possible, even with FM! What do you all think?...It may not always be easy, but it should be evident now that there are some real, tangible benefits to staying active and some easy strategic ways of planning activity. What would some of you say some of your favorite benefits of a program of regular physical activity are?...I think you can all be proud to consider yourselves "exercisers". And remember not to worry or stress out too much if you have a lapse – just try to get back into your regular program as soon as you can.
Other points concerning regular physical activity that were brought up tonight include...anything else?
Finally, what do you all think is the MOST IMPORTANT thing that we could tell individuals newly diagnosed with FM about the benefits or importance of a regular program of physical activity?...

KEY ELEMENTS TO TARGET (ASPECTS OF QUESTIONNAIRE)

TPB variables:

1. Attitudes – health benefits (eg, healthy, useful, good, worthwhile...) and the experience of activity (eg, fun, pleasant, stimulating...)
2. Subjective norm – who is important and how much does their opinion matter
3. Perceived control / efficacy – the control activity affords over FM pain, symptoms, TP's
   - the individual being able to do "other" things so that they can fit activity into their schedule (i.e., coping, pacing, etc)
4. Behavioral Intention – feel like you want to be active

FM Symptoms:

1. FIQ – daily living – the ability of exercise to make you feel like you can do ADL's
2. Fatigue – decreased with activity
3. Pain – decreased with activity
4. TP's – less sore in certain TP's because of activity
5. FM symptom control – improved because of activity

Discussion Script – Negative

"I would like to establish some guidelines for our discussion this evening so that we can achieve our objectives. The focus tonight will be on the barriers to physical activity. We know that it isn't always easy to do, especially with having FM and all of the symptoms that we must learn to deal with. There are some individuals with FM, like us here tonight, who engage in physical activity for a time, and then stop. And others find it hard to even begin. So in order to generate the information that we need tonight, we will have to stay on topic. While there might be other valid points that we could bring up, for the purpose of this discussion I will keep bringing us "back on track" to focus on the barriers to physical activity. Is everyone okay with this focus?? (show of hands, please)."
"I'm going to start the evening by simply posing some questions to you. Please participate and answer as honestly as possible, drawing on your own experience to answer the questions. We are, as I stated earlier, going to focus on the barriers of engaging in regular physical activity – why don't we engage in a program of regular physical activity even if we're told it is good for us?
So, the first question is this – a very general one:

1. What are some of the barriers of engaging in regular physical activity for individuals, like you, with FM?

(draw on your own experiences; examples-no time, too sore, etc)

2. What are some of the negative implications that a program of regular physical activity can have on the management of FM for people like ourselves?

(e.g., exacerbate symptoms, etc)

We will know discuss the negative impact of physical activity in some more specific areas

3. How does a program of regular physical activity negatively impact your job or volunteer work?
   -affective component
   -tangible negatives
   -barriers/struggles
4. How does a program of regular physical activity negatively impact your social life?
   -affective component
   -tangible negatives
   -barriers/struggles
5. How does a program of regular physical activity negatively impact your family?
6. How does a program of regular physical activity negatively impact your time with friends?
   -affective component
   -tangible negatives
   -barriers/struggles
7. How can a program of regular physical activity make your FM seem worse?

(physical and psychological)

   -affective component
   -tangible negatives

-barriers/struggles

8. What are the barriers to starting a program of regular physical activity?
   -affective component
   -tangible negatives
   -barriers/struggles
9. What are the barriers of maintaining a program of regular physical activity?
   -affective component
   -tangible negatives
   -barriers/struggles
10. How hard is it to "re-start" if you have a lapse?
    -affective component
    -tangible negatives
    -barriers/struggles

AFTER BREAK:

"Well, as you can all see from our discussion this past ½ hour, you have suggested that making physical activity a regular part of your lifestyle is not easy, especially with FM! What do you all think?...It is evident that due to the nature of the symptoms of FM, it is especially hard to start a program, agreed?...And even if you do manage to start to engage in a program of regular physical activity, there are plenty of things which can put you back off-track – partly due to the ever-changing nature of the FM symptoms (sometimes alright, mostly pretty bad). What would some of you say some of the biggest barriers to engaging in a program of regular physical activity are?...And even if we can get over all of these barriers, the nature of many of the programs that are available, and the knowledge especially of the instructors of FM program, may limit our participation. I think we can all agree it just isn't as easy as "starting a program" as our doctors may think it is.

Other points concerning regular physical activity that were brought up tonight include...anything else?

Finally, what do you all think is the MOST IMPORTANT thing that we could tell individuals newly diagnosed with FM about the risks of a regular program of physical activity?...

KEY ELEMENTS TO TARGET (ASPECTS OF QUESTIONNAIRE)

TPB variables:

1. Attitudes – health benefits (eg, unhealthy, not useful, bad, not worthwhile...) and the experience of activity (eg, boring, unpleasant, not fun...)
2. Subjective norm – who is important and how much does their opinion matter
3. Perceived control / efficacy – how control does not seem to be enhanced with active lifestyles – how it can actually be decreased because of increased pain
   - Finding other skills aren't useful for incorporating activity into one's lifestyle

     (i.e., coping, pacing, etc)

4. Behavioral Intention – feel like you don't want to be active

FM Symptoms:
6. FIQ – daily living – the ability of exercise to make you feel like you can't do ADL's
7. Fatigue – increased with activity
8. Pain – increased with activity
9. TP's – more sore in certain TP's because of activity

FM symptom control – less because of activity

Appendix J4

Study Three

Participant Information Letter & Informed Consent

Participant Information Letter - Positive

Dear FM Participant:

Thank you for attending this important Focus Group Meeting on the benefits of physical activity for individuals with FM! We all know that physical activity is advocated to help cope with FM, however we don't know exactly what the perceived benefits are for individuals with FM – so that is what we hope to find out more about tonight.

Information from this meeting will be used in part of a research study at the University of Waterloo. As well, videotaped segments of this meeting will be edited into a "physical activity" video that we hope to disseminate to the OFA support groups throughout South-Western Ontario. If you do not feel comfortable about speaking in front of a camcorder, please sit in the "non-camera" section which is the upper rows.

We have two questionnaires that we would like you to complete during specified times this evening. If you have any questions regarding the items, please do not hesitate to ask me for clarification. In between the two questionnaires, we hope to have a lively discussion regarding the benefits of physical activity! Please share your experiences with the group. I'm sure we can all learn something new from each other tonight!

Our guest speakers will be available for a session after the second questionnaire has been completed. This is your chance to ask any questions you may have regarding the physical or psychological benefits of physical activity from experts in the field.

Please keep this letter for your information and contact references. The page attached gives your consent to be a study participant in the research project. Please complete it and return it to me before you leave tonight.

Thanks again for your participation!

S. Nicole Culos-Reed
Ph.D. Candidate, Health and Exercise Psychology
Department of Kinesiology
University of Waterloo
(519)885-1211 ext.6587
snculos@healthy.uwaterloo.ca

Dr. L. R. Brawley, Advisor
Ph.D.
University of Waterloo

Participant Informed Consent

I agree to participate in the Focus Group Meeting on Physical Activity. By completing the questionnaires, I am consenting to participate as a research subject in the University of Waterloo FM project.

I understand that my participation is completely voluntary and I am not obligated to complete any of the questionnaire items if I do not wish to do so.

I understand that my responses are completely confidential, that I will make no identifying marks on the questionnaires, and that any results from the research project will only be presented as group information (i.e., no individual results will be presented).

_____

Name

_____

Signature

_____

Date

Participant Information Letter - Negative

Dear FM Participant:

Thank you for attending this important Focus Group Meeting on the barriers of physical activity for individuals with FM! We all know that physical activity is advocated to help cope with FM, however we don't know exactly what the perceived barriers are for individuals with FM – so that is what we hope to find out more about tonight.

Information from this meeting will be used in part of a research study at the University of Waterloo. As well, videotaped segments of this meeting will be edited into a "physical activity" video that we hope to disseminate to the OFA support groups throughout South-Western Ontario. If you do not feel comfortable about speaking in front of a camcorder, please sit in the "non-camera" section which is in the upper rows.

We have two questionnaires that we would like you to complete during specified times this evening. If you have any questions regarding the items, please do not hesitate to ask me for clarification. In between the two questionnaires, we hope to have a lively discussion regarding the barriers of physical activity! Please share your experiences with the group. I'm sure we can all learn something new from each other tonight!

Our guest speakers will be available for a session after the second questionnaire has been completed. This is your chance to ask any questions you may have regarding the physical or psychological barriers of physical activity from experts in the field.

Please keep this letter for your information and contact references. The page attached gives your consent to be a study participant in the research project. Please complete it and return it to me before you leave tonight.

Thanks again for your participation!

S. Nicole Culos-Reed
Ph.D. Candidate, Health and Exercise Psychology
Department of Kinesiology
University of Waterloo
(519)885-1211 ext.6587
snculos@healthy.uwaterloo.ca

Dr. L. R. Brawley, Advisor
Ph.D.
University of Waterloo

Participant Informed Consent

I agree to participate in the Focus Group Meeting on Physical Activity. By completing the questionnaires, I am consenting to participate as a research subject in the University of Waterloo FM project.

I understand that my participation is completely voluntary and I am not obligated to complete any of the questionnaire items if I do not wish to do so.

I understand that my responses are completely confidential, that I will make no identifying marks on the questionnaires, and that any results from the research project will only be presented as group information (i.e., no individual results will be presented).

Name

Signature

Date

Appendix J5

Study Three

Recruitment Poster

FM AND PHYSICAL ACTIVITY...WHAT DO WE KNOW?

Please come and share your experiences with us

A Focus Group Meeting for Individuals with FM

Where: University of Waterloo, Burt Matthews Hall, **Room 1035**
When: ThurSDay, November 4, 7-9pm
Why: To help yourself and others with FM, to further research, and to help practitioners develop physical activity programs for FM

Guest Speakers – Dr. Ranney and Dr. Kilborn

DOOR PRIZES!!!
REFRESHMENTS!!
ABSOLUTELY FREE!!!

For more information, please call Nicole at the number below

FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext.6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting 885-1211 ext. 6587
FM Focus Group Meeting

Appendix K

Physical Activity Thoughts

Pre- and Post-Manipulation

Study Three.

Pre- and Post-Manipulation Frequency of Physical Activity Thoughts.

	Pre-Manipulation		Post-Manipulation	
Type of Thought:	Negative (n)	Positive (n)	Negative (n)	Positive (n)
Positive Condition:	11	21	4	58
Negative Condition:	27	18	32	21

Individuals were asked to list their thoughts they had right now regarding participation in regular physical activity. Thoughts were coded as positive (e.g., I like exercise) or negative (e.g., Exercise hurts me). A number of participants also listed thoughts regarding different physical activity behaviours (e.g., I will stretch) or made other comments that could not be classified specifically as positive or negative. In each condition, the importance of the ratings (on a 0, "not at all important" to 10 "very important" scale) was above 8, both pre- and post-manipulation.

There is an evident shift within the positive condition from pre- to post-manipulation in the nature of their physical activity thoughts. Specifically, far greater positive thoughts are recalled post-manipulation as compared to pre-manipulation, along with a decrease in negative thoughts from pre- to post-manipulation.

Appendix L

Study 3

Scale Reliabilities

Pre-Manipulation

Study 3.

Pre-Manipulation Scale Reliabilities.

Scale	Alpha
Attitude - Total	.93
Experiential Attitude	.90
Factual Attitude	.92
Efficacy - Total	.90
Efficacy – to cope	.89
Efficacy – to use skills	.91

Note: n = 64.

Appendix M

Study 3

Scale Reliabilities

Post-Manipulation

Study 3.

Post-Manipulation Scale Reliabilities.

Scale	Alpha
Attitude - Total	.94
Experiential Attitude	.89
Factual Attitude	.93
Efficacy - Total	.93
Efficacy – to cope	.91
Efficacy – to use skills	.91

Study 3.

Post-Manipulation Scale Reliabilities for the Positive and Negative Condition.

Scale	Negative Group Alpha	Positive Group Alpha
Attitude - Total	.93	.93
Experiential Attitude	.86	.92
Factual Attitude	.88	.96
Efficacy - Total	.92	.93
Efficacy – to cope	.85	.95
Efficacy – to use skills	.94	.89

Appendix N

Study Three

Factor Analysis

Pre- and Post-Manipulation

Study 3.

Factor Analysis of the Attitude Scale Pre-Manipulation.

Item	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading
Experiential Attitudes:			
1. Enjoyable	.198	**.847**	.287
2. Pleasant	.145	**.871**	.253
3. Interesting	.256	.484	**.595**
4. Fun	.306	**.854**	.113
5. Stimulating	.354	.406	**.665**
6. Convenient	--	**.766**	.103
Factual Attitudes			
1. Positive	.196	.274	**.793**
2. Useful	.274	.158	**.785**
3. Beneficial	**.631**	--	**.632**
4. Good idea	**.894**	.267	.118
5. Healthy	**.859**	.105	.390
6. Worthwhile	**.848**	--	.424
7. Wise	**.851**	.325	.199

Note: $\underline{n} = 64$

Study 3.

Factor Analysis of the Attitude Scale Post-Manipulation.

Item	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading
Experiential Attitudes:			
1. Enjoyable	.178	**.799**	.385
2. Pleasant	.187	**.819**	.346
3. Interesting	.378	**.740**	.166
4. Fun	.342	**.866**	--
5. Stimulating	.285	.291	**.661**
6. Convenient	--	**.748**	.147
Factual Attitudes			
1. Positive	.268	.274	**.872**
2. Useful	.184	.158	**.890**
3. Beneficial	.301	--	**.894**
4. Good idea	**.894**	.267	.227
5. Healthy	**.875**	.105	.317
6. Worthwhile	**.912**	--	.272
7. Wise	**.878**	.325	.240

Note: $\underline{n} = 63$

Factor Analysis of the Efficacy Scale Pre-Manipulation.

Item	Factor 1 Loading	Factor 2 Loading
To cope:		
1. To cope with symptoms	.357	**.819**
2. When fatigued	.202	**.925**
3. With TP pain	.256	**.844**
To apply skills:		
2. Plan a rest	**.834**	.228
3. Schedule	**.742**	.431
4. Use strategies	**.913**	.214
5. Pace	**.878**	.265

Note: $\underline{n} = 64$.

Factor Analysis of the Efficacy Scale Post-Manipulation.

Item	Factor 1 Loading
To cope:	
1. To cope with symptoms	.844
2. When fatigued	.854
3. With TP pain	.819
To apply skills:	
4. Plan a rest	.820
5. Schedule	.910
6. Use strategies	.891
7. Pace	.754

Note: $\underline{n} = 63$.