Beyond health locus of control:

A multidimensional measure of health-related control beliefs and motivations

by

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A thesis submitted to the faculty of Graduate Studies and Research in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

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Abstract

A new model of health-related control was developed and tested over a series of five studies with the aim of creating a new set of measures of perceived control that would improve assessment and understanding of the role of control in health for those with and without chronic illness. Three multidimensional scales were proposed to assess the key dimensions of health-control: control beliefs, control motivations, and the preferred style of control. Following generation of an item pool, a pretest of the items' substantive validity for each scale was assessed in Study 1 with a sample of students with ($n = 19$) and without chronic illness ($n = 32$). In Study 2, exploratory factor analyses and item analyses with a sample of students ($n = 339$) and community dwelling adults ($n = 98$) evaluated the proposed factor structure and composition of the scales. An initial test of the validity and reliability of the new scales was conducted in Study 3 using the Study 2 samples collapsed into a single group. After further item refinement, the factor structure of each scale was examined in Study 4 across three samples consisting of students ($n = 301$), those with arthritis ($n = 336$), and those with inflammatory bowel disease (IBD) ($n = 290$). Convergent and divergent validity were also assessed. In Study 5, the concurrent validity of the scales was evaluated in an arthritis sample ($n = 132$), an IBD sample ($n = 112$), and a mixed chronic illness sample ($n = 127$). The relations of the new scales to measures of physical and psychological well-being and health-related behaviors were assessed across the collapsed sample. Overall, the results supported a multidimensional assessment of control beliefs, with Mastery, Adaptive Control, and Control Motivations demonstrating consistent and unique associations with indicators of psychological well-being and health-related behaviors. Individual Modes of Control scales also accounted for

differences in well-being and Communion was a good indicator of visits to health professionals. The validity of the new scales for populations with and without chronic illness is discussed and future directions to expand and clarify the current findings are proposed.

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Table of Contents

Introduction	1
Health Locus of Control – Beginnings and Evolution	2
HLOC: Issues and Inconsistencies	8
HLOC and health behaviors.	8
Possible moderators of HLOC	11
An apparent paradox.	14
Other conceptual problems	16
Proposal of a New Health-related Control Measure	19
Adaptive Control.	20
Control Expectancies.	22
Autonomy and health.	23
Desire for control.	24
Health Value.	25
Self-mastery/efficacy.	25
Agency and Communion.	26
An Integrated Measure of Health Control Beliefs.	28
Overview of Scale Development	32
Study 1	35
Pre-test Item-sort Task	35
Method	36
Sample	36
Procedure and Materials	37

Analyses	40
Substantive validity	40
Results and Discussion	42
Health Groups	42
Rater Screening	42
Substantive Validity	43
Control Beliefs items	43
Control Motivations items	46
Modes of Control items	49
Study 2	54
Factor Structure and Item Analysis	54
Sample	55
Procedure	56
Materials	56
Analyses	57
Factor structure	57
Item analysis	59
Overview of factor analysis strategy	61
Results and discussion	62
Health Groups	62
Higher Order Factor Structure	62
Factor Structure – Control Beliefs Inventory	65
Factor Structure – Control Motivations Inventory	67

Factor Structure – Modes of Control Inventory	70
Item Analysis - Control Beliefs Inventory	72
Item Analysis - Control Motivations Inventory	76
Item Analysis – Modes of Control Inventory	82
Study 3	85
Construct Validity	88
Sample	88
Materials	88
Results and Discussion	91
Response Bias – Control Beliefs Inventory	91
Response Bias – Control Motivations Inventory	91
Response Bias – Modes of Control Inventory	93
Construct Validity Analysis – Control Beliefs Inventory	93
Construct Validity Analysis – Control Motivations Inventory	96
Construct Validity Analysis – Modes of Control Inventory	98
Scale and Item Changes	101
Study 4	109
Verifying Scale Composition and Structure.	109
Convergent and Divergent Validity	109
Concurrent Validity	114
Generalizability	115
Participants and Procedure	115
Student sample	116

Arthritis sample	117
Inflammatory bowel disease sample	120
Materials	120
Scale Validation Measures – All Samples	121
Scale Validation Measures – Chronic Illness Samples	124
Scale Validation Measures – Student Samples	126
Health Status – Student Samples	127
Health Status – Chronic Illness Samples	127
Results	129
Data Screening	129
Verification of Scale Composition and Structure	129
Control Beliefs Inventory	129
Modes of Control Inventory	133
Control Motivations Inventory	137
Scale Reliability	141
Construct Validity and Generalizability	143
Construct Validity – All Control Scales	146
Construct Validity – Control Beliefs Inventory	147
Association with illness beliefs	150
Association with coping measures.....	153
Association with personality measures.....	157
Construct Validity – Control Motivations Inventory	158
Construct Validity – Modes of Control Inventory	159

Association with illness beliefs	160
Association with coping and attachment measures	163
Association with personality	164
Concurrent Validity	168
Discussion	169
Scale Composition and Structure.	169
Convergent and Divergent Validity	171
Concurrent Validity	177
Study 5	178
Health-related Outcomes	178
Health-related Behaviors	180
Use of health services	180
Use of social support groups	181
Participants and Procedure	182
Materials.....	185
Concurrent Validity Measures	185
Use of Social Support Groups	187
Use of Health Services	187
Results	188
Data Screening	188
Health Characteristics	188
Scale Structure and Reliability	191
Relationship to Demographic Variables	195

Concurrent Validity - Subjective and Objective Health	195
Concurrent Validity – Well-being and Perceived Social Support	199
Concurrent Validity – Use of Support Groups	204
Concurrent Validity – Use of Health Services	209
Discussion	213
Concurrent Validity - Subjective and Objective Health	213
Concurrent Validity – Use of Support Groups	218
Concurrent Validity – Use of Health Services	220
General Discussion	222
Summary of Results and Conceptual Issues.....	222
Relations to Health Locus of Control.....	227
Control and Adjustment to Chronic Illness.....	229
Limitations and Future Directions.....	233
Conclusions	239

List of Tables		
Table	Description	Page
1	Proposed model of the health-related control constructs	29
2	Total number of items in each scale and subscale administered to the pretest sample.	38
3	Study 1: Substantive validity indices for the Control Beliefs items retained after the substantive validity analysis for each of the health groups.	44
4	Study 1: New items added to the Control scales following the substantive validity analyses.	45
5	Study 1: Items retained for the Control Beliefs Inventory subscales after the substantive validity analysis.	47
6	Study 1: Substantive validity indices for the Control Motivations items retained after the substantive validity analysis for each of the health groups.	47
7	Study 1: Items retained for the Control Motivations Inventory subscales after the substantive validity analysis.	50
8	Study 1: Substantive validity indices for the Modes of Control items retained after the substantive validity analysis for each of the health groups.	51
9	Study 1: Items retained for the Modes of Control Inventory subscales after the substantive validity analysis.	53

Table	Description	Page
10	Study 2: Health characteristics and demographics of the two health groups.	63
11	Study 2: Items that did not load onto the expected factors across the two health groups.	64
12	Study 2: Preliminary factor compositions of the Control Beliefs Inventory items across the two health groups.	68
13	Study 2: Preliminary factor compositions of the Control Motivations Inventory items.	70
14	Study 2: Preliminary factor compositions of the Modes of Control Inventory items.	72
15	Study 2: Post item analysis factor loadings of the Control Beliefs Inventory for the chronic and non-chronic groups.	75
16	Study 2: Items retained for the Control Beliefs Inventory subscales following the item analysis.	77
17	Study 2: Post item analysis factor loadings of the Control Motivations Inventory.	81
18	Study 2: Items retained for the Control Motivations Inventory subscales following the item analysis.	80
19	Study 2: Post item analysis factor loadings of the Modes of Control Inventory.	83

Table	Description	Page
20	Study 2: Items retained for the Modes of Control Inventory subscales following the item analysis.	84
21	Study 3: Marker scales for the assessment of item and construct validity of the health-related control subscales.	87
22	Study 3: Correlations among the Control subscales and the short form Marlowe-Crowne Social Desirability Scale	92
23	Study 3: Correlations among the construct marker scales and the subscale items of the Control Beliefs Inventory	94
24	Study 3: Correlations among the construct marker scales and the subscale items of the Control Motivations Inventory.	97
25	Study 3: Correlations among the construct marker scales and the subscale items of the Modes of Control Inventory.	99
26	Theoretical relations among the Agency and Communion constructs.	100
27	Study 3: Items retained for the Control Beliefs Inventory subscales following the construct validity analysis.	103
28	Study 3: Items retained for the Control Motivations Inventory subscales following the construct validity analysis.	105
29	Study 3: Items retained for the Modes of Control Inventory subscales following the construct validity analysis.	108
30	Study 4: Demographics and health characteristics of the student sample stratified by health groups.	118

Table	Description	Page
31	Study 4: Demographic characteristics of the two chronic illness samples.	119
32	Study 4: Factor loadings of the Control Beliefs Inventory with the Arthritis sample.	130
33	Study 4: Factor loadings of the Control Beliefs Inventory with the IBD sample.	132
34	Study 4: Factor loadings of the Control Beliefs Inventory with the student sample.	134
35	Study 4: Factor loadings of the Modes of Control Inventory for the Arthritis sample	135
36	Study 4: Factor loadings of the Modes of Control Inventory for the IBD sample.	136
37	Study 4: Factor loadings of the Modes of Control Inventory for the Student sample.	138
38	Study 4: Validity results for the Control Beliefs Inventory scales across the chronic illness and student samples.	139
39	Study 4: Validity results for the Modes of Control Inventory scales across the chronic illness and student samples.	140
40	Study 4: Health characteristics of the two chronic illness samples.	145
41	Study 4: Intercorrelations among the CBI, CMI, and MCI control scales for the arthritis and IBD samples.	148

Table	Description	Page
42	Study 4: Intercorrelations among the CBI, CMI, and MCI control scales for the student sample.	149
43	Study 4: Intercorrelations among the Control Beliefs Inventory (CBI), the Control Motivations Inventory, the MHLC and the ICQ scales with the Chronic illness samples.	151
44	Study 4: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the Control Motivations Inventory, coping efficacy and coping styles for the chronic illness samples.	154
45	Study 4: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the Control Motivations Inventory, and the personality measures for the chronic illness samples.	155
46	Study 4: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the Control Motivations Inventory, and the personality measures for the student sample.	156
47	Study 4: Intercorrelations among the Control Modes of Control Inventory (MCI), the MHLC, and the ICQ scales with the chronic illness samples.	161
48	Study 4: Intercorrelations among the Modes of Control Inventory (MCI) and the coping measures with the chronic illness samples.	162

Table	Description	Page
49	Study 4: Intercorrelations among the Modes of Control Inventory (MCI) and the personality measures with the chronic illness samples.	165
50	Study 4: Intercorrelations among the Modes of Control Inventory (MCI) and the personality measures for the student sample.	166
51	Study 5: Demographics characteristics of the three chronic illness samples.	184
52	Study 5: Health characteristics of the three chronic illness samples.	189
53	Study 5: Factor loadings of the Control Beliefs Inventory for the combined chronic illness samples.	192
54	Study 5: Factor loadings of the Modes of Control Inventory for the combined chronic illness samples.	193
55	Study 5: Means and reliabilities for the Control Beliefs Inventory (CBI), the Control Motivations Inventory (CMI), and the Modes of Control Inventory (MCI) scales across the three chronic illness samples.	194
56	Study 5: Intercorrelations among the Control Beliefs Inventory (CBI), the Control Motivations Inventory (CMI), and the perceived health variables for the chronic illness samples.	196
57	Study 5: Intercorrelations among the Modes of Control Inventory (MCI) scales and the perceived health variables for the chronic illness samples.	197

Table	Description	Page
58	Study 5: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the CMI scale, perceived social support, depressive mood, and the Psychological well-being scales for the combined chronic illness samples.	198
59	Study 5: Regression analyses of the Control Beliefs Inventory (CBI) scales and the CMI scales with the well-being and social support measures.	201
60	Study 5: Intercorrelations among the Modes of Control (MCI) scales, perceived social support, depressive mood, and the Psychological well-being scales for the combined chronic illness samples.	202
61	Study 5: Regression analyses of the Modes of Control Inventory (MCI) with the well-being and social support measures.	205
62	Study 5: Correlations of the Control Beliefs Inventory (CBI) and the Control Motivations Inventory (CMI) and the reasons for using or not using in person support groups.	206
63	Study 5: Correlations of the Modes of Control Inventory (MCI) scales and the reasons for using or not using in person support group.	210
64	Study 5: Mean differences for health problems and the new control scales as a function of health service use.	211

List of Figures

Figure	Description	Page
1	Overview of the development of the health-related perceived control scales	33
2	Scree plot for the Control Beliefs Inventory merged data set initial extraction	66
3	Scree plot for Control Motivations Inventory merged data set initial extraction	69
4	Scree plot for Modes of Control Inventory merged data set initial extraction	71

List of Appendices

Appendix	Description	Page
A	Control beliefs item pool and construct definition.....	267
B	Study 1: Recruitment notices and materials.....	274
C	Pretest Card sort task instructions and materials.....	276
D	Study 2: Student sample recruitment notices and materials.....	281
E	Study 2: Community recruitment notices and materials.....	284
F	Study 2: Survey materials	289
G	Study 3: Survey materials	297
H	Study 4: Student sample recruitment notices and materials.....	309
I	Study 4: Students sample survey materials.....	312
J	Study 4: Arthritis sample recruitment notices and materials.	318
K	Study 4: Proportions of specific disease types for the arthritis and inflammatory bowel disease samples.	322
L	Study 4: IBD sample recruitment notices and materials.	323
M	Study 4: IBD and arthritis sample survey materials.	326
N	Study 4: Revised CBI, CMI, and MCI scales.	335
O	Study 5: Recruitment notices and materials for the 3 chronic illness samples.	338
P	Study 5: Proportions of specific disease types for the arthritis, IBD, and mixed chronic illness samples.	343
Q	Study 5: Survey materials	344

Introduction

Belief in personal control is an important variable for understanding and predicting health behaviours and outcomes. Perceived control can lead to the initiation and persistence of efforts to improve or maintain health (Bandura, 2000), and is associated with positive health outcomes (Rodin, Timko, & Harris, 1985). Control over one's health is often considered synonymous with health locus of control (HLOC) beliefs and measured with health-specific locus of control (LOC) scales, such as the Multidimensional Health Locus of Control scale (MHLC; Wallston, Wallston, & DeVellis, 1978). However, HLOC is not always a consistent predictor of health behaviours, perhaps because it is often mistakenly treated as a motivational variable (Shapiro, Schwartz, & Astin, 1996) rather than as an expectancy for control over health outcomes. Indeed, the desire for control over one's own choices (Deci & Ryan, 1985) may be different from expectations of control over outcomes (Burger, 1985; Burger & Cooper, 1979).

In response to its poor performance, several attempts have been made to improve the assessment of HLOC by considering the impact of other related variables, and by suggesting a configural approach to interpreting findings. Despite these conceptual and methodological refinements, HLOC remains a poor predictor of health behaviours and health-related outcomes. Furthermore, the inconsistent performance of LOC within the health domain has led several researchers to question both its utility and its conceptual validity (Calnan, 1989; Norman & Bennett, 1996; Norman, Bennett, Smith, & Murphy, 1997, 1998).

Conceptually, the difficulty may lie within the apparent paradox created when taking control of one's health necessarily involves the control of powerful others. The act of seeking help for one's health issues (from powerful others such as doctors) may not necessarily reflect a diminished sense of personal control over one's health and a belief in powerful others' control as predicted by HLOC beliefs. Instead, it may suggest a motivation to take control over one's health by getting the appropriate assistance or information which, practically speaking, may be the more salient control construct for predicting health-related outcomes.

Following a review of the HLOC construct, the development and validation of a new multidimensional measure of health control beliefs that is conceptually distinct from the current HLOC formulations is outlined. Other control-related constructs that may be important to predicting and understanding health-related outcomes are presented as possible facets of the new multidimensional measure. Central to the formulation of this new measure is the idea that control within the health domain needs to be considered in terms of its applied meaning, not just as a reflection of attaining a perfect state of health. Thus, being in control of one's health may mean being an active participant in managing, not just curing, health problems.

HLOC – Beginnings and Evolution

Emerging from Rotter's (1954; 1966) social learning theory, the original LOC construct refers to a generalised expectancy about the relationship between outcomes and personal actions and/or characteristics. Events that are perceived as being contingent upon personal behaviours or enduring tendencies reflect beliefs in internal LOC. Events that are perceived to be outside of or beyond one's personal control and as a result of

chance or the influence of powerful others are termed external LOC beliefs (Rotter, 1966). An individual's attributional style develops accordingly from the cumulative experience with LOC beliefs and their history of reinforcement.

Rotter (1954; 1966) suggests that behaviour is a function of both the expectancy and reinforcement value in a particular situation. Accordingly, positive reinforcement for control attempts in the past will lead to expectations that specific events are controllable. This leads to a greater likelihood of efforts in the future to ensure that a desired outcome is reached. However, unsuccessful attempts to control outcomes result in an attribution of events to causes beyond one's efforts. Reinforcement of external control beliefs also results when successful outcomes occur in the absence of any perceived individual effort, and can lead to diminished personal effort and instrumental action, and greater reliance on help from outside sources and authorities. Eventually an internal or external expectancy of control will be generalized from the specific encounters with reinforcement to other situations, guiding both outcome expectancy and the behaviours necessary for goal attainment (Rotter, 1975).

Originally, internal and external control beliefs were conceived of as lying on opposite ends of a continuum (Rotter, 1966). The Internal-External Control scale (I-E scale) is a 29-item self-report inventory created to assess these interdependent constructs. Although it was designed to predict behaviour across a variety of situations, the I-E scale only assesses generalized expectancies for internal and external control. Thus, it may not accurately predict behaviours in specific domains (Rotter, 1975), such as health, where health-specific beliefs are more salient.

Nonetheless, the potential utility of applying LOC to the area of health behaviours was first tested in a classic study by Seeman and Evans (1962). Using an earlier version of Rotter's I-E scale, the differential influence of LOC beliefs on disease knowledge was tested with a population of hospitalised tuberculosis patients. Both self-rated and staff-rated disease knowledge were higher for those with a high internal LOC compared to those classified as having an external LOC, after controlling for intelligence. This suggested that individuals with an internal control orientation may make more effort to seek information about their health issues in order to gain a sense of control over their health.

Although this early investigation suggested some promise for the application of LOC for understanding and predicting health-related behaviours, not all of the initial investigations which employed the I-E scale in clinically relevant settings were as successful. In fact, reviews of these early studies suggested that the results with respect to health-related behaviours were inconsistent at best (Joe, 1971; Lefcourt, 1966).

Aware of the potential misuses and misconceptions surrounding the LOC construct, Rotter (1975) continued to stress the limitations of using a global measure of control beliefs with specific populations, and urged the importance of developing more powerful specialised scales to target the concerns of particular populations. Following this suggestion, the Health Locus of Control scale (HLC), was developed by Wallston, Wallston, Kaplan, and Maides (1976) in order to provide a means for more accurate predictions of health-related behaviours. Initial validation of this 11-item scale suggested that it indeed measured generalized reinforcement expectancies for health, rather than the more global expectancies assessed by the original I-E scale. For example, an internal

HLOC orientation was assessed with items such as “Whenever I get sick its because of something I’ve done or not done”, whereas items such as “I can only do what my doctor tells me to do”, and “Good health is largely a matter of good fortune” assess an external HLOC. The single score yielded from the HLC classified individuals as “health-externals” (higher scores) who believe that external factors determine their health, or “health-internals” (lower scores) who believe that their health outcomes are contingent upon their personal actions.

However, a growing controversy regarding the dimensionality of Rotter’s (1966) original LOC construct cast doubts on the theoretical and empirical validity of the new health-related LOC measure. Levenson (1974) challenged the unidimensional conceptualization of LOC, suggesting instead that the construct was comprised of three factors rather than two. Consequently, the inconsistencies and difficulties of the I-E scale would be best remedied by distinguishing external control beliefs into two separate subscales, powerful others and chance LOC. The former reflected a belief that the world was controlled by powerful others, while the latter was essentially a belief that the world was governed by chance, and that events are unpredictable. Both beliefs suggest that the control of events is in the hands of someone or something other than oneself. Moreover, Levenson (1974) contended that internal and external control beliefs were orthogonal, not dichotomous, as Rotter (1966) had originally proposed. This multidimensional re-conceptualization of LOC implied that individuals could be both internal and external in their beliefs about the causal attributions of events, and that prediction and understanding of external beliefs could be achieved by distinguishing them into powerful others and

chance beliefs. Accordingly, Levenson (1974) developed 3 subscales, Internal (I), Powerful others (P), and Chance (C), to assess generalized LOC beliefs.

Subsequent examinations of the factor structure of the HLC supported Levenson's (1974) proposal that LOC was a multidimensional, rather than a unidimensional construct. An investigation of the construct validity of the HLC found relatively low internal consistency (Lewis, Morisky, & Flynn, 1978). Furthermore, Boyle and Flynn (1981) found that the HLC items did not load onto a single factor as would be expected if the scale was unidimensional, and instead formed two independent factors.

Following Levenson's (1974) demonstration of three distinct dimensions of LOC, and further analyses of the HLC refuting its unidimensionality (Wallston et al., 1978), Wallston and associates (1978) revised the HLC scale to include Internal, Powerful others and Chance HLOC subscales. The result was the Multidimensional Health Locus of Control Scale (MHLC), an 18-item inventory with different forms (A, B, and C) for use with repeated administrations. Each of the three subscales contains 6 items that are rated on a six-point Likert-type scale, ranging from 1 for "strongly disagree" to 6 for "strongly agree". Many of the original items from the HLC were re-used or re-worded for the MHLC, and new items reflecting the powerful others dimension were added, as the original HLC scale only contained one item related to this subscale. Subsequent research has demonstrated the validity and independence of the three MHLC subscales (Hartke & Kuncze, 1982; Winefield, 1982). Furthermore, cross validation with Levenson's (1974) I, P and C scales supported the health-specific adaptation of a multidimensional LOC construct (Wallston et al., 1978).

The new MHLC scale was heralded as offering a wide range of uses across different health-related areas, with the potential to increase understanding and prediction of health-related behaviours and outcomes (Wallston et al., 1978). Indeed, during initial development and validation, the authors found that internal HLOC (IHLC) was positively associated with health status, whereas chance health locus of control (CHLC) was negatively related to health.

Over the past several decades since its inception, the MHLC has become the most well-researched and widely used health specific LOC scale. Although over 25 health-related LOC scales have been developed (Furnham & Steele, 1993), only one of these, the Health-Specific LOC Beliefs (Lau & Ware, 1981), is similar to the MHLC in that it is designed to be applied to general populations and across general health conditions. Other HLOC measures have been created to be used with specific populations such as children (De Vellis et al., 1985; Parcel & Mayer, 1978), and with specific disease concerns such as diabetes (Bradley, Brewin, Gamsu, & Moses, 1984; Bradley, Lewis, Jennings, & Ward, 1990; Ferraro, Price, Desmond, & Roberts, 1987), cardiovascular problems (O'Connell & Price, 1985; Stanton, 1987), and cancer (Pruyn et al., 1988; Watson, Greer, Pruyn, & van der Borne, 1990).

Despite the proliferation of health and disease specific LOC scales, and the continued popularity of the MHLC, HLOC has not proven to be a consistent predictor of health behaviors and outcomes. The following section will review the literature to date on the utility of the HLOC construct as a determinant of health-related outcomes, as well as the issues surrounding its unsuccessful application to the health domain.

HLOC: Issues and Inconsistencies

HLOC and health behaviors. According to the HLOC paradigm, health behaviour will be directed by one's enduring health-related control attribution beliefs, which have developed from past experiences with health and their reinforcement history. Individuals who are internal in their HLOC beliefs believe that their health outcomes are contingent upon their individual efforts. Thus, they are expected to demonstrate a more active, self-assured approach to their health care. Accordingly, individuals who are high on internal HLOC will be more likely to initiate and continue health behaviours that are self-directed, involve self-care and independent decision making (Wallston et al., 1978).

A belief that health outcomes are controlled by external sources, such as powerful others, suggests that the individual is more willing to trust the control of their health to those who are authorities on health (e.g. doctors, medical professionals, etc.). Therefore, health behaviours that involve seeking help from powerful others, such as doctors, as well as adhering to their recommendations for care, are more likely to be associated with powerful others HLOC beliefs. However, a chance external control over health reflects a belief that health outcomes are not only beyond one's control, but that health is unpredictable and at the mercy of fate or chance. Individuals with chance HLOC beliefs are expected to put little effort into initiating or maintaining health-related behaviours since they believe it will not make a difference in their health outcomes (Wallston et al., 1978).

Research over the past two decades has examined the proposed relationships between HLOC beliefs and a variety of health behaviours. One key area of investigation is health-promoting and maintenance behaviours (e.g., exercise, proper diet, medical

regimen adherence, etc.) and their association with HLOC beliefs. Since these types of health behaviours often require self-initiation and maintenance, it is expected that internal HLOC would be positively associated with performance of these behaviours, whereas a chance HLOC would be negatively related. The relationship of powerful others HLOC to health-promoting behaviours is less clear, and would depend on the influence of doctors and other medical authorities in the decision to engage and maintain these behaviours.

Overall, the results of these investigations have been mixed. Several studies have reported the expected positive association between internal HLOC and health-promoting behaviours such as frequent tooth brushing (Regis, Macgregor, & Balding, 1994), exercise (Calnan, 1989; Laffrey & Isenberg, 1983; Norman, Bennett, Smith, & Murphy, 1997; Slenker, Price, & O'Connell, 1985), healthy dietary behaviours (Caggula & Watson, 1992; Raab, 1987; Speake, Cowart, & Stephens, 1991), weight loss (Saltzer, 1982), and general measures of healthy behaviours (Mechanic & Cleary, 1980; Norman, Bennett, Smith, & Murphy, 1998; Seeman & Seeman, 1983).

However, the associations between HLOC and health behaviours in several of these studies was modest at best (Calnan, 1989; Norman et al., 1997, 1998). For example, Norman and colleagues (1998) found that overall, HLOC was a weak predictor of health-related behaviour, with internal HLOC explaining only 2 per cent of the variance in the health behaviours. Furthermore, the large sample size of over eleven thousand increased the likelihood that even weak associations would reach statistical significance. Similarly, with a sample of over thirteen thousand adults, Norman and associates (1997) found that HLOC beliefs explained less than 1 percent of the variance in exercise behaviour.

Powerful others HLOC has been found to be negatively related to self-initiated health-promoting behaviours (Calnan, 1989; Norman et al., 1998), and positively related to increased medical service use (Goldsteen, Counte, & Goldsteen, 1994). A powerful others HLOC is also associated with utilization of protease inhibitors in HIV-positive populations, presumably because the results of this therapy are unpredictable and therefore trust in the prescribing doctor is required (Evans, Ferrando, Rabkin, & Fishman, 2000).

There is limited evidence regarding the relevance of chance HLOC beliefs for understanding health behaviours. A Chance HLOC belief was positively associated with increased hospitalization (Goldsteen et al., 1994), and negatively associated with health promoting behaviours (Duffy, 1988; Muhlenkamp, Brown, & Sands, 1985; Norman et al., 1997; Speake et al., 1991; Steptoe et al., 1994). However, a belief that health is contingent upon chance also predicted successful smoking cessation, contrary to what theory suggests (Stuart, Borland, & McMurray, 1994).

Other studies have failed to find any relationship between HLOC and health-promoting behaviours. Although HLOC theory would suggest otherwise, in these studies internal LOC did not predict mammography behaviour (Holm, Frank, & Curtin, 1999), weight loss (Nir & Neumann, 1991; Tobias & MacDonald, 1977), exercise (Rabinowitz, Melamed, Weisberg, Tal, & Ribak, 1992; Williams, Grow, Freedman, Ryan, & Deci, 1996), nutritional habits (Mitchell, Newell, & Schumm, 1987; Read, Brunner, St Jeor, Scott, & Carmody, 1991), healthy lifestyle practices (Brown, Muhlenkamp, Fox, & Osborn, 1983; Muhlenkamp et al., 1985; Norman, 1995; Steptoe et al., 1994; Winefield, 1982), rehabilitation progress (Norman & Norman, 1994), biofeedback training (Carlson,

Bridges, & Williams, 1982), use of alternative medicine (Ramos-Remus, Watters, Dyke, & Suarez-Almazor, 1999; Sirois & Gick, 2002), and adherence to self-administered medical regimens (Eaton et al., 1992; Nielsen & Brodbeck, 1997).

Possible moderators of HLOC. In response to the inconsistent performance of HLOC, Wallston (1992) has argued that HLOC interacts with other moderating variables (e.g., health value, efficacy) to predict health behaviour. Therefore, an assessment of these contributing factors is necessary in order to more accurately understand and explain the variance in health-related behaviours. Indeed, Rotter (1975) stated that neglecting to measure the reinforcement value of a particular behaviour is the most common error made by LOC researchers. In terms of health behaviour, the value an individual has for health would be as important as their expectancies regarding what actions (personal, powerful others, or chance) influence their health-related outcomes. Individuals will engage in health-related behaviour only if they value the reinforcements associated with the behaviour, and if their actions support their health control expectancies (Wallston, 1992). In accordance with the Health Belief model (Rosenstock, 1974) and Bandura's (1977; 1982) efficacy beliefs, the extent to which a course of action is expected to actually work, will also increase the likelihood that a health behaviour will occur.

However, support for this approach to HLOC research is inconsistent. In some studies, individuals who value health, internal HLOC beliefs predicted preventive health behaviours (Abella & Heslin, 1984), health-related information seeking (Wallston, Maides, & Wallston, 1976), consumption of healthier foods (Bennett, Moore, Smith, Murphy, & Smith, 1994), and greater health knowledge after receiving health information (Quadrel & Lau, 1989). Other investigations have failed to find any influence of health

value for improving the predictive ability of HLOC beliefs (DeVito, Bogdanowicz, & Rezinkoff, 1982; Lewis et al., 1978; Wurtele, Britcher, & Saslawsky, 1985). For example, Norman and Norman (1994) found that health-related values were not significant predictors of short-term rehabilitation progress, although internal HLOC beliefs were. Similarly, neither health value nor internal HLOC beliefs predicted biofeedback control, together or separately (Carlson et al., 1982). One investigation found that the interaction of health values and behaviour-specific efficacy beliefs predicted health behaviours, whereas HLOC beliefs were not associated with health behaviours as a function of health value (Norman, 1995).

Research on the role of self-efficacy in the HLOC and health behaviour relationship does not offer clear support for Wallston's (1992) assertions. Waller and Bates (1992) found that individuals with an internal HLOC who had high self-efficacy practiced more healthy behaviours than individuals with an external locus of control and low self-efficacy. However, other investigators have found that self-efficacy predicts health-promoting behaviours (e.g., maintenance of smoking cessation) independent of internal HLOC beliefs, which were unrelated to successful outcomes (Stuart et al., 1994).

These findings coincide with the conclusions of other reviewers that the HLOC construct is a poor predictor of health behaviours, even when health value and self-efficacy are taken into account (Norman & Bennett, 1996).

Another approach that has been suggested to reconcile the inconsistent effectiveness of the HLOC construct is the application of a HLOC typology for predicting health behaviours. Wallston and Wallston (1982) proposed that observing the patterns of control across all the MHLC subscales could provide a more reliable way of

determining differences in health-related behaviours. This typology assumes that each of the three dimensions are non-mutually exclusive, and therefore profiles of high and low ratings can be combined to form eight different HLOC “types”. The first three HLOC types represent high HLOC beliefs in one of each of the three respective subscales (I, PO, and C), and are appropriately termed “pure internals”, “pure powerful others”, and “pure chance” types. The next three types reflect high beliefs on two of each of the three MHLC subscales. “Double externals” have high scores on the two external HLOC scales, PO and C, “believers in control” rate high on the I and PO scales, and the “internal/chance” type has both internal and chance HLOC beliefs. The last two types, rate either high (“yea-sayers”), or low (“nay-sayers”), on all three of the MHLC subscales.

Subsequent validation studies of the Wallston’s (1982) typology have failed to support the functional relevance of all eight of these theoretical types. Cluster analytic studies using healthy college students (Rock, Meyerowitz, Maisto, & Wallston, 1987) and cancer patients (Jenkins & Burish, 1995) have validated only six of the HLOC types, thereby excluding the “double externals” and “internal chance” types. Moreover, at least one other study has found that only five of the HLOC types may be valid in an applied setting (Buckelew et al., 1990).

One interesting finding from these studies is that the “believers in control” (high scores on both internal and powerful others HLOC) tend to experience less psychological distress, better adjustment to their particular condition, and improved intervention outcomes as compared to the other types. This is similar to other studies that have found both internal and powerful other beliefs together were associated with adaptive

behaviours for coping with illness (Fontaine, McKenna, & Cheskin, 1997), and frequent preventive health behaviours (Raab, 1987).

An apparent paradox. If both internal and powerful others HLOC beliefs are necessary for the occurrence of positive health behaviours, then there is limited utility in measuring health-related control beliefs this way. A more parsimonious approach would be to simply assess a belief that one's health can be controlled by whatever means, since distinguishing between personal and powerful others control does not add any substantive value to understanding health-related outcomes. This is not to say that the concept of control with respect to health is a simple, unidimensional construct. Indeed, sense of control is a complex concept that can include expectations and motivations, and therefore cognitive and affective dimensions. However, when sense of control is taken to be synonymous with locus of control, not only is the potential richness and complexity of the construct lost, it may also be no longer relevant when applied to the health domain.

It is important to note that Rotter's (1954; 1966) original locus of control concept has been successful when applied to general areas where the influence of either one's own or other's actions may or may not be perceived as controlling important outcomes. In general domains there may be no clear reason to believe that outcomes are necessarily pre-determined by internal, external or random forces, and therefore generalized attributions about what forces control events may develop freely from personal experiences with reinforcements. Over time, any one of the three attributional styles will develop. Consequently, the formation of these control beliefs will depend mostly upon individual experiences rather than any domain-specific factors that may limit the action-outcome relationship.

Practically speaking, health is a restricted domain¹, where outcomes often and necessarily depend upon the influence of powerful others such as doctors or other health professionals. When control is conceptualized in terms of locus of control and applied to this domain, the result is an apparent paradox. If one believes strongly that their own actions control their health then that individual is expected to engage in preventive health practices such as monitoring their diet, getting proper rest, and staying active. These actions may be sufficient to “control” one’s health in the absence of any immediate health issues. However, when there is a particular health problem that needs attention (e.g., an infection), it is not reasonable to assume that one can successfully influence the outcome without involving the assistance of others with specialized knowledge and experience regarding the health problem. Furthermore, following the advice of the doctor may involve completing and adhering to certain lifestyle changes (e.g., more rest and increased fluids intake) as well as taking medications. These recommendations involve personal action to successfully resolve the health issue, yet the physician directed the course of action. If the outcome of enlisting a doctor to resolve a health problem is successful, whose effort/action is responsible for the outcome – the doctor’s, or one’s

¹The restrictions within the health domain involve the limits imposed by the characteristics of the health issue. This may necessarily direct the individual’s choices and/or course of action irrespective of their control beliefs. For example, the experience of an acute or severe health problem will often necessitate seeking help in order to control the problem. However, when the health problem is relatively benign and transient (e.g., headache, flu/cold) the choice of how and whether to deal with the health issue is no longer restricted by the demands of the health problem. In this instance, it would be expected that the influence of HLOC beliefs would have the most influence over subsequent control efforts. Indeed, ongoing research has found that when the health issue does not demand treatment, internal HLOC beliefs are negatively related to treatment seeking, whereas powerful others HLOC beliefs are positively associated with seeking treatment from health professionals (Gick & Sirois, 2001).

own? Thus, it is not clear which control belief will be reinforced since the action-outcome relationship is dependent upon both internal and external factors. The Wallstons (1982) may contend that both beliefs will be reinforced (e.g., “believers in control”) and therefore jointly predict health behaviours. However, this proposition renews the previous issue, that if both beliefs are necessary to consistently predict a particular health behaviour, then making the distinction between internal and powerful others control may be neither salient nor practical when assessing health-related outcomes.

Other conceptual problems. Ostensibly, these conceptual and practical difficulties may be why HLOC has performed so poorly in predicting health-related outcomes. Other conceptual issues that may also contribute to the lack of consistent empirical support for the utility of HLOC involve misconceptions about the meaning of internal health control beliefs.

Believing that one’s health outcomes rely upon one’s personal actions (internal HLOC) is not necessarily the same as wanting to be an active participant in one’s health. The former describes expectancies for control (e.g., perceived control), whereas the latter reflects a desire for control, a motivational variable which is not assessed by either Rotter’s (1966) or Wallston and associates’ (1978) locus of control scales (Shapiro, Schwartz, & Astin, 1996). Furthermore, research suggests that desire for control is a distinct construct from locus of control (Burger, 1985; Burger & Cooper, 1979), and reflects the extent to which one wants to be in control of outcomes and events. Indeed, Kirscht (1972) found that a measure that distinguished expectancy and motivation for control over health was more useful for understanding health behavior than an assessment of control expectancies alone. However, much of the HLOC research assumes that these

two constructs are one and the same, and that differences in expectancies for personal control over health will naturally lead to differences in the desire to control health outcomes by performing the necessary behaviours.

Several studies have examined the relationship between perceived control and desire for control with respect to health-related outcomes. Dental patients who had a high desire for control but perceived that they had little control over pain reported greater fear and distress (Logan, Baron, Keeley, Law, & Stein, 1991), and higher levels of expected pain (Baron, Logan, & Hoppe, 1993), than the other desire/expectancy for control patient subgroups. The researchers concluded that these findings support the idea that desire for control moderates the effects of perceived control (Baron et al., 1993). Similarly, a mismatch between desire for control and perceived control in an elderly population predicted depression, and approached significance in explaining physical health outcomes (Wallace & Bergeman, 1997). Taken together, these findings suggest that both perceived control and motivation for control are important dimensions of subjective control that need to be assessed in order to better understand health-related outcomes.

Other investigators have suggested that the lack of a consistent relationship between HLOC and health outcomes is due to the possibility that multiple and perhaps conflicting components exist within the internal HLOC construct. Marshall (1991) suggests that internal HLOC is a multidimensional construct comprised of several distinct dimensions that are differentially associated with health outcomes. Four empirically distinct dimensions within the internal HLOC were identified: self-mastery, illness prevention, illness management and self-blame. Of these, self-mastery showed the

strongest associations with physical well-being, whereas the other components were not significantly related to physical health.

Other investigators have agreed that the MHLC may be too simplistic in how it construes control beliefs, and the concepts contained within the internal HLOC subscale are contradictory. In her deconstruction of the MHLC, Stainton Rogers (1995) found that self-determination, a concept often viewed as synonymous with internal locus of control, was confounded with self-blame within the internal HLOC subscale. Individuals who endorsed items suggesting that they had control over their health (e.g., “If I take the right actions, I can stay healthy”) rejected items that implied self-blame for poor health outcomes (e.g., “When I get sick I am to blame”). Taking responsibility for one’s health is not necessarily the same as blaming one’s self for failure to achieve positive health outcomes. Yet a high internal HLOC as assessed by the MHLC suggests that self-blame is included within these control beliefs. For example, in a sample of pain rehabilitation patients, those who scored high on internal HLOC were more likely to use self-blame strategies for coping with their pain (Buckelew et al., 1990).

Another common misconception regarding internal locus of control beliefs is that they are conceptually equivalent with the construct of autonomy. Researchers often mistakenly associate these two concepts as being synonymous (e.g., Reich & Zautra, 1997), perhaps because autonomy is taken to suggest independence. An internal locus of control does imply that outcomes are dependent upon oneself (i.e., independence), whereas powerful others locus of control suggest dependency on others for controlling health outcomes. According to self-determination theory (Deci & Ryan, 1985), autonomy refers to the need to feel that one’s behaviours are chosen by and emanate from oneself as

opposed to being controlled by outside pressures that do not allow for true choice (Deci & Ryan, 1985; Deci & Ryan, 1987). Unlike an internal locus of control, autonomy does not exclude enlisting and accepting the help of others who may be instrumental in reaching desired outcomes. For example, choosing to visit a doctor to deal with a troubling health issue can be considered an autonomous behaviour in that it reflects responsible action initiated and chosen by the individual (Deci & Ryan, 1987). Within the locus of control paradigm, seeking help from others is implicitly a function of powerful others beliefs. Therefore, the perception of internal locus of control beliefs as being conceptually equivalent to autonomy is clearly inaccurate. Internal and powerful others beliefs reflect elements of an independence-dependence continuum, whereas autonomy may actually include concepts related to both internal and external locus of control beliefs.

Proposal of a New Health-related Control Measure

As a control construct, HLOC has performed poorly in furthering our understanding about health-related behavior. Yet, despite its inconsistencies in predicting health-related outcomes, HLOC continues to be perceived as a paragon of health-related control. As other researchers have suggested (Furnham & Steele, 1993), this is surprising especially since other control constructs have been applied to the health domain with encouraging results. For example, autonomy was associated with exercise adherence (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997) and weight loss management (Williams et al., 1996), self-control expectancies over pain was related to decreased post-surgical pain reporting (Bachiocco, Morselli, & Carli, 1993), and sense of coherence was found to moderate the deleterious effects of stress on immune functioning (Lutgendorf,

Vitaliano, Tripp Reimer, Harvey, & Lubaroff, 1999). Control may therefore be a useful construct for understanding and predicting health-related outcomes, but not in the way it is measured or conceptualized with HLOC.

The following section will briefly review these control-related constructs and their potential usefulness within the health domain. The control constructs presented will form the starting point for the development of a new multidimensional measure of health-related control.

Adaptive Control. Before considering other control dimensions it is important to understand what being in control of one's health really means. Ultimately this may depend on the individual's current state of health, since controlling health when one is essentially healthy and illness free may be very different from when serious or chronic health problems exist. For example, compared to cancer patients, individuals without cancer scored significantly higher on internal locus of control (Arraras, Wright, Jusue, Tejedor, & Calvo, 2002). Other research suggests that perceived control is influenced by symptom severity (Gustafsson & Gaston Johansson, 1996; Jensen & Karoly, 1991), predictability (Bennett et al., 1994), and chronicity (Crisson & Keefe, 1988). Assessment of control beliefs needs to be considered relative to the level of control that is expected by an individual given her or his state of health.

For an individual who is in good health and wishes to maintain that state, successful control over health may mean remaining illness free. If a transient health problem develops (e.g. an infection), action may be taken in order to regain control over health (i.e., return to a healthy, illness free state). Beliefs and expectations about whether and how this can be achieved reflect dimensions of the individual's health control beliefs.

Control in this situation may mean curing or eradicating the illness, and possibly taking preventive actions to ensure that it does not reoccur.

However, control over health may be defined very differently if an individual has a pre-existing or chronic health condition. Since it is neither adaptive nor reasonable to expect that this condition will be cured, control over health will naturally take on a different meaning for this individual. Successful control may equate to taking action towards diminishing the severity or frequency of symptoms, taking part in treatment-related decision making, or simply feeling that one can manage the illness. In other words, successful control over health is achieving the best possible results within the limitations imposed by the health condition. This idea of adaptive control is consistent with Reid's (1984) multidimensional compensation model of adjustment to chronic illness that allows for adaptive and realistic distinctions in what individuals with chronic illness believe they can and cannot control. When faced with a chronic stressor such as a chronic illness where control is limited, individuals will search for the controllable aspects of the situation and exert their influence over these areas (e.g., treatment decision making) (Reid, 1984; Thompson, Sobolew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993).

The issue of illness chronicity and how this affects control is an important one that parallels similar distinctions in other domains. Illness can be viewed as a stressor that is either acute or chronic. Therefore, different coping strategies and different ways of regaining a sense of control are implied depending on whether the stress is transient or long-standing. For example, an individual may try to control the stress of unemployment by engaging in activities such as applying for jobs and networking for job opportunities.

Although these actions may not “cure” the unemployment, they may manage it, and enhance perceptions of control. Similarly, efforts taken (e.g., health behaviors) to manage a chronic illness and not necessarily cure it can demonstrate a sense of control.

If the control expectations of the illness-free individual were contrasted with those of someone with a chronic health condition, the former person would be judged to have a greater sense of control over health than the latter according to the HLOC paradigm (e.g., Arraras et al., 2002). However, both individuals may be very actively engaging and persisting in efforts to “control” their health and feel that their efforts are successful. Believing in control over health may mean more than just staying illness free – it may mean taking an active role in managing one’s health, regardless of one’s health state. Yet, current conceptualizations of health-related control may confound health status with control over health. MHLC scale items such as “If I take care of myself I can avoid illness” and “When I get sick I am to blame” clearly equate being in control of one’s health with being illness-free. In terms of overall physical and psychological well-being, however, control as an adaptive means of dealing with existing health problems may be the more realistic and salient control concept.

The new multidimensional measure of health-specific control will assess not only motivational and belief dimensions of control, but will also evaluate the perceived limits of control given the individual’s health status. It is hoped that assessing this important but neglected aspect of health-related control beliefs will lead to a clearer understanding of how control beliefs are related to adaptive and successful health outcomes.

Control Expectancies. Perhaps the most obvious dimension of control-related beliefs is whether an individual believes that a particular outcome or event can be

controlled. Within the restrictions of the health domain where efforts for control may necessarily involve others, the question of who controls your health may not be as essential as asking whether one believes that health can be controlled at all². Recall the Wallston's (1982) HLOC type "believers in control" and its association with positive health behaviors. This "type" appears to reflect a belief that health can be controlled by whatever means, as opposed to believing that health outcomes cannot be controlled and are unpredictable (i.e., chance control beliefs). The distinction of a control/no control belief dichotomy is further supported by the fact that the internal/chance type theorized by Wallston and Wallston (1982) has not been empirically demonstrated, suggesting that these two belief dimensions cannot coexist.

In accordance with both social learning theory (Rotter, 1954, 1966), and the Health Belief Model (Rosenstock, 1974), expectations for control will lead to a greater likelihood that health behaviors will be initiated and successfully completed or maintained. Knowing the extent to which an individual believes that health is controllable is an important control belief dimension to assess in order to understand health behaviors and outcomes.

Autonomy and health. Autonomy refers to engaging in acts that are initiated and experienced as emanating from oneself (Deci & Ryan, 1987). As outlined previously, autonomy does not exclude seeking help from outside sources or taking advice from

² Beliefs about whether or not health is controllable may not be solely the result of individual differences in experiences with health, but may also reflect societal influences. Advances in sanitation, medicine, and pharmaceuticals over the past century have likely shifted perceptions of health as being less controllable to the prevailing (and erroneous) view today that health is almost completely controllable. This view may be further strengthened by the fact that health-related information today is more readily accessible via the Internet and the media than ever before.

others. However, to be autonomous one must feel free to be able to make choices about which advice and sources of outside help will be followed (Dworkin, 1988). The regulation of intentional behaviors, such as health behaviors, can be viewed as varying along a continuum from autonomous to controlled (i.e., coerced by outside forces; Deci & Ryan, 1987). For example, if the decision to quit smoking was driven by a need to feel healthier, actions taken to reach this goal would be considered autonomous health behaviors. However, if the choice to stop smoking was pressured by others and there is not a genuine willingness to cease smoking, then efforts made to achieve this goal would be considered controlled.

To the extent that one is acting autonomously within the health domain, she or he is being an active participant in the decision making and initiation of behaviors that are relevant to health. Accordingly, autonomous health-related behavior may lead to both emotional (Sheldon, Ryan, & Reis, 1996a), and physical well-being (Williams et al., 1996). Using a general measure of autonomy, Williams and colleagues (1996) have demonstrated that autonomy is associated with initiation, regulation, and maintenance of health behavior change. A health-specific assessment of this motivation variable is proposed to evaluate the role of autonomous self-regulation of health behaviors in predicting health-related outcomes.

Desire for control. The desire to control the outcome of events is a motivational variable that may be important for understanding not only the variance in health-related behaviors, but also any potential psychological distress that may result when belief expectations and motivations are incongruent. Recall that mismatches between perceived

and desired control are associated with higher levels of distress (Logan et al., 1991; Wallace & Bergeman, 1997).

Burger and Cooper (1979) posit that the level of general control motivation interacts with situational variables to explain behavioral differences. For example, individuals high in the desire for control demonstrated a belief in personal control over a situation where outcomes were clearly governed by chance, whereas those low in desire for control did not (Burger & Cooper, 1979). In situations where health-outcomes are not clearly pre-defined, it may be expected that those with a strong desire for control will be more likely to make efforts to attain positive outcomes. An assessment of the health-specific desire for control may therefore reveal important differences in health-related behavior that are dependent upon situation specific factors.

Health value. The importance or value that one places on reaching certain health outcomes is another motivation variable that may be key for understanding control efforts. Research suggests that health value interacts with other variables associated with health control beliefs in order to predict health behaviors. For example, health value has been found to predict health behavior in combination with efficacy beliefs (Norman, 1995), and health status (Wurtele et al., 1985). Although this variable is conceptually related to the desire for control over outcomes, it may interact with other dimensions of control to predict health behaviors in a way that is distinct from the influence of desire for control.

Self-mastery/efficacy. Self-mastery refers to an individual's perceived capacity to perform the actions necessary to achieve desired outcomes (Marshall, 1991). Conceptually, this is similar to Bandura's (1977; 1982) concept of self-efficacy that

suggests that individuals will tend to pursue tasks that they believe they can accomplish and avoid those that are perceived as exceeding their capabilities. Individuals with strong self-efficacy beliefs are able to enlist and mobilize effort towards achieving their goals as well as persist with that effort when faced with obstacles (Bandura, 2000). Self-efficacy has demonstrated its utility as a predictor of a variety of health behaviors (AbuSabha & Achterberg, 1997; O'Leary, 1985; Stretcher, De Vellis, Becker, & Rosenstock, 1986), and as a potent predictor of adjustment to chronic illness (Edwards, Telfair, Cecil, & Lenoci, 2001; French et al., 2000; Marks, 2001).

Agency and communion. When applying the concept of perceived control to the health domain, the source of control (self versus others) may not be as important as the mode of control. Agency and communion are personality constructs that reflect fundamental modalities of human existence necessary for well-being (Bakan, 1966). The defining characteristics of agency include self-control, self-assertion, and self-direction, whereas communion is typified by cooperation, group participation, and the establishment of unions.

Helgeson (1994) proposes that both agency and communion are linked to health-related outcomes through their associations with health behaviors. Communion may have beneficial health effects when the outcomes center on interpersonal relations and help-seeking behavior (Helgeson, 1994). For example, communion was associated with greater mobilization of social support in college students, whereas agency was linked to less mobilization (Burda, Vaux, & Schill, 1994). In terms of health-behaviors, communion may also be beneficial for seeking information and advice from friends and family regarding the treatment of one's health. This "lay referral system" tends to be

utilized when the interpretation of symptoms is ambiguous (Sanders, 1982). The mobilization of the lay referral system along with the utilization of social support are important modes through which an individual may try to exert control over health outcomes.

The positive health correlates of agency are hypothesized to occur as a function of the heightened sense of personal control that characterizes this orientation. However, agency may also be related to help-seeking when this entails taking a pro-active approach to a concrete health problem (Helgeson, 1994). Over a 4-year period, agency was associated with more health-care visits in a student sample (Reis, Wheeler, Nezelek, Kernis, & Spiegel, 1985). Since agency is also associated with fewer health complaints (Robbins, Spence, & Clark, 1991), agency may reflect an active and direct way of handling health issues when they occur.

Agency and communion are viewed as complementary constructs that are both necessary for health and well-being. However, when agency occurs without communion (unmitigated agency), and communion is devoid of agency (unmitigated communion) two extreme ways of acting result (Helgeson, 1994; Helgeson & Fritz, 2000). Unmitigated agency reflects a focus on self to the exclusion of others, whereas unmitigated communion is an exaggerated focus on the needs of others that excludes caring for oneself (Fritz & Helgeson, 1998; Helgeson, 1994). Both unmitigated agency and unmitigated communion are associated with a reluctance to ask for help from others, and a range of poor health behaviors (Helgeson & Fritz, 2000). Taking into account these extreme modalities when assessing health behaviors may reveal why otherwise positive beliefs and motivations for control may not result in positive health outcomes.

Overall, the agency – communion distinction may provide valuable information about the ways in which people take action to control their health, and supersede the internal versus powerful others source of control delineation.

An integrated measure of health control beliefs. The proposed new measure of health-related control beliefs will integrate existing control-related constructs into a multidimensional assessment tool for predicting and understanding health behaviors and outcomes. Table 1 presents the main components of control to be included and tested in the development of the new health-specific measure. Control Beliefs establish the extent to which health outcomes are believed to be controllable and include adaptive control perceptions that are relative to the individual's health status, and beliefs about whether these outcomes are achievable. Control Motivations reflect the drive and need to control one's health. Modes of Control describe the ways in which efforts for control over health are likely to manifest themselves, given the individual's enduring tendency to act self-sufficiently or in communion with others.

Each of these three dimensions of health-related control are hypothesized to be important for understanding health-related behaviors and outcomes. Control Beliefs capture the cognitive aspect of perceived control over health, Control Motivations reflect the affective component, and Modes of Control describe the way in which perceived control over health is achieved. Together these dimensions reflect a more sophisticated and thorough perspective of an individual's perceived control over health that does not focus solely on the source of control but on whether or how control is acted upon. Within each dimension, the various facets were tested to determine their relative contributions to explaining health-related outcomes. The overall picture derived from these dimensions

Table 1. *Proposed model of the health-related control constructs.*

Control dimensions	
Control facet	Health-related construct description
Control Beliefs	
Adaptive control	To what extent does one believe that symptoms are controllable?
Control expectancies	To what extent does one believe that health is controllable?
Self-mastery	How capable is one in taking the necessary steps to control health?
Control Motivations	
Autonomy	To what extent does one need to feel that health-related decisions and actions are self-determined?
Desire for control	To what extent does one want to control health outcomes?
Health value	How important is health?
Modes of Control	
Agency	Control over health is demonstrated primarily through self-initiated and self-directed Actions.
Unmitigated Agency	Control over health is demonstrated through a focus on self and the exclusion of others.
Unmitigated Communion	Control over health is demonstrated through a focus on others and self-neglect.
Communion	Control over health is demonstrated primarily by seeking help, cooperating with and establishing connections with others.

will provide a more sensitive assessment of control that may help predict the extent to which an individual is taking an active role in their health, as well as preferred modes of actualizing the control beliefs.

Other models of perceived control have taken a similar approach by incorporating the assessment of existing control-relevant concepts into a single framework. However, the new multidimensional model of perceived health control proposed here offers several unique advantages and improvements over the existing approaches.

Paulus and Christie (1981) developed a taxonomy of perceived control factors and distinguished four separate facets of control - source, target, valence, and sphere of control – which interact to offer a more complete assessment of control. Included within the source of control dimension is the familiar separation of control into chance, skill (e.g., personal ability), and others as perceived sources of control. As previously argued, delineating control expectancies this way may not be useful or compatible when assessing control within the health domain. Moreover, as other researchers have pointed out (Smits, Deeg, & Bosscher, 1995), Paulhus and Christie's (1981) framework is missing a facet that reflects motivation.

Shapiro (1990) also developed a multidimensional measure of control that assesses perceived control within four quadrants. The Shapiro Control Inventory (SCI) (Shapiro, 1994) assesses potential psychological distress and psychopathology based on the profiles created by scores on each of the control dimensions. Both domain-specific control expectancies and desire for control are assessed in addition to modes of control (positive assertive and positive yielding), and agency of control (e.g., self or others as source of control). Although Shapiro (1996) argues that agency within this model refers

to the source from which control is initiated, conceptually this dimension of control may still reflect a belief that either self or others are in control of outcomes.

Both Shapiro's (1990) and Paulus and Christie's (1981) approaches to understanding control assess control in general. Thus, they do not take into consideration how the meaning and manifestation of control may be different when this concept is applied to understanding outcomes within the health domain. The proposed multidimensional measure of health-related control broadens the control concept to include adaptive and active aspects of control that are relevant to positive health outcomes. Within this framework, factors related to taking an active role in one's health are considered the most important aspects of control for determining health behaviors, rather than potentially paradoxical beliefs about who is in charge of one's health.

By integrating existing control constructs that may be relevant to health into a health-specific measure, the new measure may overcome some of the conceptual and practical difficulties that have been encountered with current conceptualizations and applications of perceived control within the health domain. In addition to assessing health-related control motivations and expectations, the new measure will evaluate the preferred ways in which control may be demonstrated, and will include an assessment of control that is appropriate for individuals with ongoing or chronic health issues. By removing an emphasis on who is control of one's health, the focus can shift to viewing whether the individual is an active agent participating in the process of control, regardless of whether this is done alone or with others.

Overview of Scale Development

The new scale is comprised of a family of scales nested under each of the three dimensions of health-related control (i.e., Control Beliefs, Control Motivations, and Modes of Control). Therefore, the scale development process involved the concurrent development and validation of each of the three scale dimensions with its constituent facets as if it was a multidimensional scale in its own right. This modular approach to scale development results in scales with component sub-dimensions that do not necessarily have to be administered together, although this procedure may be preferable for the prediction of many health-related outcomes. The development of the new health-related control scale is outlined in the following sections.

The rationale and methods for development of the new health-related control scales follow the general guidelines suggested by DeVellis (1991) and presented in Figure 1. These guidelines can be grouped into three main steps. The first step involved the generation of an item pool for each of the proposed control belief constructs. Some of the items were rationally derived based on the construct descriptions, whereas others were reworded from extant measures of the general constructs proposed to underlie the new health-specific dimensions. After initial generation, items were read by several experts for clarity of phrasing and meaning, and appropriate changes made. The items that were contained in the initial item pool and the sources of the items for each major scale are presented in Appendix A.

Figure 1. Overview of scale development

The second step in the scale development involved a more formal evaluation of the items and a reduction of the initial item pool. This included a pre-test item-sort task (Study 1) to establish substantive validity³, followed by further refinement of items within each facet subscale by administering the items retained after the pretest to a larger sample and using factor analytic methods to evaluate how well they reflected their corresponding latent constructs (Study 2). The final step in the development of the new family of scales involved assessing the validity and reliability of the new reduced scales. In Study 3, comparing the scales to marker variables of their underlying constructs initially tested elements of the scale's construct validity and reliability and allowed for further item amendments and refinements. The factor structure, reliability, and generalizability of the scales was investigated in Study 4 through administration of the scales to three different samples. Convergent and divergent validity was also explored in this Study 4 by correlation analyses of the scales with illness cognition, personality, and coping scales across the different samples. Finally, the concurrent validity of the scales was established by examining the relations of the scales with measures of physical and psychological well-being and health behaviors (Study 5).

Details regarding the assessments made at each stage are outlined in the descriptions of the scale development studies.

³ Substantive validity is a property of the individual items or measures, whereas content validity refers to a property of an item or measure set together (Holden & Jackson, 1979). Items will have substantive validity to the extent that they reflect or are theoretically linked to the construct of interest. Moreover, adequate content cannot be established if substantive validity is lacking (Anderson & Gerbing, 1991).

Study 1

Pre-test Item-sort Task

The procedure used to select the items from the refined item pool for the new measure was an item-sort task advocated by Anderson and Gerbing (1991). This pre-test methodology is recommended for establishing the substantive validity of a measure, and as a test prior to further empirical testing of construct validity. Indeed, Anderson and Gerbing (1991) have empirically demonstrated the utility of this method for the selection of items that were later retained through a subsequent confirmatory factor analysis, as well as the reproducibility of the substantive validity index across two different samples. Because the new scales are designed to be used across samples with and without health issues, and subject to further tests of construct validity, this method of pretest was considered an appropriate ‘litmus test’ of the initial item pool created.

According to this procedure, respondents are given a set of constructs described in everyday language along with a set of items. After reading each item, the participants then complete a comparative rating task, where they choose the construct that is best reflected by the item. After assigning items to a particular construct, participants are asked to review their item decisions with an opportunity to make changes in item assignment as needed. The assignment decisions provide the data for the assessment of the substantive validity for each scale. Two indices, the proportion of substantive agreement and the substantive-validity coefficient (to be discussed later), are then calculated from the responses, and necessary changes and decisions about item placement and retention are made.

Although Anderson and Gerbing (1991) suggest allocation of the items to the construct descriptions with a pencil and paper numbering system, the items in the current research were presented on numbered cards. This approach was used since there were a large number of items, and presentation on sheets of paper was considered to be both cumbersome and potentially biasing if the items were not sufficiently randomized. Shuffling the cards before presentation provided a convenient way of randomizing the items, as well as making the item-sort task more manageable for the participants.

Method

Sample

Because it is recommended that pre-test samples should be representative of the populations of interest for the scales being developed (Ghiseli, Campbell, & Zedeck, 1981), it was decided that the pretest would be conducted across two groups of participants: those with and without chronic health issues. Recommendations for the pretest sample size are generally small, ranging from 12 to 30 (Hunt, Sparkman, & Wilcox, 1982). Accordingly, fifty-one introductory psychology students⁴ (20 males, 31 females) were recruited with the intention of dividing the sample into 2 groups based on self-reported health. The mean age of the sample was 22.41 (SD = 8.54) ranging from 16 to 71 years, and 65.5% were Caucasian. Participants were recruited through

⁴ Although ideally community dwelling adults with and without chronic illness would be more truly representative of the target samples for the scales, an undergraduate sample was chosen for reasons of convenience and practicality. However, specifically examining those with chronic illness served as a proxy for a community sample so as not to deplete any available and willing community participants that were necessary for subsequent studies where a larger sample was required.

announcements (see Appendix B) placed on the Introductory Psychology experiment notice board and each student received 1 experimental credit for participating.

Procedure and Materials

Participants were run in small groups of up to 5 people. Upon arriving, students read and signed the informed consent (see Appendix B), and were asked to complete the Brief Health History questionnaire (Sirois & Gick, 2002) and some questions about general demographic information (Appendix B). The Brief Health History questionnaire is a health report checklist that assesses the experience of 13 acute and 10 chronic health problems. For the current study, the health checklist was used to assess the self-reported health of the participants and to assign participants to one of two health groups, chronic and non-chronic.

Participants were then given a set of cards, instructions and the response forms for each scale dimension in order to complete the card sort task (see C). Brief verbal instructions and a demonstration was also provided to make sure that the participants understood the task requirements.

Each card set was divided into three sets to reflect each of the three scale constructs being evaluated⁵. The number of cards in each set and the corresponding subsets are given in Table 2. The cards within each subset had a statement about control over health that reflected a particular control dimension on one side of the card, and a number from one to 108 on the opposite side of the card. Participants were instructed to

⁵ Originally, participants were to sort the cards into the three main categories first, and then sort each of the three categories into their sub dimensions. However, a pilot study with several participants indicated that this method was too difficult and therefore the card-sorting task was simplified into a one-tier sorting task.

Table 2. *Total number of items in each scale and subscale administered to the pretest sample.*

Control Scale	Control Subscale	Number of items
Control Beliefs		49
	Control expectancies	20
	Adaptive control	17
	Mastery	12
Control Motivations		34
	Autonomy	11
	Desire for control	11
	Health Value	12
Mode of Control		25
	Agency	13
	Communion	12
Total number of items		108

deal with each subset of cards individually. Accompanying each subset of cards was a corresponding set of sheets that reflected the subscale dimensions. These sheets listed the subscale description and definition at the top of a single sheet of paper followed by a series of blank spaces where card numbers could be recorded. For each set of cards participants were required to first lay out the response sheets and read the descriptions. Next they were asked to read each card and decide which type of control it best reflected by placing the card on the sheet. After all the cards had been allocated participants could review their decisions and once satisfied they then recorded the number from each card in the blank spaces provided on the construct sheet.

Because some of the items were to be reverse scored, participants were also made aware of the possibility that some statements may reflect ideas that were opposite in meaning to the construct described. For these cards they were asked to write the letter 'R' next to the card number on the response sheets. Once finished, participants separated and secured the new subsets of cards before placing both the sorted cards and the corresponding construct page in an envelope marked with the construct name. This procedure was then repeated for each of the remaining card sets so that each of the three initial sets were secured and sorted separately. Because the card sets were to be reused, once the card assignments for each subscale construct were verified against the response sheets, the separated cards within each subscale set were integrated to make one set of cards for each scale. These cards sets were then shuffled to randomize the cards for the next participant.

Analyses

Substantive validity. Two indices of the measure's substantive validity were calculated from the data aggregated across the judges (i.e., the participants) as proposed by Anderson and Gerbing (1991). Both indices have been empirically tested and found to be successful for their utility in predicting item retention or deletion in a subsequent confirmatory factor analysis (Anderson & Gerbing, 1991). The “proportion of substantive agreement”, p_{sa} , was calculated as follows:

$$p_{sa} = n_c / N ,$$

where n_c reflects the number of respondents who assigned an item to its proposed construct and N represents the total sample of respondents. The values of p_{sa} can range from 0 to 1 with larger values reflecting greater substantive validity. This index assesses the extent to which an item reflects its intended construct, but not how much an item may also be related to other constructs. The “substantive-validity coefficient”, c_{va} , represents the extent to which a particular item is assigned to its posited construct more than to any of the other constructs, and is therefore a more accurate estimate of substantive validity (Anderson & Gerbing, 1991). Defined as:

$$c_{va} = n_c - n_o / N ,$$

where n_o reflects the highest number of assignments of an item to any other construct, and n_c and N retain their previous definitions. Greater substantive validity is similarly indicated by larger values of this coefficient, but the value of c_{va} can range from -1.0 to 1.0 . Although larger negative values would still indicate the item would have substantive validity, in this case it would be for a construct other than the one proposed. Although Anderson and Gerbing (1991) have suggested that a test of statistical significance of the

substantive-validity coefficients can be conducted by calculating a critical value for c_{va} , they also suggest that in practice it is appropriate to use the c_{va} in a comparative manner. This is achieved by retaining items with the largest values for each construct regardless of whether these values reach statistical significance. This approach was used in the present study with the lower limit of .50 suggested by Anderson and Gerbing (1991) used to consider an item for deletion. Items with a p_{sa} value less than .50 would be considered for rejection and those with c_{va} values less than .50 in both the chronic and non-chronic groups would also be candidates for removal. This more liberal guideline for rejecting items with low c_{va} values was based on the fact that c_{va} values are necessarily lower than p_{sa} values. However, if an item had a high negative value for c_{va} then this item may be considered for inclusion as an item for another subscale since its substantive validity would be high for that construct.

Anderson and Gerbing (1991) suggest that the failure to achieve sufficiently high substantive validity coefficient values reflects problems with either items, construct definitions, or both. If all items that are proposed to measure a certain construct have low coefficients, then this may mean that the construct definition is unclear or ambiguous, and would need to be redefined and re-tested.

In addition to problems with the items themselves, another threat to an item's rating comes from problems with the judges themselves. It is possible that certain judges may not be taking the task seriously or may have difficulty in making appropriate decisions. Such individuals would likely have a very low hit rate in placing the items, regardless of any inherent problems with the items. Several decision rules were adopted to help identify potential problems with the non-expert raters. First, performance on

making accurate hits across the three main dimension scales was assessed, with possible rejection of a rater if a hit rate of less than 50 percent overall on two of the three dimension scales was obtained. Second, if a rater failed to achieve a hit rate of 50 percent across four of the eight total subscales, then the rater was rejected. These rules were applied to each of the two samples.

Results and Discussion

Health groups

Participants were divided into two groups based on whether a chronic health condition was reported. Thirty-two participants reported no chronic health issues and 19 participants reported one or more chronic health problems and were assigned to the chronic group.

Rater Screening

In order to assess the accuracy of the raters' judgments each item was assigned '1' for a correct assignment to a construct and '0' for an incorrect assignment. The total number of hits and misses were then summed for each participant and the percentage of hits for each of the three dimensions and their subscales were assessed. For the chronic group 1 participant had a hit rate of less than 50% on two of the scales, and 4 others failed to reach the 50% hit rate criteria for four or more of the eight subscales. These 5 participants were excluded from further analyses leaving 14 participants in the chronic group. In the non-chronic group, 5 participants had a hit rate of less than 50% on two of the scales, and 5 more failed to reach the 50% hit rate criteria for four or more of the eight subscales. After excluding these participants the final non-chronic group was comprised of 22 participants.

Substantive Validity

The values for the p_{sa} and the c_{va} for the items in each of the eight subscales were calculated and reviewed for inclusion or deletion from the item pool.

Control Beliefs items. The results of the substantive validity analyses are presented in Table 3. Of the 49 items only 24 were selected for inclusion after the substantive validity analyses. Items that were rejected initially had p_{sa} values less than .50. Overall, agreement on the validity indices was fairly consistent across the chronic and non-chronic groups. However, the Adaptive Control subscale was left with only 5 items after this analysis, and the 9 items retained for the Control Expectancy subscale all appeared to be tapping the reverse of this construct – a belief in chance rather than control. It was decided that additional items were needed to better reflect the subscale constructs.

Accordingly, 8 items were added to the scale to help reflect the aspects of control not covered by the 24 items. These items are presented in Table 4. Three new items, 2 reworded items, and 3 intact items from the original item pool were added to bring the total item count to 32 for the Control Beliefs scale. The 3 items that had been originally rejected due to low substantive validity index values were included because they expressed the concept of a belief in personal control that the Control Expectancy subscale was currently lacking⁶, and because these low values were due to equal assignment to the correct construct (Control Expectancy) and a similar construct (Adaptive Control).

⁶ It is possible that in assigning the items, the participants' decisions were influenced by the large number of items reflecting a belief in chance, and that other aspects of a belief in control such as taking personal control were subsequently viewed as not belonging to the same category. Therefore, assignment to other constructs was made and the validity indices were lowered.

Table 3. Study 1: Substantive validity indices for the Control Beliefs items retained after the substantive validity analysis for each of the health groups.

Subscale	Item	Group			
		Non-chronic		Chronic	
		P _{sa}	C _{sa}	P _{sa}	C _{sa}
Control Expectancies					
(14)	24. You are either born with good health or not.	86.4	77.3	100.0	100.0
(10)	96. My family's health determines how healthy I will be.	81.8	68.2	92.9	85.7
(4)	105. My health depends on forces beyond my control.	95.5	90.9	85.7	71.4
(17)	90. How soon I recover from an illness depends on how lucky I am.	81.8	72.7	78.6	64.3
(5)	65. Regardless of circumstances, I can always do things to improve my health.	90.9	81.8	85.7	57.1
(2)	83. People who are sick are often victims of circumstances.	95.5	90.9	85.7	78.6
(12)	102. My health is determined by circumstances beyond my control.	86.4	77.3	85.7	71.4
(6)	86. If I am lucky I will stay healthy.	86.4	77.3	92.9	85.7
(22)	25. If I am lucky my health will improve.	77.3	50.0	78.5	57.1
Mastery					
(1)	75. If I set my mind to it I can change my health.	68.2	72.7	57.1	41.7
(16)	76. I know that I can do what is necessary to improve my health.	72.3	54.5	69.2	46.2
(23)	38. I am confident that I could deal with any unexpected health problems.	86.4	72.7	71.4	64.3
(13)	20. I am confident in my ability to make the right decisions about my health.	95.5	90.9	71.4	50.0
(25)	62. When facing a health problem, I often feel overwhelmed about what to do.	81.8	72.7	85.3	71.4
(26)	72. I am certain that with effort I can improve my health.	68.2	50.0	64.3	42.8
(18)	28. I am able to meet the challenge of following a healthy routine.	95.2	90.4	92.9	85.7
(28)	78. I am confident that I can successfully look after my health.	95.2	90.4	78.6	64.3
(9)	81. When it comes to my health, I often feel unable to do what I know should be done.	86.4	77.3	85.7	78.6
(27)	43. Even though there are things I can do to improve my health, I don't feel that I can do them.	86.7	80.0	60.0	40.0
Adaptive Control					
(3)	80. I believe that I can do more to control my symptoms.	68.2	50.0	57.1	42.9
(19)	35. The only way I can control my health is by taking medication.	68.2	50.0	85.7	78.6
(11)	100. There are things that I can do to make my health problem easier to deal with.	77.3	63.6	71.4	50.0
(30)	85. If I do the right things I can make my symptoms more manageable.	81.8	72.7	85.7	71.4
(7)	39. Taking control of my health condition means doing whatever I can to ease my symptoms.	63.6	50.0	71.4	50.0

Note: P_{sa} = Proportion of substantive validity index; C_{sa} = substantive validity coefficient; Numbers in parenthesis indicate item number in the scale administered for the next phase of development.

Table 4. *Study 1: New items added to the Control scales following the substantive validity analyses.*

Subscale	Item	Source of item
Control Beliefs		
(2)	People who take care of themselves stay healthy.	New item
(8)	If I make the effort, I can manage my illness.	Item 18 from pretest
(15)	It is my own actions that determine how healthy I am.	New item
(21)	My current state of health is a reflection of how I look after myself.	Item 52 from pretest
(24)	I will use whatever resources are necessary to improve my health.	Item 104 from pretest
(31)	I can usually find several ways to deal with any health problem.	New item
(32)	My health depends on how I take care of myself.	Item 48 reworded
(29)	How soon I recover from an illness depends on how I look after myself.	Item 8 reworded
Control Motivations		
(1)	I am the one who makes the choices about my health.	Item 49 reworded
(3)	I need to feel that I can influence my health.	New Item
(6)	I want to take responsibility for my own health.	Item 51 from pretest
(13)	Taking care of my health has important consequences for many aspects of my life.	Item 32 from pretest
(12)	I like to feel that I am participating in the management of my health.	New item
(23)	When I am ill, I prefer to let the illness take its own course.	New item
(29)	It is important that I feel like I am in control of my health.	New item
Modes of control		
(3)	When it comes to solving a health problem, I will involve others only if necessary.	New item
(5)	Other people can't help me with my health so why bother asking.	Item 7 from pretest
(9)	Only people who are weak ask others for help with their health problems.	Item 9 from pretest
(14)	I don't want to burden others with my health problems.	New item
(16)	I don't bother asking others for help when I have a health problem because they usually can't help me anyway.	Item 6 from pretest
(20)	I avoid asking others for help with my health problems.	New item

Note: Numbers in parenthesis indicate item number in the scale administered for the next phase of development.

If these items were not very representative of either of these constructs then the factor analysis and item analysis in the next study would make this clear. The final Control Expectancy scale following the item analysis is presented in Table 5.

Control Motivations items. After the substantive validity analysis, the original item pool of 34 items for the Control Motivations scale was reduced to 23 items (see Table 6). Again, agreement across each group was fairly high, suggesting that the items were viewed as reflecting the proposed constructs whether or not one had an ongoing health issue or not. Items in the Health Value subscale had moderate to high substantive validity indices overall and appeared to capture this construct very well. However, several of the Desire for Control items had very low values for one of the substantive validity indices. An inspection of the other assignments of these items revealed an interesting and unexpected pattern. Although the p_{sa} values for many of the items were in the acceptable range, the c_{va} values were very low, suggesting that these items were also receiving high assignments to another construct. In many cases, the substantive validity index was lowered because there were a large number of assignments to the Autonomy construct. Recall that originally it was expected that the Desire for Control and Autonomy constructs may not be very distinct and may at one point be collapsed into a single construct. The results of the pretest appeared to support this idea for many of the items. It was therefore decided that items from the Desire for Control or Autonomy subscales that maintained a p_{sa} value above .50, but had a very low c_{va} value because of assignment to the similar construct (Desire for Control or Autonomy) would be retained. Several items in the Desire for Control subscale met these criteria, especially for the non-

Table 5. *Study 1: Items retained for the Control Beliefs Inventory subscales after the substantive validity analysis.*

Subscale	Item
Control Expectancies	
	14. You are either born with good health or not.
	10. My family's health determines how healthy I will be.
	4. My health depends on forces beyond my control.
	17. How soon I recover from an illness depends on how lucky I am.
	2. People who are sick are often victims of circumstances.
	12. My health is determined by circumstances beyond my control.
	6. If I am lucky I will stay healthy.
	22. If I am lucky my health will improve.
	2. People who take care of themselves stay healthy.
	21. My current state of health is a reflection of how I look after myself.
	32. My health depends on how I take care of myself.
	29. How soon I recover from an illness depends on how I look after myself
Mastery	
	1. If I set my mind to it I can change my health.
	16. I know that I can do what is necessary to improve my health.
	23. I am confident that I could deal with any unexpected health problems.
	13. I am confident in my ability to make the right decisions about my health.
	25. When facing a health problem, I often feel overwhelmed about what to do.
	26. I am certain that with effort I can improve my health.
	5. Regardless of circumstances, I can always do things to improve my health.
	18. I am able to meet the challenge of following a healthy routine.
	28. I am confident that I can successfully look after my health.
	9. When it comes to my health, I often feel unable to do what I know should be done.
	27. Even though there are things I can do to improve my health, I don't feel that I can do them.
	15. It is my own actions that determine how healthy I am.
	24. I will use whatever resources are necessary to improve my health.
	31. I can usually find several ways to deal with any health problem.
Adaptive Control	
	3. I believe that I can do more to control my symptoms.
	19. The only way I can control my health is by taking medication.
	11. There are things that I can do to make my health problem easier to deal with.
	30. If I do the right things I can make my symptoms more manageable.
	7. Taking control of my health condition means doing whatever I can to ease my symptoms.
	8. If I make the effort, I can manage my illness.

Note: Item numbers correspond to the scale as administered in Study 2.

Table 6. Study 1: Substantive validity indices for the Control Motivations items retained after the substantive validity analysis for each of the health groups.

Subscale	Item	Group			
		Non-chronic		Chronic	
		P _{sa}	C _{sa}	P	C _{sa}
Autonomy					
(16)	57. It is easier to do what I am told to do about my health than to think about it myself.	77.3	63.6	64.3	28.6*
(7)	55. I would feel guilty if I didn't do things to stay healthy.	76.2	61.9	85.7	71.4
(5)	13. If I didn't look after my health others would be upset with me.	95.2	90.5	100.0	100.0
(28)	101. Often I will do things to improve my health to stop people from getting on my case.	95.5	90.9	92.9	85.7
Desire for Control					
(15)	108. When it comes to my health, I enjoy making my own decisions.	68.2	22.7*	78.6	57.1
(18)	106. When I have a health problem, I prefer to do something about it rather than sit by and let it continue.	54.5	36.3*	85.7	71.4
(19)	14. I enjoy taking part in decisions about my health.	54.5	9.1*	50.0	7.0*
(21)	53. I dislike not having any say in what should be done about my health.	72.7	50.0*	92.9	85.7
(10)	88. I prefer to let other people decide what is best for my health.	54.5	13.6*	57.1	14.3*
(4)	27. When I have a health problem, I like to find out as much as I can about it.	50.0	18.2*	78.6	64.3
(9)	84. I like to know as much as possible about any health concerns I have.	72.7	54.5	78.6	64.2
(24)	11. I would rather find information about a health issue on my own than leave it completely to someone else.	57.9	15.8*	81.8	57.1
Health Value					
(25)	61. I take my health seriously.	90.5	76.2	85.7	78.6
(22)	63. Health and well-being are the most important concerns in my life.	81.0	61.9	92.9	85.7
(20)	17. Making sure that I am as healthy as I can be is an important goal for me.	72.7	54.5	76.9	61.5
(11)	94. I hardly ever think about my health.	81.8	72.7	78.6	71.4
(17)	50. There are few things as important as having good health.	95.5	81.8	100.0	100.0
(26)	56. There are many other things that are more important than health.	90.9	81.8	85.7	71.4
(27)	15. Having and maintaining good health is a life-long goal for me.	68.2	54.5	71.4	50.0
(30)	26. Any time I spend looking after my health is time well spent.	77.3	63.6	85.7	71.4
(8)	47. Being as healthy as I can be is a worthwhile pursuit.	72.7	54.5	85.7	71.4
(2)	42. Many people take their good health for granted.	81.8	63.6	71.4	50.0
(14)	107. I have better things to do than to spend time on my health.	77.3	63.6	64.3	50.0

Note: P_{sa} = Proportion of substantive validity index; C_{sa} = substantive validity coefficient; Numbers in parenthesis indicate item number in the scale administered for the next phase of development. * = assignments to a closely related construct, i.e. Autonomy/Desire for Control.

chronic group, and were included. Only one item in the Autonomy subscale fell in this category and was subsequently retained.

Several items were added to the scale to bring the total number of items up to 307. Seven items in total were either written or re-introduced from the original item pool (see Table 4). Items 51, 32, and 49 each had p_{sa} values below .50 for the Autonomy subscale, but had p_{sa} values above .50 for Desire for Control subscale, suggesting that each may be a good item for the latter subscale. Four new items were also written to capture aspects of Autonomy not addressed by the retained items. The items composing the Control Motivations Inventory following these changes is presented in Table 7.

Modes of Control Items

Because there were only two general subscales within the Modes of Control scale and therefore only one other assignment category possible, the values for c_{va} and p_{sa} were therefore the same (see Table 8). From the original pool of 25 items for this scale only 16 met the substantive validity index criteria and were retained. Six new items were added to the scale to bring the total items in the scale to 22. Three of these were new items and 3 were items from the previous items pool. Although Agency and Communion are proposed to be unrelated constructs (Helgeson, 1994), it appeared that the participants had difficulty making distinctions between these two constructs. For example, some items were designed to reflect Unmitigated Agency that is suggested to be negatively related to Communion (Helgeson, 1994; Helgeson & Fritz, 2000). Consequently, 3 items

⁷ Although adding back items after reducing the number of items in a scale may appear counterproductive, it has been suggested that it is important to keep the size of the scales as large as possible especially in the early stages of development (J. Ware, personal communication, November 11, 2001).

Table 7. *Study 1: Items retained for the Control Motivations Inventory subscales after the substantive validity analysis.*

Subscale
Item
Autonomy
16. It is easier to do what I am told to do about my health than to think about it myself.
7. I would feel guilty if I didn't do things to stay healthy.
5. If I didn't look after my health others would be upset with me.
28. Often I will do things to improve my health to stop people from getting on my case.
6. I want to take responsibility for my own health.
1. I am the one who makes the choices about my health.
Desire for Control
15. When it comes to my health, I enjoy making my own decisions.
18. When I have a health problem, I prefer to do something about it rather than sit by and let it continue.
19. I enjoy taking part in decisions about my health.
21. I dislike not having any say in what should be done about my health.
10. I prefer to let other people decide what is best for my health.
4. When I have a health problem, I like to find out as much as I can about it.
9. I like to know as much as possible about any health concerns I have.
24. I would rather find information about a health issue on my own than leave it completely to someone else.
3. I need to feel that I can influence my health.
12. I like to feel that I am participating in the management of my health.
23. When I am ill, I prefer to let the illness take its own course.
29. It is important that I feel like I am in control of my health.
Health Value
25. I take my health seriously.
22. Health and well-being are the most important concerns in my life.
20. Making sure that I am as healthy as I can be is an important goal for me.
11. I hardly ever think about my health.
17. There are few things as important as having good health.
26. There are many other things that are more important than health.
27. Having and maintaining good health is a life-long goal for me.
30. Any time I spend looking after my health is time well spent.
8. Being as healthy as I can be is a worthwhile pursuit.
2. Many people take their good health for granted.
14. I have better things to do than to spend time on my health.
13. Taking care of my health has important consequences for many aspects of my life.

Note: Item numbers correspond to the scale as administered in Study 2.

Table 8. Study 1: Substantive validity indices for the Modes of Control items retained after the substantive validity analysis for each of the health groups.

Subscale	Item	Group	
		Non-chronic	Chronic
		P _{sa}	P _{sa}
Agency			
(6)	5. If my health improves it is because of the actions that I have taken.	81.8	100.0
(1)	37. I know what is best for my health.	81.8	100.0
(10)	54. I may listen to what others have to say about my health but the final decision is always my own.	77.3	78.6
(8)	79. No one but me is going to keep me healthy.	77.3	92.9
(17)	33. I am the best person to manage my health.	86.4	100.0
(11)	86. I prefer to solve my health problems alone.	77.3	100.0
(13)	60. Nobody can look after my health as well as I can.	72.7	92.9
(15)	2. I am usually the one that makes the decisions regarding my health.	90.0	92.9
(22)	99. Asking for help with a health problem is a sign of weakness.	57.1	64.3
Communion			
(12)	44. I often find that I can solve my health problems by getting help from others.	95.5	100.0
(7)	59. Other people's advice about how to deal with my health is always welcome.	61.1	66.7
(19)	10. I find that other people usually have good advice for me regarding my health.	86.4	85.7
(21)	103. I enjoy working with others to improve my health.	90.9	85.7
(18)	74. I feel more comfortable looking after others when they are ill than having others look after me if I am sick.	50.0	50.0
(2)	89. My health should not be a burden to anyone else.	54.5	57.1
(4)	77. I feel uncomfortable having other people look after me when I am ill.	61.9	57.1

Note: P_{sa} = Proportion of substantive validity index; C_{sa} = substantive validity coefficient; Numbers in parenthesis indicate item number in the scale administered for the next phase of development.

reflecting Unmitigated Agency were designated as reverse keyed items for the Communion scale. These 3 items were therefore added back to the Unmitigated Agency scale with the hope that the factor analysis and item analysis would help clarify the construct that they best reflected. The revised Modes of Control Inventory is presented in Table 9.

The main purpose of the pre-test was to provide an initial evaluation of the items' performance regarding their respective constructs. Although pre-tests are not a necessary step in scale development, inclusion of a pre-test helps identify items that do not tap their intended constructs and ensures that limited subject pools are not exhausted for subsequent development studies (Anderson & Gerbing, 1991). Accordingly, several items that performed poorly were reassigned to more appropriate constructs, and additional items were reworded to keep the scale numbers high. The performance of these scales with the addition of these new items was examined more thoroughly in the subsequent study through factor analytic techniques and detailed item analysis.

Table 9. Study 1: Items retained for the Modes of Control Inventory subscales after the substantive validity analysis.

Subscale	Item
Agency (including Unmitigated Agency)	6. If my health improves it is because of the actions that I have taken.
	1. I know what is best for my health.
	10. I may listen to what others have to say about my health but the final decision is always my own.
	8. No one but me is going to keep me healthy.
	17. I am the best person to manage my health.
	11. I prefer to solve my health problems alone.
	13. Nobody can look after my health as well as I can.
	15. I am usually the one that makes the decisions regarding my health.
	22. Asking for help with a health problem is a sign of weakness.
	3. When it comes to solving a health problem, I will involve others only if necessary.
	5. Other people can't help me with my health so why bother asking.
	9. Only people who are weak ask others for help with their health problems.
	16. I don't bother asking others for help when I have a health problem because they usually can't help me anyway.
Communion (including Unmitigated Communion)	12. I often find that I can solve my health problems by getting help from others.
	7. Other people's advice about how to deal with my health is always welcome.
	19. I find that other people usually have good advice for me regarding my health.
	21. I enjoy working with others to improve my health.
	18. I feel more comfortable looking after others when they are ill than having others look after me if I am sick.
	2. My health should not be a burden to anyone else.
	4. I feel uncomfortable having other people look after me when I am ill.
	14. I don't want to burden others with my health problems.
	20. I avoid asking others for help with my health problems.

Note: Item numbers correspond to the scale as administered in Study 2.

Study 2

Factor Structure and Item analysis

Following the initial refinement of items from the original item pool developed with the pre-test, the performance of the remaining items within each subscale was evaluated. Although the pretest helped in establishing the relationship of each item to the proposed construct and facet, the homogeneity or consistency of the items within each facet remained to be established. Nunnally & Bernstein (1994) advocate item analysis as a means of reducing and refining the item pool prior to the factoring of the items. This process involves administering the scales to a large representative sample and then evaluating the items by examining the item scale correlations, item variances and means, inter-item correlations, and coefficient alpha.

However, it was possible that the factor structure of the scales may not follow the outlined structure, making any subsequent item analyses meaningless. Therefore, a preliminary assessment of the hypothesized factor structure was necessary prior to evaluating the items. This involved exploring the proposed factor structure of the scale with a factor analysis to see if the proposed number of factors within each dimension was statistically supported. Because a model suggesting both the number and structure of the factors is in place, this process may be more aptly described as "quasi-confirmatory" rather than truly exploratory (B. Wheaton, personal communication, June 16, 2001). That is, the factor analysis was used to confirm the expected factor structure rather than for determining a previously unknown structure (DeVellis, 1991). However, the same procedure and guidelines as an exploratory factor analysis apply.

A hierarchical approach to the factor analysis was used to reflect the multi-levels of the measure's proposed dimensions and subscales. This approach is recommended when a scale is comprised of several higher order factors each comprised of more than one lower-order facets (Kline, 1994). Again, each dimension was treated as an individual measure comprised of several facets as proposed by the model of health-related control. For example, motivation for control over health was hypothesized to consist of three health-related facets - health value, autonomy, and desire for control. A factor analysis was used to determine if this dimension is best described by three factors as proposed or fewer. This same approach was repeated for the other two dimensions, control beliefs and modes of control. Table 1 presents the hypothesized structure of the three scale dimensions and the corresponding facets.

Sample

Two samples consisting of individuals with and without chronic illness were recruited to conduct the item analyses and confirm the factor structure of the newly reduced scales. Because a large number of participants were required, a student sample comprised one of the samples. Participants were 339 students (125 males, 214 females), with a mean age of 20.86 ($SD = 3.87$) ranging from 17 to 50 years. Sixty-four percent of the sample was Caucasian. Students were recruited through announcements (see Appendix D) placed on the Introductory Psychology experiment notice board received and course credit for participation.

A second community based sample was also recruited using a survey display placed in public places within the community, including local community centers and medical offices (see Appendix E). Additional participants were also recruited through

convenience sampling of friends and co-workers. A total of 98 participants (25 males, 73 females) from the community completed the survey. The mean age of the community sample was 45.79 ($SD = 13.9$), with ages ranging from 22 to 80 years. The majority of the sample (92.1%) was Caucasian.

Procedure

Students completed the survey on campus in small groups of up to five people. For the community sample, a sign describing the study was placed along with surveys in either the community centers (3) or medical clinics (2). Prior permission to set up the display was obtained from the medical office or community center manager/administrator. Potential participants could obtain the survey package on site from the display and either return their completed surveys to the drop box provided or return the surveys with the postage paid envelope included within the survey package. Each survey package contained a letter describing the study, a consent form, the survey, an addressed postage paid return envelope, and a sealed debriefing letter with instructions to open this letter only after completion of the survey. The same package was also distributed to the student sample.

Materials

The survey packages for both the student and the community samples were essentially the same. Additional questionnaires were included in the survey package and used for establishing the factorial validity of the scales (Study 3); however, only those scales relevant to the item analyses are mentioned in this section (see Appendix F). General demographic information was assessed with the General Information questionnaire, with minor changes in the background information questions that were

appropriate for each sample. Similar to the first study, the Brief Health History questionnaire was used to assess self-reported health and determine if chronic health issues were experienced. This was for the purposes of classifying participants into two groups – chronic and non-chronic.

The three newly reduced control scales were also included. The Control Beliefs Inventory (CBI) contained 32 items, the Control Motivations Inventory (CMI) contained 30 items, and the Modes of Control Inventory (MCI) contained 22 items (Appendix F).

Analyses

Factor structure. A preliminary analysis of the factor structure of the scales was conducted prior to the item analysis in order to ensure that the proposed structure of each scale and subscale was viable. Although the number of factors for each dimension is known beforehand, a check of the simple factor structure was conducted using Catell's (1978) scree test. After generating a scree plot of the eigenvalues that correspond to each factor, visual inspection was used to determine the number of meaningful factors within each dimension subscale. Catell's (1978) guidelines suggest retaining factors that are at or above the visual "elbow" of the plot⁸, and rejecting those factors that lie below it. Although this test is considered highly subjective, it avoids the overestimation of factors that tests such as Kaiser's eigenvalue rule⁹ promote (Nunnally & Bernstein, 1994).

⁸ A useful heuristic for identifying the "elbow" is to observe the point at which the angle on the line is most severe.

⁹ Kaiser's eigenvalue rule involves retaining factors based on the magnitude of the factors' eigenvalues, and thus retains factors that explain more variance than the average amount explained by any one of the items (Kline, 1994). Usually the number of eigenvalues greater than one are taken to indicate the number of factors underlying the model.

The number of factors revealed by the scree test was then used to specify the number of factors to select when running the preliminary factor analysis of each dimension. DeVellis (1991) suggests first trying to approximate the simple structure by using an orthogonal rotation such as varimax. If this fails to produce the expected structure, and if the factors are expected to be somewhat correlated, then a non-orthogonal rotation is appropriate (Collins, 1974; DeVellis, 1991). Although each of the proposed facets that comprise the dimensions are believed to be distinct, non-dichotomous constructs, it was possible that the different subscales may be correlated given that they describe different aspects of the same construct – control over health.

Although this scale is designed to be a “family” of scales rather than one single-tier multi-dimensional scale, testing the hypothesized three factor structure of health-related control in general is an important first step if each of the proposed dimensions are indeed part of a broader construct. Following a scree test of the total items from each of the three dimensions, the next step in this quasi-confirmatory procedure was to check if all the items from the three scales factored into the proposed three main dimensions, Control Beliefs, Control Motivation, and Modes of Control. After confirming the model’s higher order structure, the structure of each of the constituent scales and their subscales was confirmed to examine if the proposed number of facets within each dimension is supported by the factor solutions.

If the proposed factor structure is not supported by the factor solutions, then alternate solutions will be tested and evaluated. For example, it may be that the distinction between Desire for Control and Health Autonomy is not supported by the analyses as the results of the pretest suggested. In this case these two facets will be

combined into a single facet, and the factor analysis rerun to test if this simplified solution is supported.

Item analysis. Following the preliminary confirmation of subscale structure an item analysis was conducted. Item-scale correlations were calculated to evaluate whether each item was substantially related to the other remaining items within each subscale of the three new scales. The corrected item-total correlation was used, as this is less sensitive to possible inflation due to including the item of interest in the overall correlation with which it is being compared (DeVellis, 1991). This involved computing a correlation between the item and all remaining items in the subscale, excluding itself. Items with higher values reflect better association with the total subscale.

Item variances were also evaluated to ensure a diverse range of responses. It was decided that items with low variances would be likely candidates for rejection as these items will not discriminate individuals with different levels of the construct (DeVellis, 1991). The means of the items were also examined to ensure that the item's average response falls within the center of the range of possible scores. This procedure helps to eliminate items with lopsided means that may fail to detect certain values of the construct. Although DeVellis (1991) points out that items with low variances and lopsided means will tend to reduce an item's correlation with other items, this process is a useful double-check of items which have been tentatively selected on the basis of the item-scale correlations.

The quality of each facet scale was assessed by computing coefficient alpha. This helped determine if the previously outlined methods for retaining good items and rejecting weak ones had been successful (DeVellis, 1991), and that each of the facet

scales was internally consistent. Because alpha reflects the proportion of variance in the scale scores that can be attributed to the true score of the underlying construct (DeVellis, 1991), higher values are preferable. The lower acceptable bound of .70 (Nunnally & Bernstein, 1994) is often cited as the guide for assessing this reliability coefficient. However, alpha values between .65 and .70 are also considered by many methodologists to be minimally acceptable (DeVellis, 1991). For the development of the current scale, reliability values (e.g., coefficient alpha) at this initial testing of the subscales were deemed acceptable at the .70 level. Scales may be provisionally retained for further testing if alpha values were below .70 but above .65. The standard procedure of removing items that appear to have lower than average correlations with other items and then observing changes in the reliability coefficient, was used to make decisions about item retention.

The proposed approach to evaluating items for the new scales involved conceptualizing each facet scale that comprised the higher order dimensions as an independent scale. Therefore, for each of the proposed facets (adaptive control, belief in control, mastery, autonomy, health value, desire for control, agency, and communion) of the three dimensions (control expectancy, control motivation, and mode of control), the consistency of the scale, the characteristics of each item and its relationship to other items were assessed. Items that showed poor performance across both the higher and lower order scale analyses were considered candidates for removal from the scale. In addition, if the preliminary analyses revealed a different structure from that proposed then the item analyses were to be conducted according to the new factor structure.

Finally, the proposed analyses were conducted by merging the data from each individual sample (students and community), and comparing analyses across groups based on self-reported chronic illness status. Because the scales are designed to be applicable to populations with chronic health conditions, problems in the item analyses that occurred with the chronic group would be given more weight when making decisions about item retention.

Overview of factor analysis strategy. The strategy adopted for the factor analysis of the current scales follows the inductive approach suggested by Kline (1994). In the early stages of development and when the scale factor structure is theoretically derived, the choice to use one particular type of factor extraction and rotation method over another is driven by extracting the solution that best estimates the expected factor structure. Indeed, choosing a principal components analysis over some other common form of factor analysis may be arbitrary as each generally produces similar results (Kline, 1994), and because factor structures are highly robust across different methods of extraction and rotation (Clark & Watson, 1995).

The main difference between a principal components analysis and a common factor analysis such as an unweighted least squares factor extraction is that the former attempts to account for all the variance (including the error variance) of the observed variables in defining the factors, whereas the latter approach only accounts for the common or variance shared with other variables (Floyd & Widaman, 1995). Given that the preliminary factor analysis of the scales may likely include many items that are irrelevant or redundant, an unweighted least squares extraction was first performed on the unreduced item set so as to minimize the influence of the error variance in the selection

of factors. Once weak items were removed through the item analysis, the reduced set was factored using a principal components analysis unless there were very few items per factor. In this case, it has been suggested that a factor analysis produces more accurate estimates of the factor loadings than a principal components analysis (Floyd & Widaman, 1995) and therefore an unweighted least squares extraction was used.

Results and Discussion

Health Groups

The number of chronic health problems were summed for the participants in each sample, and those who reported no chronic conditions were assigned to the non-chronic group whereas those who indicated a chronic health issue were assigned to the chronic health group. These groups were then collapsed across the student and community samples for the purposes of comparing the results of the analyses. The health characteristics and demographics for each of these groups are presented in Table 10.

Higher Order Factor Structure

An unweighted least squares (ULS) factor analysis was performed on all 84 items from the three scales to inspect the higher order structure of the family of scales and to examine how well this structure was described by the three proposed factors. An oblique rotation was chosen because it was expected that the different control scales would be somewhat correlated with each other. Further, the initial varimax rotation did not clean up the factors as well as the oblique rotation. The oblimin converged in 19 iterations when 3 factors were specified, and revealed that most items loaded onto their expected factors. Table 11 presents the details regarding overall item loadings and items that did not load onto the expected scales. Recall that more weight was given to the results for the

Table 10. *Study 2: Health characteristics and demographics of the two health groups.*

		Group	
		Non-chronic	Chronic
<i>N</i>		255	182
Sex	% female	61.2	72.0
Age			
	Mean	23.28	31.1
	<i>SD</i>	8.62	16.05
	Range	17-65	18 - 80
Ethnicity (% Caucasian)		63.1	80.8
Acute health problems			
	Mean	3.19	4.56
	<i>SD</i>	1.81	2.16
	Range	0 - 11	0 -11
Chronic health problems			
	Mean	0	1.65
	<i>SD</i>	0	1.08
	Range	---	1 - 8

SD = standard deviations

chronic group in assessing the success of the factor loadings.

Overall, the Control Beliefs Inventory (CBI) appeared to have the most accurately described structure in terms of item loadings, whereas the Control Motivations Inventory (CMI) revealed the most problems. The results of this preliminary inspection of the higher order factor structure of the three scales indicated areas for further improvement and refinement of the items comprising each scale. Items that did not load onto the expected scales and later showed other problems during the item analysis would be considered strong candidates for removal.

Table 11. *Study 2: Items that did not load onto the expected factors across the two health groups.*

Factor	Scale item	Item loadings	
		Non-chronic group (<i>n</i> = 255)	Chronic group (<i>n</i> = 182)
1. CMI	MCI	1, 21, 7, 13, 8, 6	1, 17, 15, 13, 10, 7
	CBI	24, 8, 5, 7, 29, 11	24, 18, 13, 28, 7, 6, 14
2. MCI	CBI	3, 8	27, 25, 9, 17
	CMI	5	28, 5
3. CBI	MCI	15, 10	8, 6, 19
	CMI	1, 10, 16, 28	1

Note: CMI = Control Motivations Inventory, MCI = Modes of Control Inventory, CBI = Control Beliefs Inventory. Factor loadings were obtained using an unweighted least squares extraction with an oblique rotation.

Factor Structure – Control Beliefs Inventory

Using an unweighted least squares extraction with an oblique rotation¹⁰ on the data from both samples combined ($N = 391$, listwise deletion) the scree plot of the items comprising the Control Beliefs Inventory (CBI) revealed that a 4 factor solution better described the structure of the CBI, rather than the 3 factor solution initially proposed (see Figure 2). Originally, the scale was suggested to be comprised of 3 factors: Control Expectancy, Mastery, and Adaptive Control. However, inspection of the items comprising the extracted factors suggested that the Control Expectancy subscale may be comprised of 2 scales, Control Expectancy and Chance control beliefs. This construal of control beliefs is in accord with that proposed by Levenson (1974) who suggests, in opposition to Rotter (1966), that internal and external locus of control beliefs are orthogonal and not dichotomous. The Control Expectancy scale was initially modeled to contain external “Chance” beliefs although this preliminary analysis indicates that Chance beliefs are independent of Control Expectancy. In addition, some of the Adaptive Control items appeared to be loading onto the Control Expectancy scale.

To confirm which items comprised each of the possible 4 factors a factor analysis of the Control Beliefs Inventory was conducted for each of the two health groups – chronic and non-chronic. This comparison was chosen because the scale was designed to

¹⁰ A principal components analysis with an oblique rotation failed to converge in 25 iterations. Therefore, an ULS extraction was used.

Figure 2. Scree plot for the Control Beliefs Inventory factor extraction.

be equally applicable for both populations, and because the adaptive control subscale may be especially meaningful for individuals with chronic health issues¹¹.

An unweighted least squares extraction of 4 factors with an oblique rotation for each group (chronic and non-chronic) indicated slightly different factor compositions (see Table 12). Factor 2 (Mastery) and Factor 4 (Chance) were similar across the two groups although the latter was comprised of only 3 items for the non-chronic group. As well, Factor 1 (Control Expectancy) and Factor 3 (Adaptive Control) were well defined for the chronic group, but not for the non-chronic group, as these two factors combined to form Factor 1 for this group. This may be because the concept of adaptive control may not be as meaningful for those who do not experience ongoing health issues as it is for those who do. Because this scale in particular should be applicable to chronic illness populations, it was decided that the preliminary factor structure and item assignment defined by the chronic group would be used for further item analysis of this scale.

Factor Structure – Control Motivations Inventory

An unweighted least squares extraction of the data with an oblique rotation from both the student and community samples combined ($N = 412$, listwise deletion) revealed a scree plot indicating a 2 factor solution for the CMI instead of the initial 3 factor structure proposed (see Figure 3). Although 5 factors were extracted, the majority of the

¹¹ A preliminary study using the CBI with a chronic health condition population (tinnitus) found that a 4-factor solution best described the scale structure, and that adaptive control was particularly relevant for understanding adjustment to tinnitus (Sirois, Davis, & Morgan, 2003).

¹³ The initial varimax rotation failed to replicate the expected factor structure. As well, it indicated that the factors were highly correlated.

Table 12. Study 2: Preliminary factor compositions of the Control Beliefs Inventory items across the two health groups.

Factor loadings of items				
Factors	Non-chronic group (n = 255)	Factor description	Chronic group (n = 187)	Factor description
1	16**, 26**, 30**, 1**, 32**, 29, 8, 2, 21, 11, 15**, 3, 5, 18**, 17, -14*	Control Expectancy + Adaptive Control	32, 15, 1, 26, 29, 2, 16, 21, 5	Control Expectancy
2	-28**, 9, 27, -13**, -23**, -24**, -31**, -10*	Mastery	18, -27, 28, -25, 13, 23, -9, 24, 31*	Mastery
3	4, 12, 19, 25, 20**	Mixed	30, 8, 11, 3, 7, 10*	Adaptive Control
4	17, 6, 22	Chance	22, 17, 6, 12, 20, 19*, 14*, 4*	Chance

Note: * item with a loading <.30, **items loading onto another factor. Factor loadings were obtained using an Unweighted Least Squares extraction with an oblique rotation.

Figure 3. Scree plot for the Control Motivations Inventory factor extraction.

items fell within the first 2 factors (see Table 13). Most of the items loading onto the first factor were from the Health Value subscale, whereas the second factor was comprised of items mainly from the Desire for Control subscale with some items from the Autonomy subscale. This was not completely unexpected as it was anticipated that the Desire for control subscale and the Autonomy subscale may not be very distinct from each other.

Table 13. *Study 2: Preliminary factor compositions of the Control Motivations Inventory items.*

Factor description	Items composing each factor
1. Health value	20, 25, 27, 30, 22, 29, 14-, 8, 18, 12, 26-, 9, 4, 11-*, 13*, 17*, 23-*
2. Desire for control	15, 10-, 1, 16-, 19, 21, 24-, 6, 3, 28-

Note: * = item with a loading <.30. Factor loadings were obtained using a principal components extraction with an oblique rotation.

Factor Structure – Modes of Control Inventory

The scree plot from the unweighted least squares extraction of the data from both the student and community samples combined ($N = 402$, listwise deletion) indicated a possible 3 or 4 factor solution (see Figure 4). An inspection of the factors extracted found that most items fell within 4 factors with the exception of 2 items. The 4 factors could be described as paralleling the 4 expected subscales, Agency, Communion, Unmitigated Agency, and Unmitigated Communion, respectively. The factor analysis was rerun with 4

Figure 4. Scree plot for the Modes of Control Inventory factor extraction.

factors specified using an ULS oblique rotation as it was expected that the factors would be correlated. The item loadings for each of the four factors and their descriptions are presented in Table 14.

Table 14. *Study 2: Preliminary factor compositions of the Modes of Control Inventory items.*

Factor description	Factor item compositions
1. Communion	20*, 12-, 21-, 7-, 19
2. Agency	17, 13, 15, 1, 8, 6, 10, 3
3. Unmitigated Agency	9, 22, 16*, 5*
4. Unmitigated Communion	4, 14, 2*, 11*, 18

Note: * = items that load onto more than one factor. Factor loadings were obtained using an Unweighted Least Squares extraction with an oblique rotation.

Item Analysis - Control Beliefs Inventory

An analysis of the 32 items comprising the overall scale suggested several items that might be considered for removal. Items 14, 7, 10, and 20 all had corrected item-total correlations that were .20 or less (see Appendix F for items). The alpha coefficient for the 32-item scale was .83. However, individual analysis of the change in coefficient alpha if each of these items was removed suggested that the alpha value would increase to .85, indicating that the inclusion of each of these items in the scale reduced the internal consistency. These items were therefore removed. This was also true for item 19, with coefficient alpha increasing to .88 with the removal of this item. In addition, the mean for

item 19 was less than the scale median of 3, and the standard deviation of this item was very high (1.33). Given the poor overall performance of this item, it was removed from the scale prior to the individual item analyses of the subscales. Individual subscale item analyses were then conducted for each of the four CBI subscales overall, and by comparing the chronic to the non-chronic groups for each subscale.

The following item analyses are based on the factor compositions that were obtained from the chronic group and initially presented in Table 9. The 9-item Control Expectancy subscale had an initial alpha coefficient of .84 ($n = 421$). The results of the item analyses indicated that item 5 had the lowest inter-item correlations for the non-chronic (.25) and the chronic (.19) groups (see Appendix F for items). The item analyses also indicated that item 32 (“My health depends on how I take care of myself”) was very representative of the subscale construct with the highest corrected-item total correlations for the total sample (.65), the non-chronic (.61) and the chronic (.68) groups.

The alpha coefficient for the 9-item Mastery subscale was .82 ($n = 421$). Subsequent item analyses compared across both groups indicated that item 31 was the weakest item in the scale. The inter item correlations for the total sample (.12) and the chronic group (.09) were lower than those for any other items. Item 28 (“I am confident that I can successfully look after my health.”) had the highest corrected-item total correlations for total sample (.68), the non-chronic (.67) and the chronic (.67) groups, suggesting that this item was very representative of the subscale construct.

The 7-item Chance subscale had a coefficient alpha of .74. Item analyses revealed two items that might be considered for removal from the scale. Item 14 had the lowest corrected item-total correlation (.24) and the lowest inter-item correlation for the total

sample (.11; $n = 425$). Item 20 had the lowest inter item correlation for the non-chronic group (.19).

After the item analysis only 4 items remained in the Adaptive Control subscale. It was decided that item 5 that performed poorly with the Control Expectancy subscale would be added to the Adaptive Control subscale prior to the item analysis to assess its suitability. However, the item analysis revealed that item 5 did not fit very well with this subscale as it had the lowest inter-item correlation for the total sample (.23). In addition, the alpha coefficient for the 5-item scale was only .71. Thus, it was concluded that this subscale needed several new items written to properly reflect the underlying construct. The principal components analysis with a varimax rotation of the newly reduced Control Beliefs subscale was rerun for each of the two health groups. For the chronic group a 4-factor solution was obtained. Similar to the preliminary inspection of the scale structure, a 3-factor solution was obtained for the non-chronic group, whereas a 4-factor solution did not work for this group. The solutions are presented in Table 15. Essentially, the Control Beliefs and Adaptive Control subscales merged into one subscale for the group reporting no chronic health problems, whereas adaptive control formed a separate factor for the group with chronic health issues.

Conceptually, this seemed reasonable as the Adaptive Control subscale was specifically designed to assess the belief that one's illness and its symptoms can be controlled. If one does not have an ongoing health issue, this belief would be no different from a belief in controlling one's health in general. However, with a chronic health issue, adapting one's belief about control over health to one of illness and symptom

Table 15. *Study 2: Post item analysis factor loadings of the Control Beliefs Inventory for the chronic and non-chronic health groups.*

Factor	Item	Group loadings	
		Non-chronic (<i>n</i> = 233) 3 factors	Chronic (<i>n</i> = 166) 4 factors
Control Expectancy	26. I am certain that with effort I can improve my health.	.625	.597
	29. How soon I recover from an illness depends on how I look after myself.	.637	.549
	1. If I set my mind to it I can improve my health.	.615	.591
	16. I know that I can do what is necessary to improve my health.	.606	.512
	2. People who take care of themselves stay healthy.	.586	.683
	32. My health depends on how I take care of myself.	.561	.744
	21. My current state of health is a reflection of how I look after myself.	.560	.582
	5. Regardless of circumstances, I can do things to improve my health.	.558	.377
	15. It is my own actions that determine how healthy I am.	.548	.741
Adaptive control ^a	11. There are things that I can do to make my health problem easier to deal with.	.639	.809
	30. If I do the right things I can make my symptoms more manageable.	.628	.769
	8. If I make the effort, I can manage my illness.	.577	.745
Mastery	3. I believe that I can do more to control my symptoms.	.637	.447
	27. Even though there are things I can do to improve my health, I don't feel that I can do them.	-.797	-.757
	28. I am confident that I can successfully look after my health.	.702	.711
	9. When it comes to my health, I often feel unable to do what I know should be done.	-.701	-.594
	13. I am confident in my ability to make the right decisions about my health.	.592	.653
	23. I am confident that I could deal with any unexpected health problems.	.494	.585
	25. When facing a health problem, I often feel overwhelmed about what to do.	-.490	-.664
	24. I will use whatever resources are necessary to improve my health.	.486	.526
	18. I am able to meet the challenge of following a healthy routine	.477	.761
Chance	4. My health depends on forces beyond my control	.709	.382
	17. How soon I recover from an illness depends on how lucky I am	.700	.743
	22. If I am lucky my health will improve	.688	.829
	12. My health is determined by circumstances beyond my control	.684	.580
	6. If I am lucky I will stay healthy	.679	.752

Note: ^a The adaptive control factor was extracted only for the chronic group – items from this factor were part of the Control Expectancies factor for the non-chronic group. Factor loadings were obtained using a principal components extraction with a varimax rotation.

management from one that views control in more absolute terms may be not only realistic but necessary for successful adaptation. The items retained for the CBI following the item analysis are presented in Table 16.

Item Analysis - Control Motivations Inventory

The alpha coefficient for the overall 30-item scale was .91 ($n = 412$), suggesting that there may be some redundancy in the items (Nunnally & Bernstein, 1994). Item analysis of the 30-item scale indicated three items that should be removed prior to the subscale item analyses. Item 5 showed no correlation to the total scale with a corrected item total correlation of $-.06$ and was therefore removed. Item 2 had the lowest corrected item total correlation overall (.25), and for the non-chronic (.22; $n = 240$) and the chronic group (.27; $n = 173$). Item 7 which was originally designed as a reverse item for health autonomy performed better when not reversed, indicating that it was not accurately reflecting the construct of Desire for Control. This item was also dropped from the scale, leaving a 27-item scale. Because the scree plot from the preliminary factor analysis indicated that the scale was comprised of 2 factors, a principal components analysis with an oblique rotation of the 27 items was performed to confirm the items for each of the 2 subscales prior to the item analysis. The results are presented in Table 16.

Because there was an adequate number of items for the Health Value subscale, the two items that had factor loadings less than .30 (items 23 and 17) were removed from the scale before conducting the item analysis (see Appendix F for items). The new 14-item Health Value subscale had an initial alpha coefficient of .89 ($n = 421$). Subsequent analysis of the items revealed several items that may be removed to improve the integrity

Table 16. *Study 2: Items retained for the Control Beliefs Inventory subscales following the item analysis.*

Subscale	Item
Control Expectancy	<p>26. I am certain that with effort I can improve my health.</p> <p>29. How soon I recover from an illness depends on how I look after myself.</p> <p>1. If I set my mind to it I can improve my health.</p> <p>24. I will use whatever resources are necessary to improve my health.</p> <p>2. People who take care of themselves stay healthy.</p> <p>32. My health depends on how I take care of myself.</p> <p>21. My current state of health is a reflection of how I look after myself.</p> <p>15. It is my own actions that determine how healthy I am.</p>
Adaptive Control	<p>11. There are things that I can do to make my health problem easier to deal with.</p> <p>30. If I do the right things I can make my symptoms more manageable.</p> <p>8. If I make the effort, I can manage my illness.</p> <p>3. I believe that I can do more to control my symptoms.</p> <p>5. Regardless of circumstances, I can do things to improve my health.</p>
Mastery	<p>27. Even though there are things I can do to improve my health, I don't feel that I can do them.</p> <p>28. I am confident that I can successfully look after my health.</p> <p>16. I know that I can do what is necessary to improve my health.</p> <p>9. When it comes to my health, I often feel unable to do what I know should be done.</p> <p>13. I am confident in my ability to make the right decisions about my health.</p> <p>23. I am confident that I could deal with any unexpected health problems.</p> <p>25. When facing a health problem, I often feel overwhelmed about what to do.</p> <p>18. I am able to meet the challenge of following a healthy routine</p>
Chance	<p>4. My health depends on forces beyond my control</p> <p>17. How soon I recover from an illness depends on how lucky I am</p> <p>22. If I am lucky my health will improve</p> <p>12. My health is determined by circumstances beyond my control</p> <p>6. If I am lucky I will stay healthy</p>

of the scale. Item 26 had the lowest inter-item correlation (.13) with the overall sample ($n = 421$), and for the non-chronic (.15; $n = 245$) and chronic groups (.05; $n = 176$). Item 13 had the lowest squared multiple correlation with the overall sample (.26) and the lowest loading on the 14-item factor.

After removing these two items the item analysis was rerun and now item 11 had the lowest squared multiple correlation for the chronic group (.17). As well, this item did not appear to be conceptually valid for individuals with an ongoing health issue (I hardly ever think of my health) and therefore this item was removed from the scale. Items 4, 9, 12 and 18 were originally designed as items reflecting Desire for Control, not Health Value. Further, each of these items loaded onto both subscales and were therefore removed from the Health Value scale and added to the Desire for Control scale to test their suitability for that subscale. This left 7 items in the Health Value subscale. The alpha coefficient for the new 11-item Desire for Control subscale was .84 ($n = 429$). Two items (3, 28) showed signs of poor fit with the scale. Item 28 had very low inter-item correlation (-.05), and a low corrected-item total correlation (.15) for the total sample, and item 3 had low inter-item correlations for the non-chronic group (.04; $n = 252$) and the chronic group (.12; $n = 178$). Item 16 had a mean over 5 ($M = 5.2$), and had a very low inter-item correlation for the non-chronic group (.04; $n = 252$). These three items were removed leaving only 8 items. Items 9, 4, 12, and 18, were originally written for the Desire for Control scale but had been tested and removed from the Health Value scale. These 4 items were added to the Desire for Control scale to test their appropriateness.

The item analysis was then rerun for the 12 items. Item 10 had the second lowest squared multiple correlation for the total sample (.23; $n = 431$) as well as the lowest inter-item correlation (.14). Item 21 had the lowest squared multiple correlation for the total sample (.21). The wording on this item was also awkward (I dislike not having any say in what should be done about my health), and therefore it was decided that this item should be removed. Item 4 had the lowest inter-item correlation (.16), and was also highly correlated with item 9 (.74) suggesting that it was a redundant item. These four items were removed leaving an 8-item scale.

A final check of the factor structure and internal consistency of the Control Motivations scale and subscales was performed. A principal components extraction of 2 factors using an oblique rotation¹³ found that all the items loaded on the appropriate factors except for item 18 which loaded on the Health value factor (.4363) and also somewhat on the Desire for Control factor (.2329). Given that the item analysis indicated that this item did not fit well on the Health Value scale and it was worded to capture Desire for Control it was removed and the factor analysis rerun. The results are presented in Table 17. The Health Value subscale had 4 loadings greater than .6 which, according to the Monte Carlo studies, indicates that it is a reliable factor (Guadagnoli & Velicer, 1988). The Desire for Control scale also had all 7 loadings greater than .6. However, several items continue to load onto both factors suggesting that the two factors may not be completely distinct from one another. Overall, the 13 item CMI scale had very good internal consistency ($\alpha = .90$; $n = 418$), with an alpha coefficient of .86 ($n = 421$) for the 6 item Health Value subscale, and .83 ($n = 431$) for the 7 item Desire for Control subscale. The final scale is presented in Table 18.

Table 17. Study 2: Post item analysis factor loadings of the Control Motivations Inventory.

Subscale	Item	Factor	
		1	2
Health Value	20. Making sure that I am as healthy as I can be is an important goal for me.	.84287	.53127
$\alpha = .86$	27. Having and maintaining good health is a life-long goal for me.	.82500	.40592
	25. I take my health seriously.	.81534	.46621
	30. Any time I spend looking after my health is time well spent.	.74167	.45931
	22. Health and well-being are the most important concerns in my life.	.69654	.21966
	14. I have better things to do than to spend time on my health.	-.66099	-.34086
Desire for Control	19. I enjoy taking part in decisions about my health.	.54240	.73071
$\alpha = .83$	15. When it comes to my health, I enjoy making my own decisions.	.29125	.72294
	6. I want to take responsibility for my own health.	.55619	.70903
	29. It is important that I feel like I am in control of my health.	.67054	.69065
	12. I like to feel that I am participating in the management of my health.	.59115	.66434
	24. I would rather find information about a health issue on my own than leave it completely to someone else.	.21212	.66092
	9. I like to know as much as possible about any health concerns I have.	.38690	.61945

Note: Factor loadings were obtained using a principal components extraction with an oblique rotation, $n = 418$. Highest factor loadings of an item are given in boldface type.

Table 18. *Study 2: Items retained for the Control Motivations Inventory subscales following the item analysis.*

Subscale	Item
Health Value	20. Making sure that I am as healthy as I can be is an important goal for me.
	27. Having and maintaining good health is a life-long goal for me.
	25. I take my health seriously.
	30. Any time I spend looking after my health is time well spent.
	22. Health and well-being are the most important concerns in my life.
	14. I have better things to do than to spend time on my health.
Desire for Control	19. I enjoy taking part in decisions about my health.
	15. When it comes to my health, I enjoy making my own decisions.
	6. I want to take responsibility for my own health,
	29. It is important that I feel like I am in control of my health.
	12. I like to feel that I am participating in the management of my health.
	24. I would rather find information about a health issue on my own than leave it completely to someone else.
	9. I like to know as much as possible about any health concerns I have.

Item Analysis – Modes of Control Inventory

Item analysis of the overall 22-item scale indicated that 4 items should be removed prior to further analyses (see Appendix F for items). Items 1, 6, and 7 each had low corrected item-total correlations (.18 to .23; $n = 405$). In addition each of these items had loaded incorrectly when the higher order structure of the 3 control scales was initially examined (see Table 11). Item 10 similarly had loaded onto each of the other higher order scales (CBI and CMI) depending on the group examined. This item also had a low squared multiple correlation (.22). Therefore these 4 items were removed prior to further item analyses of the scale leaving an 18-item scale.

The Modes of Control scale was proposed to contain 4 subscales. According to the examination of the initial factor structure three of the reduced subscales would now contain only 4 items, and one subscale would have 6 potential items. Thus, individual item analyses for each subscale would not be very meaningful because there were too few items. It was therefore decided to recheck the factor structure of the 18-item scale to confirm the subscale compositions and to determine whether any further items needed to be removed. An unweighted least squares extraction of 4 factors with an oblique rotation found that the items proposed to comprise the Agency and Unmitigated Agency subscale loaded onto their corresponding factors. The remaining two factors, Communion and Unmitigated communion were for the most part intact with the exception of 2 items. Item 3 and 11 from the Agency subscale loaded onto the Unmitigated Communion and Communion subscales respectively (see Appendix F for items). In addition, item 11 had high loadings ($> .4$) on two other factors. Both of these items were removed and a principal components factor analysis of the 4 factors

Table 19. Study 2: Post item analysis factor loadings of the Modes of Control Inventory.

Subscale	Item	Factor			
		1	2	3	4
Unmitigated Agency $\alpha = .78$	9. Only people who are weak ask others for help with their health problem.	.82786	-.12781	-.13832	.12439
	22. Asking for help with a health problem is a sign of weakness.	.81527	-.05551	-.18804	.14875
	5. Other people can't help me with my health so why bother asking.	.64965	.08384	-.36122	.38030
	16. I don't bother asking others for help when I have a health problem because they usually can't help me anyways.	.64188	.08645	-.53723	.33172
	13. Nobody can look after my health as well as I can	.00078	.79823	-.01885	.14071
Agency $\alpha = .72$	17. I am the best person to manage my health	-.02363	.79346	-.03085	.12877
	15. I am usually the one that makes the decisions regarding my health	-.13005	.73285	-.01497	.22974
	8. No one but me is going to keep me healthy	.00425	.61103	.01348	.18631
	12. I often find that I can solve my health problems by getting help from others	-.22677	-.11653	.70304	-.24848
Communion $\alpha = .65$	19. I find that other people usually have good advice for me regarding my health.	-.13876	-.07537	.69779	-.01951
	21. I enjoy working with others to improve my health.	-.13722	.25872	.68220	-.18108
	20. I avoid asking others for help with my health problems. (r)	.46680	.05106	-.58533	.45889
	4. I feel uncomfortable having other people look after me when I am ill.	.34962	.19881	-.13634	.71987
Unmitigated Communion $\alpha = .59$	14. I don't want to burden others with my health problems.	.21116	.13961	-.34869	.69902
	18. I feel more comfortable looking after others when they are ill than having others look after me if I am sick.	.32501	.19734	-.03175	.63095
	2. My health should not be a burden to anyone else.	-.21285	.19789	-.12165	.59532

Note: Factor loadings were obtained using a principal components extraction with an oblique rotation, $n = 418$. Highest factor loadings of an item are given in boldface type.

Table 20. *Study 2: Items retained for the Modes of Control Inventory subscales following the item analysis.*

Subscale	Item
Unmitigated Agency	<p>9. Only people who are weak ask others for help with their health problem.</p> <p>22. Asking for help with a health problem is a sign of weakness.</p> <p>5. Other people can't help me with my health so why bother asking.</p> <p>16. I don't bother asking others for help when I have a health problem because they usually can't help me anyways.</p>
Agency	<p>13. Nobody can look after my health as well as I can .</p> <p>17. I am the best person to manage my health</p> <p>15. I am usually the one that makes the decisions regarding my health</p> <p>8. No one but me is going to keep me healthy</p>
Communion	<p>12. I often find that I can solve my health problems by getting help from others</p> <p>19. I find that other people usually have good advice for me regarding my health.</p> <p>21. I enjoy working with others to improve my health.</p> <p>20. I avoid asking others for help with my health problems.</p>
Unmitigated Communion	<p>4. I feel uncomfortable having other people look after me when I am ill.</p> <p>14. I don't want to burden others with my health problems.</p> <p>18. I feel more comfortable looking after others when they are ill than having others look after me if I am sick.</p> <p>2. My health should not be a burden to anyone else.</p>

with an oblique rotation was run. The results presented in Table 19 show 4 factors each with 4 items and their corresponding alpha coefficients. Because each factor contained only 4 items, the Monte Carlo studies suggest that factors with few components should not be interpreted unless the sample size is minimum 300 (Guadagnoli & Velicer, 1988). The overall sample for this analysis was over 400. However, given the few items in each subscale it was clear that new items needed to be introduced into this scale to improve overall reliability. The final MCI scale for this study is presented in Table 20.

Study 3

Construct Validity

After reducing and refining the items and factor structure of the new set of scales the next step in the scale development involved examining whether the statistically derived factors reflected the constructs proposed by the a priori model. To assess whether the health-specific versions of the control-related constructs were indeed tapping their intended constructs, the new scales were compared to several measures of the base constructs. This type of validity has been termed construct validity since it assesses whether the items and scales are behaving statistically as though they are measuring the constructs they are intended to measure (Comrey, 1988). Thus, each facet scale was expected to be related to its corresponding marker scale as well with related marker scales for the other facets within the same scale. The hypothesized relations between the new scales and the marker scales are presented in Table 21. For example, the Control Expectancy subscale of the CBI should be somewhat related to the Internal subscale of Rotter's (1966) Internal-External Control scale (I-E scale), and the Chance subscale should be related to the External subscale.

However, some subscale dimensions do not have corresponding general measures of their constructs. Value measures are typically domain specific, and so it is not possible to compare the Health Value subscale with a general measure. Conceptually, Health Value is motivation for control over health, so it is expected that there should be some relation to the other control motivations scales, Desire for Control and Self-determination. Although Agency and Communion also do not have exact corresponding measures, the Bem (1974) Sex Role Inventory is often referred to as an analogous measure of these two constructs (Helgeson, 1994), and was therefore used as a proxy measure of these constructs. Specifically the Masculinity and Femininity scales were used as marker variables for the agency and communion modes of control facets. The remaining measures that correspond to the health-specific facets in the proposed scale are presented in Table 21.

Although this process was not intended to fully establish construct validity, it was proposed to provide an early glimpse of whether the subscales were reflecting the health-specific expressions of the broader domains that they were intended to assess.

Finally, the influence of social desirability on the item responses was explored. A short measure of social desirability was included in order to assess whether participants' responses are distorted by a need to appear favorably in the eyes of others. A short version of the Marlowe-Crowne Social Desirability Scale (Strahan & Gerbasi, 1972) is recommended as a good scale for assessing the influence of this variable during scale development (DeVellis, 1991). DeVellis (1991) suggests that items that are significantly correlated with the social desirability measure should be considered as candidates for removal unless there is theoretical reason indicating otherwise.

Table 21. *Study 3: Marker scales for the assessment of item and construct validity of the health-related control subscales.*

Control dimension	Control facet	Marker scales	Items
Control beliefs	Adaptive control	(none)	
	Control Expectancy	Internal-External Locus of control scale	
	Chance beliefs	(Rotter, 1966)	29
	Mastery	The General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 2000)	10
Control motivations	Autonomy	The Self-determination Scale (Sheldon & Deci, 1996)	10
	Desire for control	The Desirability of Control Scale (Burger & Cooper, 1979)	20
	Health value	(none)	
Modes of control	Agency	Masculinity scale from the Bem Sex Role Inventory (Bem, 1974)	20
	Communion	Femininity scale from the Bem Sex Role Inventory (Bem, 1974)	20

Sample

The sample consisted of 330 students and 98 community participants, the same sample that was used for Study 2. Data were merged into one set in order to examine the factorial validity of the reduced scales and to screen items for possible response bias.

Materials

In addition to the materials outlined in Study 2, several other questionnaires were used to assess the construct validity of the control scales as well as their relation to response bias (Appendix G).

Internal-External Locus of control scale (I-E scale; Rotter, 1966). This 29-item measure assesses general Locus of Control (LOC) beliefs, the extent to which one attributes outcomes to either internal or external forces. The I-E scale includes 6 filler items and uses a forced choice response format with internal and external beliefs assessed dichotomously. The number of items endorsed reflecting External LOC beliefs are summed, with lower values reflecting greater internal LOC beliefs and higher values reflecting external LOC beliefs. Scores can range from 0 (high internal) to 23 (high external). This scale has demonstrated adequate internal consistency ($\alpha = .70$, $N = 400$) (Rotter, 1966). The alpha coefficient for the current sample was .72. This measure was used to assess the validity of the Control Expectancy and Chance Beliefs subscales of the Control Beliefs Inventory (CBI).

The General Perceived Self-Efficacy Scale (GPSE; Schwarzer & Jerusalem, 1995). This 10-item questionnaire assesses global feelings of self-efficacy. Confidence about completing tasks are scored on a 4-point Likert-type scale ranging from 1 for “Not at all true” to 4 for “Exactly true”. The GPSE has demonstrated good internal

consistency ($\alpha = .90$, $n = 219$) in a sample of older adults with arthritis. The alpha coefficient for the current sample was .86. Scores on the GPSE were compared to the Mastery subscale of the CBI to evaluate the validity of this health-specific self-efficacy scale.

The Desirability of Control Scale (DCS; Burger & Cooper, 1979). The desire to feel that one is in control is assessed by this 20-item scale. Agreement with the statements reflecting desire for control are rated on a 7-point Likert-type scale ranging from 1 for “Does not apply to me at all” to 7 for “Always applies to me”. The DCS has shown good discriminant validity with Rotter’s Internal-External Locus of control scale ($r = -.19$; $n = 268$), and good internal consistency ($\alpha = .80$) (Burger & Cooper, 1979). The alpha coefficient for the current sample was .78. The construct validity of the Desire for Control subscale of the CMI was assessed by examining the correlations with the DCS.

The Self-Determination Scale (SDS; Sheldon & Deci, 1996). This 10-item scale assesses individual differences in the extent to which people tend to function in a self-determined, autonomous way. Each item is comprised of two pairs of statements and agreement with one statement or the other is assessed on a 5-point dichotomous scale ranging from 1 for “Only A feels true” to 5 for “Only B feels true”. The SDS has demonstrated good psychometric properties with alpha coefficients ranging from .85 to .93 (Sheldon, Ryan, & Reis, 1996b). The alpha coefficient for the current sample was .81. Although the autonomy subscale and the desire for control subscale were collapsed into one scale, associations with the SDS scale were examined to provide additional construct validity for the Desire for Control subscale.

The Bem Sex Role Inventory (BSRI; Bem, 1974). This 60-item instrument measures the tendency to describe oneself in accordance with sex-typed behaviors and characteristics for men and women. It contains 2 subscales, Masculinity, and Femininity that are proposed to be relatively independent. Respondents rate the extent to which each characteristic describes them on a 7-point Likert-type scale ranging from 1 for “Never or almost never true” to 7 for “Always or almost always true”. The BSRI has demonstrated good internal consistency with an alpha coefficient of .86 for the Masculinity scale ($n = 444$) and .82 for the Femininity scale ($n = 279$). The alpha coefficients of the two subscales for the current sample were .86 for the Masculinity scale and .76 for the Femininity scale. Because Agency and Communion are often assessed with the Masculinity and Femininity scales of the BSRI (Helgeson, 1993a), the construct validity of the Agency and Communion subscales of the Modes of Control Inventory (MCI) was evaluated by comparing each to the BSRI scales.

The Short Version Marlowe-Crowne Social Desirability Scale (MC-SDSI; Strahan & Gerbasi, 1972). This scale contains 10 true-false items drawn from the original 37-item Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). The original Marlowe-Crowne scale was designed to assess social desirability and the need for approval. However, more recently it has been interpreted as assessing the need to avoid disapproval (Berger, Levin, Jacobsen, & Millham, 1977). Respondents indicate whether the statements accurately reflect their self-perceptions and item scores are summed such that higher values indicate a greater desire to avoid disapproval. DeVellis (1991) recommends the use of this measure during scale development for assessing the influence of social desirability bias.

Results and Discussion

Response Bias – Control Beliefs Inventory

The mean score for the current sample ($M = 4.43$, $SD = 1.90$) on the Short form Marlowe-Crowne Social Desirability Scale (MC-SDS10) was comparable to that found with other adult samples ($M = 4.6$, $SD = 2.1$; Strahan & Gerbasi, 1972). An analysis of the relations between the 26 individual items on the Control Beliefs Inventory (CBI) and the Short form Marlowe-Crowne Social Desirability Scale (MC-SDS10) revealed that only three items were significantly related to the MC-SDS10. Each of these items was a part of the Mastery subscale and was a reverse scored item. Item 27 ($r = .12$, $p < .05$), item 25 ($r = .11$, $p < .05$), and item 9 ($r = .16$, $p < .01$), each showed modest correlations to the social desirability index for the entire sample ($N = 396$) (see Appendix F for items). However, given the size of the sample and the relatively low magnitude of the correlations, a decision was made to not remove these items from the scale unless the construct validity analyses indicated further problems.

Intercorrelations of the MC-SDS10 and each of the CBI subscale means was also examined (Table 22), and the Mastery subscale was the only scale that showed a modest relation to social desirability ($r = .15$, $p < .01$, $N = 435$).

Response Bias – Control Motivations Inventory

An examination of the relations between the MC-SDS10 and the 13 items of the Control Motivations Inventory (CMI) revealed that 3 items were modestly associated with the social desirability index. Item 20 ($r = .11$, $p < .05$), and item 25 ($r = .11$, $p < .05$), of the Health Value subscale, and item 9 ($r = .11$, $p < .05$) from the Desire for Control subscale were each weakly related to the MC-SDS10 ($N = 414$) (see Appendix F for

Table 22. Study 3: Correlations among the Control subscales and the short form Marlowe-Crowne Social Desirability Scale (MC-SDS10)

Scale	1	2	3	4	5	6	7	8	9	10	11
1. Marlowe-Crowne SDS-10	---										
2. Control Beliefs	.02	---									
3. Adaptive Control	.02	.60**	---								
4. Chance Beliefs	.01	-.35**	-.15**	---							
5. Mastery	.15**	.41**	.33**	-.26**	---						
6. Control Motivations Inventory	.09	.40**	.36**	-.13**	.46**	---					
7. Health Value	.11*	.33**	.27**	-.14**	.40**	.90**	---				
8. Desire for Control	.04	.39**	.38**	-.08	.44**	.91**	.65**	---			
9. Agency	-.01	.43**	.35**	-.14**	.26**	.45**	.33**	.48**	---		
10. Unmitigated Agency	-.05	-.18**	-.12*	-.15**	-.28**	-.27**	-.25**	-.23**	-.02	---	
11. Communion	.05	.16**	.10*	-.05	.22**	.29**	.32**	.19**	.02	-.45**	---
12. Unmitigated Communion	.11*	.11*	.21*	.03	.01	.05	-.01	.10*	.23**	.34**	-.32**

Note: * $p < .05$, ** $p < .01$, ($N = 435$).

items). However, only the subscale mean for the Health Value subscale was related to the MC-SDS10 ($r = .10, p < .05$) (Table 22). Because of the low magnitude of the correlations and the relatively large sample size these associations were not deemed as a threat to the scale's validity unless the construct validity of the scales was also compromised.

Response Bias – Modes of Control Inventory

An analysis of the relations of the 16 items of the Modes of Control Inventory (MCI) with the MC-SDS10 revealed that only item 18 from the Unmitigated Communion subscale was significantly related to the MC-SDS10 ($r = .18, p < .01, N = 435$). The mean for the Unmitigated Communion subscale was also related to the social desirability index ($r = .11, p < .05$) (Table 22). Item 18 was therefore considered a potential candidate for removal or revision depending on its performance in the construct validity analysis.

Construct Validity Analysis – Control Beliefs Inventory

The individual 26 items and the mean scores for the Control Beliefs Inventory were analyzed for correlations with the scores for Rotter's I-E LOC scale (Rotter, 1966) and the Generalized Perceived Self Efficacy Scale (GPSE; Schwarzer & Jerusalem, 1995). Reverse keyed items were reverse scored prior to the analyses and the results are presented in Table 23.

The mean score for the current sample on the I-E LOC scale was 10.83 ($SD = 3.95$), which is comparable to the range of norms (means from 11.3 to 12.6) found for other samples (Lefcourt, 1991). The mean GPSE score for the current sample ($M = 3.21, SD = .41$) was comparable for the norms reported for other adult samples ($M = 2.95, SD = .51; N = 1,594$) (Schwarzer & Jerusalem, 1995).

Table 23. Study 3: Correlations among the construct marker scales and the subscale items of the Control Beliefs Inventory.

Subscale	Marker scale	Item correlations									
		26	29	1	16	2	32	21	15	Scale	
Control Expectancies	I-E LOC	-.15**	-.18**	-.16**	-.21**	-.18**	-.20**	-.20**	-.24**	-.27**	
	GPSE	.22**	.14*	.34**	.27**	.14**	.20**	.14**	.18**	.28**	
Adaptive control	I-E LOC	-.12*	-.18**	-.19**	-.15**	-.17**	-.24**				
	GPSE	.19**	.15**	.24**	.19**	.14**	.29**				
Chance Beliefs	I-E LOC	.22**	.21**	.18**	.20**	.14**	.26**				
	GPSE	-.10*	-.03	-.09	-.11*	-.04	-.11*				
Mastery	I-E LOC	.27(r)	.28	.9(r)	.13	.23 ^a	.25(r)	.24	.18	Scale	
	GPSE	-.17**	-.18**	-.18**	-.18*	-.16**	-.19**	-.01	-.14**	-.25**	
	GPSE	.26**	.36**	.28**	.31**	.39**	.29**	.26**	.20**	.45**	

Note: * $p < .05$, ** $p < .01$, (r) = reverse scored item, I-E LOC = Rotter's Internal-External Locus of Control scale (Rotter, 1966), GPSE = Generalised Perceived Self-efficacy scale (Schwarzer & Jerusalem, 1995), $N = 396$ with listwise deletion.

^a this item was originally adapted from the GPSE to reflect a health-specific focus.

Overall, each of the 8 items of the Control Expectancy subscale showed significant correlations with both the I-E LOC scale and the GPSE. In addition, the subscale mean was significantly related to both of the marker scales. Although self-efficacy is considered distinct from perceived locus of control, other studies have similarly found moderate correlations between measures of locus of control and self-efficacy (Schiaffino & Revenson, 1992). The magnitude of associations between Control Expectancy items and the LOC measure were not very high, and this may be due to the limitations of the I-E LOC scale. For example, a review of the properties of the I-E scale suggest that it may be more multidimensional than unidimensional (Lefcourt, 1991), and other studies have suggested that the internal and external items are not highly correlated with one another (Collins, 1974) although Rotter (1966) suggests that they are dichotomous dimensions of control.

The 5 items of the Adaptive Control subscale were also each significantly related to the two marker scales, as was the overall subscale mean. Some of the associations were slightly higher with the GPSE which conceptually fits with the underlying meaning of this scale – a belief in being able to act adaptively and take control of the aspects of one's health that are more controllable, rather than a more absolute belief in control. Self-efficacy is similarly linked to expectancies that one's actions will bring the expected results (Bandura, 1977).

The 5 items of the Chance Beliefs subscale were each significantly related to the I-E LOC scale in the expected direction, as was the overall subscale mean. In addition, two items were negatively and modestly associated with the GPSE. Again the magnitude

of the correlations was not as high as expected, perhaps because of the limitations of the I-E LOC scale previously mentioned.

The Mastery subscale and each of its 8 items showed significant correlations with the GPSE, with correlations ranging from .20 to .39. for the items and .45 for the overall subscale¹⁴. Although all three reverse scored items had shown some modest association with the social desirability index, these items were clearly also good indicators of the underlying construct of self-efficacy, and were therefore retained for the next study.

Construct Validity Analysis – Control Motivations Inventory

The correlations of the 13 items of the Control Motivations Inventory (CMI) and the means for the two subscales, Desire for Control and Health Value, with the two marker scales, Desire for Controllability (DCS; Burger & Cooper, 1979) and the Self-Determination Scale (SDS; Sheldon & Deci, 1996) were examined to evaluate early signs of construct validity. Reverse keyed items were reverse scored prior to the analyses and the results are presented in Table 24. The mean value for the DCS in the current study ($M = 98.8$, $SD = 12.2$, $N = 414$) was similar to that of the norms previously established for the DCS ($M = 99.1$, $SD = 11.8$, $N = 453$; Burger & Cooper, 1979).

Overall, the items and overall scale mean of the Health Value subscale showed more consistent association with the DCS than with the SDS. Although neither scale was considered a direct match in terms of the construct of Health Value, conceptually, valuing

¹⁴ Although some of the items in the original item pool were adapted from the marker scales (see Appendix A, Tables 23 and 24), the moderate to low magnitude of correlations between the scale items and the marker scales (less than .40) suggests that the derived items were not inflating the associations between the new scales and the comparison scales. Indeed, the associations between general and domain specific scales of the same construct are often not substantial owing to conceptual differences between domain-specific versus general constructs.

Table 24. Study 3: Correlations among the construct marker scales and the subscale items of the Control Motivations Inventory.

Subscale	Marker scale	Item correlations							
Health Value		20	27	25	30	22	14 (r)	Scale	
DCS	DCS	.25**	.13**	.26**	.17**	.17**	.15**	.25**	
	SDS	.18**	.15**	.16**	.09	.09	.10*	.16**	
Desire for Control		19	15 ^a	6 ^b	29	12	24	9	Scale
	DCS	.32**	.27**	.17**	.24**	.24**	.20**	.17**	.32**
	SDS	.29**	.27**	.14**	.21**	.19**	.10*	.11*	.26**

Note: * $p < .05$, ** $p < .01$, (r) = reverse scored item, DCS = Desire for Controllability Scale, (Burger, 1985), SDS = Self Determination Scale (Sheldon & Deci, 1996), $N = 414$ with listwise deletion.

^a This item was adapted from the DCS to reflect a health-specific focus.

^b This item was adapted from the SDS to reflect a health-specific focus.

one's health may be associated with a desire to have control over that particular domain. Indeed, the association between the Health Value subscale and the Desire for Control subscale of the CMI was considerable ($r = .65$). However, valuing one's health may not be necessary to feel that one is acting autonomously (self-determinately) in looking after one's health.

The 7 items of the Desire for Control subscale were significantly associated with both the DCS and the SDS, although the magnitude of these associations was slightly higher for the DCS. Although the underlying construct of this subscale was a desire to have control over one's health, this subscale was comprised of items based on both the DCS and the SDS, and therefore the dual association was to be expected. Both the concepts of desire for control and self-determination reflect an underlying motive to control events in areas of importance for the individual (Burger & Cooper, 1979). Further both self-determination and desire for control can be characterized by acting assertively, decisively, and taking action over areas that relate to the domain of interest (Burger & Cooper, 1979; Deci & Ryan, 1987).

Construct Validity Analysis – Modes of Control Inventory

The four subscales of the Modes of Control Inventory (MCI) were examined for their associations with the marker scales, the Masculinity and Femininity subscales of the Bem Sex Role Inventory (BSRI). The mean values on the Masculinity ($M = 4.82$, $SD = .74$, $N = 437$) and Femininity ($M = 4.95$, $SD = .64$, $N = 437$) subscales were comparable to the norms found in other samples (Masculinity: $M = 4.97$, $SD = .67$, $N = 444$; Femininity: $M = 5.01$, $SD = .52$; $N = 279$; Bem, 1974). Reverse keyed items were reverse scored prior to the analyses and the results are presented in Table 25.

Table 25. *Study 3: Correlations among the construct marker scales and the subscale items of the Modes of Control Inventory.*

Subscale	Marker scale	Item correlations				
Agency		13	17	15	8	Scale
	BSRI-M	.20**	.22**	.28**	.18**	.28**
	BSRI-F	.02	.06	-.01	.00	.03
Unmitigated Agency		9	22	5	16	Scale
	BSRI-M	-.05	-.01	-.03	-.08	-.04
	BSRI-F	-.17**	-.16**	-.01	-.04	-.13**
Communion		12	19	21	20(r)	Scale
	BSRI-F	.14**	.05	.16**	.08	.15**
	BSRI-M	.03	.07	.14**	-.02	.07
Unmitigated Communion		4	14	18	2	Scale
	BSRI-F	-.10*	.06	.03	.06	.01
	BSRI-M	.12*	.01	.04	.07	.07

Note: * $p < .05$, ** $p < .01$, (r) = reverse scored item, BSRI = Bem Sex Role Inventory (Bem, 1974), M = Masculinity scale, F = Femininity, $N = 405$ with listwise deletion.

The 4 items in the Agency subscale each showed the expected significant associations with the BSRI Masculinity subscale, and no association with the BSRI Femininity subscale. The Agency scale mean demonstrated the same expected pattern of associations with the BSRI Masculinity and Femininity scales. Recall that Agency and Communion are proposed to be independent, orthogonal constructs (see Table 26) (Helgeson, 1994). Together, these results suggest that the Health Agency subscale reflected the intended construct of Agency.

Table 26. *Theoretical relations among Agency and Communion constructs based on Helgeson's (1994) model.*

Construct	Expected direction of relation			
	1	2	3	4
Agency	---	(+)	0	(-)
Unmitigated agency		---	(-)	0
Communion			---	(+)
Unmitigated Communion				---

The results for the Unmitigated Agency subscale were less encouraging. Two of the items (9, 22) and the subscale mean showed the expected negative associations with the BSRI Femininity subscale, whereas the other 2 items (5, 16) showed no association with this scale (see Appendix F for items). Further, none of the items were associated with the BSRI Masculinity scale although theoretically Unmitigated Agency should be positively associated with Agency (see Table 26). Items 5 and 16 were removed from the

scale and it was decided that new items would be written to try to better capture a health-specific version of this construct.

For the Communion subscale, two of the 4 items and the subscale mean showed the expected positively associations with the BSRI Femininity subscale. As well, 3 of the items showed no association with the BSRI Masculinity subscale, whereas item 21 was related to this marker scale. Items 19 and 20 were subsequently removed from the scale as neither showed the expected relations with the marker scales. Again, the decision was made to write new items to help better capture the proposed underlying construct of health-specific Communion.

The Unmitigated Communion subscale also showed poor construct validity. Three items showed no relation to either the Masculinity or Femininity subscales although theoretically Unmitigated Communion should be positively related to Communion/Femininity and negatively related to Agency/Masculinity (Helgeson, 1994). In addition, item 4 demonstrated a modest negative association with the BSRI Femininity subscale, and positive association with the BSRI Masculinity subscale. Clearly, although the previous factor analysis indicated that these 4 items formed a unique factor, this factor did not reflect the intended construct of health-specific Unmitigated Communion. It was therefore decided that all of the items from this subscale would need to be removed or rewritten prior to further testing.

Scale and Item Changes

Overall, items within each subscale were related to their corresponding and associated marker scales with the exception of some items from the Modes of Control scales. Although many items had been removed because of poor performance in the item

analysis, some items were considered candidates for rewording and addition back to the scales should they prove to be valid theoretically.

For the Control Beliefs Inventory (CBI) all items were retained and kept intact with the exception of item 5 from the Adaptive Control subscale, which had the weakest correlations with the marker scales. This item was therefore reworded slightly to increase its clarity. An additional item was written and added to the subscale (“I can take control of my health condition by managing my day-to-day symptoms”) to capture the idea that Adaptive Control reflects an awareness and belief in taking control of the more controllable aspects of one’s health condition. The final CBI scale after the changes made in this study is presented in Table 27.

The Control Motivations Inventory (CMI) subscales, Health Value and Desire for Control, had performed well in the early checks of their construct validity. However, the CMI contained only one reverse scored item, item 14, as part of the Health Value subscale. Two reverse scored items from the Desire for Control subscale that had been previously removed were reconsidered for provisional inclusion in this subscale. Item 16 had a low inter-item correlation for the chronic group in the item analysis, and item 10 similarly had a low inter-item correlation across both groups (see Appendix F for items). However, a post hoc examination of their association with the two marker scales indicated that both of these items reflected the construct underlying this subscale. After reverse scoring these items, item 10 was positively correlated with both the DCS ($r = .26$, $p < .01$) and the SDS ($r = .22$, $p < .01$), and item 16 was also correlated with the DCS ($r = .27$, $p < .01$) and the SDS ($r = .21$, $p < .01$). Each of these items was therefore slightly reworded to potentially improve their association with the other scale items and included

Table 27. *Study 3: Items retained for the Control Beliefs Inventory subscales following the construct validity analysis.*

Subscale	Item
Control Expectancy	<p>2. It is my own actions that determine how healthy I am.</p> <p>4. If I set my mind to it I can improve my health.</p> <p>13. My health depends on how I take care of myself.</p> <p>15. People who take care of themselves stay healthy.</p> <p>17. How soon I recover from an illness depends on how I look after myself.</p> <p>20. My current state of health is a reflection of how I look after myself.</p> <p>25. I am certain that with effort I can improve my health.</p>
Adaptive Control	<p>7. I can take control of my health by managing my day-to-day symptoms.</p> <p>9. If I make the effort, I can manage my illness.</p> <p>11. There are things that I can do to make my health problem easier to deal with.</p> <p>14. I believe that I can do more to control my symptoms.</p> <p>21. If I do the right things I can make my symptoms more manageable.</p> <p>22. Regardless of circumstances, I can do things to improve my health.</p>
Mastery	<p>1. I know that I can do what is necessary to improve my health.</p> <p>5. I am confident that I can successfully look after my health.</p> <p>8. Even though there are things I can do to improve my health, I don't feel that I can do them.</p> <p>12. I am able to meet the challenge of following a healthy routine</p> <p>16. When facing a health problem, I often feel overwhelmed about what to do.</p> <p>19. I am confident that I could deal with any unexpected health problems.</p> <p>23. I am confident in my ability to make the right decisions about my health.</p> <p>26. When it comes to my health, I often feel unable to do what I know should be done.</p>
Chance	<p>3. If I am lucky I will stay healthy</p> <p>6. My health depends on forces beyond my control</p> <p>10. How soon I recover from an illness depends on how lucky I am</p> <p>18. If I am fortunate my health will improve</p> <p>24. My health is determined by circumstances beyond my control</p>

Note: Item numbers correspond to the scale as administered in Study 4.

back in the Desire for Control subscale provisionally. If either of these items compromised the consistency or integrity of this subscale in the next study, then they would be removed again. The final CMI scale following the changes made in this study is presented in Table 28.

The results of the construct validity analysis of the Modes of Control Inventory (MCI) indicated that this scale needed major revisions before further testing. As well, the very few items comprising each of the 4 subscales suggested that additional items may help improve the consistency and validity of the scale.

The Agency subscale showed good indication of reflecting this health specific mode of control even with only 4 items. Item 10, which had been previously removed during the item analysis because it lowered the scale's internal consistency, was re-examined for possible rewording and inclusion. This item appeared to capture an important aspect of the Agency construct not addressed by the other 4 items, namely the idea that help from others may be considered, but that the final decisions are made by the individual. An analysis of the relation of this item to the BSRI Masculinity and Femininity subscales supported this observation, with item 10 demonstrating a positive association with the BSRI Masculinity subscale ($r = .17, p < .01$), and no association with the BSRI Femininity subscale. This item was reworded to a simpler form ("I may listen to others' advice about my health but the final decision is always my own") and added back to the scale in order to retain its underlying meaning while potentially improving its performance within the subscale.

With only two remaining items after the construct validity analysis, the Unmitigated Agency scale required more items to rebuild this subscale and adequately

Table 28. *Study 3: Items retained for the Control Motivations Inventory subscales following the construct validity analysis.*

Subscale	Item
Health Value	2. Any time I spend looking after my health is time well spent.
	5. I take my health seriously.
	7. Having and maintaining good health is a life-long goal for me.
	9. There are many things that are more important than health.
	11. I have better things to do than to spend time on my health.
	13. Making sure that I am as healthy as I can be is an important goal for me.
	15. Health and well-being are the most important concerns in my life.
Desire for Control	1. I like to know as much as possible about any health concerns I have.
	3. It is important that I feel like I am in control of my health.
	4. When it comes to my health, I find it easier to do what I am told to do than to think about it myself.
	6. I like to feel that I am participating in the management of my health.
	8. I prefer to let other people decide what is best for my health.
	10. I want to take responsibility for my own health.
	12. I enjoy taking part in decisions about my health.
	14. I would rather find information about a health issue on my own than leave it completely to someone else.
	16. When it comes to my health, I enjoy making my own decisions.

Note: Item numbers correspond to the scale as administered in Study 4.

capture the health-specific construct. Unmitigated Agency reflects an exaggerated need for control that excludes assistance or interaction with others. One item that had been previously removed during the item analysis appeared to capture this idea. Further, the reason for removal was based on multiple factor loadings, specifically with the Communion and Unmitigated Communion subscales. Given that both of these subscales did not perform well in the construct validity analysis, it was possible that this item may be a candidate for revision and inclusion. A check for its relation to the BSRI marker scales confirmed this suggestion with item 11 demonstrating the expected negative correlation with the BSRI Femininity subscale ($r = -.17, p < .01$) and positive correlation with the BSRI Masculinity subscale ($r = .12, p < .01$). This item was therefore reworded (“I like to work on my health problems alone”) and included in the Unmitigated Agency subscale.

Items 5 and 16 had also been removed and both appeared to address the idea that help from others was not useful. Accordingly, a new item was written to capture this idea while being relatively easy to read (“Asking others for advice about my health is a waste of time”). One more item was written to reflect the focus on self and not others that characterizes Unmitigated Agency (“People should keep their health problems to themselves”) and added to this subscale. This item was similar to a reverse item from the Communal Orientation Scale (Clark, Ouellette, Powell, & Milberg, 1987), reworded to reflect a health focus. Given that Unmitigated Agency is negatively related to Communion, it was expected that this item would reflect the Unmitigated Agency construct. The newly revised scale now included 5 items to be further tested in the next study.

The Communion scale, which had retained only 2 items, also needed additional items. The qualities of Communion are that of cooperation, requesting support from others, and engaging in reciprocal helping connections (Helgeson, 1994). Two new items designed to reflect these ideas were written and added: “I find that when people work together to improve their health everyone benefits” and “When I have a health concern, I prefer talking with others about it rather than trying to deal with it on my own”.

The items in the Unmitigated Communion scale had shown very poor signs of construct validity and therefore several new items were needed. Item 18 appeared to reflect the idea of focus on others to the exclusions of self that characterizes Unmitigated Communion. However, this item had also shown modest associations with the social desirability index. Therefore, it was reworded to “I prefer to look after others when they are ill rather than to have others look after me if I am ill” and added back to the scale for re-testing. Four other items were derived from Helgeson’s Unmitigated Communion Scale (Helgeson, 1993a) and reworded to reflect a health-specific focus. Each of these items had shown high factor loadings during a development study involving new cardiac patients and their spouses and the overall scale had also predicted poor adjustment 3 months after hospital discharge (Helgeson, 1993a). It was expected that because these new items were based on items that had been previously validated to reflect Unmitigated Communion that they would capture a health specific version of this construct for the current scale. The final MCI scale following the changes made in this study is presented in Table 29.

Table 29. *Study 3: Items retained for the Modes of Control Inventory subscales following the construct validity analysis.*

Subscale	Item
Unmitigated Agency	
	3. People should keep their health problems to themselves.
	7. Only people who are weak ask others for help with their health problem.
	13. Asking others for advice about my health is a waste of time.
	14. I like to solve my health problems alone.
	18. Asking for help with a health problem is a sign of weakness.
Agency	
	1. Nobody can look after my health as well as I can .
	5. I am usually the one that makes the decisions regarding my health
	10. No one but me is going to keep me healthy
	16. I am the best person to manage my health
	19. I may listen to others' advice about my health but the final decision is always my own.
Communion	
	2. I enjoy working with others to improve my health.
	9. When I have a health problem I turn to others for support.
	11. I often find that I can solve my health problems by getting help from others
	15. I prefer talking with others about any health concern I have rather than trying to deal with it on my own.
	17. I find that when people work together to improve their health everyone benefits.
Unmitigated Communion	
	4. I have difficulty looking after my own health when it interferes with the health of my family.
	6. Even when I am sick I will help a sick friend.
	8. I always place the health of my friends and family above my own.
	12. I would rather look after others when they are ill than have others look after me if I am ill.
	20. I often find myself getting overly involved in other people's health problems.

Note: Item numbers correspond to the scale as administered in Study 4.

Study 4

The purpose of this study was twofold. First, because additional items were included following the preliminary factor analysis and item analysis, it was important to re-examine the scale compositions and structure to ensure that the new items were suitable for the scales. This is a necessary and expected step in the iterative process of scale development (Clark & Watson, 1995). The second purpose was to establish the psychometric properties of the new scales, including reliability, construct validity, and generalizability.

Verifying Scale Composition and Structure.

DeVellis (1991) suggests that a replication of the scales' reliability and factor structure with an independent sample is useful for demonstrating factor stability. Accordingly, the factor structure of the revised scales was examined prior to further analyses of the scales' properties and the subscale items were subjected to a further brief item analysis (if necessary) following the guidelines previously stated in Study 2. Further, two specific indices of reliability were assessed, the internal consistency or alpha coefficient, and the test-retest reliability of the scales over time (John & Benet-Martinez, 2000). Given that the new scales are designed to reflect relatively stable control perceptions, the stability over a two-week period should be above the recommended value of .70 (Nunnally & Bernstein, 1994).

Convergent and Divergent Validity

In order to establish elements of the new scales' construct validity, the subscales will be compared to other measures. Two important aspects of construct validity are convergent and divergent validity, establishing what a test measures and what it does not

measure, respectively (John & Srivastava, 1999). This is often accomplished by comparing the new scales with other general personality measures and observing the patterns of correlations (John & Benet-Martinez, 2000). Accordingly, related constructs should show higher correlations with the scales and unrelated or distinct constructs should show low associations (Anastasi, 1968).

The Big Five Factors of personality reflect higher order personality factors that provide a framework in which to situate the new control constructs. Although it was expected that the control subscales would not be substantially related to any one of the five major personality domains, previous research suggests that there may be some association between certain subscales and the personality factors. For example, internal LOC has been found to be related to conscientiousness (Marshall, Wortman, Vickers, Kusalas, & Hervig, 1994). Thus, the Control Beliefs subscale, which subsumes the internal LOC construct, may be related to this personality factor.

Furthermore, one of the facets of neuroticism is passivity (McCrae & Costa, 1999), which is conceptually opposite to agency (Helgeson, 1994). Therefore, a negative relation between this personality domain and the agentic mode of control is expected. An evaluation of how the five factors are related to each control dimension will demonstrate how the health control constructs are related to these five major personality factors, as well as validate that the scales are not simply assessing the same types of personality domains.

Two other personality constructs, optimism and self-esteem, were compared to the new control subscales to establish elements of divergent and convergent validity. Because self-esteem reflects an individual's feeling of self-worth, and not self-control, it

was expected that the correlations between self-esteem and the health-related control constructs will be minimal. Like optimism, feelings of mastery incorporate a positive expectancy for the future, although this is combined with a sense of personal responsibility for this expectancy (Scheier, Carver, & Bridges, 1994). Therefore, the Mastery subscale should show a positive relation to optimism as has been previously demonstrated (Scheier et al., 1994).

The Multi-dimensional Health Locus of Control scale (MHLC) (Wallston et al., 1978) was also used to assess the discriminant and convergent validity of the new scales. Because the new measures are designed to subsume and re-specify certain dimensions of the MHLC, it is important to demonstrate that these measures are both similar yet distinct. For example, the new Control Expectancies subscale is designed to subsume internal and powerful others control but without the content related to self-blame that is included in the MHLC internal scale (Marshall, 1991; Stainton Rogers, 1995). The Chance beliefs subscale should be positively related to the Chance HLOC beliefs scale. Thus, the corresponding relations of these MHLC scales with the control subscales are expected to be found. However, the Agency and Communion modes of control are expected to not be substantially related to the internal and powerful others HLOC scales as these constructs redefine the role of involving others in one's health from the original MHLC powerful others conceptualization. Similarly, Motivation for Control is expected to be distinct from the internal HLOC construct as has been demonstrated in previous studies of these two constructs (Burger & Cooper, 1979; Wallston et al., 1983).

The control dimensions assessed by the new scales are proposed to help predict adjustment to chronic health conditions. Similarly, other illness cognitions such as

acceptance, perceived benefits and helplessness are implicated as important constructs in understanding adaptation to chronic illness (Evers et al., 2001). It is expected therefore that the new control scales would show some associations with these illness cognitions. For example, helplessness can be viewed as the absence of perceived control over stressful situations (Peterson, 1982; Seligman, 1975) and accordingly negative associations with the Control Belief scales are expected. Adaptive control involves perceiving control over the more controllable aspects of one's health condition. This necessarily entails first accepting one's illness and perhaps focusing on its positive consequences, two illness cognitions that are associated with positive adaptation to chronic illness. Thus, positive associations between the Adaptive control scale and acceptance and benefit finding would assist in validating this scale's properties. Furthermore, because the style in which one exerts control over illness may also be related to illness cognitions, associations with the Modes of control scales were also explored to further validate the new scales.

The Modes of Control scales assess one's style of taking control of health, ranging from the absence of involvement to over involvement with others. Similarly, different attachment styles describe the different ways in which people relate to others based on internalized working models of self and others (Hazan & Shaver, 1987). Conceptually, certain Modes of Control subscales may show relations with the different attachment styles. For example, avoidant attachment which is characterized by an avoidance of seeking support from others (Simpson, Rholes, & Nelligan, 1992), may be related to the unmitigated agency subscale, whereas anxious attachment, the tendency to seek out and provide support in times of stress (Simpson et al., 1992), may show some

relation to unmitigated communion. Because secure attachment describes a well-adjusted way of relating to others it is expected that this construct may be related to constructs of agency and communion that similarly describe well-balanced ways of relating to others. Indeed, Fritz and Helgeson (1998) found that a general measure of communion was related to a secure attachment style.

Further evidence of convergent validity for the new scales was explored by assessing the relation of the control subscales to various coping styles as assessed by the brief COPE (Carver, 1997). For example, adaptive control with its emphasis on accepting one's health condition and taking action to deal with it, should show positive association with problem-focused coping styles such as active coping and planning, and negative associations between more avoidant coping styles such as behavioral disengagement and denial. Similar relations with the COPE are expected between the CBI subscales of Mastery and Control expectancies. Further, because the Control Expectancy scale was designed to reflect a belief in personal control similar to that of the internal scale of the MHLC (Wallston et al., 1978) but be free from items related directly to self-blame, this subscale should be unrelated to the self-blame scale of the brief COPE. The Modes of Control Inventory (MCI) subscales are also expected to show some relations with the two social support subscales of the brief COPE, instrumental and emotional social support. Given that Communion reflects a help-seeking style in taking control of one's health, this subscale should have the largest positive relations with these coping styles, whereas unmitigated agency should show negative association with these two coping styles.

The success of coping efforts is also important for understanding adaptation to a health condition. Coping efficacy reflects an individual's appraisal of how well they are

managing their health condition (Gignac, Cott, & Badley, 2000) and increased coping efficacy is related to psychological well-being (Zautra & Wrabetz, 1991). Conceptually, both health-specific efficacy and adaptive control may therefore be related to successfully coping with one's health condition. Therefore, a measure of coping efficacy will help to further establish the convergent validity of the new control belief scales.

Concurrent Validity

One other aspect of construct validity is concurrent validity, or the extent to which current scores on a measure estimate an individual's present criterion score (John & Benet-Martinez, 2000). This form of criterion-related validity is characterized as the practical validity of a test in a specific situation (Anastasi, 1968). Although aspects of concurrent validity will be explored in Study 5, for the current study an assessment of the practice of wellness behaviors provides an initial examination of this form of construct validity with respect to each of the new control scales. Wellness behaviors are health promoting or maintaining behaviors (e.g., exercise, proper diet) that are associated with a sense of personal control and mastery. Specific control subscales are accordingly expected to predict the frequency of wellness behaviors. For example, health value has been found to predict health behavior in combination with efficacy beliefs (Norman, 1995), and self-efficacy is also a predictor of various health behaviors (AbuSabha & Achterberg, 1997; O'Leary, 1985; Stretcher et al., 1986). With the exception of Chance Beliefs which are negatively associated with health promoting behaviors (Duffy, 1988; Muhlenkamp et al., 1985; Norman et al., 1997; Speake et al., 1991; Steptoe et al., 1994) the new health-control subscales are expected to demonstrate positive associations with the frequency of wellness behaviors.

Generalizability

Finally, the generalizability of the new scales across different populations will provide an elaboration of their construct validity (John & Benet-Martinez, 2000). In addition to assessing the reliability and validity of the new scales with a convenience sample of students, an assessment of the psychometric properties of the scales with two specific chronic illness populations will assist in cross-validating the results of the empirical tests.

Because the three new control scales were designed to assess several distinct aspects of control perceptions the comparison of the means of each control scale among the sample groups will provide further evidence of construct validity. For example, although beliefs about control over health are known to fluctuate according to differences in health status (Arraras et al., 2002), the modes of control constructs reflect different styles of exerting control over health that should not necessarily be influenced by changes in health status. Therefore, mean differences on the CBI and CMI scales across the different samples is expected, whereas it was not expected that the mean scores of the MCI scales should be very different when comparing the different health samples.

Participants and Procedure

Three types of representative samples were recruited for the purpose of confirming the factor structure and items of the new scales and for conducting the reliability and validity analyses. In order to assess the psychometric properties of the new scales with a healthy population a student sample comprised one of the samples. In addition, participants were recruited from two chronic illness populations to assess the relevance of the scales for those with an ongoing health issue. Arthritis and inflammatory

bowel disease were chosen as the chronic illness populations. Arthritis is characterized by pain due to inflammation of the joints and can often limit mobility. Inflammatory bowel disease is a chronic and incurable inflammatory condition affecting the intestines that can result in pain, diarrhea, anemia, and malnutrition (Guyatt et al., 1989). Symptoms are unpredictable and accordingly planning of daily activities are often difficult. Because each of these health conditions can restrict normal day-to-day functioning and negatively impact quality of life (Affleck, Tennen, Pfeiffer, & Fifield, 1987; Krol, Sanderman, & Suurmeijer, 1993; Vallis & Turnbull, 1996), control perceptions are particularly relevant.

Student sample. Participants were 301 students (96 females, 90 males, 14 unreported), with a mean age of 21.37 ($SD = 5.36$) ranging in age from 16 to 64 years, and 51.8 per cent of the sample were Caucasian (Table 30). Students were recruited through announcements (see Appendix H) placed on the Introductory Psychology experiment notice board and received course credit for participation. Upon arriving, participants were given a screening page to determine if they had an ongoing health condition. Those who did not were given the healthy control version of the survey, and those that indicated a chronic health condition were provided with the chronic health condition version (Appendix I). If participants indicated that they had been diagnosed with either arthritis or inflammatory bowel disease, the survey specific for that condition was completed and they were included in the arthritis or IBD sample rather than the student sample.

To examine the temporal stability of the new scales the survey was administered again to a small subsample of students two weeks following the initial administration. A

total of 175 students (73.5% female) completed the survey the second time. This subsample was further split into two groups on the basis of health status so as to examine the temporal stability of the new measures for those with and without chronic health conditions. Both subsamples were similar in demographic characteristics and tended to differ only in terms of health characteristics (see Table 31)

Arthritis sample. This sample consisted of 336 adults (mean age = 43.45, $SD = 11.34$) with one of several forms of arthritis (see Appendix K). The majority of the sample was female (81.3%) and Caucasian (93.9%; see Table 22 for complete demographic characteristics). Two hundred and eighty-nine participants completed the survey online and 46 completed the mail-in version of the survey.

Participants were recruited through a variety of methods including notices placed in the community and in the offices of rheumatologists, notices distributed to physiotherapy clinics by the regional office of the Arthritis Society of Canada, and a questionnaire display set up in two community centers that each featured a warm pool especially for patrons with rheumatic conditions (see Appendix J). Additional electronic notices were posted on several message boards and support groups for various forms of arthritis, on the online research page of the Arthritis Society of Canada, and on two online psychology research web sites. Participants recruited through the community who were interested in participating were mailed the survey package which included instructions, a consent form, a sealed debriefing letter, the survey, and a postage paid envelope to return the survey by mail (see Appendix J). Those who learned about the study through the community center displays took their survey package from the display and either returned it by mail or deposited it in the sealed drop-off box that accompanied

Table 30. *Study 4: Demographics and health characteristics of the student sample stratified by health groups.*

		Group		
		Total sample	Non-chronic	Chronic
<i>N</i>		301	207	94
Sex	% female	65.1	62.3	71.3
Age				
	Mean	21.37	21.04	22.09
	<i>SD</i>	5.36	4.19	7.27
	Range	16 – 64	17 - 38	16 - 64
Ethnicity (% Caucasian)		51.8	58.8	49.4
Employment status (%)				
	full-time	7.4	7.7	6.7
	part time	51.9	52.0	51.7
	unemployed	39.6	39.8	39.3
	retired	0.4	0.0	1.1
	disabled	0.7	0.5	1.1
Relationship status				
	Married	10.2	9.2	12.6
	Separated/divorced	1.8	0.5	4.6
	Never married	88.0	90.3	82.8
Acute health problems				
	Mean	3.00	2.84	3.35
	<i>SD</i>	1.73	1.74	1.68
	Range	0 - 10	0 -10	0 -9
Chronic health problems				
	Mean	0.40	0.00	1.25
	<i>SD</i>	0.64	0.00	0.46
	Range	0 - 3	0	1 -3
Mental health conditions (%)				
	One or more conditions	9.0	6.8	13.8

Note: *SD* = standard deviations

Table 31. *Study 4: Health characteristics of the two chronic illness samples.*

	Group	
	IBD	Arthritis
<i>N</i>	290	336
Time since diagnoses (yrs.)		
Mean (<i>SD</i>)	8.50 (8.76)	8.53 (9.13)
Range	.04 - 49	.00 - 48
Mental health problems (%)		
One or more	34.4	32.7
Current health rating (1 – 5)		
Mean (<i>SD</i>)	2.73 (1.03)	2.53 (1.00)
Influence of disease on daily activity (1 - 4)		
Mean (<i>SD</i>)	3.13 (.93)	3.43 (.78)
Other chronic health problems		
Mean (<i>SD</i>)	1.10 (1.00)	1.22 (1.37)
Range	0 - 5	0 - 12
Disease specific severity:		
IBDQ bowel symptoms (1 – 7)	4.89 (1.35)	---
HAQ disability (0 – 3)	---	0.85 (.54)
AIMS2 pain (1 – 5)	---	3.60 (.96)
Standardized disease severity index		
Mean (<i>SD</i>)	0.0 (1.0)	0.0 (1.0)
Range	-1.56 – 2.59	-2.60 – 2.05

Note: higher scores on the current health rating indicate better perceived health; higher scores on the influence on daily activity rating indicate greater disease impact on daily functioning; *SD* = standard deviations

the display. Participants could also complete the survey online as advertised through the electronic notices or, if they preferred, the survey was mailed to them if they resided in Canada or the United States.

Inflammatory bowel disease sample. This sample consisted of 290 adults (mean age = 36.20, $SD = 11.93$) who had been diagnosed with ulcerative colitis, Crohn's disease, or some other form of inflammatory bowel disease (IBD) (see Appendix K). Similar to the arthritis sample, the majority of the IBD sample was female (75.2%) and Caucasian (96.0%). Two hundred and fifty-three participants completed the survey online and 36 completed a mail-in version of the survey.

Participants were recruited through notices placed in the community, in the offices of several gastroenterologists, and through online postings to support groups and message boards specifically for Crohn's disease, Colitis, or IBD in general. For online communities with restricted access to the general public, the moderator of the notice board was contacted and permission was received prior to posting the study notice. Community participants who were interested in participating in the study were mailed the IBD version of the survey package and materials similar to that for the arthritis sample (see Appendix L). Individuals who learned about the study from the online notices could complete the survey online or have the survey mailed to them if they lived in Canada or the United States.

Materials

The survey packages for each of the samples contained the revised control belief scales along with several scale validation and health status measures appropriate for each sample. When possible, the same instruments were used for each sample in order to allow

for comparisons between samples. However, the measure of wellness behaviors was only administered to the student sample as several of the questions concerning regular exercise and dietary habits would not be relevant for the arthritis and inflammatory bowel disease samples due to the activity and dietary restrictions associated with these conditions. Because it was important that the coping styles assessed were relevant to dealing with a health problem rather than with stress in general, the measures of coping and coping efficacy were only administered to the chronic illness samples (arthritis, IBD, and student chronic group) and not the healthy student sample. In assessing health status, disease-specific measures for each of the arthritis and IBD samples were combined, and a standardized index of health was calculated for each sample. Demographic questions regarding age, gender, ethnicity, presence of psychiatric conditions, and relationship status were also included (Appendix M).

Scale Validation Measures – All Samples

Each of the newly revised Control scales was administered to each sample along with the scale validation measures. The revised Control Beliefs Inventory contained 26 items, the Control Motivations Inventory contained 16 items, and the Modes of Control Inventory was comprised of 20 items (see Appendix N).

The Big Five Factor Inventory (BFFI; John & Srivastava, 1999) is a 44-item inventory of the Big Five personality factors, openness, agreeableness, neuroticism, extroversion, and conscientiousness. It requires approximately 5 minutes to complete, and is therefore preferred over longer more time-consuming measures of the five major personality domains. A list of 44 characteristics is presented after the statement “I see myself as someone who ...” and respondents rate how much they agree with each

characteristic on a 5 point Likert scale ranging from 1 (Disagree strongly) to 5 (Agree strongly). Higher scores reflect greater identification with that particular personality factor. The BFFI has demonstrated good internal consistency for the total scale ($\alpha = .83$, $n = 462$) and subscales, with alpha coefficients ranging from .81 for Conscientiousness to .88 for Extraversion, and has demonstrated good construct validity in comparison with other Big Five measures (John & Srivastava, 1999). The alpha coefficients for the current study for ranged from .80 for conscientiousness, to .84 for extroversion.

The Multi-dimensional Health Locus of Control scale, form A (MHLC; Wallston et al., 1978) is an 18-item measure of internal, powerful others, and chance HLOC beliefs. Each of the three subscales consists of six items that are rated on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree), with higher scores summed from each scale indicating greater reflection of the corresponding LOC dimension. The MHLC form A has demonstrated adequate internal consistency, with alpha coefficients for each subscale ranging from .67 for the powerful others subscale to .77 for the internal subscale, and good construct validity in comparison to other general Locus of Control scales (Wallston et al., 1978). For the current study the alpha coefficients for each subscale were .62 for the Powerful Others scale, .76 for the Internal scale, and .78 for the Chance scale.

The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) is a well established measure of global feelings of self-esteem. The scale consists of 10 items about one's sense of self worth (e.g., "I take a positive view of myself."; "All in all, I am inclined to think of myself as a failure.") each answered on a 4-point Likert scale ranging from 0

(strongly disagree) to 3 (strongly agree). Half of the items are reverse scored and a total self-esteem score is obtained by summing across the 10 items. The RSES has demonstrated good psychometric properties ($\alpha = .88$; Rosenberg, 1965). The alpha coefficient for the current study was .91 for each sample.

The Life Orientation Test - Revised (LOT-R; Scheier et al., 1994) is a 10-item dichotomous measure of dispositional optimism and pessimism that has demonstrated good construct validity in several health-relevant studies (Scheier & Carver, 1992). Respondents rate how much they agree with each of the statements on a 5-point Likert scale ranging from 1 (I agree a lot) to 5 (I disagree a lot). Of the ten items, 4 are fillers that are not included in the score. Three of the remaining items assess optimism, three assess pessimism, and the responses to the six scored items are coded so that higher values reflect optimism. The LOT-R has demonstrated adequate internal consistency ($\alpha = .78$; Carver, 1997) and the alpha coefficient for the current study ranged from .81 in the arthritis sample to .86 in the IBD sample.

The Attachment Styles survey (Simpson et al., 1992) is a 13-item measure that assesses each of 3 attachment styles, secure, avoidant, or anxious/ambivalent. Items comprising each of the attachment styles types were derived from the three attachment vignettes created by Hazan and Shaver (1987). Factor analysis during the development study suggested two factors, with avoidant/secure attachment as one 8 item dichotomous factor, and anxious attachment as a separate 5 item factor. Three of the 13 items are worded in a negative direction and responses are scored on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores on the avoidant/secure subscale reflecting greater avoidance, and higher scores on the anxious

attachment subscale reflecting greater anxiety. The Attachment Styles survey has demonstrated good internal consistency for each of the subscales with an alpha coefficient of .81 for the avoidant/secure attachment index, and .61 for the anxious attachment index (Simpson et al., 1992). For the current study the alpha coefficients ranged from .66 for the anxious attachment index, to .84 for the avoidant/secure attachment index.

Scale Validation Measures – Chronic Illness Samples

The Brief COPE (Carver, 1997) is a shortened version of the original COPE scale (Carver, Scheier, & Weintraub, 1989) and contains 28 items that assess 14 different coping styles. It is recommended for use when the time demands on participants may be high due to the inclusion of multiple other measures and it has been used in several health-relevant studies and has demonstrated good construct validity (Carver, 1997). To ensure the relevance of the coping preferences for a disease specific stressor, respondents were asked to list the most stressful aspect of their condition at the top of the questionnaire and then to think about the type of coping that they typically used to deal with this stressor. This approach has been used successfully with other chronic illness population to assess how people cope with disease specific concerns (Dunkel-Schetter, 1992). Respondents rated how often they used each type of coping to deal with this stressor on a 4-point Likert scale ranging from 1 (I usually don't do this at all) to 4 (I usually do this a lot). Scores for each coping style were calculated by taking a mean of the endorsed items in each subscale. Although there are only 2 items per coping style, an initial investigation of the psychometric properties of the brief COPE with a small community sample ($n = 126$) indicated that 11 of the coping subscales had alpha

coefficients of .60 or greater, with three reaching the minimally acceptable value of .50 suggested by Nunnally (Nunnally & Bernstein, 1994)¹⁵.

Three items on coping efficacy developed by Gignac and colleagues (Gignac et al., 2000) were included to assess the individual's confidence to manage or cope with their health condition. These items, which were created for use with a chronic illness population, have been associated with adaptation to arthritis in a sample of older adults (Gignac et al., 2000). Each item is scored on a 5-point Likert type scale with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Combined into a coping efficacy scale, the items have demonstrated good internal consistency ($\alpha = .79$, $n = 286$). The alpha coefficient for three-item scale in the current study was .90 for each of the IBD and the arthritis samples.

The Illness Cognition Questionnaire (ICQ; Evers et al., 2001) is an 18-item measure that assesses 3 different illness cognitions that reflect both favorable and unfavorable adjustment to chronic illness. Each of the three subscales is comprised of 6 items and respondents indicate the extent to which they agree with each statement on a 4-point response format ranging from 1 (not at all) to 4 (completely). The Helplessness subscale has predicted increases in functional disability in rheumatoid arthritis patients and those with multiple sclerosis, whereas the Acceptance subscale and Perceived Benefits subscale predicted beneficial changes in physical and psychological health in each of these populations (Evers et al., 2001). Illness Cognition Questionnaire has demonstrated good internal consistency for each of the subscales with an alpha coefficient of .88 for the Helplessness scale, .91 for the Acceptance scale, and .85 for the

Perceived Benefits scale. The alpha coefficients for the current study were .87 for the Benefit Finding scale, .88 for the Helplessness scale and .90 for the Acceptance scale.

Scale Validation Measures – Student Samples

The Wellness Behavior Inventory (WBI) is a reworded version of the Wellness Behavior Checklist (Sirois, Melia-Gordon, & Pychyl, 2003). The WBI consists of 10 items that assess how often a variety of wellness behaviors are performed. Vickers (Vickers, Conway, & Hervig, 1990) suggests that preventative health behaviors are multidimensional, and that wellness maintenance behaviors form an empirically distinct subset of health behaviors separate from those related to accident control and substance use. The items in the WBI reflect a set of health behaviors from this model related to health maintenance and enhancement, such as diet, exercise, and rest/relaxation. For example, items such as “I eat at least 3 meals a day” and “I eat fresh fruits and/or vegetables” reflected dietary habits. Physical activity was assessed with items such as “I walk as much as possible, for example, I take the stairs not the elevator, etc.” and “I exercise for 20 continuous minutes or more, to the point of perspiration”. The frequency of these behaviors was rated on a 5-point scale with possible responses ranging from 1 for *less than once a week/never* to 5 for *every day of the week* for each of the listed behaviors. After reversing the score for 2 items, a mean of the 10 items was calculated to produce an overall wellness behavior score with higher scores indicating the practice of more frequent wellness behaviors. The WBI has demonstrated good construct validity and internal consistency in other samples of university students ($\alpha = .75, n = 257$;

¹⁵ Because the brief COPE contained a large number of subscales each containing only 2 items the alpha values were not reported for the current study.

(Sirois & Pychyl, 2002). Reliability analysis of the WBI in the current study revealed good internal consistency ($\alpha = .73$).

Health Status – Student Samples

Self-reported health was assessed with the Brief Health History questionnaire (Sirois & Gick, 2002) a checklist that assesses the experience of 13 acute and 10 chronic health problems. Students who indicated one or more chronic health issues received the chronic version of the survey and those who reported no chronic health conditions received the healthy control version of the survey.

Health Status – Chronic Illness Samples

Several self-report questions about health were completed by both the arthritis and the IBD samples. These included the type of arthritis or IBD, time since diagnoses, how much daily activities are influenced, and rating of their current state of health on a 5-point scale ranging from 1 (excellent) to 5 (poor). A checklist of 12 other chronic health conditions was included to assess comorbidity with other chronic health conditions, and a question about the presence of mental health conditions was also included.

In addition, the arthritis sample completed two disease specific measures of health. Three items from the Pain Index of the Arthritis Impact Measurement Scales 2 (AIMS2; Meenan, Mason, Anderson, Guccione, & Kazis, 1992) assessed the severity and frequency of pain and discomfort associated with arthritis experienced in the past month. This measure is an widely used and accepted measure of arthritis-related pain (Meenan, Mason, Anderson, Guccione, & Kazis, 1992). One item assesses pain severity on a 5-point scale ranging from 1 (severe) to 5 (none), and two items assess the frequency of pain on a 5 point scale from 1 (all days) to 5 (no days). Scores are first reversed and a

mean pain score is calculated. The Disability Index from the Stanford Health Assessment Questionnaire (HAQ; Fries, Spitz, Kraines, & Holman, 1980) was used to assess the functional status of the arthritis sample. The Disability Index contains 20 items that assess 8 functional categories and has been widely used with arthritis populations to determine daily functional status and overall arthritis severity (Fries et al., 1980). Respondents indicate the extent to which they have been able to perform the listed tasks over the past week on a 4-point Likert type scale ranging from 0 (without any difficulty) to 3 (unable to do). Scores are summed with higher values reflecting a greater degree of arthritis related disability.

Disease severity for the inflammatory bowel disease sample was assessed with the 10-item bowel symptoms subscale of the Inflammatory Bowel Disease Questionnaire (IBDQ; Guyatt et al., 1989). The IBDQ is a well-validated and widely used measure of disease related dysfunction in IBD populations (Han, McColl, Steen, Barton, & Welfare, 1998). Respondents rate the severity and frequency of bowel symptoms within the past 2 weeks on a 7-point Likert type scale ranging from 1 (more frequent than before) to 7 (no increase or normal). Scores for each item were first reversed for the current study and then summed with higher values reflecting greater symptom severity. The bowel symptom subscale has demonstrated good internal consistency in a sample of IBD patients ($\alpha = .81$; Han et al., 1998). The alpha coefficient for the current study was .88.

Scores from the disease specific severity measures were standardized to allow for comparisons of symptom severity across the two chronic illness samples. Higher scores on this disease severity index indicated greater self-reported disease severity.

Results

Data Screening

Prior to the analyses the survey responses received via email were screened for duplication and missing data. Although the web survey responses were essentially anonymous, each was identified by the date and time of submission and the Internet protocol (IP) address of the sender. Surveys received from the same IP address were compared by date of submission, age, gender, and text-based responses to ensure that each was a unique survey response. Duplicates were subsequently discarded. As well, surveys that were missing 20 percent or more of the required responses were not included in the analyses. These same criteria were used in assessing the inclusion of the mail-in and student surveys. Eighteen participants from the arthritis sample and 15 participants from the IBD sample had incomplete surveys and were therefore not included in the analyses. All but one of the incomplete surveys were obtained from the Internet. An assessment of the differences between those that did and did not complete the survey was not possible as the responses provided were inconsistent and the demographic questions that appeared at the end of the survey were left unanswered.

Verification of Scale Composition and Structure

A principal components analysis with a varimax rotation was performed on each of the three scales for each sample in order to examine the factor structure and composition of each scale and make amendments where necessary.

Control Beliefs Inventory (CBI). An initial factor analysis of the 26-item CBI with the arthritis sample revealed that all but 5 items loaded onto their corresponding 4 factors. Items 1 and 5 from the Mastery subscale, items 6 and 24 from the Chance subscale, and

Table 32. *Study 4: Factor loadings of the Control Beliefs Inventory with the Arthritis sample.*

Description	Item	Factor			
		1	2	3	4
Control Expectancy	15. People who take care of themselves stay healthy.	.7615	.0177	.1285	.0132
	2. It is my own actions that determine how healthy I am.	.7073	.2519	.0803	.0508
	20. My current state of health is a reflection of how I look after myself.	.6662	-.0124	-.0328	-.0218
	13. My health depends on how I take care of myself.	.6467	.4263	-.0474	.0446
	17. How soon I recover from an illness depends on how I look after myself.	.6323	.3410	-.0631	-.0509
	4. If I set my mind to it I can improve my health.	.6081	.3895	.1343	.1244
	25. I am certain that with effort I can improve my health.	.5866	.2949	.0320	.1779
Adaptive control	11. There are things that I can do to make my health problem easier to deal with.	.0291	.8115	.1839	-.0384
	9. If I make the effort, I can manage my illness.	.2726	.7546	.1858	.0605
	7. I can take control of my health by managing my day-to-day symptoms.	.1405	.6969	.1662	-.1218
	21. If I do the right things I can make my symptoms more manageable.	.2812	.6610	.1249	-.0690
	22. Regardless of circumstances there are things I can do to improve my health.	.4213	.6268	.0164	.0395
Mastery	26. When it comes to my health, I often feel unable to do what I know should be done.	.0373	-.0005	-.8223	.0963
	16. When facing a health problem, I often feel overwhelmed about what to do.	-.0988	.0781	-.7282	.0841
	8. Even though there are things I can do to improve my health, I don't feel that I can do them.	.1903	-.3078	-.5758	.0672
	19. I am confident that I could deal with any unexpected health problems.	.1430	.3503	.5725	.1377
	12. I am able to meet the challenge of following a healthy routine.	.2029	.4027	.5541	.0802
	23. I am confident in my ability to make the right decisions about my health.	.0323	.3719	.5057	.0312
	3. If I am lucky I will stay healthy.	.0846	.0072	.0699	.8331
Chance	18. If I am fortunate my health will improve	.0329	.1428	-.0761	.8306
	10. How soon I recover from an illness depends on how lucky I am	-.0324	-.1982	-.0862	.7876

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $n = 314$. Highest factor loadings of an item are given in boldface type.

item 14 from the Adaptive Control subscale were removed and the factor analysis was rerun. With the removal of these 5 items all items factored onto their corresponding 4 subscales as expected with the 4 factor model explaining 58.3 % of the variance in the CBI scores (see Table 32). In addition, the Adaptive Control and Control Expectancy factors demonstrated good reliability according to the guidelines of the Monte Carlo studies (Stevens, 1996), with 4 or more loadings greater than .60 in absolute value. The Mastery subscale almost met this criterion with two loadings above .60 and 2 loadings of .57. Although the Chance subscale only contained 3 items, the loadings for each of these were above .78 and the sample size was over the recommended 300 necessary to consider this factor reliable (Stevens, 1996).

An examination of the CBI factor structure with the IBD sample confirmed that the 5 items that loaded incorrectly with the arthritis sample were problematic with this sample. However, when the principal components analysis was rerun without these items the 4 factor structure could not be replicated. Items from the Control Expectancy and the Adaptive Control subscales merged together into one factor as was demonstrated with the student sample in the previous study, and the Mastery subscale split into two smaller factors. The analysis was rerun specifying a 3-factor structure as suggested by the scree plot and items loaded correctly for the Chance and Mastery factors. The Adaptive Control and Control Expectancies scales merged into one larger factor (see Table 33). This 3-factor model explained 52.4% of the variance in the CBI scores. Each of these factors followed the guidelines for reliability suggested by the Monte Carlo studies (Stevens, 1996).

Table 33. *Study 4: Factor loadings of the Control Beliefs Inventory with the IBD sample.*

Description	Item	Factor		
		1	2	3
Control Expectancy /Adaptive control*	25. I am certain that with effort I can improve my health.	.8049	.1215	.0002
	2. It is my own actions that determine how healthy I am.	.8040	-.0615	.0083
	4. If I set my mind to it I can improve my health.	.7917	.0823	.0370
	*21. If I do the right things I can make my symptoms more manageable.	.7327	.1737	.0953
	13. My health depends on how I take care of myself.	.7300	.1375	-.0717
	*9. If I make the effort, I can manage my illness.	.6609	.2939	.0809
	20. My current state of health is a reflection of how I look after myself.	.6501	.0010	-.1199
	*22. Regardless of circumstances there are things I can do to improve my health.	.6254	.2753	.0812
	15. People who take care of themselves stay healthy.	.6148	-.0924	-.0297
	17. How soon I recover from an illness depends on how I look after myself.	.5852	.0402	.0037
	*11. There are things that I can do to make my health problem easier to deal with.	.5313	.3751	.0460
Mastery	*7. I can take control of my health by managing my day-to-day symptoms.	.5097	.3078	.0451
	26. When it comes to my health, I often feel unable to do what I know should be done.	.0633	-.8254	.0354
	8. Even though there are things I can do to improve my health, I don't feel that I can do them.	.0055	-.6608	.1722
	12. I am able to meet the challenge of following a healthy routine.	.2366	.6580	.1066
	23. I am confident in my ability to make the right decisions about my health.	.1943	.6579	-.0356
	16. When facing a health problem, I often feel overwhelmed about what to do.	-.0334	-.5893	.1470
Chance	19. I am confident that I could deal with any unexpected health problems.	.2003	.5420	.1673
	18. If I am fortunate my health will improve.	.0763	-.0546	.8648
	10. How soon I recover from an illness depends on how lucky I am.	-.0983	-.1927	.8148
	3. If I am lucky I will stay healthy.	.1202	.0921	.7887

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $n = 275$. Highest factor loadings of an item are given in boldface type.

A factor analysis of the CBI with the student sample specifying 3 factors¹⁶

found that 3 items (1, 5, and 14) did not have high loadings. The two Chance scale items 6 and 24 loaded correctly onto the Chance factor. Items 1, 5, and 14 were subsequently removed and the analyses revealed that all items loaded correctly on the 3 factors (see Table 34). The 3-factor model explained 42.5% of the variance in the CBI scores. Relatively high loadings for each factor suggested that each was reliable.

Modes of Control Inventory (MCI). A principal components analysis of the 20 item MCI scale did not reproduce the expected 4 factor structure with each of the chronic illness samples. Instead a three-factor structure was supported with Agency and Unmitigated Communion as two distinct factors and Communion and Unmitigated Agency forming a third factor (see Tables 35 and 36). This 3-factor solution accounted for 45.6% of the variance in the MCI scores for the arthritis sample, and 47.2% of the variance in the MCI scores for the IBD sample. This finding is in line with theoretical models suggesting a negative relation between these two constructs (Table 26) although Helgeson (1994) suggests that Communion and Unmitigated Agency are distinct and should be assessed separately. Saragovi and colleagues (Saragovi, Koestner, Di Dio, & Aube, 1997) have noted similar problems with factor analyses of Unmitigated Agency and Communion items resulting in both constructs loading onto a single factor. However, given the theoretical distinctions asserted by Helgeson (1994) the two subscales were assessed separately in the subsequent reliability analyses to test whether or not each could be considered a distinct subscale.

¹⁶ Recall that items from the Control Expectancy and the Adaptive Control scales formed one factor in the previous study with the student sample and therefore a similar factor structure was expected with this sample.

Table 34. Study 4: Factor loadings of the Control Beliefs Inventory with the student sample.

Description	Item	Factor		
		1	2	3
Control Expectancy /Adaptive control*	17. How soon I recover from an illness depends on how I look after myself.	.7274	-.0391	.0696
	13. My health depends on how I take care of myself.	.6658	.1234	-.0265
	15. People who take care of themselves stay healthy.	.6608	-.1410	-.0300
	*21. If I do the right things I can make my symptoms more manageable.	.6185	.1403	.0098
	*22. Regardless of circumstances there are things I can do to improve my health.	.5690	.1937	-.0937
	25. I am certain that with effort I can improve my health.	.5650	.2768	-.0986
	20. My current state of health is a reflection of how I look after myself.	.5479	.2948	-.1140
	*9. If I make the effort, I can manage my illness.	.5011	.2848	.0183
	2. It is my own actions that determine how healthy I am.	.4911	.0916	-.0912
	*7. I can take control of my health by managing my day-to-day symptoms.	.4277	.3346	.1144
	4. If I set my mind to it I can improve my health.	.3903	.3419	-.2947
	*11. There are things that I can do to make my health problem easier to deal with.	.3746	.2965	-.1096
Mastery	23. I am confident in my ability to make the right decisions about my health.	.2319	.7330	.0933
	26. When it comes to my health, I often feel unable to do what I know should be done.	-.0098	-.7054	.1377
	12. I am able to meet the challenge of following a healthy routine.	.2252	.6930	.0912
	8. Even though there are things I can do to improve my health, I don't feel that I can do them.	-.0752	-.6377	.1572
	16. When facing a health problem, I often feel overwhelmed about what to do.	-.0508	-.5334	.2626
	19. I am confident that I could deal with any unexpected health problems.	.3747	.5118	.0475
Chance	18. If I am fortunate my health will improve.	-.0288	-.0224	.7162
	10. How soon I recover from an illness depends on how lucky I am.	.2067	-.1368	.6734
	6. My health depends on forces beyond my control.	-.2804	.0042	.6572
	3. If I am lucky I will stay healthy.	.0669	-.0288	.6214
	24. My health is determined by circumstances beyond my control.	-.3408	-.0949	.5927

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $n = 283$. Highest factor loadings of an item are given in boldface type.

Table 35. Study 4: Factor loadings of the Modes of Control Inventory for the Arthritis sample.

Description	Item	Factor		
		1	2	3
Agency	16. I am the best person to manage my health.	.8065	-.0656	-.0372
	1. Nobody can look after my health as well as I can.	.7591	-.0152	-.0054
	10. No one but me is going to keep me healthy.	.6423	-.2354	-.0116
	5. I am usually the one that makes the decisions regarding my health.	.5666	.1672	.1544
	19. I may listen to other's advice about my health but the final decision is always on my own.	.5297	.1693	.0860
Communion/ Unmitigated Agency*	17. I find that other people usually have good advice for me regarding my health.	.1956	.6902	.1279
	11. I often find that I can solve my health problems by getting help from others.	.0883	.6825	.0573
	9. When I have a health problem I turn to others for support.	.0223	.6717	-.0094
	*14. I like to solve my health problems alone.	.3529	-.6671	.1917
	*13. Asking others for advice about my health is a waste of time.	.0728	-.6563	.1289
	15. I prefer talking with others about any health concerns I have rather than trying to deal with it on my own.	-.1010	.6207	.2824
	*18. Asking for help with a health problem is a sign of weakness.	-.1557	-.5929	.3564
	2. I enjoy working with others to improve my health.	.1635	.5858	.0850
	*3. People should keep their health problems to themselves.	.2349	-.5773	.1988
	*7. Only people who are weak ask others for help with their health problem.	-.0039	-.4522	.4084
Unmitigated Communion	8. I always place the health of my friends and family above my own.	-.0502	-.0699	.7257
	12. I would rather look after others when they are ill than have others look after me if I am ill.	.1086	-.0039	.7118
	4. I have difficulty looking after my own health when it interferes with the health of my family.	.0063	-.0244	.6814
	6. Even when I am sick I will help a sick friend.	.0531	.0707	.5265
	20. I often find myself getting overly involved in other people's health problems.	.0864	.0308	.4970

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $n = 310$. Highest factor loadings of an item are given in boldface type.

Table 36. Study 4: Factor loadings of the Modes of Control Inventory for the IBD sample.

Description	Item	Factor		
		1	2	3
Agency	16. I am the best person to manage my health.	.7854	.0565	-.1123
	1. Nobody can look after my health as well as I can.	.7688	-.0068	.0117
	5. I am usually the one that makes the decisions regarding my health.	.6437	-.0707	.2019
	19. I may listen to other's advice about my health but the final decision is always on my own.	.5707	-.1217	-.0736
	10. No one but me is going to keep me healthy.	.5340	.2733	.0288
Communion/ Unmitigated Agency*	9. When I have a health problem I turn to others for support.	-.0726	-.6993	-.0911
	*14. I like to solve my health problems alone.	.2310	.6960	.1777
	*13. Asking others for advice about my health is a waste of time.	.1682	.6955	.0552
	15. I prefer talking with others about any health concerns I have rather than trying to deal with it on my own.	-.1224	-.6647	-.0273
	11. I often find that I can solve my health problems by getting help from others.	.0158	-.6482	.0289
	17. I find that other people usually have good advice for me regarding my health.	.2199	-.6430	.0712
	*7. Only people who are weak ask others for help with their health problem.	-.0739	.6370	.1656
	*18. Asking for help with a health problem is a sign of weakness.	-.1517	.6315	.2419
	2. I enjoy working with others to improve my health.	.1961	-.5938	.0477
	*3. People should keep their health problems to themselves.	.0832	.5883	.0560
Unmitigated Communion	8. I always place the health of my friends and family above my own.	-.1979	.1957	.7299
	4. I have difficulty looking after my own health when it interferes with the health of my family.	-.1284	.1225	.7181
	6. Even when I am sick I will help a sick friend.	.2299	-.0572	.6645
	12. I would rather look after others when they are ill than have others look after me if I am ill.	.2692	.1427	.6390
	20. I often find myself getting overly involved in other people's health problems.	-.0465	-.0015	.5432

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $n = 267$. Highest factor loadings of an item are given in boldface type.

The principal components analyses of the MCI with the student sample yielded similar results with one exception. Item 20 (“I often find myself getting overly involved in other people’s health problems”) from the Unmitigated Communion scale did not load strongly on this factor. A subsequent analysis revealed the same 3-factor solution as was found for the chronic illness samples (Table 37), with 41.9% of the variance explained. An item analysis was performed and found that item 20 and item 4 (“I have difficulty looking after my own health when it interferes with the health of my family”) had low interitem correlations. In addition, the item analysis revealed deletion of these two items would increase the scale reliability. The items were removed from the scale leaving a 3-item version of the Unmitigated Communion scale for the student sample.

Control Motivations Inventory (CMI). The principal components analysis of the Control Motivations Inventory (CMI) failed to replicate the proposed 2 factor structure of Health Value and Desire for Control. Items from the Health Values subscale loaded onto the Desire for Control subscales and vice versa for each of the chronic illness samples. After 5 weak items that loaded onto both factors were removed the two expected factors were produced. However, more than half of the remaining 11 items loaded onto both factors with an absolute value of .30 or more suggesting that this scale reflected a unidimensional rather than a multidimensional construct. The decision to remove the 5 weak items was supported by an item analysis that revealed items 4, 8, 9, 11, and 14 had either the highest or lowest interitem correlations. Once these items were removed the range of interitem correlations approximated the recommendations of Clark and Watson (1995) that the majority of the interitem correlations should be moderate in magnitude and should fall within the range of .15 to .50 to ensure unidimensionality (see Table 38).

Table 37. Study 4: Factor loadings of the Modes of Control Inventory for the Student sample.

Description	Item	Factor		
		1	2	3
Agency	16. I am the best person to manage my health.	.8266	.0405	.0014
	1. Nobody can look after my health as well as I can.	.6903	.0130	.0085
	5. I am usually the one that makes the decisions regarding my health.	.6592	.0292	.0045
	10. No one but me is going to keep me healthy.	.6037	.0463	.0578
	19. I may listen to other's advice about my health but the final decision is always on my own.	.5944	.0461	-.0785
Communion/ Unmitigated Agency*	*14. I like to solve my health problems alone.	.2991	.7130	.0991
	*13. Asking others for advice about my health is a waste of time.	.0075	.6838	.0137
	11. I often find that I can solve my health problems by getting help from others.	.0069	-.6661	.0796
	9. When I have a health problem I turn to others for support.	-.1521	-.6618	.0381
	15. I prefer talking with others about any health concerns I have rather than trying to deal with it on my own.	-.2349	-.6409	-.0638
	*18. Asking for help with a health problem is a sign of weakness.	-.0468	.5685	.2889
	*7. Only people who are weak ask others for help with their health problem.	-.1389	.5334	.2993
	*3. People should keep their health problems to themselves.	.0724	.5068	.1340
	17. I find that other people usually have good advice for me regarding my health.	.1872	-.4792	-.0967
	2. I enjoy working with others to improve my health.	.3758	-.4660	.0257
Unmitigated Communion	8. I always place the health of my friends and family above my own.	-.0004	.1270	.7283
	12. I would rather look after others when they are ill than have others look after me if I am ill.	.1814	.2163	.6414
	6. Even when I am sick I will help a sick friend.	-.1640	-.0111	.5831
	4. I have difficulty looking after my own health when it interferes with the health of my family.	.1800	-.0966	.5429
	20. I often find myself getting overly involved in other people's health problems.	-.1149	.1705	.3118

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $n = 294$. Highest factor loadings of an item are given in boldface type.

Table 38. Study 4: Reliability results for the Control Beliefs Inventory (CBI) scales and the Control Motivations Inventory (CMI) across the chronic illness and student samples.

Statistic		Sample	CBI subscale					CMI scale
			Control expectancy	Adaptive control	Mastery	Chance		
Number of items			7	5	6	3 ^a	11	
Mean (SD)	Arthritis		3.68 (1.02)	4.36 (.87)	4.02 (.90)	2.93 (1.20)	5.14 (.64)	
	IBD		3.88 (.89)	4.39 (.77)	4.08 (.84)	3.51 (1.20)	5.10 (.58)	
	Student		4.92 (.65)	4.70 (.68)	4.21 (.84)	3.19 (.83)	4.74 (.68)	
ANOVA		<i>F</i> (1,923)	322.34***	60.11***	7.74*	8.84*	57.34***	
Cronbach's alpha								
	Arthritis		.85	.84	.77	.76	.89	
	IBD		.86	.80	.76	.78	.88	
	Student		.80	.72	.77	.70	.88	
Inter-item correlation Means (range)								
	Arthritis		.45	.52	.36	.51	.43	
	(range)		(.31 - .60)	(.36 - .60)	(.26 - .51)	(.49 - .55)	.15 - .67	
	IBD		.46	.44	.35	.54	.39	
	(range)		(.36 - .65)	(.31 - .52)	(.14 - .52)	(.45 - .61)	.18 - .65	
	Student		.36	.34	.35	.32	.40	
	(range)		(.14 - .50)	(.24 - .45)	(.17 - .59)	(.11 - .65)	.18 - .72	
Test-retest reliability								
Total student sample (<i>n</i> = 175)			.78	.69	.72	.69	.84	
Student control (<i>n</i> = 113)			.78	.66	.71	.65	.82	
Student chronic (<i>n</i> = 62)			.79	.72	.74	.77	.88	

Note: ^a = 5 items for the student sample, * *p* < .05, ** *p* < .01, *** *p* < .001.

Table 39. Study 4: Reliability results for the Modes of Control Inventory (MCI) scales across the chronic illness and student samples.

Statistic	Sample	MCI subscale			
		Agency	Unmitigated Agency	Communion	Unmitigated Communion
Number of items		5	5	5	5 ^a
Mean (SD)					
	Arthritis	4.66 (.72)	2.42 (.86)	3.93 (.80)	3.85 (.87)
	IBD	4.67 (.72)	2.36 (.90)	4.01 (.81)	3.76 (.88)
	Student	4.63 (.77)	2.37 (.84)	4.03 (.79)	4.18 (.91)
	<i>F</i> (1,923)	0.23	0.70	2.45	21.78***
Cronbach's alpha					
	Arthritis	.71	.76	.76	.68
	IBD	.70	.80	.79	.69
	Student	.74	.74	.67	.57
Inter-item correlation Mean (range)					
	Arthritis	.33	.39	.39	.30
	(range)	(.15 - .53)	(.27 - .67)	(.23 - .51)	(.16 - .44)
	IBD	.32	.45	.42	.31
	(range)	(.11 - .54)	(.35 - .70)	(.35 - .56)	(.19 - .49)
	Student	.36	.36	.29	.31
	(range)	(.18 - .55)	(.25 - .60)	(.10 - .48)	(.26 - .34)
Test-retest reliability					
	Total student sample (<i>n</i> = 175)	.75	.72	.64	.65
	Student control (<i>n</i> = 113)	.74	.73	.66	.70
	Student chronic (<i>n</i> = 62)	.76	.69	.60	.59

Note: ^a = 3 items for the student sample. *** *p* < .001.

Similar results were obtained when the analyses were repeated for the student sample confirming the decision to treat this scale as unidimensional.

Scale Reliability

The internal consistencies, interitem correlations and test-retest reliability for each control scale across the various samples are given in Tables 38 and 39. Overall, each of the Control Expectancy subscales had alpha coefficients above the lower acceptable bound of .70 suggested by Nunnally (1994), and in the respectable (.70 to .80) or very good (.80 to .90) ranges suggested by DeVellis (1991) (Table 38). In general, the scale alpha values were consistent across each of the samples with the exception of the Adaptive Control scale. The internal consistency of this scale was considerably lower for the student sample perhaps this construct may be less meaningful for a relatively healthy and young sample.

Clark and Watson (1995) suggest that the average interitem correlation of a scale is also a very useful index of a scale's internal consistency. Accordingly, the mean intercorrelation for a scale should fall within the range of .15 to .50, with optimal values varying to reflect the generality or specificity of the target construct (Clark & Watson, 1995). Given that each of the control subscales of the CBI reflects a very distinct and narrowly defined aspect of control over health the mean intercorrelations across the samples tended to fall at the higher end of the recommended range (Table 38). Because the temporal stability of each CBI subscale was assessed only for the student sample, test-retest reliability was assessed across the chronic and non-chronic student subsamples. This allowed for a proxy test of the temporal stability of the scales for the chronic illness groups. Test-retest reliability values reached or approached the

recommended threshold values of .70 (Nunnally & Bernstein, 1994) despite the fact that there were few items in each subscale (Table 38). The lowest values across the subsamples from the overall student sample were obtained for the control student group and the higher values for the students with chronic health conditions. This suggests that perceptions of control over health may be more invariant when one is dealing with an ongoing health issue than when there are only transient or acute health issues.

The results for the Control Motivations Inventory (CMI) revealed good internal consistency with high alpha values and mean interitem correlations in the high end of the recommended range (Clark & Watson, 1995). The temporal stability of the CMI was also very good, although relative to the CBI this scale had considerably more items. Again, the highest value (.88) was obtained for the chronic illness subsample (Table 38). Overall, the Modes of Control Inventory (MCI) demonstrated adequate internal consistency (Table 39). The alpha coefficients for most of the MCI subscales were in the respectable range of .70 to .80. However, the Unmitigated Communion subscale had values in the minimally acceptable range of .65 to .70 suggested by DeVellis (1991). In addition, the two Communion subscales from the student sample had the lowest alpha coefficients of all the subscales. This may be partially due to the fact that the Unmitigated Communion subscale contained only 3 items for the student sample and not 5 items.

Demographic differences between the student sample and the chronic illness samples may provide an explanation. The student sample was more ethnically diverse than either of the chronic illness samples with only 51.8 % of the sample Caucasian compared to almost 95% or more Caucasian in each of the chronic illness samples (see Tables 30 and 31). The Communion subscales address the idea of taking control over

one's health by getting involved with and focusing on others, a style of interacting that may be more prevalent among non-Western cultures. The low alpha coefficient for this subscale with the student sample may therefore reflect a less consistent pattern of responses because of this diversity.

Each of the MCI subscales demonstrated acceptable or good temporal stability. However, the values for each of the Communion subscales were in the minimally acceptable range, perhaps due to the cultural diversity of this student sample. Alternatively, it may be that this style of control over health is less stable over time because the quality and nature of available social relationships also fluctuates over time. This is in line with DeVellis's (1991) suggestion that test-retest reliability reflects not only the stability of the measure, but the stability of the phenomenon it is measuring.

Construct Validity and Generalizability

The associations of each of the new scales with other measures of personality and related constructs were examined across the three samples in order to assess the generalizability of the new scales. The validity of the new scales was assessed for the total student sample of which about one third had some type of ongoing health issue (Table 30). However, most of these chronic health issues could be considered non-disabling compared to the health problems experienced by those with IBD or arthritis. For example, the most frequently reported chronic health problems among the chronic group were chronic headaches/migraines (69.1%) and asthma (31.9%), whereas chronic illnesses such as diabetes and arthritis were each reported by only 2.1 percent of this subgroup. Results from this sample can therefore be considered representative of a relatively young and healthy sample with few life threatening or disabling health issues.

Because of the nature and number of the chronic health problems reported by the student sample only the correlations for the two chronic illness samples will be examined when assessing the construct validity of the new scales for measures relevant to chronic illness (MHLC, ICQ, and the coping measures).

Although both the arthritis and the IBD samples are chronic illness samples, the extent and nature of disability and disease-related severity may not be the same across each sample. This could therefore influence the associations between the control scales and the various personality and coping scales. The two chronic illness samples were compared on the 4 health status variables to assess any differences (Table 40). Participants with arthritis reported more influence of their illness on daily activity ($M = 3.43$, $SD = .78$) than those with IBD ($M = 3.24$, $SD = .93$; $t(618) = 4.22$, $p < .001$), and poorer self-reported health ($M = 2.53$, $SD = 1.00$) than participants with IBD ($M = 2.73$, $SD = 1.03$; $t(618) = 2.47$, $p = .01$). The arthritis and IBD samples did not differ in terms of the number of concomitant chronic health problems ($t(618) = 1.18$, ns), the number of years since diagnosis ($t(612) = .03$, ns), or the number of people reporting one or more mental health problems ($t(616) = -.32$, ns ; see Table 40 for values).

Because it is well recognized that negative affect can sometimes inflate self-reports of health (Watson & Pennebaker, 1989), the two samples were also compared for differences in negative affect using the Neuroticism scale from the BFFI. Those with IBD scored higher on trait negative affect ($M = 3.27$, $SD = .90$) than those with arthritis ($M = 3.05$, $SD = .84$; $t(618) = 4.22$, $p = .01$), suggesting that the differences found between the two samples on the rating of self-reported health may be underestimated. An analysis of

Table 40. *Study 4: Health characteristics of the two chronic illness samples.*

	Group	
	IBD	Arthritis
<i>N</i>	290	336
Time since diagnoses (yrs.)		
Mean (<i>SD</i>)	8.50 (8.76)	8.53 (9.13)
Range	.04 - 49	.00 - 48
Mental health problems (%)		
One or more	34.4	32.7
Current health rating (1 – 5)		
Mean (<i>SD</i>)	2.73 (1.03)	2.53 (1.00)
Influence of disease on daily activity (1 - 4)		
Mean (<i>SD</i>)	3.13 (.93)	3.43 (.78)
Other chronic health problems		
Mean (<i>SD</i>)	1.10 (1.00)	1.22 (1.37)
Range	0 - 5	0 - 12
Disease specific severity:		
IBDQ bowel symptoms (1 – 7)	4.89 (1.35)	---
HAQ disability (0 – 3)	---	0.85 (.54)
AIMS2 pain (1 – 5)	---	3.60 (.96)
Standardized disease severity index		
Mean (<i>SD</i>)	0.0 (1.0)	0.0 (1.0)
Range	-1.56 – 2.59	-2.60 – 2.05

Note: higher scores on the current health rating indicate better perceived health; higher scores on the influence on daily activity rating indicate greater disease impact on daily functioning; *SD* = standard deviations

covariance (ANCOVA) controlling for Neuroticism found the groups did differ on self-rated current health, $F(1,621) = 9.00, p < .01$, with the arthritis group reporting poorer health (adjusted $M = 2.51$) than the IBD group (adjusted $M = 2.75$).

Construct Validity – All Control Scales

The three new control scales were designed to assess several distinct aspects of control perceptions that may or may not be influenced by changes in health status. The means of each of the control scales were compared among each of the three samples with an analysis of variance (ANOVA) to cross-validate their properties. As expected, there were significant mean differences among the three samples for the Control Expectancies scale, $F(1, 923) = 314.95, p < .001$, the Adaptive Control scale, $F(1, 924) = 59.57, p < .001$, the Mastery scale, $F(1, 923) = 7.74, p < .01$, the Chance scale, $F(1, 923) = 9.98, p < .01$, and the Control Motivations scale, $F(1, 918) = 57.34, p < .001$ (see Table 38). Similar to other studies (Arraras et al., 2002; Buckelew et al., 1990; Jensen & Karoly, 1991) the chronic illness groups scored lower than the healthy student group on three of the Control Beliefs scales, Control expectancy, Adaptive control and Mastery (see Table 38). In contrast, the chronic illness groups scored higher on the CMI than the student group, suggesting that those with chronic illness are more motivated to take control over their health. For the Chance scale, the IBD group had the highest mean score of the 3 samples. A post hoc comparison revealed that the IBD group scored significantly higher on Chance control beliefs than the arthritis group (mean difference = $-.58, p < .001$).

Because the Modes of Control Inventory (MCI) assesses different styles of control over health that should not be influenced by health status no mean differences between the different health samples were expected. Indeed, a one-way ANOVA

revealed that the three groups did not differ on their mean scores for the Agency, $F(1, 918) = 0.23, ns$, Unmitigated Agency, $F(1, 918) = 0.70, ns$, or Communion scales, $F(1, 918) = 0.12, ns$ (see Table 39). However, a group difference was found for the Unmitigated Communion scale, $F(1, 921) = 21.78, p < .001$. This difference was due to a higher mean score for the student sample as a post hoc comparison revealed no difference between the arthritis and the IBD samples (mean difference = .09, ns). As noted previously, the higher scores for the student sample are likely due to greater ethnic diversity in this sample rather than any influence of health status on this control style.

Construct Validity – Control Beliefs Inventory (CBI)

Because of the ample size of the three samples (approximately 300 in each) and the number of correlations being examined, only correlations with $p < .01$ will be considered of interest although significant correlations starting at $p < .05$ are noted in all tables. The intercorrelations among all the control scales are presented in Tables 41 and 42. As expected, many of the CBI subscales were correlated with each other and with the CMI. The Chance scale was unrelated to the other Control Beliefs scales and the CMI in both the chronic illness samples, but was negatively related to each of the CBI scales in the student sample. This different pattern of association may be explained by the difference in the number of items per scale. The Chance scale for the students included 2 additional items beyond the three for the chronic illness sample that address issues regarding forces beyond one's control, not just luck.¹⁷

¹⁷ When scores on the Chance scale were calculated using the same 3 items as the scale for the chronic illness samples, none of the correlations with the remaining CBI subscales were significant.

Table 41. Study 4: Intercorrelations among the CBI, CMI, and MCI control scales for the arthritis and IBD samples

Scale	1	2	3	4	5	6	7	8	9
1. CBI Control Expectancies	---	.69**	.07	.20*	.15*	.31**	.10	.08	-.06
2. CBI Adaptive Control	.57**	---	.08	.43**	.25**	.33**	-.09	.22**	-.18**
3. CBI Chance Beliefs	.06	.06	---	-.08	-.07	.07	.17**	-.03	.00
4. CBI Mastery	.21**	.46**	-.03	---	.37**	.30**	-.24**	.15**	-.27**
5. Control Motivations Inventory (CMI)	.16**	.33**	-.03	.41**	---	.35**	-.20**	.29**	-.05
6. MCI Agency	.23**	.28**	-.01	.27**	.33**	---	.11	.01	.04
7. MCI Unmitigated Agency	-.02	-.18**	.21**	-.22**	-.18*	.13*	---	-.55**	.23**
8. MCI Communion	.11	.23**	-.06	.13*	.39**	.08	-.51**	---	-.13*
9. MCI Unmitigated Communion	.01	-.07	.06	-.11*	.04	.08	.24**	.01	---

Note: Correlations among the arthritis sample (listwise $N = 335$) are below the diagonal and correlations among the Inflammatory Bowel Disease (IBD) sample (listwise $N = 287$) are above the diagonal, CBI = Control Beliefs Inventory, MCI = Modes of Control Inventory, * $p < .05$, ** $p < .01$.

Table 42. Study 4: Intercorrelations among the CBI, CMI, and MCI control scales for the student sample.

Scale	1	2	3	4	5	6	7	8	9
1. CBI Control Expectancies	---								
2. CBI Adaptive Control	.64**	---							
3. CBI Chance Beliefs	-.23**	-.18**	---						
4. CBI Mastery	.42**	.44**	-.39**	---					
5. Control Motivations Inventory (CMI)	.38**	.38**	-.10	.49**	---				
6. MCI Agency	.44**	.40**	-.09	.40**	.46**	---			
7. MCI Unmitigated Agency	-.07	-.06	.23**	-.04	-.06	.09	---		
8. MCI Communion	.20**	.09	-.08	.06	.27**	.01	-.53**	---	
9. MCI Unmitigated Communion	.11	-.20**	-.06	.09	-.01	.10	.19**	-.21**	---
10. Wellness behaviors	.30**	.20**	-.15*	.42**	.45**	.24**	-.09	.27**	-.05

Note: CBI = Control Beliefs Inventory, MCI = Modes of Control Inventory, * $p < .05$, ** $p < .01$, ($N = 29$).

The Control expectancies and Adaptive Control scales were moderately intercorrelated across all three samples (Tables 41 and 42), although this was to be expected given that Adaptive Control beliefs can be viewed as a subset of general beliefs about control over health. As well, the factor analyses suggested that these two scales formed one factor for the IBD and student samples. The magnitude of the correlation of these two subscales was the highest for the IBD sample suggesting that general control beliefs over health and beliefs about control over one's illness and symptoms may be less distinct for this illness group.

The Mastery subscale was moderately associated with the Adaptive Control subscale and less strongly related to Control Expectancies for the chronic illness groups (Table 41). The construct of Adaptive Control is intended to reflect taking an active role in managing one's illness whereas the Control Expectancies scale simply reflects a belief in personal control over health and not whether one believes they can take the action necessary to manifest that control. Mastery was correlated equally strongly with both the Adaptive Control and Control Expectancy subscales for the student sample (Table 42), perhaps because Adaptive Control may not be viewed as distinct from general Control Expectancies in a younger and healthier population.

Association with illness beliefs. The intercorrelations of the CBI with the MHLC and the ICQ for each of the chronic illness samples are presented in Table 43. Only correlations with $p < .01$ will be considered of interest although significant correlations starting at $p < .05$ are noted in all tables. The Control Expectancy scale was strongly associated with the Internal scale from the MHLC for both samples as expected (Table 43). However, the Control Expectancy scale was not associated with self-blame in either

Table 43. Study 4: Intercorrelations among the Control Beliefs Inventory (CBI), the CMI, the MHLC and the ICQ scales with the Chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10	11
1. CBI Control Expectancies	---	.69**	.08	.22**	.16**	.70**	.01	-.23**	-.25**	.20**	-.16**
2. CBI Adaptive Control	.57**	---	.10	.43**	.27**	.54**	-.11	-.26**	-.33**	.32**	.20**
3. CBI Chance Beliefs	.06	-.04	---	-.08	-.07	.02	.18**	.60**	.12*	-.18**	-.16**
4. CBI Mastery	.22**	.46**	-.03	---	.38**	.09	-.25**	-.27**	-.41**	.58**	.36**
5. Control Motivations Inventory (CMI)	.16**	.32**	-.03	.41**	---	.13*	-.08	-.16**	-.07	.22**	.34**
6. Internal MHLC	.73**	.50**	.04	.15**	.07	---	.11	-.24**	-.26**	.26**	.16**
7. Powerful others MHLC	-.01	-.12*	.02	-.19**	-.12*	.08	---	.27**	.16**	-.16**	.00
8. Chance MHLC	-.32**	-.32**	.49**	-.24**	-.12*	-.24**	.10	---	.33**	-.27**	-.23**
9. Helplessness ICQ	-.35**	-.46**	.13*	-.49**	-.11*	-.29**	.18**	.20**	---	-.58**	-.23**
10. Acceptance ICQ	.22**	.47**	.02	.56**	.23**	.22**	-.11*	-.13*	-.53**	---	.46**
11. Benefit finding ICQ	.14**	.39**	-.05	.42**	.44**	.15**	-.03	-.18**	-.25**	.52**	---

Note: Correlations among the arthritis sample (listwise $N = 333$) are below the diagonal and correlations among the Inflammatory Bowel Disease (IBD) sample (listwise $N = 284$) are above the diagonal; MHLC = Multidimensional Health Locus of Control, ICQ = Illness Cognitions Questionnaire. * $p < .05$, ** $p < .01$.

the arthritis ($r = .06$, *ns*) or the IBD sample ($r = .03$, *ns*), whereas the Internal scale from the MHLC was strongly related to self blame for both samples (Arthritis $r = .73$, $p < .001$; IBD $r = .70$, $p < .001$). Similar to the Internal scale, the Control Expectancies scale was unrelated to the Powerful Others scale and negatively related to the MHLC Chance scale in both samples. These results suggest that the Control Expectancy scale may be a valid replacement scale for the Internal MHLC that assesses expectancy about personal control over health without containing items that assess self-blame.

The Chance beliefs scale was moderately associated with the MHLC Chance scale in both samples (Table 43). There was also evidence that the new Chance beliefs scale was independent of the Control Expectancies scale in both samples. The Control Expectancy scale and the CBI Chance scale were unrelated, whereas the MHLC Internal and Chance scales were negatively related. In addition, the CBI Chance scale was positively related to the Powerful Others MHLC scale but only for the IBD sample. For both samples the CBI Chance beliefs scale was unrelated to Helplessness whereas the MHLC Chance scale was positively related to Helplessness. There was a modest negative association to the ICQ Acceptance and Benefit Finding scales for the IBD sample only, whereas the MHLC Chance scale was positively correlated with these two ICQ subscales for both samples. This pattern of results suggest that the new CBI Chance beliefs scale is distinct from the MHLC Chance scale and may assess aspects of Chance beliefs that are less related to helplessness.

The pattern of associations of the remaining CBI scales with the Illness Cognitions Questionnaire (ICQ; Evers et al., 2001) scales suggests that each of these control beliefs is indicative of positive and adaptive evaluations of chronic illness. The

CE scale was negatively correlated with the ICQ helplessness scale, and positively correlated with the Acceptance scale and modestly correlated with the Benefit Finding scale (Table 43). A similar pattern of associations with the ICQ scales was observed for the Adaptive Control and the Mastery scales, although the magnitude of the correlations with the Adaptive Control scale was greater for the arthritis sample.

Association with coping measures. The intercorrelations of the CBI scales, coping efficacy, and the relevant COPE scales are presented in Table 44, and as previously noted only correlations with a significance level less than .01 will be considered.

Associations with problem-focused coping were evident for the Adaptive Control scale, with positive correlations to planning and active coping for both samples. Similarly, the Mastery scale was positively related to each of the problem-focused coping scales for both samples, whereas the Chance scale was not associated with either coping style. The Control Expectancies scale was only related to active coping for the arthritis sample. Both Mastery and Adaptive control were also positively correlated with the emotion-focused coping styles positive reframing and acceptance, although Adaptive Control was only weakly related ($p < .05$) to acceptance for the IBD sample. Control Expectancies was similarly weakly related to the emotion-focused coping styles across each sample, although this scale was significantly related to positive reframing for the IBD sample.

Mastery was negatively associated with the two avoidant coping styles, denial and behavioral disengagement, for both the arthritis and the IBD sample. Chance beliefs were

Table 44. Study 4: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the CMI scales, coping efficacy and coping styles for the chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10	11	12
1. CBI Control Expectancies	---	.69**	.09	.22**	.15*	.07	.12*	.13*	.24**	.09	.05	-.14*
2. CBI Adaptive Control	.58**	---	.10	.43**	.26**	.19**	.18**	.24**	.28**	.12*	-.03	-.25**
3. CBI Chance Beliefs	.08	-.03	---	-.08	-.06	-.03	-.07	-.07	-.04	-.14*	.16*	.13*
4. CBI Mastery	.20**	.45**	-.04	---	.38**	.39**	.24**	.36**	.32**	.31**	-.27**	-.53**
5. Control Motivations Inventory	.16**	.33**	-.03	.41**	---	.10	.35**	.38**	.26**	.20**	-.12*	-.30**
6. Coping efficacy	.09	.29**	.10	.34**	.15**	---	.10	.18**	.19**	.24**	-.21**	-.34**
7. Planning	.10	.30**	-.04	.31**	.46**	.21**	---	.63**	.27**	.23**	-.07	-.18**
8. Active coping	.24**	.36**	-.05	.37**	.37**	.17**	.60**	---	.26**	.25**	-.18**	-.34**
9. Positive reframing	.11*	.33**	-.09	.33**	.39**	.16**	.47**	.38**	---	.31**	-.05	-.17**
10. Acceptance	.12*	.40**	.00	.35**	.29**	.32**	.41**	.35**	.33**	---	-.31**	-.24**
11. Denial	.02	-.12*	.19**	-.26**	-.05	-.14*	-.07	-.06	-.06	-.30**	---	.44**
12. Behavioral disengagement	-.13*	-.37**	.07	-.48**	-.27**	-.28**	-.26**	-.39**	-.30**	-.32**	.32**	---

Note: Correlations among the arthritis sample (listwise $N = 329$) are below the diagonal and correlations among the Inflammatory Bowel Disease (IBD) sample (listwise $N = 283$) are above the diagonal; * $p < .05$, ** $p < .01$.

Table 45. Study 4: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the Control Motivations Inventory scale and the personality measures for the chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10	11	12
1. CBI Control Expectancies	---	.69**	.08	.22**	.16**	-.02	.02	.03	-.03	-.16**	.16**	.19**
2. CBI Adaptive Control	.59**	---	.10	.43**	.27**	.20**	.23**	.27**	.14*	-.13*	.26**	.19**
3. CBI Chance Beliefs	-.01	-.02	---	-.08	-.07	-.08	-.11	-.17**	-.12*	.02	-.08	-.14*
4. CBI Mastery	.22**	.46**	-.03	---	.38**	.18**	.30**	.26**	.18**	-.46**	.38**	.42**
5. Control Motivations Inventory	.17*	.33**	-.02	.41**	---	.20**	.23**	.27**	.14*	-.13*	.18*	.29**
6. BFFI Openness	.12*	.21**	.12*	.25**	.35**	---	.20**	.42**	.10	-.19*	.11	.24**
7. BFFI Conscientiousness	.17**	.15**	-.03	.26**	.33**	.25**	---	.26**	.26**	-.24**	.19**	.26**
8. BFFI Extraversion	.15**	.26**	.05	.32**	.26**	.38**	.22**	---	.16**	-.29**	.36**	.40**
9. BFFI Agreeableness	.13*	.16**	.09	.17**	.30**	.26**	.40**	.23**	---	-.32**	.27**	.23**
10. BFFI Neuroticism	-.18**	-.34**	-.10	-.52**	-.31**	-.30**	-.34**	-.31**	-.32**	---	-.55**	-.48**
11. Optimism	.23**	.38**	-.04	.45**	.21**	.27**	.30**	.36**	.27**	-.51**	---	.47**
12. Self-esteem	.15**	.36**	.02	.46**	.37**	.29**	.37**	.33**	.32**	-.53**	.47**	---

Note: Correlations among the arthritis sample (listwise $N = 333$) are below the diagonal and correlations among the Inflammatory Bowel Disease (IBD) sample (listwise $N = 284$) are above the diagonal, BFFI = Big Five Factor Inventory, * $p < .05$, ** $p < .01$.

Table 46. Study 4: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the CMI scale and the personality measures for the student sample.

Scale	1	2	3	4	5	6	7	8	9	10	11
1. CBI Control Expectancies	---										
2. CBI Adaptive Control	.63**	---									
3. CBI Chance Beliefs	-.23**	-.19**	---								
4. CBI Mastery	.42**	.43**	-.40**	---							
5. Control Motivations Inventory (CMI)	.37**	.36**	-.09	.47**	---						
6. BFFI Openness	.19**	.21**	-.02	.18**	.12*	---					
7. BFFI Conscientiousness	.16**	.22**	-.21**	.42**	.34**	.09	---				
8. BFFI Extraversion	.09	.15*	-.17**	.13*	.07	.19**	.11	---			
9. BFFI Agreeableness	.07	.03	-.17**	.23**	.16**	.09	.33**	.07	---		
10. BFFI Neuroticism	-.25**	-.01	.18**	-.48**	-.18**	-.15*	-.19**	-.26**	-.23**	---	
11. Optimism	.26**	.36**	-.22**	.40**	.24**	.26**	.27**	.19**	.23**	-.48**	---
12. Self-esteem	.23**	.15**	-.18**	.46**	.28**	.21**	.34**	.36**	.17**	-.47**	.51**

Note: BFFI = Big Five Factor Inventory, * $p < .05$, ** $p < .01$, (listwise $N = 283$).

positively related to denial but not strongly related to behavioral disengagement. In contrast, Control Expectancies were weakly ($p < .05$) and negatively related to behavioral disengagement but not denial for both samples. Adaptive control was also negatively related to behavioral disengagement but not significantly related to denial for both samples

Finally, both Adaptive Control and Mastery showed the expected positive associations with coping efficacy for both samples. Neither the Chance nor the Control Expectancies scales were related to coping efficacy in the two samples.

Associations with personality. The associations among the CBI and the personality measures are presented in Tables 45 and 46. The pattern of correlations among the control scales and the Big Five Factor Inventory (BFFI) were most consistent for the Mastery subscale, with positive associations to Openness (O), Conscientiousness (O), Extraversion (E), and Agreeableness, and a negative relation to Neuroticism (N) across the student, arthritis and IBD samples. The only exception was the correlation with E that did not exceed the .05 significance level for the student sample. As expected, both the Control Expectancy scale and the Adaptive Control scales were correlated negatively with N and positively with C, although these relations were found consistently across only two of the three samples. There were also positive associations between Adaptive Control scale and the remaining BFFI scales for both the arthritis and the IBD samples. With the exception of a negative correlation to the E scale for the IBD sample, the Chance scale was not substantially related to the BFFI scales for the chronic illness groups. However, for the student sample, Chance beliefs were negatively related to C, E, and A, and positively related to N. This different pattern of associations was likely due to

the difference in items that comprised the Chance scale for the student sample as compared to the scale for the chronic illness samples.

The expected positive correlation between Mastery and optimism was found for each of the three samples. In addition, Mastery was positively correlated to self-esteem in each of the samples. Adaptive Control and Control Expectancy were also positively correlated with optimism and self-esteem for each sample. The Chance scale was negatively related to both optimism and self-esteem for the student sample only, perhaps because of the difference in scale composition between the student and chronic illness samples.

Construct Validity – Control Motivations Inventory

The association between the Control Motivations Inventory (CMI) and the illness beliefs measures are presented in Table 43. Similar to the validity studies for the general Desirability of Control scale (Burger & Cooper, 1979), the CMI, which includes items dealing with desire for control over health, was not substantially related to the internal scale of the MHLC in each of the chronic illness samples. In addition, the CMI was only weakly related to the other MHLC scales for each of the samples supporting the proposition that motivations for control over health are distinct from HLOC beliefs (Burger, 1985; Burger & Cooper, 1979). The CMI was also positively correlated with both Acceptance and Benefit Finding illness cognitions for each of the illness samples. There were no substantial associations with Helplessness.

The CMI correlated with both problem-focused coping strategies (active and planning coping) and emotion-focused coping (acceptance and positive reframing) across both illness samples (see Table 44). However, the CMI was negatively correlated with

behavioral disengagement, but was not substantially related to denial. Although the CMI was not significantly related to coping efficacy for the IBD sample, it was modestly related to coping efficacy for the arthritis sample.

The associations of the CMI with the various personality measures are presented in Tables 45 and 46. Optimism and self-esteem were consistently and positively correlated with the CMI across all three samples. However, only the O, C, and E scales from the BFFI were consistently and positively associated and with the CMI across the two chronic illness samples. Neuroticism was negatively correlated with the CMI for the arthritis and the student sample, and was only modestly correlated with the CMI for the IBD sample.

Construct Validity – Modes of Control Inventory (MCI)

The intercorrelations among the MCI scales are presented in Tables 41 and 42. Unless stated otherwise reported associations were found for both the arthritis and the IBD sample. In accordance with the proposed theoretical relations between Agency and Communion (Helgeson, 1994), the Agency scale was unrelated to Communion, and Unmitigated Agency scale was negatively associated with Communion across all three samples. In contrast to this model (see Table 26), the Agency scale was not correlated with the Unmitigated Communion scale for all three samples, and was modestly associated with Unmitigated Agency scale for the arthritis sample only. In addition, Communion was unrelated to Unmitigated Communion in the arthritis sample, and negatively related in the IBD and student samples, although Helegeson's (1994) model suggests that they should be positively related. Unmitigated Agency was positively

associated with Unmitigated Communion although the model suggests that these two general constructs should be unrelated.

Association with illness beliefs. The correlations among the MCI scales, the Multidimensional Health Locus of Control (MHLC; Wallston et al., 1978), and the Illness Cognitions Questionnaire (ICQ; Lewis, Morisky, & Flynn, 1978) for the chronic illness samples are presented in Table 47. As previously noted, only correlations with $p < .01$ are considered as substantial associations although significant correlations starting at $p < .05$ are noted in all tables.

Given that Agency reflects a self-assertive way of taking control over one's health it was not surprising that this scale was positively correlated with Internal MHLC and negatively correlated with Powerful Others MHLC. In contrast, Communion, a style of taking control over one's health that involves cooperating with others, was unrelated to Internal MHLC and positively correlated with Powerful Others MHLC. Neither Unmitigated Agency nor Unmitigated Communion was associated with the Internal or the Powerful Others MHLC. However, Unmitigated Agency was positively correlated with the Chance MHLC, whereas Unmitigated Communion was only modestly associated with Chance MHLC beliefs. Both Agency and Communion were unrelated to the Chance MHLC.

The associations of the MCI scales with the ICQ scales support (Helgeson, 1994) the assertion that Agency and Communion are associated with positive functioning, whereas Unmitigated Agency and Unmitigated Communion reflect less positive functioning (Table 47). Agency was positively correlated with Acceptance for both

Table 47. Study 4: Intercorrelations among the Control Modes of Control Inventory (MCI), the MHLC and the ICQ scales with the Chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10
1. MCI Agency	---	.10	.01	.04	.20**	-.29**	-.04	-.05	.24**	.06
2. MCI Unmitigated Agency	.13*	---	-.56**	.23**	.15*	.04	.28**	.23**	-.10	-.25**
3. MCI Communion	.08	-.51**	---	-.13*	.01	.25**	-.05	-.09	.05	.26**
4. MCI Unmitigated Communion	.08	.24**	.01	---	-.04	.07	.13*	.31**	-.18**	-.04
5. Internal MHLC	.27**	.08	.05	.09	---	.13*	-.24**	-.26**	.27**	.16**
6. Powerful others MHLC	-.26**	-.00	.17**	.10	.08	---	.28**	.16**	-.16**	-.00
7. Chance MHLC	-.00	.27**	-.09	.13*	-.24**	.10	---	.33**	-.26**	-.23**
8. Helplessness ICQ	-.09	.17**	-.03	.16**	-.29**	.18**	.20**	---	-.57**	-.23**
9. Acceptance ICQ	.26**	-.09	.07	-.10	.22**	-.12*	-.13*	-.53**	---	.46**
10. Benefit finding ICQ	.20**	-.20**	.31**	-.01	.15**	-.03	-.18**	-.25**	.25**	---

Note: Correlations among the arthritis sample (listwise $N = 333$) are below the diagonal and correlations among the Inflammatory Bowel Disease (IBD) sample (listwise $N = 284$) are above the diagonal; MHLC = Multidimensional Health Locus of Control, ICQ = Illness Cognitions Questionnaire. * $p < .05$, ** $p < .01$.

Table 48. Study 4: Intercorrelations among the Modes of Control Inventory (MCI) and the coping measures with the chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10	11	12
1. MCI Agency	---	.11	.02	.03	.09	-.03	-.06	.15*	.16**	-.05	-.04	-.10
2. MCI Unmitigated agency	.14*	---	-.55**	.23**	-.15*	-.35**	-.32**	-.13*	-.05	.30**	.40**	.27**
3. MCI Communion	.08	-.51**	---	-.12*	.07	.51**	.49**	.25**	.09	-.14*	-.34**	-.21**
4. MCI Unmitigated communion	.09	.24**	.01	---	-.18**	-.02	.03	-.04	-.03	.28**	.22**	.21**
5 Coping efficacy	.14*	-.13*	.04	-.12*	---	.09	-.01	.18**	.24**	-.26**	-.31**	-.24**
6. Emotional social support	-.02	-.35**	.49**	.02	-.01	---	.67**	.24**	.06	-.07	-.21**	-.26**
7. Instrumental social support	.05	-.42**	.54**	.03	-.04	.63**	---	.26**	.06	-.02	-.07	-.03
8. Active coping	.21**	-.17**	.24**	-.02	.15**	.17**	.24**	---	.25**	-.14*	-.19**	-.13*
9. Acceptance	.23**	-.16**	.11*	.03	.31**	.05	.04	.34**	---	-.21**	-.11	-.14*
10. Self-blame	-.08	.15**	-.07	.28**	-.28**	.00	.02	-.07	-.23**	---	.39**	.34**
11. Secure/avoidant attachment	.05	.31**	-.32**	-.03	-.15**	-.28**	-.16**	-.19**	-.24**	-.15**	---	.46**
12. Anxious attachment	-.10	.16**	-.06	.06	-.25**	-.04	-.04	-.08	-.22**	-.22**	.30**	---

Note: Higher scores on the secure/avoidant attachment scale indicate more avoidant attachment; correlations among the arthritis sample (listwise $N = 332$) below the diagonal and correlations among the IBD sample (listwise $N = 284$) are above the diagonal. * $p < .05$, ** $p < .01$.

samples, and positively correlated with Benefit Finding only in the arthritis sample.

Communion was positively correlated with Benefit Finding but not Acceptance in both samples. Unmitigated Agency was negatively associated with Benefit Finding in both samples, and Unmitigated Communion was negatively related to Acceptance in the IBD sample only. Both Unmitigated Agency and Unmitigated Communion were positively related to Helplessness in each of the chronic illness samples.

Associations with coping and attachment measures. The correlations of the MCI scales and the Brief COPE scales (Carver, 1997), coping efficacy, and the Attachment Styles scales (Simpson et al., 1992) are presented in Table 48. Communion was unrelated to coping efficacy, whereas Agency was modestly and positively correlated to coping efficacy for the arthritis sample only. A modest negative correlation between coping efficacy and both Unmitigated Agency and Unmitigated Communion was found, suggesting that these two styles of control may be related to less successful coping. The distinctions between Agency and Communion and each of their less adaptive unmitigated counterparts were illustrated through the pattern of associations with the scales of the Brief COPE. As expected, Communion was strongly related to both Instrumental and Emotional social support coping, whereas Unmitigated Communion was negatively correlated to each of the social support styles. Both Agency and Communion were positively correlated with active coping supporting the notion that these styles of control reflect ways of controlling one's health that may promote well-being. Agency was also positively related to Acceptance. Both Unmitigated Agency and Unmitigated Communion were positively related to Self-blame, and Unmitigated Agency was negatively related to Active coping, and Acceptance for the arthritis sample only.

Because Agency and Communion reflect more adaptive ways of taking control over health, it was expected that each of these scales might be positively associated with secure attachment and negatively associated with anxious attachment, whereas their Unmitigated counterparts would show the opposite pattern of relations with the attachment scales. Although Agency was unrelated to either attachment style, Communion was negatively associated with avoidant attachment for both samples, and negatively associated with anxious/ambivalent attachment for the IBD sample only. As expected, Unmitigated Agency was positively correlated with avoidant attachment for both samples. The relations of Unmitigated Communion to the attachment styles were less consistent across the 2 samples as this scale was positively related to both the avoidant and anxious/ambivalent scales for the IBD sample but unrelated to the two attachment scales for the arthritis samples.

Association with personality. The correlations between the MCI scales and the Big Five Factor Inventory (BFFI) scales, self-esteem, and optimism are presented in Tables 40 and 41. In contrast to the CBI scales, the MCI scales were not substantially related to the BFFI Conscientiousness scale, supporting the proposed distinction between control beliefs and styles of control. The only exception was for the student sample where Conscientiousness was positively correlated with Agency, an association that has been noted in other Agency-Communion research (Fritz & Helgeson, 1998). Consistent with the idea that both Agency and Communion reflect adaptive and flexible styles of seeking control over health, both scales were modestly correlated with Openness for the chronic illness samples. Only Agency was related to Openness for the student sample. The expected negative association of Agency to Neuroticism was also found. In contrast to

Table 49. Study 4: Intercorrelations among the Modes of Control Inventory (MCI) and the personality measures with the chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10	11
1. MCI Agency	---	.10	.01	.04	.16**	.12*	.18**	-.05	-.16**	.18**	.19**
2. MCI Unmitigated agency	.13*	---	-.56	.23**	-.13*	-.14*	-.31**	-.25**	.11	-.26**	-.30**
3. MCI Communion	.08	-.51**	---	-.13*	.15*	.12*	.34**	.23**	-.08	.29**	.25**
4. MCI Unmitigated communion	.07	.24**	.01	---	-.02	-.01	-.06	.02	.23**	-.28**	-.33**
5. BFFI Openness	.15**	-.14*	.20**	-.06	---	.20**	.42**	.10	-.19**	.24**	.11
6. BFFI Conscientiousness	.07	-.05	.08	.00	.24**	---	.26**	.26**	-.24**	.19**	.26**
7. BFFI Extraversion	.11	-.17**	.22**	.02	.38**	.22**	---	.16**	-.29**	.36**	.40**
8. BFFI Agreeableness	.08	-.11*	.18**	.16**	.24**	.39**	.23**	---	-.32**	.27**	.23**
9. BFFI Neuroticism	-.21**	.08	-.05	.18**	-.30**	-.34**	-.31**	-.32**	---	-.55**	-.48**
10. Optimism	.14**	-.24**	.17**	-.18**	.26**	.29**	.36**	.25**	-.51**	---	.47**
11. Self-esteem	.17**	-.25**	.12*	-.15**	.28**	.36**	.33**	.29**	-.53**	.46**	---

Note: Correlations among the arthritis sample (listwise $N = 332$) are below the diagonal and correlations among the Inflammatory Bowel Disease (IBD) sample (listwise $N = 284$) are above the diagonal, BFFI = Big Five Factor Inventory, * $p < .05$, ** $p < .01$.

Table 50. Study 4: Intercorrelations among the Modes of Control Inventory (MCI) and the personality measures for the student sample.

Scale	1	2	3	4	5	6	7	8	9	10
1. Agency	---									
2. Unmitigated agency	.10	---								
3. Communion	.01	-.55**	---							
4. Unmitigated communion	.09	.20**	-.22**	---						
5. BFFI Openness	.19**	-.05	.07	.04	---					
6. BFFI Conscientiousness	.24**	-.04	.02	.08	.09	---				
7. BFFI Extraversion	.06	-.09	.10	.16**	.19**	.11	---			
8. BFFI Agreeableness	.10	-.19**	.22**	.18**	.09	.33**	.07	---		
9. BFFI Neuroticism	-.18**	-.03	-.09	-.06	-.15*	-.19**	-.26**	-.23**	---	
10. Optimism	.09	-.13*	.18**	.00	-.21**	.27**	.27**	.23**	-.48**	---
11. Self-esteem	.16**	.09	.16**	.01	.26**	.34**	.36**	.17**	-.47**	.51**

Note: BFFI = Big Five Factor Inventory ($N =$), * $p < .05$, ** $p < .01$.

other research (Fritz & Helgeson, 1998), Agency was only related to Extraversion in the IBD sample.

Because Communion reflects a more socially oriented mode of control over health it was not surprising that this scale was positively correlated with both Extraversion and Agreeableness, although the association with Extraversion was negligible for the student sample. Agency was unrelated to Agreeableness in all three samples, and positively correlated with Extraversion for the IBD sample only.

Unmitigated Agency, with its focus on self to the exclusion of others (Helgeson, 1994) was negatively correlated with Extraversion for the chronic illness samples, and negatively correlated with Agreeableness for all three samples. This scale was unrelated to Neuroticism in all samples, and weakly related to Openness in all but the student sample. These findings are consistent with those found previously where Unmitigated Agency was negatively related to Conscientiousness, Agreeableness, and Openness (Helgeson & Fritz, 1998). The Unmitigated Communion scale was positively correlated with Neuroticism for the chronic illness samples, and positively correlated to Extraversion in the student sample only. In addition, a modest correlation with Agreeableness was found for the arthritis and the student sample, a finding that is consistent with other studies of general Unmitigated Communion scales (Helgeson & Fritz, 1998).

Each of the MCI scales was associated with self-esteem and Optimism for the chronic illness samples. Consistent with other research suggesting Agency and Communion are associated with positive well-being (Helgeson, 1994), the two health-related Agency and Communion scales were positively correlated with both Self-esteem

and Optimism. In contrast, the Unmitigated Agency and Unmitigated Communion scales were negatively correlated with both Self-esteem and Optimism, supporting the proposition that these two styles of health control like their general counterparts are related negatively to well-being (Helgeson & Fritz, 2000). For the student sample, only the Communion scale showed the same pattern of correlations as for the chronic illness samples. Agency was also positively correlated with Self-esteem and there was a very weak negative correlation of Unmitigated Agency with Optimism. The remaining correlations among the MCI scales and the positive personality scales were not obtained for the student sample.

Concurrent Validity

An assessment of criterion-related validity was provided by the correlations of each of the new control scales with wellness behaviors (Table 42). Recall that due to reasons related to the impact of illness on the arthritis and the IBD sample, wellness behaviors were only assessed for the student sample. As expected, moderately strong correlations between the Wellness Behaviors Index (WBI) were found for both the Mastery and the Control Motivations Inventory (MCI). As well, a modest negative association between Chance beliefs and the WBI was found as expected. Control Expectancies and Adaptive Control were each positively related to wellness behaviors. And consistent with previous research of general Agency and Communion measures (Helgeson, 1994), each of these two health specific scales were positively correlated with the practice of wellness behaviors. Although other studies have found that Unmitigated Agency and Unmitigated Communion were related to a range of poor health behaviors

(Helgeson & Fritz, 2000), the Unmitigated Agency and Unmitigated Communion scales in the current study were unrelated to wellness behaviors.

A comparison of the performance of the CBI Control Expectancy scale to the internal MHLC with respect to wellness behaviors was also conducted with regression analyses. Control Expectancy was designed to improve upon the internal MHLC scale in assessing general beliefs about control over health. The internal MHLC was entered first and explained for only 3 percent of the variance in wellness behaviors, $R^2 = 0.03$, $F(1,236) = 8.89$, $p < .01$. The addition of the Control Expectancy scale accounted for an additional 5 percent of the variance ($R^2 = 0.08$, $F(2,236) = 11.31$, $p < .001$), and the internal MHLC scale was no longer a unique predictor of wellness behaviors ($\alpha = .03$, *ns*).

Another regression was performed to assess the performance of the CBI scales and the CMI relative to one another. Control Expectancy was entered first ($R^2 = 0.08$, $F(1,300) = 28.98$, $p < .001$), followed by Mastery which explained an additional 11 percent of the variance in wellness behaviors ($R^2 = 0.19$, $F(2,299) = 35.68$, $p < .001$). The Control Motivations Inventory (CMI) was entered last and accounted for 7 percent of the variance above and beyond the previous two scales ($R^2 = 0.26$, $F(2,299) = 34.57$, $p < .001$). Control Expectancy was not a unique predictor of wellness behaviors in the final model ($\alpha = .08$, *ns*).

Discussion

Factor Structure and Composition

The factor structure and composition of each of the three health-related control scales were established across two distinct chronic illness samples as well as with a

relatively younger and healthier student sample. Several changes from the factor structures originally proposed for the scales were found. The proposed 4-factor structure of the Control Beliefs Inventory was only supported for the arthritis sample, whereas a 3-factor solution with Adaptive Control and Control Expectancy forming a single factor emerged for the IBD and the student samples. Differences in health status may account for the factor structure changes in the student sample as Adaptive Control, which reflects beliefs in control over illness symptoms, may not be appropriate for a younger and healthier population. However, the changes found with the IBD sample are intriguing. Because the sample sizes were considered adequate for obtaining reliable factors (Comrey, 1988; Guadagnoli & Velicer, 1988) the differential structures obtained may be more indicative of the differences between how those with arthritis and those with IBD view control over health. Further investigation of the factor structures in Study 5 with a mixed chronic illness population that includes those with arthritis and IBD will help to establish whether a 3 factor or 4 factor solution best defines the CBI.

The scale compositions were supported across each of the samples with only two exceptions (see Tables 32-37 for final scale compositions). The full 5-item Chance scale appeared to be valid only for the student sample whereas a shortened 3-item scale was supported for the chronic illness sample. One explanation for this difference may be that beliefs in forces outside of one's control are viewed similarly by individuals with less pervasive health issues, whereas those living with a chronic illness such as arthritis or IBD that impacts daily life may make distinctions about the types of forces that are outside of one's control. For example, genetic factors are often associated with the onset of a chronic illness and like luck can be considered as random or chance forces beyond

one's control. However, believing that genetics may be responsible for one's health is not qualitatively the same as believing that luck plays a role in one's health. Thus, those with a chronic health issue may view the influence of predetermined forces (genetics) on health quite differently from the influence of undetermined forces (luck) on health. The former may be quite adaptive and aid in acceptance of one's condition whereas the latter may reflect a more passive approach. For a younger and healthier population this type of distinction may not be made.

The Unmitigated Communion scale was also modified for the student sample. Specifically the two items that did not fit may not have been appropriate for such a young sample. Some students may have only limited contact with their family, or may be at a life stage where providing support for their family is not appropriate. Additionally, spending too much time on the health problems of others requires exposure and an interest in these issues. Given that the majority of students are young adults in generally good health it is unlikely that item 20 would be endorsed strongly. Developmentally, health-related Unmitigated Communion may not be a valid construct for this population.

Convergent and Divergent Validity

Evidence of convergent and divergent validity for the new scales was provided through the patterns of correlations with the personality measures, coping styles, and illness cognitions. Overall, the associations of the CBI scales with each of the validity measures followed what was expected given the proposed properties of each scale. Mastery and Adaptive Control were each consistently and substantially associated with adaptive coping styles, better coping efficacy, and positive illness cognitions, and negatively associated with avoidant coping styles and negative illness cognitions. Control

Expectancy followed a similar overall pattern of association, although the magnitude of the correlations was less substantial and consistent. Each of these scales was also positively associated with personality variables known to predict positive well-being (Keyes, Shmotkin, & Ryff, 2002; McCrae & Costa, 1991; Scheier et al., 1994), and health-promoting behaviors (Booth-Kewley & Vickers, 1994; Lemos-Giraldez & Fidalgo-Aliste, 1997; Marshall et al., 1994). In addition, each was negatively related to Neuroticism. This evidence, although indirect, supports the proposition that these control belief scales assess aspects of perceived control that may be important for positive adjustment to chronic illness.

The associations with other illness cognitions also supported the construct validity of the Mastery, Adaptive Control and Control Expectancy scales. Acceptance and benefit finding reflect positive ways of re-evaluating the inherently aversive qualities of chronic illness (Evers et al., 2001). Acceptance diminishes the aversive meaning of the illness, and benefit finding focuses on deriving positive meaning from the illness. Indeed, benefit finding is often referred to as secondary or interpretive control (Rothbaum, Weisz, & Snyder, 1982), whereas other control constructs such as mastery or HLOC are referred to as primary control. The former involves positive adjustment to a challenging event by changing one's view of the event, whereas the latter involves beliefs in one's abilities to change or circumvent the event (Rothbaum et al., 1982). Like benefit finding, helplessness is also a passive secondary control strategy but instead involves emphasizing the aversive rather than the positive qualities of illness (Evers et al., 2001). The positive associations of Mastery, Adaptive Control, and to a lesser extent, Control Expectancy with each of the adaptive illness cognitions, acceptance and benefit finding, and the

negative associations of each of the scales with helplessness provides strong support of the beneficial qualities of these control perceptions for adjustment to chronic illness.

A comparison of the Control Beliefs Inventory scales with the Multidimensional Health Locus of Control Scales (MHLC; Wallston et al., 1978) was important for assessing the divergent and convergent validity of the new scales. Although there was some conceptual overlap between the new Control Expectancy scale and the Internal HLOC scale as evidenced by their strong intercorrelation, Control Expectancy was unrelated to self-blame. Similar to other studies (Buckelew et al., 1990; Stainton Rogers, 1995), the internal MHLC scale in the current study was strongly associated with self-blame coping, supporting Marshall's (1991) proposition that self-blame is a distinct property of the internal MHLC scale. The primary goal in creating the Control Expectancy scale was to produce a scale that reflected beliefs in personal control over general health that would emulate some of the properties of the MHLC internal scale, but be free of content related to self-blame. The findings from the present study suggest that this was accomplished.

The Chance scale from the CBI was designed to reflect some of the same beliefs in random forces outside of one's control that are contained within the MHLC Chance scale. However, as was previously noted, those with chronic illness in the current study appeared to separate undetermined forces (luck) from predetermined forces (genetics). Accordingly, the resulting 3-item scale appears to have qualities that are distinct from the MHLC Chance scale. Both Chance scales were moderately but not strongly correlated, and the expected association with helplessness was very modest for the CBI scale, and stronger for the MHLC scale. However, the 3-item CBI Chance scale was positively

related to denial coping. Only the 5-item Chance scale demonstrated some of the expected associations with the personality measures. High scores on Chance were associated with less Conscientiousness, less optimism and self-esteem, and more Neuroticism. Given these findings, it appears that the 3-item Chance scale that was tailored for the chronic illness samples assesses a narrower concept of Chance control beliefs that may have limited value for understanding adjustment to chronic illness.

The analysis of the Control Motivations Inventory revealed this to be a unidimensional as opposed to multidimensional construct as originally proposed. The initial items chosen for this scale reflected motivation to control health based on the value placed on one's health and the desire to be in control of one's health. However, both of these dimensions of control motivations may be so interrelated that distinctions are neither possible nor necessary. Indeed, valuing health may be a precursor to an increased desire for managing health (Wurtele et al., 1985) and making health-related decisions. Nonetheless, the pattern of associations of the CMI followed very much that of the CBI Mastery and Adaptive Control scales, suggesting that the desire for control over health may be adaptive overall. One important way in which the CMI was distinguished from the CBI scales was the lack of any substantial association with the internal MHLC scale. This finding was anticipated and provides further construct validity for the CMI by supporting the proposition that motivations for control over health are distinct from HLOC beliefs (Burger, 1985; Burger & Cooper, 1979).

Based on Helgeson's (1994) Agency-Communion model, the Modes of Control Inventory (MCI) scales were designed as health-specific measures of the way in which individuals choose to exert control over their health. Agency is characterized by self-

assertion, initiative and individualization, and Communion reflects urges towards cooperation, and forming meaningful connections with others (Helgeson, 1994). In contrast, Unmitigated Agency refers to a focus on the self to the exclusion of others, and Unmitigated Communion refers to a focus on others to the point of self-neglect (Helgeson, 1994). Accordingly, Agency and Communion are associated with well-being, better health outcomes and health behaviors (Helgeson, 1994), whereas Unmitigated Agency and Unmitigated Communion represent extreme and unbalanced ways of being that are related to poor well-being and problem behaviors (Helgeson & Fritz, 2000).

The overall pattern of associations of the MCI scales with the personality, illness cognitions, coping styles, and attachment styles suggest that the health-related versions capture many of the qualities of the original constructs. Both Agency and Communion were associated with adaptive coping styles, benefit finding, optimism and self-esteem. In addition, the social aspects of Communion were demonstrated by the positive associations of this scale with Extraversion, Agreeableness, social support coping, and powerful others HLOC. Both Unmitigated Agency and Unmitigated Communion were associated with greater helplessness, self-blame, Chance MHLC beliefs, and low self-esteem, suggesting that each of these styles of taking control over one's health may be associated with lower well-being. The negative associations of Unmitigated Agency with both forms of social support coping further highlights a style of control that excludes accepting or enlisting help from others.

Further support for the construct validity of the MCI scales was obtained through the pattern of associations of the MCI scales with the different attachment styles.

Attachment styles are relatively stable and trait-like characteristics said to reflect internal

working models of the relation of self to others that influence the quality of social and interpersonal relationships (Hazan & Shaver, 1987). Secure attachment reflects a balanced approach to relationships, whereas avoidant attachment is characterized by a defensive and distancing interpersonal style. Anxious/ambivalent attachment refers to a fearful and resentful style of interaction. As expected, Communion was related to secure attachment and negatively related to an anxious attachment style, and Unmitigated Agency and Unmitigated Communion were each related to avoidant attachment and to anxious/ambivalent attachment to a lesser extent. These findings are consistent with those found in another investigation where Communion was associated with secure attachment, and Unmitigated Communion was related to anxious attachment (Fritz & Helgeson, 1998), and supports the proposition that the MCI scales reflect health-specific versions of general Agency and Communion constructs.

This assertion comes with an important caveat. Although several of the expected relations between the scales and the concurrent validity measures were demonstrated, the pattern of associations among the health-specific scales Agency and Communion scales did not always parallel the expected relations suggested by Helgeson's (1994) model. Specifically, it appears that the most problems occurred with the Unmitigated Communion scale. This is intriguing as four of the five items for this scale were derived from an unmitigated communion scale developed by Helgeson (1993a). In a study of patient and spouse adjustment to a first coronary event, the proposed positive relation between unmitigated communion and communion was only found for spouses but not the patients (Helgeson, 1993a). Therefore, the issues with the Unmitigated Communion scale in the current study may be more indicative of problems regarding Helgeson's (1993)

unmitigated communion scale and its relation to the Agency-Communion model

(Helgeson, 1994). Alternatively, it may be that a health-specific assessment of Agency and Communion scales in the current study altered some of the expected relations. Future investigations of the MCI scales may help to clarify these issues.

Concurrent Validity

The current study also explored the concurrent validity of each of the new control scales by examining the relationship with wellness behaviors in the student sample. Consistent with Helgeson's (1994) model, both Agency and Communion were associated with more frequent wellness behaviors. Excluding Chance beliefs, each of the CBI scales and the CMI was positively related to the practice of wellness behaviors. In addition, the Control Expectancy scale, which was designed to improve assessment of general beliefs in control over health, accounted for a greater proportion of variance in wellness behaviors than did the internal MHLC scale. Similar to other studies (Calnan, 1989; Norman et al., 1997, 1998), the current study found that the internal MHLC scale accounted for a modest amount of the variance in health-promoting behaviors. However, Mastery and Control Motivations each accounted for substantial proportions of the variance in wellness behaviors. This suggests that Mastery and Control Motivations are perhaps the more salient constructs for understanding the practice of health-promoting behaviors. These findings are consistent with several studies that propose that mastery or self-efficacy predicts health promoting and maintaining behaviors (AbuSabha & Achterberg, 1997; French et al., 2000). Although research on the relationship of desire for control and health behaviors is scant (e.g., Kirscht, 1972), some research suggests that

valuing health is a predictor of health promoting behaviors (Abood & Conway, 1992; Wurtele et al., 1985).

Concurrent validity was more fully examined in the Study 5. However, the findings from this study offer a preliminary glimpse of the concurrent validity of the new scales and suggest that they offer an alternative and improved means of assessing control over health.

Study 5

The purpose of this fifth and final study was to first cross-validate the factor structure and psychometric properties of each of the new control scales, and additionally to examine the concurrent validity of the scales.

Concurrent validity reflects the extent to which current scores on a measure estimate an individual's present criterion score (John & Benet-Martinez, 2000). The new health control measures are expected to relate to constructs that reflect health outcomes, both physical and psychological. Further, health behaviors are well known to show associations with health control measures (e.g., AbuSabha & Achterberg, 1997). Relationships between these criterion variables would therefore help to establish the concurrent validity of the new scales.

Health-related Outcomes

Belief in control over health is often associated with physical health outcomes (Arraras et al., 2002; Edwards et al., 2001), perhaps because higher control perceptions may lead to increased preventive health behaviors (AbuSabha & Achterberg, 1997; Norman, 1995; O'Leary, 1985). Indeed, Mastery has been linked to both better health behaviors and outcomes (Arntstein, 2000; French et al., 2000). Similarly, an approach

oriented style of taking control over health such as Agency (Robbins et al., 1991) is posited to be associated with better health outcomes (Helgeson, 1994), whereas the more avoidant style of Unmitigated Communion is known to be related to self neglect (Fritz & Helgeson, 1998; Helgeson & Fritz, 2000) and therefore poorer health (Helgeson, 1994).

Theories of cognitive adaptation to threatening events suggest beliefs about control also play a central role in psychological adjustment (Reid, 1984; Taylor, 1983). Maintaining a sense of control can help offset the feelings of helplessness and distress brought on by a chronic health stressor (Reid, 1984; Taylor, 1983; Thompson, 1981) and therefore aid in the restoration of well-being. Accordingly, Adaptive Control, Mastery and Control Expectancies should be related to better psychological well-being, and less distress. Similarly, the less adaptive styles of control, Unmitigated Agency and Unmitigated Communion, have been linked to poor psychological adjustment to illness and more distress (Fritz & Helgeson, 1998; Helgeson, 1993a; Helgeson & Fritz, 2000), and are therefore expected to be negatively related to well-being and positively related to depressive mood.

Conceptually, well-being is comprised of two dimensions, hedonic well-being or happiness, and eudaimonic well-being or human potential (Ryan & Deci, 2001). Although the former reflects the balance between positive and negative affect, the latter reflects personal meaning and is related to overall psychological functioning and adaptation (Ryff & Keyes, 1995). Because the new scales are designed to reflect distinct aspects of control perceptions necessary for adjustment to chronic illness, correlations among the scales and dimensions of eudaimonic well-being are expected to be moderate to strong depending on the scale. For example, Mastery with its emphasis on confidence

and efficacy in handling the challenges of a health issue was expected to show considerable associations with psychological well-being, whereas Chance beliefs may be unrelated or negatively related to well-being.

Health-related Behaviours

In addition to the physical and psychological indicators of adjustment, two behavioral indices, use of health services and use of social support groups, were assessed to further establish the concurrent validity of the scales.

Use of health services. Although the use of health services such as a general practitioner or a practitioner of alternative therapies may be best predicted by medical need (Andersen & Newman, 1973; Sirois & Gick, 2002), individual differences in styles of affiliation may also play a role in the use of health services (Sirois & Gick, 2003), perhaps through their relation to social support. For example, Communion, with its emphasis on forming connections with others may be related to increased visits to health care professionals. Indeed, health care visits may in some cases serve the function of social support (Cameron, Leventhal, & Leventhal, 1993, 1995) and Communion is related to mobilization of social support (Helgeson, 1994). However, one study of health care use in college students found that Agency, but not Communion, was related to more health care visits over a 4-year period (Reis et al., 1985). These findings may be accounted for by the fact that those high in communion substitute social support for care-seeking, whereas individuals high in agency may wish to take action to solve their health problems by seeking help but do not use social support for this purpose. Therefore, the relations of the different styles of control and control beliefs to visits made to health care

professionals should be examined after controlling for social support to examine their practical validity.

Social support. An assessment of the relation of the new scales to actual use of social support in the form of visits to in-person and online support groups for chronic illness will further establish the concurrent validity of the new measures. Although very few studies have examined the psychological factors associated with support group use, those that did so examined only in-person support groups and not online support groups. In general, greater physical and emotional distress, and desire to cope with one's illness were among the reasons for use of support groups, whereas having sufficient support from friends and family was the main reason for not using support groups (Plass & Koch, 2001). Communion with its emphasis on working with others to take control of one's health has been related to mobilization of social support (Helgeson, 1994) and may therefore be related to support group use, especially in the absence of other perceived support. Conversely, Unmitigated Agency is associated with a lack of seeking support from others and may therefore be negatively related to support group use (Helgeson & Fritz, 2000). Constructs such as Mastery and Control Expectancy that are associated with adaptive coping and less distress (Marks, 2001) may be related to less support group use simply because of less need.

Finally, the relation of perceived social support to the new scales is expected to follow the directions suggested by theory. Because received social support does not always mean that needs will be met, perceived social support is suggested as the more salient variable for assessing the supportive effects of one's social network (Helgeson, 1993b). For example, Communion with its emphasis on both giving and receiving

support is hypothesized to be related to more satisfaction with one's current social support (Helgeson, 1994). However, those high in Unmitigated Agency or Unmitigated Communion may have difficulty accepting support (Helgeson & Fritz, 1998, 2000) and may therefore be less satisfied with their support networks. Adaptive Control and Mastery are associated with active coping styles and individuals high in these variables may accordingly perceive their social networks as resources that can fulfill their needs.

Participants and Procedure

To ensure that the new scales were relevant for a variety of chronic health concerns, participants were sampled from three chronic illness populations. As in the previous study, an arthritis sample and an IBD sample were recruited. In addition, a third sample comprised of individuals with various other chronic health conditions was recruited.

Participants were recruited through notices placed in the community, and through online postings to support groups and message boards specifically for chronic illness, including IBD, arthritis, and a variety of other chronic health conditions such as diabetes, multiple sclerosis, heart disease, cancer, chronic migraines, asthma (see Appendix O). Notices with links to the study web site were also placed on the online research page of the Arthritis Society of Canada, and on two online psychology research web sites. Only versions of the survey appropriate for the sample being targeted were advertised (i.e., arthritis survey on arthritis boards). Participants were given the choice of completing the survey online or having the survey sent to them by mail. All but two participants completed the survey online.

The demographic characteristics of the total sample stratified by illness group are presented in Table 51. The arthritis sample was comprised of 132 individuals with a diagnosis of any type of arthritis, although rheumatoid arthritis (31.3%), osteoarthritis (17.6), and psoriatic arthritis (16.0) were the most frequently reported types (see Appendix P). Participants were predominately female (80.2%), Caucasian (91.9%), with a mean age of 41.96 ($SD = 9.71$). Of the 112 adults (mean age = 35.65, $SD = 11.38$) in the inflammatory bowel disease (IBD) sample, the majority had Crohn's disease (75.9%). Similar to the arthritis sample, the IBD participants were predominately female (75.7%) and Caucasian (97.1%). The mixed chronic illness sample consisted of 127 adults (mean age = 38.87, $SD = 12.06$), who reported one of several different chronic health conditions. Chronic migraines (15.9%), chronic fatigue syndrome (15.0%), and multiple sclerosis were the three most frequent chronic illness types (see Appendix P). This sample was also predominantly Caucasian (90.8%) and female (82.5%). Each sample was fairly well educated with approximately 60 percent of each group having at least some college or university education. The majority of each sample was employed full-time or part-time and were married or living with an intimate other, whereas relatively few in each sample were separated or divorced (9.8% of the arthritis sample to 16.0% of the mixed chronic illness sample). Given the relative populations of Canada to the United States, and the fact that the survey notices were accessible to anyone with access to the Internet, it was not surprising that the majority of the respondents in each group were from the United States (50.8 to 88.0%) as opposed to Canada (8.0 to 40.8%).

Table 51. *Study 5: Demographic characteristics of the three chronic illness samples.*

		Group			
		Total sample	Arthritis	IBD	Mixed chronic
<i>N</i>		371	132	112	127
Sex	% female	79.6	80.2	75.7	82.5
Age					
	Mean	39.02	41.96	35.65	38.87
	<i>SD</i>	11.32	9.71	11.38	12.06
	Range	(16 – 71)	(18 – 66)	(16 – 62)	(16 – 71)
Ethnicity (% Caucasian)		93.1	91.9	97.1	90.8
Country of residence (%)					
	Canada	25.4	40.8	27.0	8.0
	USA	62.0	50.8	55.0	88.0
	United Kingdom	5.7	4.6	9.9	3.2
	Australia	4.4	3.8	4.5	4.8
	Europe	1.4	0.0	3.6	0.8
	Other	0.5	0.0	0.0	1.6
Employment status (%)					
	full-time	39.9	43.9	45.0	31.2
	part time	15.2	9.8	15.3	20.8
	unemployed	19.6	17.4	23.4	18.4
	retired	4.1	6.8	0.0	4.8
	disabled	21.2	22.0	16.2	24.8
Education (%)					
	High school or less	15.9	14.6	20.4	13.5
	University	61.8	68.5	58.3	57.9
	Graduate school	22.3	16.9	21.3	28.6
Relationship status (%)					
	Married	61.1	73.5	56.8	52.0
	Separated/divorced	12.2	9.8	10.8	16.0
	Never married	26.4	15.9	32.4	32.0
	Widowed	0.3	0.8	0.0	0.0

SD = standard deviations

Materials

With the exception of certain disease-specific health status questions, the measures included in the surveys for each group were identical so that responses could be compared and eventually collapsed across the groups.

The health status of each illness group was assessed with both a health checklist and a series of perceived health questions. Self-reported health was assessed with the Brief Health History questionnaire (Sirois & Gick, 2002), a checklist that assesses the experience of 13 acute and 16 chronic health problems. A sum score of the number of acute problems and chronic problems experienced is obtained for each individual to create an index of acute and chronic health problems. Also included were questions about the time since diagnoses, a general rating of current health and two comparative health ratings to others the same age and others with the same illness that were each scored on a 5-point Likert scale ranging from 1 (poor) to 5 (excellent). Two questions about how stressful life had been within the past 2 weeks and 6 months were rated on a 10-point scale ranging from 1 (not stressful at all) to 10 (extremely stressful). Additionally, participants were asked whether stress worsened their symptoms and whether they had been diagnosed with a mental health issue. Those in the general chronic illness group were asked to initially list the chronic health condition that caused them the most difficulty and to respond to the remaining questions in the survey with respect to this health condition alone (Appendix Q).

Concurrent Validity Measures

A 10-item version of the Center for Epidemiological Studies Depression (CES-D) scale (Radloff, 1977) assessed *depressive mood*. The CES-D is a well-established

measure of depressive affect used in many general population surveys. Participants are asked how frequently in the past two weeks they have felt or behaved in the listed way, with response options on a 4-point scale ranging from 1 for *less than 2 days*, to 4 for *9-14 days*. Two of the items are reverse scored and the sum of the 10 items reflects higher levels of depressive affect. The 10-item version of the CES-D has demonstrated good internal consistency in other chronic health condition samples ($\alpha = .92$) (Sirois et al., 2003). In the current study the alpha coefficient for the 10 item CES-D was .91.

Perceived social support was assessed with the Duke –UNC Functional Social Support questionnaire, a widely used and accepted measure (Broadhead, Gehlbach, DeGruy, & Kaplan, 1988). The amount of perceived personal social support is assessed with 8 items that are rated on a 5-point Likert type scale with responses ranging from 1 (much less than I would like) to 5 (as much as I would like). Scores are summed with higher scores reflecting greater perceived social support. The Duke –UNC Functional Social Support questionnaire has demonstrated good internal consistency in previous studies ($\alpha = .86$; Broadhead, Gehlbach, DeGruy, & Kaplan, 1988). The alpha coefficient for the current study was .91.

Psychological well-being was assessed with 33 items selected from the Multidimensional Well-being measure (Ryff & Keyes, 1995), a well-validated measure of dimensions of affective and goal-related well-being (Schmutte & Ryffe, 1997). These items were drawn from the three subscale dimensions of psychological well-being that have been associated with resilience in the face of adversity: personal growth, purpose in life, and positive relations with others. A total of 11 items were drawn from each of the three 14 item subscales of psychological well-being for the current study. Items were

rated on a 6-point scale from 1 for strongly disagree to 6 for strongly agree, with higher scores reflecting higher levels of psychological well-being. The 14 item subscales have demonstrated good internal consistency with alpha coefficients ranging from .82 to .90 (Schmutte & Ryff, 1997). The alpha coefficients for the 11 item subscales in the current study were .87 for personal growth, .90 for purpose in life, and .90 for the positive relations scale.

Use of social support groups. Use of both in-person and online support groups were each assessed with a question rated on a 4-point scale ranging from 1 (no, never) to 4 (regularly attend/visit). Questions about the reasons for using (10 items) or not using (16 items) an in-person support group were included to further examine the convergent validity of the Modes of Control scales. Nine of the ten items about the reasons for using a support group were adapted from the top reasons given for use of social support in a German study of cancer outpatients (Plass & Koch, 2001). Similarly, 10 of 16 items about the non-use of social support group were included from the top reasons given by those who had not attended a support group in the same study (Plass & Koch, 2001). Each of these sets of questions was rated on a 6-point Likert scale with response options ranging from 1 (strongly disagree) to 6 (strongly agree).

Use of Health Services. The use of a variety of health-related services within the past 6 months was assessed with 13 items listing specific health services including physical, mental and alternative health professionals. For each service used additional questions about the frequency of use were included to create an index of the number of health service visits made. The index of general health service use was created by the summing the frequency of use of each of the 13 health services during the past 6 months.

Results

Data screening

The same protocol for screening the data that was used in Study 4 was again used for this study. Email survey responses were screened for duplication and missing data. Surveys received from the same IP address were compared by date of submission, age, gender, and text-based responses to ensure that each was a unique survey response. Duplicates and surveys that were missing 20 percent or more of the required responses were not included in the analyses. Six participants from the arthritis sample, 3 participants from the IBD sample, and 12 from the mixed chronic illness sample had incomplete surveys and were therefore not included in the analyses. An assessment of the differences between those that did and did not complete the survey was not possible as the demographic questions that appeared at the end of the survey were left unanswered. In addition, 5 participants from the mixed chronic illness group reported mental illness such as depression or anxiety as their main chronic illness and were therefore not included in the analyses.

Health Characteristics

The health characteristics for each of the three samples are presented in Table 52. Prior to collapsing the three illness samples into one group a series of ANOVAs were run on the health variables to assess any illness group differences. There were no significant differences among the three illness samples in the mean time since diagnoses ($F(2,364) = 1.19$), the number of acute ($F(2,366) = 0.46$) or chronic ($F(2,366) = 0.64$) health problems, or the degree of life stress in the previous 6 months ($F(2,365) = 1.34$) or 2 weeks ($F(2,366) = 2.38$). However, the three illness groups differed in terms of their

Table 52. *Study 5: Health characteristics of the three chronic illness samples.*

Health variables	Group		
	Arthritis	IBD	Mixed chronic
<i>N</i>	132	112	127
Time since diagnoses (yrs.)			
Mean (<i>SD</i>)	9.04 (8.79)	9.74 (9.03)	7.96 (8.55)
Range	.30 – 36	.70 - 43	.10 - 39
Sum of chronic health problems			
Mean (<i>SD</i>)	3.29 (1.99)	3.21 (1.89)	3.50 (2.25)
Range	0 - 9	1 - 9	0 - 11
Sum of acute health problems			
Mean (<i>SD</i>)	5.02 (2.27)	4.80 (2.24)	4.77 (2.10)
Range	1 - 11	1 - 11	1 - 11
Mental health problems diagnosed (%)			
One or more	41.7	38.4	54.8
Current health rating (1 – 5)			
Mean (<i>SD</i>)	2.42 (.99)	2.78 (1.08)	2.50 (1.09)
Perceived health relative to others of same age (1 – 5)			
Mean (<i>SD</i>)	1.96 (1.01)	2.76 (1.24)	2.29 (1.23)
Perceived health relative to others with same illness (1 – 5)			
Mean (<i>SD</i>)	2.92 (1.02)	3.57 (1.07)	3.08 (3.17)
Stress in the past 6 months (1 – 10)			
Mean (<i>SD</i>)	6.87 (2.30)	7.34 (2.03)	7.08 (2.18)
Stress in the past 2 weeks (1 – 10)			
Mean (<i>SD</i>)	6.27 (2.43)	6.94 (2.45)	6.42 (2.52)
Does stress worsen or trigger your symptoms? (%)			
No	15.3	10.8	9.4
Yes	57.3	73.9	64.6
Not sure	27.5	15.3	26.0

Note: High scores on the perceived health scales indicate better health, and higher scores on the stress scales indicate higher levels of stress; *SD* = standard deviations

current health $F(2,364) = 3.83, p < .05$), their health relative to others their age $F(2,358) = 13.88, p < .001$), and relative to others with the same illness $F(2,356) = 11.27, p < .001$). For each of these health variables a visual inspection of the means revealed that the arthritis sample had the lowest perceived health scores whereas the IBD sample had the highest perceived health scores.

Adaptive Control is proposed to reflect control beliefs that take into account current health states whereas Control Expectancy does not. Accordingly, Adaptive Control scores should be higher than Control Expectancy scores for those with a chronic illness, and the difference between the Adaptive Control and Control Expectancy scores should be greater for those with worse perceived health. In order to test the proposition a series of one sample t-tests was conducted on the Adaptive Control and Control Expectancy scores for each of the chronic illness samples. The results supported the proposition that Adaptive Control scores were significantly higher than Control Expectancy scores for the arthritis sample ($t(132) = .62, p < .001$), the IBD sample ($t(112) = .40, p < .001$), and the mixed chronic illness sample ($t(127) = .41, p < .001$). An ANOVA was then performed on the mean difference score from each of the three groups, with a planned contrast to compare the difference scores from the arthritis sample (lowest perceived health) to the IBD sample (highest perceived health). The mean difference scores were significantly different between the three chronic illness groups, $F(2, 369) = 3.58, p < .05$. The proposition that the difference between the Adaptive Control and Control Expectancy scores would be largest for those with worse perceived health and lowest for those with better perceived health was supported as the difference score for the

arthritis group (.62) was significantly higher than that of the IBD group (.40; $t(370) = 2.32, p < .05$).

Scale Structure and Reliability

Prior to examining the concurrent validity of the new scales a principal components analysis of each scale was performed to confirm the factor structure proposed by the previous studies. For the Control Beliefs Inventory (CBI) an initial 4-factor solution for the total sample reproduced the 4 subscales of the CBI (Table 53). However, several items loaded highly on both the Control Expectancies scale and the Adaptive Control scales confirming the finding from the previous study that these two scales may reflect a higher order factor. A three factor solution was supported and explained 57.8% of the variance. As was found in Study 4, the items from the Chance and Mastery scales loaded onto unique factors whereas the Adaptive Control and Control Expectancies items loaded onto a third factor. A 4-factor solution for the Modes of Control Inventory (MCI) nearly replicated the 4 subscales of the MCI. However, items 14 and 20 did not load on the correct scales and three items had loadings of over .40 on other factors. A three factor solution was supported and explained 46.4% of the variance with Agency and Unmitigated Communion as separate factors, and a third factor combining Communion and Unmitigated Agency (Table 54).

The means and internal consistencies of the CBI, MCI, and Control Motivations Inventory (CMI) scales across each sample are presented in Table 55. Overall, the Control Expectancy and the Adaptive Control scales of the CBI, and the CMI had very good internal consistencies, whereas the Unmitigated Communion scales had acceptable reliability. The three illness groups differed significantly on the mean scores for the

Table 53. Study 5: Factor loadings of the Control Beliefs Inventory for the combined chronic illness samples.

Description	Item	Factor		
		1	2	3
Control Expectancy /Adaptive control*	25. I am certain that with effort I can improve my health.	.8100	.2516	.0332
	13. My health depends on how I take care of myself.	.8028	.0885	.0460
	*21. If I do the right things I can make my symptoms more manageable.	.7938	.1357	-.0567
	4. If I set my mind to it I can improve my health.	.7889	.1260	.0962
	2. It is my own actions that determine how healthy I am.	.7491	.0443	.1007
	20. My current state of health is a reflection of how I look after myself.	.7489	-.1136	-.0161
	15. People who take care of themselves stay healthy.	.7394	-.0913	.0834
	*22. Regardless of circumstances there are things I can do to improve my health.	.7357	.1496	-.0876
	*9. If I make the effort, I can manage my illness.	.7240	.3292	-.0178
	17. How soon I recover from an illness depends on how I look after myself.	.7178	.0268	-.0259
	*11. There are things that I can do to make my health problem easier to deal with.	.5970	.3333	-.0722
	*7. I can take control of my health by managing my day-to-day symptoms.	.5729	.2455	-.0140
Mastery	26. When it comes to my health, I often feel unable to do what I know should be done.	.0148	-.7762	.0469
	23. I am confident in my ability to make the right decisions about my health.	.1074	.7139	-.0079
	8. Even though there are things I can do to improve my health, I don't feel that I can do them.	-.0592	-.7107	.1052
	12. I am able to meet the challenge of following a healthy routine.	.3282	.6556	.1329
	19. I am confident that I could deal with any unexpected health problems.	.2924	.6195	-.0393
	16. When facing a health problem, I often feel overwhelmed about what to do.	.0855	-.6070	.1963
Chance	18. If I am fortunate my health will improve.	.0711	-.0175	.8554
	10. How soon I recover from an illness depends on how lucky I am.	-.1359	-.1408	.8152
	3. If I am lucky I will stay healthy.	.0821	-.0035	.7090

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $N = 371$. Highest factor loadings of an item are given in boldface type.

Table 54. *Study 5: Factor loadings of the Modes of Control Inventory for the combined chronic illness samples.*

Description	Item	Factor		
		1	2	3
Agency	16. I am the best person to manage my health.	.7947	.0453	-.1104
	1. Nobody can look after my health as well as I can.	.7460	-.0318	-.0348
	5. I am usually the one that makes the decisions regarding my health.	.7037	-.1517	-.0530
	10. No one but me is going to keep me healthy.	.6673	.2765	.0200
	19. I may listen to other's advice about my health but the final decision is always on my own.	.6094	-.1072	-.0811
Communion/ Unmitigated Agency*	*18. Asking for help with a health problem is a sign of weakness.	-.1578	.7007	.2703
	*13. Asking others for advice about my health is a waste of time.	-.0729	.6927	.1073
	17. I find that other people usually have good advice for me regarding my health.	.1636	-.6830	.1262
	*14. I like to solve my health problems alone.	.2058	.6682	.1130
	*7. Only people who are weak ask others for help with their health problem.	-.1140	.6321	.3478
	2. I enjoy working with others to improve my health.	.1722	-.6095	.1283
	9. When I have a health problem I turn to others for support.	-.1117	-.6015	-.1448
	*3. People should keep their health problems to themselves.	-.0319	.5793	.1202
	11. I often find that I can solve my health problems by getting help from others.	-.0725	-.5705	.1334
	15. I prefer talking with others about any health concerns I have rather than trying to deal with it on my own.	-.3062	-.5248	.1007
Unmitigated Communion	8. I always place the health of my friends and family above my own.	-.1326	.1310	.7649
	12. I would rather look after others when they are ill than have others look after me if I am ill.	.1317	.0488	.7036
	6. Even when I am sick I will help a sick friend.	.0582	-.2466	.6015
	4. I have difficulty looking after my own health when it interferes with the health of my family.	-.2138	.1489	.5462
	20. I often find myself getting overly involved in other people's health problems.	-.0930	.0715	.4160

Note: Factor loadings were obtained using a principal components extraction with a varimax rotation, $N = 371$. Highest factor loadings of an item are given in boldface type.

Table 55. Study 5: Means and reliabilities for the Control Beliefs Inventory (CBI), the Control Motivations Inventory (CMI), and the Modes of Control Inventory (MCI) scales across the three chronic illness samples.

Statistic	Sample	CBI subscale				CMI scale
		Control expectancy	Adaptive control	Mastery	Chance	
Number of items		7	5	6	3	11
Mean (SD)	Arthritis	3.76 (1.07)	4.38 (.92)	4.10 (.94)	3.22 (1.17)	5.10 (.61)
	IBD	3.82 (1.01)	4.22 (.77)	3.99 (.84)	3.62 (1.09)	5.09 (.65)
	Mixed chronic illness	3.83 (1.05)	4.24 (.95)	3.99 (.86)	3.16 (1.06)	5.11 (.68)
	ANOVA $F(2,366)$	0.14	1.12	.61	5.79**	0.02
Cronbach's alpha						
($N = 132$)	Arthritis	.90	.86	.84	.73	.84
($N = 112$)	IBD	.91	.89	.77	.78	.84
($N = 127$)	Mixed chronic illness	.90	.86	.77	.63	.90
($N = 371$)	All samples	.90	.86	.80	.72	.88
MCI subscale						
Statistic	Sample	Agency	Unmitigated Agency	Communion	Unmitigated Communion	
		5	5	5	5	
Number of items		5	5	5	5	
Mean (SD)	Arthritis	4.75 (.91)	2.20 (.94)	4.03 (.85)	3.92 (.87)	
	IBD	4.64 (.81)	2.18 (.84)	4.13 (.79)	3.87 (.94)	
	Mixed chronic illness	4.69 (.78)	2.16 (.89)	4.12 (.76)	3.81 (.98)	
	ANOVA $F(2,365)$	0.53	0.70	0.63	0.46	
Cronbach's alpha						
($N = 132$)	Arthritis	.80	.81	.73	.56	
($N = 112$)	IBD	.77	.75	.74	.67	
($N = 127$)	Mixed chronic illness	.74	.77	.64	.66	
($N = 371$)	All samples	.78	.78	.70	.63	

Note: SD = standard deviation. ** $p < .01$.

Chance scale, with the IBD sample scoring the highest. Scores on the remaining CBI scales, the CMI scale and the MCI scales were not significantly different among the groups.

For the remaining analyses the three illness samples were collapsed to form a single sample. The subsequent concurrent validity analyses were conducted on the combined sample ($N = 371$).

Relationship to Demographic Variables

Agency was modestly associated with being older ($r = .13, p < .05$) and higher Control Expectancies were modestly associated with being younger ($r = -.12, p < .05$). In addition, Agency, Mastery and motivation for control were each associated with being more educated ($r = .17, p < .01$; $r = .16, p < .01$; $r = .17, p < .01$ respectively), whereas Unmitigated Communion was associated with a lower education level ($r = -.17, p < .01$). Having more Chance beliefs was modestly associated with a shorter disease duration ($r = -.11, p < .05$).

Concurrent Validity – Subjective and Objective Health

The correlations among the Control Beliefs Inventory (CBI) and Control Motivations (CMI) scales and the objective and subjective health questions are presented in Table 56. Overall, the patterns of association suggest that beliefs in-personal control over health are associated with greater perceived health and to a lesser extent with fewer health problems. Mastery, Control Expectancies and Adaptive Control were moderately and positively related to each of the subjective health variables. Only Control Expectancies was related to both of the objective health variables (acute and chronic health sums), whereas Adaptive Control was unrelated to objective health. Greater

Table 56. Study 5: Intercorrelations among the Control Beliefs Inventory (CBI), the Control Motivations Inventory (CMI), and the perceived health variables for the chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10	11
1. CBI Control Expectancies	---										
2. CBI Adaptive Control	.73**	---									
3. CBI Chance Beliefs	.04	-.04	---								
4. CBI Mastery	.23**	.41**	-.09	---							
5. Control Motivations Inventory	.19**	.23**	-.07	.39**	---						
6. Current health	.42**	.40**	.09	.42**	.16**	---					
7. Health compared to others of same age	.48**	.41**	.05	.30**	.10	.69**	---				
8. Health compared to others with same illness	.40**	.39**	.06	.32**	.06	.68**	.73**	---			
9. Stress - past 6 months	-.07	-.19**	.04	-.20**	.03	-.31**	-.24**	-.25**	---		
10. Stress - past 2 weeks	-.06	-.09	.05	-.25**	-.05	-.35**	-.20**	-.18**	.55**	---	
11. Sum of acute problems	-.15**	-.10	-.19**	-.17**	-.01	-.33**	-.21**	-.15**	.11*	.18**	---
12. Sum of chronic problems	-.16**	-.06	-.05	-.07	-.01	-.35**	-.25**	-.26**	.12*	.14**	.34**

Note: Higher scores on the health ratings indicated better perceived health; higher scores on the stress ratings indicate more stress experienced (listwise $N = 369$);

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

Table 57. Study 5: Intercorrelations among the Modes of Control Inventory (MCI) scales and the perceived health variables for the chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9	10
1. MCI Agency	---									
2. MCI Unmitigated agency	-.05	---								
3. MCI Communion	-.03	-.60**	---							
4. MCI Unmitigated communion	-.14**	.24**	-.05	---						
5. Current health	.22**	-.02	-.04	-.25**	---					
6. Health compared to others of same age	.16**	-.04	-.01	-.17**	.69**	---				
7. Health compared to others with same illness	.15**	.02	-.01	-.15**	.68**	.73**	---			
8. Stress - past 6 months	.00	.07	-.04	.10	-.31**	-.24**	-.25**	---		
9. Stress - past 2 weeks	-.10*	.09	-.01	.14**	-.35**	-.20**	-.18**	.55**	---	
10. Sum of acute problems	-.13*	-.01	.05	.17**	-.33**	-.21**	-.15**	.11*	.18**	---
11. Sum of chronic problems	.02	-.05	.08	.14**	-.35**	-.25**	-.26**	.12*	.14**	.34**

Note: Higher scores on the health ratings indicated better perceived health; higher scores on the stress ratings indicate more stress experienced (listwise $N = 368$);

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

Table 58. Study 5: Intercorrelations among the Control Beliefs Inventory (CBI) scales, the CMI scale, perceived social support, depressive mood, and the Psychological well-being scales for the combined chronic illness samples.

Scale	1	2	3	4	5	6	7	8	9
1. CBI Control Expectancies	---								
2. CBI Adaptive Control	.73**	---							
3. CBI Chance Beliefs	.03	-.05	---						
4. CBI Mastery	.23**	.41**	-.09	---					
5. Control Motivations Inventory (CMI)	.19**	.23**	-.07	.39**	---				
6. Personal growth	.22**	.35**	-.12*	.56**	.37**	---			
7. Purpose in life	.22**	.32**	-.09	.58**	.34**	.75**	---		
8. Positive relationships	.05	.15**	-.07	.36**	.20**	.58**	.64**	---	
9. Perceived social support	.08	.18**	-.07	.36**	.13*	.37**	.48**	.63**	---
10. Depressive mood	-.21**	-.31**	.09	-.52**	-.21**	-.45**	-.58**	-.43**	-.44**

Note: * $p < .05$, ** $p < .01$; listwise $N = 364$.

Mastery was associated with fewer acute health problems and unrelated to the number of chronic health problems, as was a greater belief in Chance. Although Adaptive Control was associated with less perceived stress in the past 6 months, it was unrelated to stress in the past 2 weeks. Mastery, however, was related to less perceived stress within both the past 6 months and the past 2 weeks. Motivation for control was modestly associated with better self-rated current health.

The pattern of association of the Modes of Control (MCI) scales and the objective and subjective health measures was quite different (Table 57). Because the MCI reflects a style of taking control over one's health and not the extent to which one believes in control over health, it was not surprising that the associations between these scales and the health variables were minimal as well as modest in magnitude. Unmitigated Agency and Communion were unrelated to objective and subjective health and stress. However, Agency was associated with better subjective health, fewer acute health problems, and marginally associated with less stress in the past 2 weeks. Conversely, Unmitigated Communion, a style of control that is characterized by self-neglect and a focus on the health of others, was associated with poorer subjective health, more acute and chronic health problems, and more stress in the past 2 weeks.

Concurrent Validity – Well-being and Perceived Social Support

Correlations between the CBI and CMI scales and the measures of psychological well-being and perceived social support are presented in Table 58. The general pattern of correlations suggests that with the exception of the Chance scale, the CBI scales and the CMI scale were associated in general with greater psychological well-being, more perceived social support and less depressive mood.

Because both conceptually and empirically there is some overlap between each of these measures, a series of multiple regressions was performed to evaluate the unique contribution of each scale and their relative contributions to the criterion measures. Only the control scales that were significantly correlated with criterion variables were entered into the regression analyses. However, several of the control scales were significantly correlated with education level, and education level was also positively related to personal growth ($r = .17, p < .01$), purpose in life ($r = .20, p < .01$), positive relations ($r = .13, p < .05$), and negatively related to depressive mood ($r = -.14, p < .01$). Education¹⁸ was therefore entered in the first step of the regression analyses if a predictor variable that was associated with education was also entered in the analysis. Further, to avoid problems due to multicollinearity, a regression analysis including only Adaptive Control and Control Expectancies and the criterion variable of interest was first performed to determine if each explained a unique proportion of variance in the outcome variable. In each of the three analyses where both Adaptive Control and Control Expectancies were potential predictors of the criterion variables, only Adaptive Control explained a significant amount of the variance in the outcome variables beyond the effects of Control Expectancies, and was therefore entered into the subsequent full regression models with the other control scales.

The results of the regression analyses of the CBI and CMI scales on the criterion variables are presented in Table 59. Overall, the control beliefs and motivations jointly

¹⁸ The original 6 categories of education were collapsed into 3 categories in Table 42 for ease of presentation.

Table 59. *Study 5: Regression analyses of the Control Beliefs Inventory scales and the Control Motivations Inventory with the well-being and social support measures.*

Outcome variable	Predictor variables	β	t	R^2	F
Personal growth	1. Education	.16	3.16**	.02	9.98**
	2. Adaptive Control	.14	2.97**		
	Mastery	.43	8.83***		
	Control Motivations	.16	3.40***		
				.35	50.85***
Purpose in life	1. Education	.20	3.82***	.04	14.56***
	2. Adaptive Control	.09	1.89 ^a		
	Mastery	.48	9.91***		
	Control Motivations	.11	2.42*		
				.36	52.01***
Positive Relationships	1. Education	.13	2.50*	.01	6.24*
	2. Adaptive Control	.00	.00		
	Mastery	.32	5.70***		
	Control Motivations	.06	1.08		
				.14	14.35***
Perceived social support	Adaptive Control	.05	.93		
	Mastery	.35	6.21***		
	Control Motivations	.02	.40		
				.13	18.97***
Depressive mood	1. Education	-.14	-2.69**	.02	7.26**
	2. Adaptive Control	-.11	-2.17*		
	Mastery	-.48	-9.27***		
	Control Motivations	-.02	.43		
				.28	36.66***

Note: $N = 371$, ^a $p = .06$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 60. Study 5: Intercorrelations among the Control Modes of Control Inventory (MCI), perceived social support, depressive mood, and the Psychological well-being (PWB) scales for the combined chronic illness samples.

Scale	1	2	3	4	5	6	7	8
1. MCI Agency	---							
2. MCI Unmitigated Agency	-.04	---						
3. MCI Communion	-.04	-.60**	---					
4. MCI Unmitigated Communion	-.13*	.24**	-.03	---				
5. Personal growth PWB	.30**	-.30**	.20**	-.20**	---			
6. Purpose in life PWB	.21**	-.34**	.24**	-.26**	.75**	---		
7. Positive relationships PWB	.09	-.42**	.35**	-.16**	.58**	.64**	---	
8. Perceived social support	.01	-.30**	.29**	-.20**	.37**	.48**	.62**	---
9. Depressive mood	-.22**	.21**	-.09	.31**	-.44**	-.58**	-.43**	-.44**

Note: (listwise $N = 365$) * $p < .05$, ** $p < .01$.

explained between 13 % (for positive relationships and perceived social support) and 33 % (for personal growth) of the variance beyond that explained by education in the criterion variables. Mastery was the strongest and most consistent predictor of perceived social support and the well-being variables, whereas both Adaptive Control and Control Motivation were unique predictors in only two of the five regression models.

The correlations of the Modes of Control (MCI) scales with perceived social support and the well-being variables are presented in Table 60. With only a few exceptions, each of the MCI scales was significantly to moderately associated with perceived social support and the well-being measures. The pattern of associations found was in accord with the hypothesized relationships of general Agency and Communion constructs to well-being, with Agency and Communion as indicators of greater well-being, and Unmitigated Agency and Unmitigated Communion as predictors of less positive well-being (Helgeson, 1994). Both Agency and Communion were related to personal growth and purpose in life. However, only Communion was associated with more positive relationships and perceived social support, and only Agency was associated with less depressive affect. Both Unmitigated Agency and Unmitigated Communion were associated with less well-being, less perceived social support, and more depressive mood, suggesting that these two styles of control are indicative of less adaptive ways of taking control over health.

The unique contribution of each of the MCI scales to the criterion variables was assessed with a series of multiple regression analyses. Using a similar protocol to that used in assessing the contributions of CBI and CMI to well-being and social support, only those scales that were significantly correlated with the outcome measures were

entered into the regression model, and education was entered in the first step of each analysis except for perceived social support. Because of the strong relationship between Unmitigated Agency and Communion, these two scales were assessed separately prior to the full regression analyses to determine if each explained a significant proportion of the variance in the outcome variables.

The different modes of control jointly explained between 12% (for depressive mood) and 19% (for positive relationships) of the variance in the criterion variables (Table 61). Overall, the utility of each of the four MCI scales was supported with each scale accounting for unique variance in nearly all of the relevant analyses. Both Agency and Unmitigated Agency were consistent predictors of the variance above that explained by education in their respective analyses. Unmitigated Communion was a unique predictor in all but the Positive Relationships analysis, whereas Communion explained a unique proportion of the variance in each of the analyses of positive relationships and perceived social support.

Concurrent Validity – Use of Support Groups

The majority of the participants had never visited an in-person support group (72.8%), 14.8% had attended once or twice, 7.4% had attended occasionally, and only 4.9% reported that they attended on a regular basis. Conversely, only 19.4% of the participants reported that they had never visited an online support group and 55.1% said that they visited regularly. Only 8.1% visited once or twice and 17.4% visited occasionally. Of those who had visited an online support group, only 6.8% reported that they had never actively participated by posting comments.

Table 61. *Study 5: Regression analyses of the Modes of Control (MCI) scales with the well-being and social support measures.*

Outcome variable	Predictor variables	β	t	R^2	F
Personal growth	1. Education	.16	3.16**	.03	9.98**
	2. Agency	.26	5.34**		
	Unmitigated Agency	-.27	-5.58***		
	Unmitigated Communion	-.09	-1.81*		
				.18	21.84***
Purpose in life	1. Education	.20	3.82***	.04	14.56***
	2. Agency	.16	3.30**		
	Unmitigated Agency	-.29	-6.03***		
	Unmitigated Communion	-.15	-2.15***		
				.19	22.41***
Positive Relationships	1. Education	.13	2.50*	.01	6.24*
	2. Unmitigated Agency	-.32	-5.20***		
	Communion	.15	2.48**		
	Unmitigated Communion	-.06	-1.20		
				.20	23.75***
Perceived social support	Unmitigated Agency	-.14	-2.13*		
	Communion	.21	3.34***		
	Unmitigated Communion	-.16	-3.24***		
				.13	18.99***
Depressive mood	1. Education	-.14	-2.69**	.02	7.26**
	2. Agency	-.16	-3.28***		
	Unmitigated Agency	.14	2.79**		
	Unmitigated Communion	.24	4.74***		
				.14	15.68***

Note: $N = 371$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 62. Study 5: Correlations of the Control Beliefs Inventory (CBI) and the Control Motivations Inventory (CMI) and the reasons for using (A) or not using (B) in-person support groups.

A. Reason for using support groups (<i>N</i> = 103)	Control Expectancy	Adaptive Control	Mastery	Chance	CMI
To help cope with the illness.	---	---	---	.20*	---
I felt emotionally well.	---	---	-.24*	---	-.28**
My doctor recommended attending a support group.	---	---	---	---	-.28**
I had other problems not related to the illness.	.30**	---	---	---	---
I hoped for an exchange with people in a similar situation as myself.	-.22*	-.21*	---	---	---
Support groups had helped me in the past.	---	---	---	.21*	---
I felt lonely.	---	---	---	.28**	---
I needed to talk with people who would understand my illness.	---	---	---	.23*	---
I felt physically unwell.	---	-.21*	-.35**	---	---
B. Reason for not using support groups (<i>N</i> = 264)	Control Expectancy	Adaptive Control	Mastery	Chance	CMI
I have sufficient support from my family.	---	.13*	.24**	---	---
I don't feel well enough.	-.28**	-.19**	---	---	---
I can cope on my own.	.17**	.14*	.18**	---	---
I have sufficient help from my friends.	---	---	.22**	---	---
I haven't been able to find one in my area.	---	-.19**	-.15*	.15*	---
I want to forget about my problems not talk about them.	.20*	---	-.14*	---	---
I use an online support group instead.	-.21*	---	---	---	---
I have no emotional problems.	---	.16*	.31**	---	---
Other people are more in need of support than I am.	.13*	---	---	---	---
I don't know what a support group can do for me.	---	---	-.17**	---	---
I do not want help from strangers.	---	---	-.13*	---	---
I don't want to talk about my illness.	---	---	-.18**	---	-.15*

Note: Only significant correlations are presented; * $p < .05$, ** $p < .01$.

Overall, only the Control Expectancy scale was moderately associated with use of in-person support groups, with those with higher expectancies of control over their health using in-person support groups less often ($r = -.25, p < .001$). There was also a modest negative association between Adaptive Control and support group use ($r = -.12, p < .05$). However, none of the other CBI, CMI or MCI scales was associated with support group use, and none of the scales were related to use of online support groups.

Similar to a study of cancer patients where only 28% of the sample had used support groups (Plass & Koch, 2001), only 27.2% of the total sample in the current study had ever visited a support group. Thus, it may be that the reasons for attending or not attending support groups may be the more salient variables for assessing the concurrent validity of the scales. Accordingly, a correlational analysis the CBI, CMI, MCI and the reasons for using or not using an in-person support groups was conducted. Note that relationships were assessed for each subsample that used or did not use support groups.

The results for the CBI and CMI are presented in Table 62. The pattern of correlations overall suggests that low control beliefs and motivations are associated with less adaptive reasons for using or not using support groups. Higher Mastery was associated with not using support groups because of better coping, adjustment and support from friends and family. Lower Mastery was associated with not wanting to talk about health problems, rejecting help from strangers, and lack of knowledge about local groups or what they could do to help. For those who did use support groups lower Mastery was associated with use motivated by feeling physically and emotionally unwell. High Adaptive Control was modestly associated with non-use due to good coping and

adjustment, and sufficient support from family, whereas low Adaptive Control was related to not feeling well enough to attend and not finding one in one's area. Those with low Adaptive Control who did use support groups were motivated by feeling physically unwell and by wanting an exchange with similar others.

Although Adaptive Control and Control Expectancies are conceptually related, the pattern of associations with support group motivations showed some differences. Unlike Adaptive Control, high Control Expectancies was associated with wanting to avoid talking about health problems, and a belief that others were more in need than oneself. Low Control Expectancies were also related to use of an online support group instead. Interestingly, having other problems unrelated to their illness motivated use of support groups for those with high Control Expectancies. Chance beliefs were associated with several reasons for using support groups including loneliness, a need to share with others and for help coping with illness, and past support. Low Control Motivations were related to using support groups because of a doctor's recommendation and due to feeling emotionally unwell.

Table 63 presents the correlations of the MCI scales with the reasons for using and not using support groups. High Agency was associated with not using support groups because of better coping and support from friends, whereas those with low Agency did not use support groups because they wanted to avoid talking about their illness and they could not locate a local group. Use of support groups for those with low Agency was because it had been recommended by a doctor or friends and family. The correlations of Communion and Unmitigated Agency with motivations for not using support groups followed a similar but opposite pattern. High Communion/low Unmitigated Agency was

associated with not using support groups because of sufficient support from friends and family. Low Communion/high Unmitigated Agency was related to non-use due to wanting to cope alone, not wanting help from strangers, wanting to avoid talk about their illness, and believing that a support group could not help. Low Unmitigated Communion was related to non-use of support groups because of sufficient family support and not wanting to discuss one's illness.

Concurrent Validity – Use of Health Services

The frequency of health service use ranged from no visits to 155 visits in the past 6 months, with a mean number of 17.28 visits. Three health service use groups were created statistically by dividing the frequencies of visits into three approximately equal groups in order to evaluate the relationship of the control scales to the frequency of health services used. Those with 0 to 7 visits comprised the low use group, 8 to 17 visits were the medium use group, and those who made 18 or more visits in the past 6 months constituted the high health service use group. Group differences on each of the control scales were evaluated with a one-way analysis of variance (ANOVA) and the results are presented in Table 64. Visual inspection of the means suggests that low health service users scored higher in Mastery and high health service users scored lower in Mastery. Similarly, those with low health service use scored higher in Control Expectancies than those in the medium and high use groups. As expected high health service users also scored higher on Communion and lower Communion scores were found in the low health service use group. There was also a marginally significant difference in the Unmitigated Communion scores among the three health service use groups.

Table 63. Study 5: Correlations of the Modes of Control Inventory (MCI) scales and the reasons for using (A) or not using (B) in-person support groups.

A. Reason for not using support groups ($N = 102$)		Agency	Unmitigated Agency	Communion	Unmitigated Communion
My doctor recommended attending a support group.		-.26**	---	---	---
Family members and or friends suggested that I attend a support group		-.24*	---	---	.21*
B. Reasons for not using support groups ($N = 266$)					
I have sufficient support from my family.		---	-.21**	.16*	-.14*
I can cope on my own.		.20**	.14*	-.15*	---
I have sufficient help from my friends.		.12*	-.13*	.26**	---
I haven't been able to find one in my area.		-.15*	---	---	---
I want to forget about my problems not talk about them.		---	.19**	---	---
I don't know what a support group can do for me.		---	.26**	-.21*	---
I do not want help from strangers.		---	.34**	-.27**	---
I want to concentrate on the medical treatment.		---	.13*	---	---
Support groups cannot help me.		---	.34**	-.29**	---
I don't want to talk about my illness.		-.17**	.31**	-.22**	-.15*

Note: Only significant correlations are presented; * $p < .05$, ** $p < .01$.

Table 64. *Study 5: Mean differences of health problems, perceived social support and the new control scales as a function of health service use.*

Measure	Health service use groups			<i>F</i> (2,366)
	Low (<i>N</i> = 124)	Medium (<i>N</i> = 121)	High (<i>N</i> = 123)	
Sum of acute health problems	4.25 (1.97)	4.97 (1.94)	5.34 (2.52)	7.50**
Perceived social support	4.02 (0.97)	3.76 (1.01)	3.65 (1.03)	4.48*
CBI Control Expectancy	4.01 (1.11)	3.68 (0.97)	3.72 (1.02)	3.66*
1. controlling for health problems	4.00 (0.10)	3.69 (0.09)	3.70 (0.09)	2.47
CBI Adaptive Control	4.42 (0.95)	4.21 (0.93)	4.20 (0.92)	2.17
CBI Mastery	4.26 (0.85)	3.93 (0.84)	3.88 (0.92)	6.63**
1. controlling for health problems	4.18 (0.08)	3.93 (0.08)	3.90 (0.08)	3.69*
2. controlling for social support	4.14 (0.07)	3.94 (0.07)	3.93 (0.07)	2.36
CBI Chance	3.30 (1.06)	3.37 (1.10)	3.29 (1.21)	0.16
Control Motivations	5.07 (0.64)	5.10 (0.63)	5.15 (0.68)	0.43
MCI Agency	4.79 (0.85)	4.67 (0.83)	4.65 (0.83)	.92
MCI Unmitigated Agency	2.19 (0.76)	2.26 (1.00)	2.08 (0.87)	1.25
MCI Communion	4.00 (0.78)	4.03 (0.87)	4.23 (0.74)	2.93*
1. controlling for social support	3.94 (0.07)	4.06 (0.07)	4.26 (0.07)	5.04**
MCI Unmitigated Communion	3.78 (0.89)	4.03 (0.86)	3.78 (1.01)	2.81 ^a
1. controlling for health problems	3.85 (0.09)	4.03 (0.86)	3.78 (0.08)	2.19
2. controlling for social support	3.89 (0.08)	4.02 (0.08)	3.75 (0.08)	2.51

Note: Standard deviations are given in parentheses for ANOVAs, and standard errors are in parentheses for the ANCOVAs; covariates are entered cumulatively in the order listed; CBI = Control Beliefs Inventory, MCI = Modes of Control Inventory; ^a*p* = .06, **p* < .05, ***p* < .01.

Because medical need is often one of the best predictors of visits to health care professionals (Andersen & Newman, 1973; Sirois & Gick, 2002) a one-way analysis of variance (ANOVA) was first run to determine if there were significant group difference in the number of acute health problems reported in the past 6 months. As expected the health service use groups differed significantly in the number of acute health problems reported (see Table 64). High health service users reported more acute health problems, whereas low users had fewer health problems. In order to control for the effects of medical need in assessing the group differences on the control scales, an analysis of covariance (ANCOVA) controlling for the number of acute health problems was conducted for each of the scales that was positively associated with the sum of the health problems. Mastery, Control Expectancies, and Unmitigated Communion were significantly related to the number of acute health problems (Tables 47 and 48) and separate ANCOVAs were conducted for each of these scales with acute health problems as the covariate. Only Mastery scores differed significantly among the health service use groups after controlling for the effects of medical need (Table 64).

Because health services may be utilized as an alternative from of social support for those who do not perceive they have adequate social resources (Cameron et al., 1993, 1995), differences in perceived social support across the health service use groups were examined with an ANOVA. As expected, perceived social support was higher for those who made the least number of health care visits and lowest for those who made the most visits. For each of the scales that significantly differed across the health service use groups, an additional ANOCVA was run adding perceived social support as a covariate. Perceived social support was a significant covariate in each of the analyses. Neither

Mastery nor Unmitigated Communion scores differed after controlling for both perceived social support and medical need. However, the scores on Communion remained significantly different across the health service groups after accounting for the effects of perceived social support, with higher Communion scores in the high health service use group.

To further explore the proposition that those high in Communion as opposed to low Communion use more health services, a planned contrast between the high and the low health service use groups was conducted. Indeed, those who used the most health services in the past 6 months scored significantly higher on Communion than those who used the least amount of health services, $t(1, 363) = 2.23, p < .05$ (see Table 64 for means).

Discussion

In this fifth and final study the factor structures established in the previous study for the Control Beliefs and the Modes of Control scales were supported, this time with a sample that included not only arthritis and IBD but also a more diverse group of chronic illnesses. Additionally, the reliability of each of the three new scales were also replicated with a more diverse chronic illness sample, and aspects of concurrent validity were established.

Concurrent Validity – Objective and Subjective Health

The relationships of the new scales to both subjective and objective health measures generally followed those found in other studies of control related constructs, with higher personal control beliefs showing strong associations with better health. However, the direction of the relationship is unclear. That is, do control beliefs improve

health outcomes perhaps by increasing health-promoting behaviors, or do those with better health have higher control perceptions? A common finding in the health control literature is that those with a better objective health status have higher control perceptions (Jensen & Karoly, 1991), and those with chronic illnesses score lower on control measures such as LOC (Arraras et al., 2002). Alternatively, a review of the self-efficacy and pain literature concluded that self-efficacy or mastery was a potent predictor of overall health status in those with arthritis (Marks, 2001). The finding that higher control beliefs lead to better adjustment (Affleck et al., 1987; Helgeson, 1992; Krause & Stryker, 1984) and performance of health enhancing behaviors (French et al., 2000) among those with chronic illness suggests that perceived control may play an influential role in health improvement.

The relationships between control and health are complex and it is likely that such relationships are reciprocal in nature, with control leading to better behaviors and adjustment and subsequent improvements in health further enhancing beliefs about control. This is similar to Bandura's (1977) idea of *reciprocal determinism*, or the process through which self-efficacy beliefs are developed and enhanced. As a determinant of motivation, affect and behavior, self-efficacy plays an influential role in health outcomes by enlisting and sustaining effort to achieve and maintain health behaviors (Bandura, 2000). In the current study Control Expectancy was negatively related to both acute and chronic health problems, whereas Mastery was only related to acute problems. Given the theoretical and empirical support for the role of Mastery in health outcomes, and the fact that it may take many years of poor health habits before a

chronic illness manifests, it is possible that Control Expectancy may be more of a consequence and Mastery may be more a determinant of health status.

An important conceptual distinction between Adaptive Control and Control Expectancy regarding health status was also demonstrated. Not only did each of the three chronic illness groups score higher on Adaptive Control than on Control Expectancy, but the group with the lowest perceived health (arthritis) had a greater difference between Adaptive Control and Control Expectancy than did those with the highest perceived health (IBD). This is consistent with the common finding that general health control perceptions tend to be lower for those with poorer health status (Arraras et al., 2002; Jensen & Karoly, 1991). Other studies have similarly found that scores on specific beliefs about control over illness symptoms were higher and more important for adjustment than general beliefs about control over disease course (Affleck et al., 1987; Thompson et al., 1993). Consistent with Reid's (1984) compensatory model of control, Adaptive Control reflects a belief in the aspects of chronic illness that are controllable and not just a belief in general control over health. Thus, compared to Control Expectancy, Adaptive Control may be the more salient control construct for assessing the potential benefits of control for those with chronic illness.

The associations between the Modes of Control scales and the health measures were relatively modest as expected. The only two styles of control that were associated with physical health were Agency and Unmitigated Communion. Consistent with other research, Agency was associated with fewer acute health problems (Robbins et al., 1991). In addition to having more acute health problems, Unmitigated Communion was related to having more chronic health problems. This finding is intriguing and raises the issue of

directionality of this relationship. It has been suggested that those high in Unmitigated Communion exercise control over health by being too concerned about other's health and neglecting their own health (Fritz & Helgeson, 1998; Helgeson & Fritz, 2000). But such self-neglect would likely have to occur over a long period of time before it exacerbated health to the point where additional health problems would develop. Alternatively, some individuals with more chronic health issues may have difficulty dealing with their own poor health and instead focus on the health of others. Given that Unmitigated Communion was associated with poor coping efficacy in Study 4, the latter explanation may account for this intriguing finding.

In general, all three of the new scales demonstrated moderate to substantial associations with the different dimensions of well-being. This finding is in accord with theoretical models that outline the benefits of control perceptions in adjustment to chronic illness (Reid, 1984; Taylor, 1983; Thompson, 1981; Thompson et al., 1993). In addition to assessing depressive mood and perceived social support, the dimensions of psychological well-being assessed captured aspects of adjustment not solely related to positive or negative affect. Unlike hedonic well-being, eudaimonic well-being addresses key aspects of positive functioning and self-actualization (Ryff, 1989) that may be especially important for those living with the limitations imposed by a chronic illness.

The substantial and unique associations between Mastery and the well-being measures further support the concurrent validity of the Mastery scale and suggests that the confidence to carry out behaviors that are necessary for managing and enhancing one's health are essential for adjustment to chronic illness. Indeed, research on adjustment to chronic illness suggests that self-efficacy mediates the relationship between

symptomatology and disability (Arntstein, 2000), is prospectively related to less disease symptomatology (Edwards et al., 2001), and is associated with positive psychological coping strategies in the management of headache disorders (French et al., 2000). Further, for those with arthritis, mastery is associated with less depressive mood (Mangelli, Gribbin, Allard, & Sensky, 2002), and may enhance psychological well-being by ameliorating disease related pain (Marks, 2001).

The unique associations between Adaptive Control and each of the well-being measures provide evidence of the concurrent validity of this scale. Distinctions between this scale and the Control Expectancies scale were also demonstrated by the lack of associations between Control Expectancies and the social dimensions of well-being as well as the lack of unique relations of Control Expectancies when both variables were entered in the regression equation. Adaptive Control appears to reflect control beliefs that are related to a wider spectrum of well-being dimensions including utilizing one's social resources in order to manage one's health. Similar to internal HLOC (Wallston et al., 1978), Control Expectancies may decrease feelings of helplessness and heighten goal-related well-being but not necessarily influence aspects of health control that involve support from others.

Interestingly, Chance beliefs were not substantially related to psychological well-being or depressive affect in the current study, although a previous study of chronic pain patients found that Chance LOC beliefs were associated with greater helplessness in dealing with pain (Crisson & Keefe, 1988).

In accord with the research on general Agency and Communion constructs (Helgeson, 1994), the health specific Agency and Communion scales were associated

with different dimensions of well-being. Only Agency was not related to the social dimensions of well-being, perhaps because the defining characteristics of Agency have more to do with acting on one's own initiative regardless of whether advice is provided by others (Helgeson, 1994). In contrast, the remaining Modes of Control dimensions each involve exerting control that is in some way related to social interactions. The association of Unmitigated Agency and Unmitigated Communion to lower overall well-being in the current study is in accord with research on general Agency and Communion constructs (Helgeson, 1994), and supports the notion that these two styles of control reflect less effective ways of managing one's health that may negatively influence well-being.

Concurrent Validity – Social Support

Evidence of concurrent validity for the new scales by examining the use of support groups both in-person and online was less encouraging, with only Control Expectancy demonstrating any substantial relation to support group use. This may be partly explained by the restricted range of responses, with the majority of people either using or not using the different support groups. Alternatively it may be that in the case of in-person support groups, other factors such as mobility, accessibility and availability take precedence over the influence of control related cognitions. For example, one participant with arthritis provided the following as a reason for not attending a support group: “unable to travel unassisted - can not leave house alone, can't drive at this time”. Similar comments were provided by a participant with daily migraines - “Timing. Even if I could find one in my area, I'm not sure I could regularly meet the appointed time. My condition seems to have its own schedule and decides what I do when”, and a participant with IBD: “I live an hour from where meetings are held and there are no bathrooms

between here and there". These types of practical reasons for not attending were frequently mentioned in addition to the psychosocial reasons provided for use or nonuse.

Nonetheless, the association of Control Expectancy with less support group use may reflect the common finding that those who are satisfied with their own self-reliance are not likely to utilize support groups (Ramsey, 1991). The correlations between Control Expectancy and the individual reasons for use or non use suggests that this may be the case, although using support groups for other reasons than illness was also a prime reason associated with this control scale.

Direct associations between the remaining control scales and use of support groups were not obtained, although the pattern of relations with the reasons for use or non use of in-person support groups did provide some evidence of concurrent validity. Most notable are the associations of Mastery and Adaptive Control with reasons for not using support groups that reflect better adjustment and lack of need for support for those scoring high on these dimensions, and avoidance and difficulty managing for those scoring low on these dimensions. In addition, evidence that Adaptive Control and Control Expectancy are distinct constructs was reflected in the differential pattern of correlations among each scale and the reasons for use or non-use of support groups. Although both may motivate non-use due to self-reliance, Adaptive Control appears to reflect motivations related to better adjustment ("I have no emotional problems") rather than avoidance ("I want to forget about my problems not talk about them"). Some promise for the utility of the Chance scale was evidenced through its associations with reasons for using support groups. Those who scored higher on this scale used support groups out of loneliness and difficulty in coping with their illness. This is consistent with the finding

that chronic pain patients with higher Chance beliefs use less effective coping strategies (Crisson & Keefe, 1988).

Use of support groups can be motivated by multiple reasons including emotional and social need (Ramsey, 1991), but it was expected that the preferred style of control may also play a role in the decision to use support groups. However, more reasons for not using support groups rather than reasons for using support groups were associated with the individual Modes of Control scales. Overall, the patterns of associations provide further evidence of concurrent validity. Unmitigated Agency was associated with not using support groups because of a resistance to help from others combined with self-reliance and lack of existing support networks, reasons that are proposed to reflect the key characteristics of this dimension that may lead to poor health-related behaviors (Helgeson & Fritz, 2000). In contrast, Communion was associated with non-use because of sufficient support and openness to receive help and work with others regarding health issues, a finding that is consistent with previous research suggesting that Communion is related to better mobilization of social support (Helgeson, 1994). Agency may motivate non-use because of lack of need rather than resistance to share with others. Overall, these reasons confirm the proposed qualities of each style of control. The associations with Unmitigated Communion were limited, perhaps because the motivations presented did not adequately capture dimensions related to this construct.

Concurrent Validity – Health Service Use

Despite the common finding that medical need is a strong motivator of health service use (Andersen & Newman, 1973; Sirois & Gick, 2002), two of the control dimensions were associated with differences in the frequency of health services used after

controlling for differences in the number of health problems. Mastery is proposed to not only enhance well-being and health outcomes, but also reduce the use of health services through effective management of disease-related symptomology (French et al., 2000; Marks, 2001). Those who used less health services tended to have a higher sense of health-related Mastery compared to those who used more health services, although group differences did not persist when differences in social support were taken into account. Indeed, individuals with a greater sense of health Mastery appear to be effective in managing their illness on several different levels, including obtaining the necessary support from their social contacts, whereas those with less confidence in their ability to manage their health appear to substitute visits to health care professionals for social support.

Evidence for the hypothesized association between Communion and health service use was found, regardless of any differences in perceived social support among the health service use groups. In fact the differences in Communion scores became more distinct after taking into account social support. This finding suggests that those who have a Communion style of control may make more visits to health care professionals not because of medical need or lack of perceived social support, but because they genuinely enjoy working with others to manage their health. In a previous study of students where Agency but not Communion was related to health-care visits (Reis et al., 1985), health problems and perceived social support were not taken into account. As well, this relationship was found only for male students.

General Discussion

Control perceptions play a central role in the adjustment to chronic health issues (Affleck et al., 1987; Frank, Johnston, Morrision, Pollard, & MacWalter, 2000; Thompson et al., 1993) and are implicated in both psychological (Mangelli et al., 2002) and health outcomes (Arntstein, 2000; Marks, 2001). However, assessment of control perceptions is often accomplished with a measure of HLOC (Wallston et al., 1978), or through single item measures which may make generalizing research findings across different studies difficult. Inconsistencies in the HLOC literature (Calnan, 1989; Norman et al., 1997, 1998) suggest that this construct may be too simplistic to capture the different types of control perceptions that are key in understanding the psychological, social, and behavioral adjustments that people make in response to a chronic health issue.

Summary of Results and Conceptual Issues

Five studies were conducted to develop and explore a new set of multidimensional measures of control perceptions that allow for a sophisticated and valid assessment of health-related control that goes beyond HLOC. Following the creation of the initial item pool, the development of the scales proceeded through several iterative steps of item analysis, refinement and adjustment. Healthier and younger student populations along with several samples of adults with various chronic illnesses were included in the scale development to ensure the validity and applicability of the scales for those with ongoing health issues. Aspects of construct and concurrent validity were established by examining the relation of the scales to theoretically relevant constructs and behaviors. Overall, these studies supported the conceptual and practical validity of the new scales.

The conceptual model that governed the scale development process outlined three unique aspects of control, Control Beliefs, Control Motivations, and Modes of Control, each of which was proposed to be multidimensional in nature. With the exception of Control Motivations, which appears to be a unidimensional construct, the multidimensional nature of the new control scales was supported. Each scale reflected distinct aspects of health control perceptions that may be valid across different chronic illness populations as well as with those who do not have ongoing or pervasive health issues.

As expected, some of the control constructs appeared to be less applicable for younger and healthier adults. The Adaptive Control scale was specifically designed to capture aspects of control that relate directly to the management of one's illness and not just the management of one's health in general. Thus, it is recommended that when administering the Control Beliefs Inventory to younger or general adult populations that the Adaptive Control scale should be omitted and the Control Expectancy scale be used in its place. Similarly, certain items from the Unmitigated Communion scale did not appear to be as valid for a younger student population as they were for a middle-aged adult population, possibly because of developmental life role differences.

The 5-item version of the Chance scale was supported with the student sample but not the chronic illness samples. Individuals with chronic illness in Study 4 responded to questions about predetermined forces differently, reducing the Chance scale to 3 valid items. This brings into question the difference between predetermined (genetic) and undetermined forces (luck) when assessing Chance beliefs. It may be that individuals who are not dealing with a chronic illness that may have a genetic basis do not make the

same distinctions in Chance beliefs as those with a chronic illness. Accepting these predetermined forces may for someone with a chronic illness be a sign of positive adjustment, whereas an individual without a chronic illness may view such forces as a possible threat to their health. Given the brevity of the reduced scale, further work may be needed to expand the construct of undetermined forces assessed by the Chance scale, and to develop a specific Chance scale that reflects predetermined forces.

The administration of the control scales across different chronic illness samples demonstrated not only the validity of the scales for different illness populations, but provided evidence of the scales' replicable factor structure. However, there were some differences between the arthritis and the IBD samples. In study 4 the Control Beliefs Inventory demonstrated a 3-factor rather than the proposed 4-factor structure for the IBD sample, with the two related constructs Control Expectancy and Adaptive Control loading onto a single factor. With the arthritis sample a 4-factor structure was supported, raising the possibility that this inconsistency may be attributable to the qualitative differences in the disease experiences of each chronic illness population. In both Studies 4 and 5, individuals with arthritis rated their health and current functioning as worse than those with IBD, and in both studies there was also a greater proportion of participants who were on disability in the arthritis sample as compared to the IBD sample. Further, individuals with arthritis had more distinction between their Adaptive Control and Control Expectancy scores than those with IBD in Study 5.

There may be three possible explanations for these differences between the IBD and the arthritis samples. One possible reason is that the lower perceived health status of those with arthritis influences the way in which control over health and illness is

perceived. Indeed, the adaptive value of different control perceptions may depend upon the level of symptom severity (Affleck et al., 1987) and the relation of control perceptions to adjustment is stronger when the health threat is greater (Helgeson, 1992). Adaptive Control is proposed to reflect control perceptions as they relate to the perceived limits of control given an individual's health status. This concept is similar to Reid's (1984) compensatory model of control and with the propositions of Taylor (Taylor, 1983) and others (Taylor, Helgeson, Reed, & Skokan, 1991; Thompson et al., 1993) that suggest that when control is limited, individuals will search for the controllable aspects of the situation and exert their influence over these areas. Because of their poorer perceived health status and increased disability those with arthritis may view control over symptoms (Adaptive Control) as more distinct from control over health in general (Control Expectancy). Due to their higher perceived health, those with IBD may not compartmentalize their beliefs in control over symptoms from their beliefs about control over general health, and instead view Control Expectancy and Adaptive Control as less distinct.

A second possibility involves the differences in the disease experience of these two populations. Although the key symptoms of arthritis include joint pain, fatigue, and mobility issues (Meenan et al., 1992), these symptoms may not interfere with other aspects of general health such as nutrition. However, the bowel symptoms, pain, and fatigue (Guyatt et al., 1989) that accompany IBD indeed tend to affect other areas of health such as nutrition and therefore may be experienced as more pervasive, leading to less distinction between Control Expectancy and Adaptive Control in this group.

Finally, differences in self-perception may also be responsible for the different distinctions in control perceptions, due to the more obvious nature in which arthritis symptoms influence functioning (i.e., mobility limitations). Chronic illness can change the way in which others view and treat someone, which in turn can impact on the individual's self-perceptions (Leventhal, Idler, & Leventhal, 1999). The higher social visibility of arthritis symptoms in comparison to IBD may lead to more distinctions between overall health and arthritis symptoms for the individual with arthritis, which is reflected in their control perceptions.

Because arthritis symptoms tend to be more visible than those of IBD, and there is more stigma attached to IBD symptoms, it is possible that the self-presentation of those with IBD is distinct from those with arthritis. This may have influenced the responses to the control belief questions.

Conceptually, the 3-factor structure of the CBI supported across the mixed chronic illness sample suggests that both Adaptive Control and Control Expectancy are related constructs that both reflect elements of a higher order construct about belief in personal control over health. The former addresses control and management of one's illness symptoms whereas the latter deals with general perceived control over health. Because individuals with poor perceived health may make clearer distinctions between these two concepts, each was kept as a separate scale in the analyses. Other scales that assess highly similar constructs have accordingly kept each scale separate although each may load onto a single higher order factor when assessed together (e.g., Ryff, 1989; Ryff & Keyes, 1995). The differential pattern of correlations of the Adaptive Control and Control Expectancy scales with the validity measures further supports their conceptual

distinctions. Although a 3-factor solution improves the validity of the scales across different samples of individuals both with and without chronic illness (Floyd & Widaman, 1995), keeping Adaptive Control and Control Expectancy as separate scales ensures greater flexibility and sensitivity in the assessment of perceived control over health.

A similar issue regarding factor structure arose for the Modes of Control scales. The 3-factor structure found across Studies 4 and 5 may be due more to conceptual issues previously raised in other Agency and Communion research. A study of general Communion and Unmitigated Agency found that items from these two scales loaded onto a single factor (Saragovi et al., 1997). Although conceptually Communion and Unmitigated Agency are posited to be negatively related (Helgeson, 1994), each is proposed to be an independent factor. However, empirical support for this proposition is scarce. Despite these issues, a differential pattern of correlations with the validity measures was obtained for each separate scale suggesting that assessing each separately may have some value.

Relations to HLOC

The model of control perceptions that underlies the new scales posits that control over health can be distinguished according to the type of control and its manifestation. By delineating control this way, it was proposed that some of the conceptual pitfalls associated with the HLOC construct could be avoided. Evidence for both convergent and divergent validity of the Control Expectancy scale with the Internal HLOC scale was demonstrated in Study 4. Although the two scales were strongly correlated, the Control Expectancy scale was unrelated to self-blame in either the arthritis or the IBD sample.

Consistent with other studies (Buckelew et al., 1990; Marshall, 1991; Stainton Rogers, 1995), the Internal HLOC scale was strongly related to self-blame in both samples.

One of the main criticisms of the HLOC construct is that it is a poor predictor of health-related behaviors (Calnan, 1989; Norman et al., 1997, 1998). In Study 4 the Control Expectancy scale explained a greater proportion of the variance in wellness behaviors than the internal scale of the MHLC. However, the variance accounted for by each of these scales was modest, whereas both Mastery and Control Motivations were each significant predictors of wellness behaviors, jointly accounting for 26 percent of the variance in wellness behaviors. Although the Control Expectancy scale may afford some improvements over the internal MHLC scale in the assessment of general health control beliefs, the constructs of Mastery and Control Motivations appear to offer greater explanatory power in understanding differences in the practice of wellness behaviors.

Delineating control according to whether self or powerful others control one's health presents some paradoxical issues for those who have an ongoing health issue that necessarily involves assistance to manage their illness effectively. The Modes of Control Inventory was designed to present different styles of control that may account for why some people choose to work with others or alone to manage their health. Unlike the internal and powerful others HLOC scales that tend to reflect independence versus dependence (Buckelew et al., 1990) the Agency and Communion constructs were each found to be related to active coping and unrelated to helplessness in Study 4. In other studies, powerful others LOC was associated with increased use of health care (Goldsteen et al., 1994; Murray & Corney, 1988; Zitman, Linssen, & Van, 1992) when differences in

need and available social support were not taken into account. However in Study 5,

Communion, a style of control that involves cooperation with others and not dependence on others in managing one's health, was associated with increased health care use even after accounting for differences in medical need and perceived social support.

Control and Adjustment to Chronic Illness

Beyond these distinctions from the HLOC model, the new multidimensional model of health control proposes that additional aspects of control may be beneficial for understanding adjustment to chronic illness. As previously mentioned, Adaptive Control addresses an aspect of control that is particularly relevant for those with chronic illness, namely, controllability and management of one's symptoms rather than one's health in general. Indeed, Folkman (1984) asserts that it is important to ask the question 'Control over what?' to understand the complex relations between control and adjustment. The relevance of this construct for positive adjustment to chronic illness was demonstrated across each of the two validation studies. Adaptive Control was associated with less health-related helplessness, denial and disengagement, depressive affect, and stress, and greater problem-focused coping, acceptance, self-esteem, optimism, benefit finding, perceived social support and psychological well-being, and better self-perceived health. Only some of these associations were found for the Control Expectancy scale, suggesting that Adaptive Control may be the more useful perceived control construct for those with chronic illness.

Based on the concept of self-efficacy (Bandura, 1977), the Mastery scale was consistently and strongly associated with positive indicators of adjustment across both validation studies. These findings are in accord with other research that suggests that self-

efficacy is a potent predictor of both adjustment and positive health outcomes for those with chronic illness (Edwards et al., 2001; French et al., 2000; Marks, 2001). Similarly, Marshall (1991) found that self-mastery, a key dimension within internal HLOC, was associated with indices of physical well-being. Self-efficacy or Mastery is proposed to enhance health-related outcomes through confidence in one's perceived abilities and the confidence and ability to mobilize resources when needed (Bandura, 1986). The health-specific Mastery scale developed in the current study appears to be a valid and useful measure for assessing this construct in populations both with and without chronic health issues.

The overall strength of the Mastery scale raises the issue of the usefulness of the other control belief scales within the CBI. Given that Adaptive Control explained unique variance in the psychological well-being measures above that explained by Mastery, it is likely that each scale has its own benefits for understanding adjustments and health-related outcomes for those with chronic illness. For example, one study of arthritis patients found that both perceived control over health and self-efficacy were unique and valuable predictors for understanding the process of adjustment to chronic illness (Schiaffino & Revenson, 1992). Similarly, a preliminary test of the Adaptive Control and Mastery scales found that each moderated the impact of objective symptom severity on adjustment to tinnitus (Sirois et al., 2003). Future studies are needed to expand on the relationships explored in the current studies so that the benefits and distinctions between these two scales can be more fully understood. One conclusion that can be derived from the present studies is that the Mastery scale appears to be valid for both healthy and

chronically ill populations, whereas the Adaptive Control scale may be best used with chronic illness populations.

The Control Motivations Inventory (CMI) was originally proposed to assess two distinct motivational aspects of health-related control, desire for control and health value. However, subsequent analyses suggested that these control motivations are part of a single homogenous construct. The relations between the CMI and the various indicators of adjustment across the validation studies suggest that motivations to control one's health are associated with adjustment to chronic illness. In addition, control motivations were strongly related to the practice of wellness behaviors in the student sample, a finding that has been replicated in other studies (Abood & Conway, 1992; Wurtele et al., 1985). The CMI was also unrelated to internal HLOC and only modestly related to Control Expectancies, supporting the theoretical and empirical distinctions between control expectancies and control motivations suggested by other researchers (Burger, 1985; Burger & Cooper, 1979; Kirscht, 1972). Although control motivations were not substantially related to the various measures of health status in Study 5, in Study 4 those with chronic illnesses were more motivated to control their health than younger, healthier adults. One possible explanation is that the value placed on having or maintaining good health is more salient when a chronic health issue is present than when there are no threats to one's health.

In addition to control beliefs and motivations, the preferred style of exerting control over one's health was also suggested to enhance understanding of health-related outcomes. The Modes of Control were proposed to be distinct but complementary constructs to control beliefs. Whereas expectations for control over health may reflect

outcomes, the different Modes of Control were posited to reflect the process through which control is expressed. The four different styles of control were based on the dimensions of agency and communion suggested by Helgeson (1994) to be associated with physical and emotional well-being. According to this model, both Agency and Communion reflect two independent dimensions that are each associated with positive adjustment and outcomes. Agency refers to a self-reliant, independent style, and Communion reflects a cooperative and interactive style. In contrast, their extreme counterparts, Unmitigated Agency and Unmitigated Communion are associated with problem health behaviors and poor adjustment (Helgeson, 1993a; Helgeson & Fritz, 1998, 2000).

In accordance with Helgeson's (1994) theoretical model, the health-specific Agency and Communion scales overall were associated with positive coping styles, positive illness cognitions, the practice of wellness behaviors, and aspects of psychological well-being. In addition, Communion was related to social support coping, better perceived social support, positive relations well-being, and greater use of health services after accounting for medical need and social support. Although both health-related Agency and Communion tended to reflect positive adjustment overall, only Communion was associated with socially oriented adjustment.

Unmitigated Agency refers to the focus on oneself and the exclusion of others, and Unmitigated Communion refers to a focus on others and self-neglect (Helgeson, 1994). Similar to other studies where each of these constructs was associated with a lack of support from others and reluctance to ask others for help (Helgeson & Fritz, 2000), health-specific Unmitigated Agency and Unmitigated Communion were associated with

greater self-blame, helplessness, depressive mood, less perceived social support, and lower psychological well-being, coping efficacy and self-esteem. In addition, Unmitigated Agency was related to avoidant and anxious attachment, less use of social support and active coping, and less illness-related benefit finding. Interestingly, Unmitigated Communion was related to more health problems, perhaps because of self-neglect. Overall, the patterns of associations suggest that the health-specific Agency and Communion scales developed across the current set of studies capture the key aspects of these constructs proposed by Helegeson's (1994) model. In addition to control beliefs and motivations, these different styles of health control may help in understanding and predicting health outcomes.

Limitations and Future Directions

Although the early scale development samples were comprised of students and adults recruited through the community, the final scale validation studies included participants who completed the survey online. One potential issue that arises from Internet based studies is the validity of data obtained this way compared to that obtained from the community. Specifically, in the case of sampling special populations such as those with chronic illness, how does one know that the responses are genuine and that the respondents do indeed have the health conditions reported? To prevent this problem several qualitative questions were included in each survey that required responses that could be checked for relevant content. For example, participants were asked about how their illness influenced their daily life, if they had any fears regarding their illness, and what they did to cope with the problems associated with their illness. Although not everyone answered each question, everyone included in the analyses answered at least

one of these questions. In addition, responses obtained were consistent with those expected from someone with a chronic health condition. Additionally each survey required anywhere from 30 to 50 minutes to complete, a considerably long enough time that would discourage those who did not have a genuine interest in participating. Indeed, several incomplete surveys were received and discarded. It may also be that for those with arthritis, the extended time necessary to complete the online survey discouraged eligible participants. However, in both online studies, those who may find the online completion difficult were invited to have the paper version of the survey mailed to them.

One advantage of conducting online research with illness populations is that it provides an opportunity to reach individuals who may not normally be recruited in the community because of limited mobility and other illness related restrictions. For example, many studies of chronic illnesses such as arthritis find that the level of disease severity from clinically recruited participants is low to moderate, presumably because those with higher disease severity have reduced mobility (Schiaffino & Revenson, 1992; Schiaffino, Revenson, & Gibofsky, 1991). In the current study, several individuals with arthritis indicated that they had difficulty with mobility and traveling. Difficulty leaving one's home due to unpredictable bowel symptoms was also a frequently cited issue among those with IBD. Unfortunately, comments similar to that from a 59-year-old male with IBD were quite common within this sample: "I never leave the house- have not been out in years. Example - My truck is 17 years old and has less than 25,000 miles (most of those were in the first 5 years). I'm a hermit." In terms of populations with potentially limiting health conditions, Internet based research may allow for the inclusion of those who would not normally be reached and thus enhances the validity and generalizability of

the findings. In this regard, the Internet sampling methods used in Studies 4 and 5 can be viewed as a strength rather than a weakness of this research.

One other issue regarding the Internet sampling method involves the demographic and general characteristics of a sample that is obtained online versus in the community. Clearly, access to the Internet and a computer is a prerequisite for online participation. This may have also led to the generally higher education level in the samples, and the greater use of online support groups as opposed to in-person support groups. However, research on the characteristics of participants from Internet studies suggests that not only do Internet studies tend to yield larger samples than those obtained in the community, but these samples are also more heterogeneous than their community based counterparts (Krantz & Dalal, 2000).

The predominately female and Caucasian samples obtained for the validation studies present other limitations regarding the findings from the studies conducted. The higher prevalence of arthritis in women may partially account for this finding, although the proportions of women to men in the mixed chronic illness sample was equally high. Nonetheless, some of the conclusions regarding the Agency scales may be limited due to the predominantly female samples. Helegeson (1994) originally developed the Agency-Communion model to account for health differences between men and women, suggesting that Agency reflected characteristics associated with male social roles, whereas Communion reflects qualities associated with female socialization. Some of the proposed relationships between Agency and adjustment that were not found may be indicative of the lower proportion of males included in the studies. In addition, the predominantly Caucasian samples may have also influenced the findings regarding the

two Communion scales, which demonstrated lower reliability in the more ethnically diverse student samples. Future research is needed to verify the relationships of health-related Agency to psychological and physical well-being, and to assess the performance of the Unmitigated Communion scales with more ethnically diverse populations.

Other limitations involve the sample characteristics. The early scale development samples included undergraduate student samples rather than community chronic illness samples and healthy adult samples. Thus, it is possible that some of the items that were rejected early on may have performed differently had they been assessed with non-student samples. Because the student samples were divided into those with and without chronic illness and the responses differed across these two groups, it is likely that the students with chronic illness served as an adequate proxy sample for the later chronic illness samples used in the validity studies.

In addition, the samples employed for the development studies were all self-selected and this may have additional consequences for the interpretation of the results. Because the studies were advertised as being related to coping and well-being this may have attracted participants who were having difficulty adjusting to the challenges of their illness or alternatively felt that they were adjusting very well and wanted to help others. Indeed, some of the narrative responses provided by the participants expressed difficulty in coping with their illness whereas others reflected a more prescriptive tone regarding attitudes or behaviors that would enhance well-being.

Although several aspects of construct validity for the new scales were established, the predictive validity of the scales remains to be demonstrated. However, it should be noted that concurrent validity is often substituted for predictive validity (John & Benet-

Martinez, 2000), assessing both the construct of interest and the variables that are hypothesized to be influenced by this variable at a single time point. This approach, while practical and convenient, limits the strength of any conclusions about the causal relationships between the variables. Several of the analyses yielded what may be considered by other researchers evidence of predictive validity. However, a more conservative definition of predictive validity was employed for the current studies, and therefore evidence of the predictive validity of the scales remains to be tested by examining the associations between the scales and outcome measures across two time points. Indeed, Tennen and colleagues (Tennen, Affleck, Urrows, Higgins, & Mendola, 1992) have suggested that understanding the role of control appraisals in adjustment to health threats requires that both control and adaptational outcomes be assessed over time. In addition to evaluating the predictive validity of the scales, a longitudinal assessment would help clarify issues regarding the causal directions of the associations between the new scales and adjustment suggested by the current studies.

Future investigations of the properties of the new scales could examine the predictive validity of the scales with respect to several health-related outcomes. In addition to a longitudinal assessment of the new scales with respect to wellness behaviors, other health behaviors could be assessed. For example, general measures of Unmitigated Agency and Unmitigated Communion are associated with problem health behaviors such as smoking and lack of adherence to a heart-healthy diet (Helgeson & Fritz, 1999). Because the general measure of wellness behaviors used in the current study was not appropriate for use with the chronic illness populations sampled, an assessment of disease relevant health behaviors may further validate the new scales for use with

specific chronic illness populations. In addition, the practice of health promoting behaviors, such as increased activity for those with arthritis, can have benefits in terms of reducing distress and disease impact (van Lankveld, Naring, van't Pad Bosch, & van de Putte, 2000). An assessment of both health behaviors and changes in psychological and physical well-being over time would help to clarify the role of the different control perceptions for overall adjustment.

Further studies are also needed to assess how different control beliefs and motivations interface with preferred control styles in determining health-related outcomes. For example, a high motivation for control coupled with a less adaptive way of exerting control, such as unmitigated agency, may lead to difficulties in adjustment that may not be apparent if only control motivations are only accounted for. Thus, an assessment of the interaction of the different control dimensions and their relation to health-related outcomes is necessary.

The relations between control perceptions and health are complex, and more detailed investigations of the new control scales are required to further elucidate their utility. For example, symptom severity is known to influence the relationship between control perceptions and health outcomes (Affleck et al., 1987; Helgeson, 1992; Thompson et al., 1993), and often different control perceptions can interact to determine health-related outcomes (Abella & Heslin, 1984; Baron et al., 1993; Schiaffino & Revenson, 1992). Investigations that account for the influence of these other factors would provide more definitive evidence of the benefits of the new model of control perceptions suggested by the current studies.

Conclusions

An important premise that guided the development of the new scales was that health-related control beliefs are multifaceted and therefore more sophisticated than conceptualized by current models. Unlike HLOC, the new model focused on adaptive rather than absolute control over health, by assessing control beliefs relative to the limitations imposed by a chronic illness. Two other important health control dimensions, Mastery beliefs and the Motivations for Control, were included. The concept of Modes of Control was also introduced, partly to overcome the issues associated with using powerful others LOC for assessing health-related behaviors that involve social interaction.

Across the five development studies, support for a multidimensional model of health-related control perceptions emerged. Evidence of the utility of the Adaptive Control, the Control Motivations and the Mastery scales was obtained through the consistent and unique associations of each with indicators of well-being and adjustment across samples of individuals both with and without chronic illness. Individual Modes of Control scales were also associated with adjustment indicators, with Agency and Communion positively and Unmitigated Agency and Unmitigated Communion negatively related to well-being. In addition, Communion was the only scale that was associated with visits to health professionals after the effects of medical need and perceived social support had been taken into account.

Although further research is needed to fully explore the implications of this model for understanding health-related outcomes, the current set of studies offers a preliminary

yet promising glimpse of the possible benefits of assessing control beliefs in a multidimensional manner.

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Appendix A

Health-related control item pool and construct definition

Note: Items adapted from extant measures include references; items rationally derived do not.

Control Beliefs

Items that relate to a person's beliefs about the control of his or her health

Control expectancies

Construct definition. Items that relate to whether a person believes that his or her health is controllable, or is due to random or chance factors.

1. Good health depends on taking the right actions (MHLC; Wallston, Wallston, & De Vellis, 1978).
66. If I take care of myself properly I can stay healthy (MHLC; Wallston et al., 1978).
24. You are either born with good health or not.
96. My family's health determines how healthy I will be.
30. Sometimes no matter what I do my health doesn't improve.
22. I believe that I can control how healthy I am.
58. If I do the right things I can recover from illness quickly.
91. I am as healthy as I am because of my own actions.
52. My current state of health is a reflection of how well I look after myself.
48. My health depends on how well I take care of myself.
105. My health depends on forces beyond my control.
90. How soon I recover from an illness depends on how lucky I am.
31. There are many forces beyond my control that affect my health.
65. Regardless of circumstances, I can always do things to improve my health.
83. People who are sick are often victims of circumstances.
8. How soon I recover from an illness depends on how well I look after myself.
97. My health is determined by my actions.
102. My health is determined by circumstances beyond my control.

- 86. If I am lucky I will stay healthy.
 - 25. If I am lucky my health will improve.
-

Mastery/ Self-Efficacy

Construct definition. Items that relate to how confident, capable, and competent a person feels about looking after his or her health

- 19. There is little I can do to change my health (mastery; Seeman & Seeman, 1983).
- 46. I often feel helpless in dealing with my health problems (mastery; Seeman & Seeman, 1983).
- 75. If I set my mind to it I can change my health (mastery; Seeman & Seeman, 1983).
- 89. What happens to my health depends mostly upon me (mastery; Seeman & Seeman, 1983).
- 45. When I am ill, there is really nothing I can do except wait until I recover.
- 76. I know that I can do what is necessary to improve my health.
- 38. I am confident that I could deal with any unexpected health problems (GPSE: Schwarzer & Jerusalem, 1995).
- 70. When confronted with a health problem, I can usually find several ways to deal with it (GPSE: Schwarzer & Jerusalem, 1995).
- 82. I can solve most of my health problems if I invest the necessary effort (GPSE: Schwarzer & Jerusalem, 1995)
- 20. I am confident in my ability to make the right decisions about my health.
- 62. When facing a health problem, I often feel overwhelmed about what to do.
- 72. I am certain that with effort I can improve my health.
- 104. I will use whatever resources are necessary to improve my health.
- 28. I am able to meet the challenge of following a healthy routine.
- 78. I am confident that I can successfully look after my health.
- 81. When it comes to my health, I often feel unable to do what I know should be done.
- 43. Even though there are things I can do to improve my health, I don't feel that I can do them.

Adaptive Control

Construct definition. Items that relate to a person's beliefs about what controlling a current health problem and its symptoms means

- 69. There are things I can do to make the best of my health.
- 71. The symptoms I experience cannot be controlled.
- 18. If I make the effort, I can manage my illness.
- 80. I believe that I can do more to control my symptoms.
- 34. Nothing I can do will make my symptoms improve.
- 35. The only way I can control my health is by taking medication.
- 73. Given my current health issue, there is not much I can do to improve my health.
- 100. There are things that I can do to make my health problem easier to deal with.
- 23. I cannot control the symptoms I experience.
- 93. It's up to other people to find a cure for my health problem.
- 85. If I do the right things I can make my symptoms more manageable.
- 39. Taking control of my health condition means doing whatever I can to ease my symptoms.

Control motivations item pool and construct definitions

Items related to whether the person is motivated (e.g., willing to make the necessary effort) to take control of their health

Autonomy

Construct definition. Items that relate to whether a person's decisions and actions regarding health are done out of personal choice or because of other influences

- 49. I am the one who chooses what should be done about my health (SDS; Sheldon & Deci, 1996).

4. If I choose to do something to improve my health it is because I believe it is the best thing for me (SDS; Sheldon & Deci, 1996).
 57. It is easier to do what I am told to do about my health than to think about it myself (SDS; Sheldon & Deci, 1996)
 64. I want to do things to be as healthy as possible (SDS; Sheldon & Deci, 1996).
 51. I want to take responsibility for my own health (SDS; Sheldon & Deci, 1996).
 55. I would feel guilty if I didn't do things to stay healthy (SDS; Sheldon & Deci, 1996).
 13. If I didn't look after my health others would be upset with me (SDS; Sheldon & Deci, 1996).
 32. Taking care of my health has important consequences for many aspects of my life.
 21. I need to feel that I am the one who is in charge of my health.
 101. Often I will do things to improve my health to stop people from getting on my case.
 92. I am responsible for the decisions related to my health.
-

Desire for Control

Construct definition. Items relating to how much a person desires and wants to be the one in control of his or her health

95. I try to avoid situations where someone else tells me what to do about my health (DCS; Burger, 1985).
29. Others usually know what is best for my health (DCS; Burger, 1985).
108. When it comes to my health, I enjoy making my own decisions (DCS; Burger, 1985).
106. When I have a health problem, I prefer to do something about it rather than sit by and let it continue (DCS; Burger, 1985).
36. I like to wait and see if someone else is going to solve my health problem so that I don't have to (DCS; Burger, 1985).
14. I enjoy taking part in decisions about my health.

- 53. I dislike not having any say in what should be done about my health.
 - 88. I prefer to let other people decide what is best for my health.
 - 27. When I have a health problem, I like to find out as much as I can about it.
 - 84. I like to know as much as possible about any health concern I have.
 - 11. I would rather find information about a health issue on my own than leave it completely to someone else.
-

Health Value

Construct definition. Items relating to how important health is to a person

- 61. I take my health seriously.
- 67. When I start feeling sick, I take immediate action to look after my health.
- 63. Health and well-being are the most important concerns in my life.
- 17. Making sure that I am as healthy as I can be is an important goal for me.
- 94. I hardly ever think about my health.
- 50. There are few things as important as having good health.
- 56. There are many other things that are more important than health.
- 15. Having and maintaining good health is a life-long goal for me.
- 26. Any time I spend looking after my health is time well spent.
- 47. Being as healthy as I can be is a worthwhile pursuit.
- 42. Many people take their good health for granted.
- 107. I have better things to do than to spend time on my health.

Modes of Control

Items relating to the way that a person likes to take control of his or her health

Agency

Construct definition. Items relating to a style of controlling one's health that involves taking action and making decisions in a proactive way

- 16. I will do whatever is necessary to solve my health problem including involving other people.
- 5. If my health improves it is because of the actions that I have taken.
- 37. I know what is best for my health.
- 54. I may listen to what others have to say about my health but the final decision is always my own.
- 79. No one but me is going to keep me healthy.
- 33. I am the best person to manage my health.
- 86. I prefer to solve my health problems alone.
- 60. Nobody can look after my health as well as I can.
- 2. I am usually the one that makes the decisions regarding my health.

(Unmitigated agency)

- 99. Asking for help with a health problem is a sign of weakness.
- 6. I don't bother asking others for help when I have a health problem because they usually can't help me anyways.
- 9. Only people who are weak ask others for help with their health problems.
- 7. Other people can't help me with my health so why bother asking.

Communion

Construct definition. Items relating to a style of taking charge of one's health that is focused on sharing and involving others

- 44. I often find that I can solve my health problems by getting help from others.
- 59. Other people's advice about how to deal with my health is always welcome.
- 41. Other people should keep their advice about my health to themselves.
- 10. I find that other people usually have good advice for me regarding my health.
- 103. I enjoy working with others to improve my health.
- 87. I don't like asking other people for help with my health.

(Unmitigated Communion)

- 40. I don't like asking for help when I have a health problem because I don't want to burden others.
- 12. I avoid asking others for help when I have a health problem because it may annoy them.
- 3. If I ask others for help when I am ill it may cause them problems.
- 74. I feel more comfortable looking after others when they are ill than having others look after me if I am sick.
- 89. My health should not be a burden to anyone else.
- 77. I feel uncomfortable having other people look after me when I am ill.

Appendix B

Study 1 recruitment notices and materials

Informed Consent Form

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Understanding Health-related Control.

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator, Dr. M. Gick (Faculty Sponsor, 54). Should you have any ethical or other concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research. or Dr. K. Matheson (Chair, Dept. of Psychology,

Purpose. The purpose of this study is to look at how different people categorize control perceptions as they relate to health. We are interested in seeing if different statements about health-related control have the same meaning for different people.

Task requirements. You will first complete brief background questionnaires. Some of these contain personal information about your physical and mental health and general well-being. Then you will be given a set of cards with statements on them about control over health and you will be asked to sort these cards into piles based on how well they match certain headings. You will then be required to resort the piles you have created based on another set of headings.

Duration and locale. The experimental session will last approximately 1 hours. Testing will take place in Room A500C of the Loeb Building, Carleton University. Testing may possibly occur in small groups.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. You have the right to withdraw from the experiment at any time, or to not answer any questions, without academic penalty.

Signatures

I have read the above description of the Understanding Health-related Control study and understand the conditions of my participation. My signature indicates that I agree to participate in the experiment.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Health control perceptions involve many different aspects of control such as beliefs about control, desire to be in control over one's health, and the different ways that people exercise control over their health (e.g., mostly alone or by involving others). Because we are in the process of developing a new measure for assessing health-related control we wanted to see if the statements designed to reflect certain aspects of control over health could be distinguished from one another by individuals such as yourself. This is why we asked you to use your best judgement when matching the statements on the cards to the different headings describing control over health. There were no right or wrong answers but the information you provided by sorting the cards will assist us as we construct and design this new measure.

Additionally, control over health may be perceived differently by different people. For example people who are not currently experiencing health problems may view control over health as staying healthy and illness free whereas people who are currently experiencing health problems may view control over health as managing their illness. We asked you some personal questions about your health to see if your current state of health affects your perceptions of what control over health means and how this influenced the way in which you sorted the cards.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, Sponsor, or Dr. M. Gick (Faculty Chair, Carleton University Research Ethics Committee for Psychological Research, ' or Dr. K. Matheson (Chair, Dept. of Psychology,

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you might wish to contact the Health and Counseling Services at

General Information

Sex: (please check one) Female ☐ Male ☐ Other (e.g. transgender) ☐

Age: _____

Are you a full-time ☐ or part-time ☐ student? (please check one)

What year of University are you in? (circle one) 1st 2nd 3rd 4th

Where do you currently live? (please check one)

- ☐ Carleton University residence ☐ Off campus housing with an intimate other
☐ Off campus housing shared with other student(s) ☐ Off campus housing by myself
☐ Off campus with family members (e.g., parents) ☐ Other (please describe) _____

What is your first language? _____

What is the ethnic/racial group that you most identify with? (For example: Caucasian, French Canadian, Italian, East Indian, etc.)

ethnic/racial background : _____

What is your relationship status? (please check the one that applies best to you)

- ☐ Living with an intimate other/Married
☐ Dating, seeing one or more persons
☐ Single, and not seeing anyone

Are you currently employed full-time ☐ part-time ☐ not at all ☐

Financially, would you say that you are

- comfortable, don't worry too much about money ☐
making ends meet, getting by ☐
struggling a lot, have some immediate financial concerns ☐

Have you been diagnosed with any psychiatric or mental health conditions?
(e.g., clinical depression, anxiety, panic attacks, etc.)

No ☐ Yes ☐

If yes, please list all

Are you taking any prescription medications as part of this treatment? No ☐ Yes ☐

If yes, please specify all _____

Appendix C

Card Sorting Task – Health-related Control

Instructions

In this task we would like you to use your knowledge about what control over health means to help us match some statements with the appropriate headings. All that is required is that you read each statement on the cards carefully and use your best judgment about which type of control it best matches. Some of these statements may sound similar to each other but may or may not mean the same thing. Read each statement carefully and use your best judgment to make your selections. There are no right or wrong answers, we are simply interested in your opinion about the meaning of these statements.

Some of the statements are worded to reflect the same meaning as the descriptions for each control heading and others are worded to reflect a meaning that is opposite to the description given. If you think that a statement reflects the opposite of a description please place that card on the description page separately from other cards you have selected for that page and write the letter “R” next to the card’s number when you list it on the page.

In the colored box provided you will find a set of cards. Each set of cards is labeled with a heading. Each card has a statement printed on one side and a number on the reverse side. There are also sets of pages with headings, descriptions, and lines. Please follow the steps below as you read and sort the set of cards provided.

Card Sorting

Working with the first set of pages and the corresponding cards, please sort the cards provided into piles that correspond to the descriptions at the top of the pages provided. First read the descriptions given under each heading. Then try to match each of the cards with the heading that you think best describes the statements on the card. The piles you form on each sheet do not have to be equal. It is more important that you choose the cards that you

judge to be a good match for each sheet. After you have placed all of the cards, please review your decisions and make any changes as necessary.

Once you are happy with your choices, please write the number from the back of each card on the page that you have decided it best fits with.

Keeping each pile with its chosen page, please put the elastic band provided around the card piles you have created for each page and place the sheet and the cards in the envelope provided. Repeat this for each of the groups of pages. When you are finished you will have a total of 8 smaller stacks of cards with elastic around them and 8 pages with the numbers from the cards written on them. Please place all materials in the same envelope.

Appendix D – Student sample recruitment notices

Informed Consent Form

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Personality, Beliefs, and Health

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator, Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical or other concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research,) or Dr. K. Matheson (Chair, Dept. of Psychology).

Purpose. The purpose of this study is to look at how attitudes towards health are related to personality and health. We are interested in seeing if different people have different ideas about their health because of personality and/or health differences.

Task requirements. This study involves completing a questionnaire package that includes background questionnaires about you and your health, as well as some personality questionnaires. Some of these contain personal information about your physical and mental health.

Duration and locale. The experimental session will last approximately 45 minutes to 1 hour. Testing will take place in Room A500C of the Loeb Building, Carleton University. Testing may possibly occur in small groups.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks. You may experience some mild distress or discomfort when thinking about your health problems.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. You have the right to withdraw from the experiment at any time, or to not answer any questions, without academic penalty.

Signatures

I have read the above description of the Understanding Health-related Control study and understand the conditions of my participation. My signature indicates that I agree to participate in the experiment.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Beliefs about health are often different for a variety of reasons. Some people have different attitudes towards their health because of differences in their general beliefs about the world, or because of their personality characteristics. Some of these beliefs may involve perceptions of control and how this relates to health. Health control perceptions can involve many different aspects of control such as beliefs about control, desire to be in control over one's health, and the different ways that people exercise control over their health (e.g., mostly alone or by involving others). Because we are in the process of developing a new measure for assessing health-related control beliefs we wanted to see how the statements designed to reflect certain aspects of control over health are related to certain personality dimensions and general beliefs. The questionnaires that you completed about your beliefs towards health and your personality will help us examine these relationships and determine if the statements we chose reflect these beliefs accurately.

Additionally, control over health may be perceived differently by different people. For example people who are not currently experiencing health problems may view control over health as staying healthy and illness free whereas people who are currently experiencing health problems may view control over health as managing their illness. We asked you some personal questions about your health to see if your current state of health affects your perceptions of what control over health means.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); or Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical or other concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664) or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you might wish to contact the Health and Counseling Services at 520-6674.

Recruitment Announcement

Experiment title: Personality, Beliefs, and Health
Experimenter's name: Fuschia Sirois, Ph.D. candidate
Phone number:
Location of experiment:
Faculty Advisor:

Brief Description

We are looking for people interested in participating in a study on personality and health beliefs. We are interested in exploring the different attitudes that people have towards their health and how this relates to their personality and their health. This study involves completing several questionnaires related to your personality, your health, and your beliefs about health. The session is approximately 45 minutes to one hour and **you will receive 1 experimental credit for your participation**. If you are interested, please sign up below by including your initials, phone number, and the best time to call. We will contact you to set up a convenient time to complete the experiment.

PARTICIPANTS WILL RECEIVE 1 CREDIT FOR THIS EXPERIMENT

**YOU MUST KEEP A RECORD OF: THE EXPERIMENTER'S NAMES
 TITLE OF THE EXPERIMENT
 EXPERIMENT LOCATION AND TIME**

**IT IS YOUR RESPONSIBILITY TO KNOW WHERE AND WHEN THE
EXPERIMENT IS HELD**

**SIGN UP SHEETS FOR THIS EXPERIMENT ARE UNDERNEATH. PLEASE
PROVIDE INFORMATION AS REQUESTED**

Appendix E - Informed consent – Medical office sample

Informed Consent Form

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Personality, Beliefs, and Health

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical or other concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664) or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

Purpose. The purpose of this study is to look at how attitudes towards health are related to personality and health. We are interested in seeing if different people have different ideas about their health because of personality and/or health differences.

Task requirements. This study involves completing a questionnaire package that includes background questionnaires about you and your health, as well as some personality and belief questionnaires. Some of these contain personal information about your physical and mental health.

Duration and locale. The questionnaire takes approximately 45 minutes to complete. You may complete the questionnaire package at a location of your convenience and return the questionnaires to the drop-box provided, or return it by mail with the pre-addressed stamped envelope provided.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks. Some people may experience some mild distress or discomfort when thinking about their health problems.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. Your participation in this study is voluntary and does not affect your current or future medical treatment in any way. You have the right to withdraw from the study at any time, or to not answer any questions, without any consequences to your ongoing healthcare.

Signatures

I have read the above description of the Personality, Beliefs, and Health study and understand the conditions of my participation. My signature indicates that I agree to participate in the study.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Beliefs about health are often different for a variety of reasons. Some people have different attitudes towards their health because of differences in their general beliefs about the world, or because of their personality characteristics. Some of these beliefs may involve perceptions of control and how this relates to health. Health control perceptions can involve many different aspects of control such as beliefs about control, desire to be in control over one's health, and the different ways that people exercise control over their health (e.g., mostly alone or by involving others). Because we are in the process of developing a new measure for assessing health-related control beliefs we wanted to see how the statements designed to reflect certain aspects of control over health are related to certain personality dimensions and general beliefs. The questionnaires that you completed about your beliefs towards health and your personality will help us examine these relationships and determine if the statements we chose reflect these beliefs accurately.

Additionally, control over health may be perceived differently by different people. For example people who are not currently experiencing health problems may view control over health as staying healthy and illness free whereas people who are currently experiencing health problems may view control over health as managing their illness. We asked you some personal questions about your health to see if your current state of health affects your perceptions of the meaning of control over health.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); or Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical or other concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664) or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you may wish to contact your family doctor.

Instructions

1. Please read and sign the consent form.
2. Next, open the large envelope marked “Questionnaire” and answer the questions within.
3. When you have completed the questionnaire, please place it and the signed consent form in the pre-addressed stamped envelope and seal it.
4. Now open the “Thank-you” envelope and read the letter and the instructions within. Please keep the letter for future reference. We would appreciate that the completed questionnaire be returned as soon as possible.

Thank-you for your participation!

Please insert your completed questionnaire (which you have sealed in the pre-addressed stamped envelope provided) and place it in the confidential drop-box where you obtained the questionnaire. If it is more convenient, you may also return the questionnaire by mail using the same pre-addressed stamped envelope provided. Please keep the debriefing letter for future reference.

About this study

In this study we are interested in how attitudes towards health are related to personality and health. We are interested in seeing if different people have different ideas about their health because of their personality characteristics and/or differences in their state of health. Your participation in this study will contribute to a better understanding of these relationships, and may provide insight into how different beliefs about health influence the things people do to look after their health. This research is part of series of studies towards a doctoral thesis by the principal investigator.

All information you provide through your participation in this research will be kept completely confidential and will not be disclosed to your doctor or health-care professional. Your responses on the questionnaires will not be associated with your name and you will be identified only by a participant code number. Only researchers directly involved with this study will be allowed to access any information that you give, and this information will remain anonymous and identified only by your code number. If a report of this study is sent to a scientific journal, all information will reflect group information rather than information about specific individuals.

Your participation is not in any way related to the treatments or care you may be receiving from your doctor, and no treatment will be altered or withheld should you decide not to participate in this study. In addition, your participation in this study will not affect any current or future medical/health treatments that you receive. We will not request any medical information from your health-care professional or doctor, and only the information that you provide will be used in this study. You are free to withdraw from the study at any time, and this will not have any effects on your medical treatment.

If you decide to participate in this study (you must be 18 or older to participate), you will be asked to first read and sign the informed consent form attached. Then we would like you to fill out the set of questionnaires within the large envelope. Some of the questions are about background information (e.g., education) and your health, and others are about your personality and beliefs. There are no right or wrong answers to these questions, and we are interested in knowing about your unique responses. However, you do not have to answer any questions that you may feel uncomfortable with. Completing the questionnaire generally takes about 45 minutes, and you may complete it here at the office, or bring it home to complete at a time that is more convenient for you. There are instructions enclosed about how to return the questionnaire to us when you are done.

Thank you for your interest in this study and for taking the time to read this information.

Your participation is greatly appreciated.

Sincerely,

Fuschia Sirois, M.A., B.Sc., Ph.D candidate
Department of Psychology
Carleton University
Principal Investigator

Mary Gick, Ph.D.
Department of Psychology
Carleton University
Faculty Sponsor

Health Beliefs Study

Would you like to participate in a study about how different people view their health?

We are interested in seeing if different people have different ideas about their health because of personality and/or health differences.

If you are interested in participating simply take one of the large envelopes below and read the letter inside titled "About this study" for more information. If after reading it you decide to participate, just sign the consent form enclosed and fill out the questionnaire within. It usually takes about 30 to 45 minutes to complete, and you can complete it here or take it home to complete. Full instructions for returning your questionnaire are provided in the questionnaire package. Your responses will remain confidential and your doctor will not have any access to the information you give.

We thank you for your interest,

Fuschia Sirois, M.A., Ph.D. candidate
Mary Gick, Ph.D.
Department of Psychology, Carleton University

CBI

The following statements concern different ideas that people have about their health. Some of these statements refer to your general state of health and others refer to specific times when you have experienced illness symptoms. Please read each statement carefully and answer according to how much you agree with each statement by circling a number from 1 to 6. Please answer according to following scale:

	1 strongly disagree	2 disagree	3 mildly disagree	4 mildly agree	5 agree	6 strongly agree
1. If I set my mind to it I can improve my health	1	2	3	4	5	6
2. People who take care of themselves stay healthy	1	2	3	4	5	6
3. I believe that I can do more to control my symptoms	1	2	3	4	5	6
4. My health depends on forces beyond my control	1	2	3	4	5	6
5. Regardless of circumstances, I can do things to improve my health	1	2	3	4	5	6
6. If I am lucky I will stay healthy	1	2	3	4	5	6
7. Taking control of my health condition means doing whatever I can to ease my symptoms	1	2	3	4	5	6
8. If I make the effort, I can manage my illness	1	2	3	4	5	6
9. When it comes to my health, I often feel unable to do what I know should be done	1	2	3	4	5	6
10. My family's health determines how healthy I will be	1	2	3	4	5	6
11. There are things that I can do to make my health problem easier to deal with	1	2	3	4	5	6
12. My health is determined by circumstances beyond my control	1	2	3	4	5	6
13. I am confident in my ability to make the right decisions about my health	1	2	3	4	5	6
14. You are either born with good health or not	1	2	3	4	5	6
15. It is my own actions that determine how healthy I am	1	2	3	4	5	6
16. I know that I can do what is necessary to improve my health	1	2	3	4	5	6
17. How soon I recover from an illness depends on how lucky I am	1	2	3	4	5	6
18. I am able to meet the challenge of following a healthy routine	1	2	3	4	5	6

19. The only way I can control my symptoms is by taking medication	1	2	3	4	5	6
20. People who experience illness are often victims of circumstances	1	2	3	4	5	6
21. My current state of health is a reflection of how I look after myself	1	2	3	4	5	6
22. If I am lucky my health will improve	1	2	3	4	5	6
23. I am confident that I could deal with any unexpected health problems	1	2	3	4	5	6
24. I will use whatever resources are necessary to improve my health	1	2	3	4	5	6
25. When facing a health problem, I often feel overwhelmed about what to do	1	2	3	4	5	6
26. I am certain that with effort I can improve my health	1	2	3	4	5	6
27. Even though there are things I can do to improve my health, I don't feel that I can do them	1	2	3	4	5	6
28. I am confident that I can successfully look after my health	1	2	3	4	5	6
29. How soon I recover from an illness depends on how I look after myself	1	2	3	4	5	6
30. If I do the right things I can make my symptoms more manageable	1	2	3	4	5	6
31. I can usually find several ways to deal with any health problem	1	2	3	4	5	6
32. My health depends on how I take care of myself	1	2	3	4	5	6

Rating Scale:

1	2	3	4	5	6
strongly disagree	disagree	mildly disagree	mildly agree	agree	strongly agree

CMI

The following are statements about how people feel about their health. Please read each statement carefully and answer according to how much you agree with each one. Indicate your answer by circling a number from 1 to 6 next to each statement according to following scale:

	1 strongly disagree	2 disagree	3 mildly disagree	4 mildly agree	5 agree	6 strongly agree
1. I am the one who makes the choices about my health					1 2 3 4 5 6	
2. Many people take their good health for granted					1 2 3 4 5 6	
3. I need to feel that I can influence my health					1 2 3 4 5 6	
4. When I have a health problem, I like to find out as much as I can about it						
					1 2 3 4 5 6	
5. If I didn't look after my health others would be upset with me					1 2 3 4 5 6	
6. I want to take responsibility for my own health					1 2 3 4 5 6	
7. I would feel guilty if I didn't do things to stay healthy					1 2 3 4 5 6	
8. Being as healthy as I can be is a worthwhile pursuit					1 2 3 4 5 6	
9. I like to know as much as possible about any health concern I have					1 2 3 4 5 6	
10. I prefer to let other people decide what is best for my health					1 2 3 4 5 6	
11. I hardly ever think about my health					1 2 3 4 5 6	
12. I like to feel that I am participating in the management of my health						
					1 2 3 4 5 6	
13. Taking care of my health has important consequences for many aspects of my life					1 2 3 4 5 6	
14. I have better things to do than to spend time on my health					1 2 3 4 5 6	
15. When it comes to my health, I enjoy making my own decisions					1 2 3 4 5 6	
16. It is easier to do what I am told to do about my health than to think about it myself					1 2 3 4 5 6	
17. There are few things as important as having good health					1 2 3 4 5 6	
18. When I have a health problem, I prefer to do something about it rather than sit by and let it continue					1 2 3 4 5 6	

19. I enjoy taking part in decisions about my health	1	2	3	4	5	6
20. Making sure that I am as healthy as I can be is an important goal for me	1	2	3	4	5	6
21. I dislike not having any say in what should be done about my health	1	2	3	4	5	6
22. Health and well-being are the most important concerns in my life	1	2	3	4	5	6
23. When I am ill, I prefer to let the illness take its own course	1	2	3	4	5	6
24. I would rather find information about a health issue on my own than leave it completely to someone else	1	2	3	4	5	6
25. I take my health seriously	1	2	3	4	5	6
26. There are many other things that are more important than health	1	2	3	4	5	6
27. Having and maintaining good health is a life-long goal for me	1	2	3	4	5	6
28. Often I will do things to improve my health to stop people from getting on my case	1	2	3	4	5	6
29. It is important that I feel like I am in control of my health	1	2	3	4	5	6
30. Any time I spend looking after my health is time well spent	1	2	3	4	5	6

Rating Scale:

1
strongly
disagree

2
disagree

3
mildly
disagree

4
mildly agree

5
agree

6
strongly agree

MCI

The following statements concern the different ways that people deal with their health. Please read each statement carefully and indicate how much you agree with each one by circling the corresponding number next to each statement. Use the following scale to answer:

	1	2	3	4	5	6
	strongly disagree	disagree	mildly disagree	mildly agree	agree	strongly agree
1. I know what is best for my health	1	2	3	4	5	6
2. My health should not be a burden to anyone else	1	2	3	4	5	6
3. When it comes to solving a health problem, I will involve others only if necessary	1	2	3	4	5	6
4. I feel uncomfortable having other people look after me when I am ill	1	2	3	4	5	6
5. Other people can't help me with my health so why bother asking	1	2	3	4	5	6
6. If my health improves it is because of the actions that I have taken	1	2	3	4	5	6
7. Other people's advice about how to deal with my health is always welcome	1	2	3	4	5	6
8. No one but me is going to keep me healthy	1	2	3	4	5	6
9. Only people who are weak ask others for help with their health problems	1	2	3	4	5	6
10. I may listen to what others have to say about my health but the final decision is always my own	1	2	3	4	5	6
11. I prefer to solve my health problems alone	1	2	3	4	5	6
12. I often find that I can solve my health problems by getting help from others	1	2	3	4	5	6
13. Nobody can look after my health as well as I can	1	2	3	4	5	6
14. I don't want to burden others with my health problems	1	2	3	4	5	6
15. I am usually the one that makes the decisions regarding my health	1	2	3	4	5	6
16. I don't bother asking others for help when I have a health problem because they usually can't help me anyways	1	2	3	4	5	6
17. I am the best person to manage my health	1	2	3	4	5	6
18. I feel more comfortable looking after others when they are ill than having others look after me if I am sick	1	2	3	4	5	6
19. I find that other people usually have good advice for me regarding my health	1	2	3	4	5	6

20. I avoid asking others for help with my health problems	1	2	3	4	5	6
21. I enjoy working with others to improve my health	1	2	3	4	5	6
22. Asking for help with a health problem is a sign of weakness	1	2	3	4	5	6

General Information

Sex: (please check one) Female ☐ Male ☐ Other (e.g. transgender) ☐

Age: _____

Are you a full-time ☐ or part-time ☐ student? (please check one)

What year of University are you in? (circle one) 1st 2nd 3rd 4th

Where do you currently live? (please check one)

- ☐ Carleton University residence ☐ Off campus housing with an intimate other
☐ Off campus housing shared with other student(s) ☐ Off campus housing by myself
☐ Off campus with family members (e.g., parents) ☐ Other (please describe) _____

What is your first language? _____

What is the ethnic/racial group that you most identify with? (For example: Caucasian, French Canadian, Italian, East Indian, etc.)

ethnic/racial background : _____

What is your relationship status? (please check the one that applies best to you)

- ☐ Living with an intimate other/Married
☐ Dating, seeing one or more persons
☐ Single, and not seeing anyone

Are you currently employed full-time ☐ part-time ☐ not at all ☐

Financially, would you say that you are

- comfortable, don't worry too much about money ☐
making ends meet, getting by ☐
struggling a lot, have some immediate financial concerns ☐

Have you been diagnosed with any psychiatric or mental health conditions?
(e.g., clinical depression, anxiety, panic attacks, etc.)

No ☐ Yes ☐

If yes, please list all _____

Are you taking any prescription medications as part of this treatment? No ☐ Yes ☐

If yes, please specify all _____

Brief Health History

The following is a list of illnesses and physical health problems that can occur for a short period of time (acute), or can repeatedly occur over a longer period of time (chronic). **Please indicate which ones you are currently experiencing, or can remember experiencing in the past six months. Circle "YES" if you have experienced a problem and "NO" if you have not.**

For those illnesses/physical problems that you answered YES to, please indicate how recently you experienced the problem by circling the number corresponding to the time when you most recently experienced the problem. Also, please indicate how unpleasant the problem was for you by circling the letter that corresponds to how much the problem bothered you.

Rating Scales

When you experienced the problem:

- 1 = currently experiencing this problem
- 2 = within the last week
- 3 = within the last month
- 4 = within the last 3 months
- 5 = within the last 6 months

How much the problem is bothering you:

- A = mildly bothered by this problem
- B = moderately bothered by this problem
- C = very much bothered by this problem
- D = extremely bothered by this problem

For example if you experienced Allergies within the last month and they bothered you very much, your response would look like this:

Allergies	YES	NO	If YES, then circle here	1	2	3	4	5	A	B	C	D
-----------	-----	----	-----------------------------	---	---	---	---	---	---	---	---	---

<u>Acute or transitory health problems you</u>	<u>Illness/problem experienced</u>	<u>If YES indicate when you most recently experienced the problem</u>	<u>And indicate how much this problem bothered</u>
Back problems	YES NO	If YES, then circle here	1 2 3 4 5 A B C D
Sprains or muscle strains	YES NO	If YES, then circle here	1 2 3 4 5 A B C D
Headache	YES NO	If YES, then circle here	1 2 3 4 5 A B C D
Heart problems &/or high blood pressure	YES NO	If YES, then circle here	1 2 3 4 5 A B C D
Acute digestive problems (constipation, heartburn, etc.)	YES NO	If YES, then circle here	1 2 3 4 5 A B C D
Allergies	YES NO	If YES, then circle here	1 2 3 4 5 A B C D
Skin problems/rashes, eczema	YES NO	If YES, then circle here	1 2 3 4 5 A B C D
Insomnia	YES NO	If YES, then circle here	1 2 3 4 5 A B C D

Appendix G – Study 3 Materials

GPSE

Please read the following statements and answer each as they apply to you in general. For each statement circle the number that corresponds to your response.

1 = Not at all true 2 = Hardly true 3 = Moderately true 4 = Exactly true

1	I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
2	If someone opposes me, I can find the means and ways to get what I want.	1	2	3	4
3	It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
4	I am confident that I could deal efficiently with unexpected events.	1	2	3	4
5	Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
6	I can solve most problems if I invest the necessary effort.	1	2	3	4
7	I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
8	When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
9	If I am in trouble, I can usually think of a solution.	1	2	3	4
10	I can usually handle whatever comes my way.	1	2	3	4

M-C SDS 1

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is **true** or **false** as it pertains to you personally. For each item, please circle **T** if the statement is true for you and **F** if the statement is false for you.

T	F	1. I'm always willing to admit it when I make a mistake
T	F	2. At times I have really insisted on having things my own way
T	F	3. I never resent being asked to return a favor
T	F	4. I have never been irritated when people expressed ideas very different
from my own
T	F	5. I sometimes try to get even rather than forgive and forget
T	F	6. I like to gossip at times
T	F	7. There have been occasions when I took advantage of someone
T	F	8. I have never deliberately said something that hurt someone's feelings
T	F	9. I always try to practice what I preach
T	F	10. There have been occasions when I felt like smashing things.

SDS

Instructions: Please read the pairs of statements, one pair at a time, and think about which statement within the pair seems more true to you at this point in your life. Indicate the degree to which statement A feels true, relative to the degree that Statement B feels true, on the 5-point scale shown after each pair of statements. If statement A feels completely true and statement B feels completely untrue, the appropriate response would be 1. If the two statements are equally true, the appropriate response would be a 3. If only statement B feels true And so on.

1. A. I always feel like I choose the things I do.

B. I sometimes feel that it's not really me choosing the things I do.

Only A feels true 1 2 3 4 5 **Only B feels true**

2. A. My emotions sometimes seem alien to me.

B. My emotions always seem to belong to me.

Only A feels true 1 2 3 4 5 **Only B feels true**

3. A. I choose to do what I have to do.

B. I do what I have to, but I don't feel like it is really my choice.

Only A feels true 1 2 3 4 5 **Only B feels true**

4. A. I feel that I am rarely myself.

B. I feel like I am always completely myself.

Only A feels true 1 2 3 4 5 **Only B feels true**

5. A. I do what I do because it interests me.

B. I do what I do because I have to.

Only A feels true 1 2 3 4 5 **Only B feels true**

6. A. When I accomplish something, I often feel it wasn't really me who did it.

B. When I accomplish something, I always feel it's me who did it.

Only A feels true 1 2 3 4 5 **Only B feels true**

7. A. I am free to do whatever I decide to do.

B. What I do is often not what I'd choose to do.

Only A feels true 1 2 3 4 5 **Only B feels true**

8. A. My body sometimes feels like a stranger to me.

B. My body always feels like me.

Only A feels true 1 2 3 4 5 **Only B feels true**

9. A. I feel pretty free to do whatever I choose to.

B. I often do things that I don't choose to do.

Only A feels true 1 2 3 4 5 **Only B feels true**

10. A. Sometimes I look into the mirror and see a stranger.

B. When I look into the mirror I see myself.

Only A feels true 1 2 3 4 5 **Only B feels true**

BSRI

For each of the following items, rate yourself on how much the characteristic describes you. Use the following scale to indicate your answers by filling a number for each characteristic:

- 1 = Never or almost never true
 2 = Usually not true
 3 = Sometimes but infrequently true
 4 = Occasionally true
 5 = Often true
 6 = Usually true
 7 = Always or almost always true

1. self-reliant	1	2	3	4	5	6	7
2. yielding	1	2	3	4	5	6	7
3. helpful	1	2	3	4	5	6	7
4. defends own beliefs	1	2	3	4	5	6	7
5. cheerful	1	2	3	4	5	6	7
6. moody	1	2	3	4	5	6	7
7. independent	1	2	3	4	5	6	7
8. shy	1	2	3	4	5	6	7
9. conscientious	1	2	3	4	5	6	7
10. athletic	1	2	3	4	5	6	7
11. affectionate	1	2	3	4	5	6	7
12. theatrical	1	2	3	4	5	6	7
13. assertive	1	2	3	4	5	6	7
14. flatterable	1	2	3	4	5	6	7
15. happy	1	2	3	4	5	6	7
16. strong personality	1	2	3	4	5	6	7
17. loyal	1	2	3	4	5	6	7
18. unpredictable	1	2	3	4	5	6	7
19. forceful	1	2	3	4	5	6	7
20. feminine	1	2	3	4	5	6	7

21. reliable	1	2	3	4	5	6	7
22. analytical	1	2	3	4	5	6	7
23. sympathetic	1	2	3	4	5	6	7
24. jealous	1	2	3	4	5	6	7
25. has leadership abilities							
	1	2	3	4	5	6	7
26. sensitive to the needs of others							
	1	2	3	4	5	6	7
27. truthful	1	2	3	4	5	6	7
28. willing to take risks	1	2	3	4	5	6	7
29. understanding	1	2	3	4	5	6	7
30. secretive	1	2	3	4	5	6	7
31. makes decisions easily							
	1	2	3	4	5	6	7
32. compassionate	1	2	3	4	5	6	7
33. sincere	1	2	3	4	5	6	7
34. self-sufficient	1	2	3	4	5	6	7
35. eager to soothe hurt feelings							
	1	2	3	4	5	6	7
36. conceited	1	2	3	4	5	6	7
37. dominant	1	2	3	4	5	6	7
38. soft spoken	1	2	3	4	5	6	7
39. likable	1	2	3	4	5	6	7
40. masculine	1	2	3	4	5	6	7
41. warm	1	2	3	4	5	6	7
42. solemn	1	2	3	4	5	6	7

43. willing to take a stand

1 2 3 4 5 6 7

44. tender 1 2 3 4 5 6 7

45. friendly 1 2 3 4 5 6 7

46. aggressive 1 2 3 4 5 6 7

47. gullible 1 2 3 4 5 6 7

48. inefficient 1 2 3 4 5 6 7

49. acts as a leader 1 2 3 4 5 6 7

50. childlike 1 2 3 4 5 6 7

51. adaptable 1 2 3 4 5 6 7

52. individualistic 1 2 3 4 5 6 7

53. does not use harsh language

1 2 3 4 5 6 7

54. unsystematic 1 2 3 4 5 6 7

55. competitive 1 2 3 4 5 6 7

56. loves children 1 2 3 4 5 6 7

57. tactful 1 2 3 4 5 6 7

58. ambitious 1 2 3 4 5 6 7

59. gentle 1 2 3 4 5 6 7

60. conventional 1 2 3 4 5 6 7

I-E Scale

Instructions:

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. **Please select the one statement of each pair (and only one) which you more strongly believe to be the case** as far as you are concerned. Indicate your choice by circling the appropriate letter (a or b). Be sure to select the one you actually believe to be more true rather than the one you would like to be true. This is a measure of personal beliefs; obviously, there are no right or wrong answers. In some instances, you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you are concerned.

I more strongly believe that:

1.
 - a. Children get into trouble because their parents punish them too much.
 - b. The trouble with most children nowadays is that their parents are too easy with them.
2.
 - a. Many of the unhappy things in people's lives are partly due to bad luck.
 - b. People's misfortunes result from the mistakes they make.
3.
 - a. One of the major reasons why we have wars is because people don't take enough interest in politics.
 - b. There will always be wars, no matter how hard people try to prevent them.
4.
 - a. In the long run people get the respect they deserve in this world.
 - b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he or she tries.
5.
 - a. The idea that teachers are unfair to students is nonsense.
 - b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6.
 - a. Without the right breaks one cannot be an effective leader.
 - b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7.
 - a. No matter how hard you try some people just don't like you.
 - b. People who can't get others to like them don't understand how to get along with others.
8.
 - a. Heredity plays the major role in determining one's personality.
 - b. It is one's experiences in life which determine what they're like.
9.
 - a. I have often found that what is going to happen will happen.
 - b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10.
 - a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
 - b. Many times exam questions tend to be so unrelated to course work that studying is really useless.
11.
 - a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
 - b. Getting a good job depends mainly on being in the right place at the right time.
12.
 - a. The average citizen can have an influence in government decisions.
 - b. This world is run by the few people in power, and there is not much the little people can do about it.
13.
 - a. When I make plans, I am almost certain that I can make them work.
 - b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14.
 - a. There are certain people who are just no good.
 - b. There is some good in everybody.
15.
 - a. In my case getting what I want has little or nothing to do with luck.
 - b. Many times we might just as well decide what to do by flipping a coin.

16.
 - a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
 - b. Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
17.
 - a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
 - b. By taking an active part in political and social affairs the people can control world events.
18.
 - a. Most people can't realize the extent to which their lives are controlled by accidental happenings.
 - b. There really is no such thing as "luck."
19.
 - a. One should always be willing to admit his or her mistakes.
 - b. It is usually best to cover up one's mistakes.
20.
 - a. It is hard to know whether or not a person really likes you.
 - b. How many friends you have depends upon how nice a person you are.
21.
 - a. In the long run, the bad things that happen to us are balanced by the good ones.
 - b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
22.
 - a. With enough effort, we can wipe out political corruption.
 - b. It is difficult for people to have much control over the things politicians do in office.
23.
 - a. Sometimes I can't understand how teachers arrive at the grades they give.
 - b. There is a direct connection between how hard I study and the grades I get.
24.
 - a. A good leader expects people to decide for themselves what they should do.
 - b. A good leader makes it clear to everybody what their jobs are.

- 25.
- a. Many times, I feel that I have little influence over the things that happen to me.
 - b. It is impossible for me to believe that chance or luck plays an important role in my life.
- 26.
- a. People are lonely because they don't try to be friendly.
 - b. There is not much use in trying too hard to please people; if they like you, they like you.
- 27.
- a. There is too much emphasis on athletics in high school.
 - b. Team sports are an excellent way to build character.
- 28.
- a. What happens to me is my own doing.
 - b. Sometimes I feel that I don't have enough control over the direction my life is taking.
- 29.
- a. Most of the time, I can't understand why politicians behave the way they do.
 - b. In the long run, the people are responsible for bad government on a national as well as on a local level.
-

DCS

Below you will find a series of statements. Please read each statement carefully and respond to it by expressing the extent to which you believe the statement applies to you. For all items a response from 1 to 7 is required. Use the number that best reflects your belief with the numbers defined as follows:

1. Does not apply to me at all	4. Applies to me about half the time
2. Usually doesn't apply to me	5. Applies more often than not
3. Often does not apply to me	6. Usually applies to me
	7. Always applies to me

-
1. I prefer a job where I have a lot of control over what I do and when I do it. _____
 2. I enjoy political participation because I want to have as much say in running government as possible. _____
 3. I try to avoid situations where someone else tells me what to do. _____
 4. I would prefer to be a leader rather than a follower. _____
 5. I enjoy being able to influence the actions of others. _____
 6. I am careful to check everything on an automobile before I leave for a long trip. _____
 7. Others usually know what is best for me. _____
 8. I enjoy making my own decisions. _____
 9. I enjoy having control over my own decisions. _____
 10. I would rather someone else took over the leadership role when I'm involved in a group project _____
 11. I consider myself to be generally more capable of handling situations than others are. _____
 12. I'd rather run my own business and make my own mistakes than listen to someone else's orders. _____
 13. I like to get a good idea of what a job is all about before I begin. _____
 14. When I see a problem I prefer to do something about it rather than sit by and let it continue. _____
 15. When it comes to orders, I would rather give them than receive them. _____
 16. I wish I could push many of life's daily decisions off on someone else. _____
 17. When driving, I try to avoid putting myself in a situation where I could be hurt by someone else's mistakes. _____
 18. I prefer to avoid situations where someone else has to tell me what it is I should be doing. _____
 19. There are many situations in which I would prefer only one choice rather than having to make decisions. _____
 20. I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered by it. _____

Appendix H
Study 4 – student recruitment materials

Health Beliefs and Well-being

49.101/49.102 Experiment Sign-up

Experiment title:	Health Beliefs and Well-being
Experimenter's name:	Fuschia Sirois, Ph.D. candidate
Phone number:	520-2600, Ext. 3781
Location of experiment:	A503 Loeb
Faculty Advisor:	Mary Gick, Ph.D.

Brief Description

We are looking for people interested in participating in a study on health beliefs and well-being. We are interested in exploring the different attitudes that people have towards their health and how this relates to their self-perceptions and quality of life. This study involves completing several questionnaires related to your well-being, your health, and your beliefs about health. The first session is approximately 30 to 45 minutes and **you will receive 1 experimental credit for your participation.** If you choose, you can also make arrangements to **complete the second part of the experiment at a later date and receive an additional credit, for a total of 2 experimental credits.** If you are interested, please sign up below by including your initials, phone number, and the best time to call. We will contact you to set up a convenient time to complete the experiment. Thanks in advance for your participation!

**PARTICIPANTS WILL RECEIVE 1 CREDIT FOR THIS EXPERIMENT
AND CAN ALSO COMPLETE AN OPTIONAL FOLLOW-UP EXPERIMENT
FOR A TOTAL OF 2 CREDITS**

YOU MUST KEEP A RECORD OF:	THE EXPERIMENTER'S NAMES TITLE OF THE EXPERIMENT EXPERIMENT LOCATION AND TIME
-----------------------------------	--

Informed Consent Form

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Health Beliefs and Well-being

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical or other concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664) or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

Purpose. The purpose of this study is to look at how attitudes towards health are related to well-being. We are interested in exploring the different attitudes that people have towards their health and how this relates to their self-perceptions and quality of life.

Task requirements. This study involves completing a questionnaire package that includes background questionnaires about you and your health, as well as some personality, well-being, and health belief questionnaires. Some of these contain personal information about your physical and mental health.

Duration and locale. The experimental session will last approximately 30 to 45 minutes. Testing will take place in Room A500C of the Loeb Building, Carleton University. Testing may possibly occur in small groups.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks. You may experience some mild distress or discomfort when thinking about your health problems.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. You have the right to withdraw from the experiment at any time, or to not answer any questions, without academic penalty.

Signatures

I have read the above description of the Health Beliefs and Well-being study and understand the conditions of my participation. My signature indicates that I agree to participate in the experiment.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Beliefs about health are often related to how people choose to deal with their health problems, which in turn can influence overall well-being. Some of these beliefs may involve perceptions of control and how this relates to health. Health control perceptions can involve many different aspects of control such as beliefs about control, desire to be in control over one's health, and the different ways that people exercise control over their health (e.g., mostly alone or by involving others). Because we are in the process of developing a new measure for assessing health-related control beliefs we wanted to see how the statements designed to reflect certain aspects of control over health are related to your self perceptions, and your well-being (mood, satisfaction with relationships, outlook). The questionnaires that you completed about your beliefs towards health, your self-perceptions, and your general well-being will help us examine these relationships and determine if the statements we chose reflect these beliefs accurately.

Additionally, control over health may be perceived differently by different people. For example people who are not currently experiencing health problems may view control over health as staying healthy and illness free whereas people who are currently experiencing health problems may view control over health as managing their illness. We asked you some personal questions about your health to see if your current state of health affects your perceptions of what control over health means.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); or Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664). Should you have any other concerns about this study then please contact Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you might wish to contact the Health and Counseling Services at 520-6674.

Appendix I
Study 4 – General survey materials

General Information

Age: Sex: ☐ Female ☐ Male

What is your highest level of education?

☐ some high school ☐ high school graduate ☐ some graduate school	☐ some college or university ☐ college/university graduate ☐ graduate degree
---	---

Are you currently employed:

☐ full-time
 ☐ part-time
 ☐ not at all
 ☐ retired
 ☐ disabled

What is your first language? _____ What is your racial background?

What is your relationship status? (please check the one that applies best to you)

☐	Married/Living with an intimate other	☐	Never married
☐	Separated/Divorced	☐	Widowed

Have you been diagnosed with any psychiatric or mental health conditions? No ☐ Yes ☐
 []
 (e.g., clinical depression, anxiety, panic attacks, etc.)

If yes, please list all

Self Description Questionnaire

The statements below reflect thoughts that people often have about themselves. Some of these statements may be characteristic of your own thoughts, while others may not be. Please check the box to the right of each statement that indicates the extent to which that particular statement is characteristic of you. Please respond honestly to all of the statements. There are no right or wrong ratings. Your responses will remain confidential.

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

LOT-R

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer. For each statement circle that letter next to each statement that corresponds to how much you agree or disagree with each statement.

	I agree a lot	I agree a little	I neither agree nor disagree	I DISagree a little	I DISagree a lot
1. In uncertain times, I usually expect the best.					
2. It's easy for me to relax.					
3. If something can go wrong for me, it will.					
4. I'm always optimistic about my future.					
5. I enjoy my friends a lot.					
6. It's important for me to keep busy.					
7. I hardly ever expect things to go my way.					
8. I don't get upset too easily.					
9. I rarely count on good things happening to me.					
10. Overall, I expect more good things to happen to me than bad.					

Relationship Styles

The following statements describe the different feelings people can have about close relationships. Please read each statement and circle the number that reflects how you typically feel towards your romantic partner or spouse in general. If you do not have a romantic partner or spouse then answer according to how you feel towards a close friend or family member.

1	2	3	4	5	6	7
STRONGLY DISAGREE	DISAGREE	MILDLY DISAGREE	NEITHER AGREE NOR DISAGREE	MILDLY AGREE	AGREE	STRONGLY AGREE
1. I find it relatively easy to get close to others	1	2	3	4	5	6 7
2. I'm not very comfortable having to depend on other people	1	2	3	4	5	6 7
3. I'm comfortable having others depend on me	1	2	3	4	5	6 7
4. I rarely worry about being abandoned by others	1	2	3	4	5	6 7
5. I don't like people getting too close to me	1	2	3	4	5	6 7
6. I'm somewhat uncomfortable being too close to others	1	2	3	4	5	6 7
7. I find it difficult to trust others completely	1	2	3	4	5	6 7
8. I'm nervous whenever anyone gets too close to me	1	2	3	4	5	6 7
9. Others often want me to be more intimate than I feel comfortable being	1	2	3	4	5	6 7
10. Others often are reluctant to get as close as I would like	1	2	3	4	5	6 7
11. I often worry that my partner(s) don't really love me	1	2	3	4	5	6 7
12. I rarely worry about my partner(s) leaving me	1	2	3	4	5	6 7
13. I often want to merge completely with others, and this desire sometimes scares them away	1	2	3	4	5	6 7

WBI

Please indicate approximately how often you currently perform the behaviours listed below by checking the appropriate box for each item. Think about how often you do these things in general right now, that is over the **past 2 weeks**.

	less than once a week or never	one day a week	2–3 days a week	4–5 days a week	every day of the week
1. I eat breakfast					
2. I get a good night's sleep, for example, uninterrupted, restful sleep					
3. I drink 2 or more caffeinated beverages, such as coffee, tea or colas					
4. I exercise for 20 continuous minutes or more, to the point of perspiration					
5. I eat at least 3 meals a day					
6. I take time to relax					
7. I eat fresh fruits and/or vegetables					
8. I walk as much as possible, for example, I take the stairs not the elevator, etc.					
9. I take vitamins					
10. I eat junk foods, such as chips, candy/candy bars, French fries, etc.					
11. I eat healthy, well-balanced meals					
12. I take natural supplements, such as garlic pills, Echinacea, herbals, etc.					

Big Five Factor Inventory

I see myself as someone who . . .

Instructions: For each of the 44 characteristics listed below, rate how descriptive each characteristic is of you using the scale from 1 to 5 as shown below:

1	2	3	4	5
Disagree strongly	Disagree a little	Neither Agree or disagree	Agree a little	Agree strongly

I see myself as someone who . . .

1. Is talkative _____
2. Tends to find fault with others _____
3. Does a thorough job _____
4. Is depressed, blue _____
5. Is original, comes up with new ideas _____
6. Is reserved _____
7. Is helpful and unselfish with others _____
8. Can be somewhat careless _____
9. Is relaxed, handles stress well _____
10. Is curious about many different things _____
11. Is full of energy _____
12. Starts quarrels with others _____
13. Is a reliable worker _____
14. Can be tense _____
15. Is ingenious, a deep thinker _____
16. Generates a lot of enthusiasm _____
17. Has a forgiving nature _____
18. Tends to be disorganized _____
19. Worries a lot _____
20. Has an active imagination _____
21. Tends to be quiet _____
22. Is generally trusting _____ | 23. Tends to be lazy _____
24. Is emotionally stable, not easily upset _____
25. Is inventive _____
26. Has an assertive personality _____
27. Can be cold and aloof _____
28. Perseveres until the task is finished _____
29. Can be moody _____
30. Values artistic, aesthetic experiences _____
31. Is sometimes shy, inhibited _____
32. Is considerate and kind to almost everyone _____
33. Does things efficiently _____
34. Remains calm in tense situations _____
35. Prefers work that is routine _____
36. Is outgoing, sociable _____
37. Is sometimes rude to others _____
38. Makes plans and follows through with them _____
39. Gets nervous easily _____
40. Likes to reflect, play with ideas _____
41. Has few artistic interests _____
42. Likes to cooperate with others _____
43. Is easily distracted _____
44. Is sophisticated in art, music, or literature _____ |
|--|---|

Appendix J – Arthritis sample recruitment materials

Informed Consent Form

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Health Beliefs and Well-being: Living with Arthritis

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664), or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

Purpose. The purpose of this study is to look at how attitudes towards health are related to well-being. We are interested in exploring the different attitudes that people have towards their health and how these attitudes relate to self-perceptions and coping with arthritis.

Task requirements. This study involves completing a questionnaire package that includes background questionnaires about you and your health, as well as some self perception, well-being, and health belief questionnaires. We will also ask you about the challenges of living with arthritis and what you do to cope with these challenges. Some of these questions contain personal information about your physical and mental health.

Duration and locale. The questionnaire takes approximately 30 to 45 minutes to complete. You may complete the questionnaire package at a location of your convenience and return the questionnaire by mail with the pre-addressed postage paid envelope provided.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks. Some people may experience some mild distress or discomfort when thinking about their health problems.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. Your participation in this study is voluntary and you have the right to withdraw from the study at any time, or to not answer any questions.

Signatures

I have read the above description of the Health Beliefs and Well-being study and understand the conditions of my participation. My signature indicates that I agree to participate in the study.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Beliefs about health are often related to how people choose to deal with their health problems, which in turn can influence overall well-being. Some of these beliefs may involve perceptions of control and how this relates to health. Health control perceptions can involve many different aspects of control such as beliefs about control, desire to be in control over one's health, and the different ways that people exercise control over their health (e.g., mostly alone or by involving others). Because we are in the process of developing a new measure for assessing health-related control beliefs we wanted to see how the statements designed to reflect certain aspects of control over health are related to your self-perceptions, and your well-being (mood, satisfaction with relationships, outlook). The questionnaires that you completed about your beliefs towards health, your self-perceptions, and your general well-being will help us examine these relationships and determine if the statements we chose reflect these beliefs accurately.

Additionally, control over health may be perceived differently by different people. For example people who are not currently experiencing health problems may view control over health as staying healthy and illness free. In contrast, people who are currently experiencing health problems such as arthritis may view control over health as living life as fully as possible while simultaneously managing the symptoms of their illness. We asked you some personal questions about your health and well-being to see if your current state of health affects your perceptions of what control over health means. We also asked some questions about how you cope with arthritis and your self-perceptions of living with arthritis to better understand what leads to successful coping with arthritis.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); or Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664), or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you may wish to contact your family doctor.

Would you be interested in being contacted in the future to take part in a follow-up study?

If so, please check 'Yes' below and provide your contact information. This does not mean that you are signing up for a future study. Checking 'Yes' means that we will contact you at a later date to see if you are interested in participating in further research.

YES _____ NO _____

If YES, please provide contact information:

phone _____ OR email _____

Please return this page with your completed questionnaire.

About this study

In this study we are interested in how attitudes towards health are related to well-being and adjustment to arthritis. Your participation in this study will contribute to a better understanding of these relationships, and may provide insight into how different beliefs about health influence the things people do to cope with arthritis. This research is part of a series of studies towards a doctoral thesis by the principal investigator.

All information you provide in this research will not be shared with anyone. Only researchers directly involved with this study will be allowed to access any information that you give. This information will be identified only by your code number and not your name. If a report of this study is sent to a scientific journal, all information will reflect group information rather than any information about specific individuals.

If you decide to participate in this study (you must be 18 or older to participate), you will be asked to first read and sign the informed consent form attached. Then we would like you to fill out the set of questionnaires within the large envelope. Some of the questions are about your general information and your health, and others are about your well-being and health beliefs. There are no right or wrong answers to these questions. However, you do not have to answer any questions that you may feel uncomfortable with. Completing the questionnaire generally takes about 30 to 45 minutes, and you may complete it here, or bring it home to complete at a time that is more convenient for you. There are instructions enclosed about how to return the questionnaire to us when you are done.

Thank you for your interest in this study and for taking the time to read this information.

Your participation is greatly appreciated.

Sincerely,

Fuschia Sirois, M.A., B.Sc., Ph.D candidate
Department of Psychology
Carleton University
Principal Investigator

Mary Gick, Ph.D.
Department of Psychology
Carleton University
Faculty Sponsor

Appendix K

Proportions of specific disease types for the arthritis and inflammatory bowel disease samples.

Sample	Type of chronic illness	% of sample (<i>n</i>)
Arthritis (<i>n</i> = 336)		
	Rheumatoid arthritis	40.6 (136)
	Osteoarthritis	14.9 (50)
	Psoriatic arthritis	13.7 (46)
	Ankylosing spondylitis	9.2 (31)
	Fibromyalgia	8.9 (30)
	Systemic lupus erthematosis	3.9 (13)
	Reiter's syndrome	2.4 (8)
	Scleroderma	1.2 (4)
	Gout	0.3 (1)
	Other	5.1 (17)
Inflammatory Bowel Disease (<i>n</i> = 290)		
	Crohn's disease	64.5 (187)
	Ulcerative colitis	27.6 (80)
	Other (microscopic/collageneous/lymphocytic colitis, diverticulitis, undifferentiated IBD)	7.9 (23)

Appendix L

Study 4 – IBD sample recruitment materials

Informed Consent Form

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Health Beliefs and Well-being: Living with Inflammatory Bowel Disease

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664, or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

Purpose. The purpose of this study is to look at how attitudes towards health are related to well-being and adjustment to chronic illness. We are interested in exploring the different attitudes that people have towards their health and how these attitudes relate to self-perceptions and coping with inflammatory bowel disease.

Task requirements. This study involves completing a questionnaire package that includes background questionnaires about you and your health, as well as some self-perception, well-being, and health belief questionnaires. We will also ask you about the challenges of living with inflammatory bowel disease and what you do to cope with these challenges. Some of these questions contain personal information about your physical and mental health.

Duration and locale. The questionnaire takes approximately 30 to 45 minutes to complete. You may complete the questionnaire package at a location of your convenience and return the questionnaire by mail with the pre-addressed postage paid envelope provided.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks. Some people may experience some mild distress or discomfort when thinking about their health problems.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. Your participation in this study is voluntary and you have the right to withdraw from the study at any time, or to not answer any questions.

Signatures

I have read the above description of the Health Beliefs and Well-being study and understand the conditions of my participation. My signature indicates that I agree to participate in the study.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Beliefs about health are often related to how people choose to deal with their health problems, which in turn can influence overall well-being. Some of these beliefs may involve perceptions of control and how this relates to health. Health control perceptions can involve many different aspects of control such as beliefs about control, desire to be in control over one's health, and the different ways that people exercise control over their health (e.g., mostly alone or by involving others). Because we are in the process of developing a new measure for assessing health-related control beliefs we wanted to see how the statements designed to reflect certain aspects of control over health are related to your self-perceptions, and your well-being (mood, satisfaction with relationships, outlook). The questionnaires that you completed about your beliefs towards health, your self-perceptions, and your general well-being will help us examine these relationships and determine if the statements we chose reflect these beliefs accurately.

Additionally, control over health may be perceived differently by different people. For example people who are not currently experiencing health problems may view control over health as staying healthy and illness free. In contrast, people who are currently experiencing health problems such as inflammatory bowel disease (IBD) may view control over health as living life as fully as possible while simultaneously managing the symptoms of their illness. We asked you some personal questions about your health and well-being to see if your current state of health affects your perceptions of what control over health means. We also asked some questions about how you cope with IBD and your self-perceptions of living with IBD to better understand what leads to successful coping with IBD.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, 520-2600, ext. 3781); or Dr. M. Gick (Faculty Sponsor, 520-2600, ext. 2664). Should you have any ethical concerns about this study then please contact Dr. M. Gick, Chair, Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 2664, or Dr. K. Matheson (Chair, Dept. of Psychology, 520-2600, ext. 2648).

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you may wish to contact your family doctor.

Health Beliefs and Well-being Study: Living with IBD

Do you have Inflammatory Bowel Disease?

Would you like to participate in a study about how people
cope with Crohn's Disease and Ulcerative Colitis?

We are a doctoral student (Fuschia Sirois) and a Psychology professor (Mary Gick) interested in understanding how people cope with inflammatory bowel disease (IBD). Both of us live with a chronic disease, and one of us has inflammatory bowel disease. We are interested in exploring the different attitudes that people have towards their health and how these attitudes relate to self-perceptions and coping with IBD. The study involves filling out a survey that takes about 30 to 45 minutes to complete.

If you are interested in participating simply take one of the large envelopes below and read the letter inside titled "About this study" for more information. If after reading it you decide to participate, just sign the consent form enclosed and fill out the questionnaire within. You can complete it here or take it home to complete. Full instructions for returning your questionnaire are provided in the questionnaire package. Your responses will remain confidential and only the researchers involved will have access to the information you give.

We thank you for your interest,

Fuschia Sirois, M.A., Ph.D. candidate
Mary Gick, Ph.D.
Department of Psychology, Carleton University
Phone: 520-2600, ext. 3781.

Appendix M

Study 4 – IBD and Arthritis survey materials

3. Please indicate how well you feel you have been dealing with the different aspects of your condition in general by checking a box for each question.

	Strongly Disagree	Disagree	Mildly Disagree	Agree	Strongly Agree
a) I am successfully coping with the symptoms of my condition					
b) I am successfully coping with the day to day problems that living with my condition creates					
c) I am successfully coping with the emotional aspects of my condition					

Brief Health History

This section deals with health issues you have experienced that are either temporary or over a short period of time (acute), or that can repeatedly occur over a longer period of time (chronic).

ACUTE OR TRANSITORY HEALTH PROBLEMS:

Please indicate which ones you are currently experiencing, or can remember experiencing within the **past six months**. – **please check all that apply**

☐	Back problems	☐	Insomnia	☐	Allergies
☐	Sprains or muscle strains	☐	Infections	☐	Skin problems/rashes
☐	Headache	☐	Flu, cold or fever	☐	Reproductive/menstrual problems
☐	Acute digestive problems (constipation, heartburn, etc.)	☐	Dental problems	☐	Other acute problems: please specify e.g., bone fractures, etc.

CHRONIC OR RECURRING HEALTH PROBLEMS:

Please indicate which of the following health issues you have been diagnosed with – check all that apply under ‘YES’. For those problems you do have please indicate how much this problem or its symptoms has bothered you in the **past month** by checking the appropriate box.

YES		mildly bothered	moderately bothered	very much bothered	extremely bothered
☐	Chronic migraines or headaches	☐	☐	☐	☐
☐	Heart disease &/or high blood pressure	☐	☐	☐	☐
☐	Asthma	☐	☐	☐	☐
☐	Diabetes	☐	☐	☐	☐
☐	Cancer	☐	☐	☐	☐
☐	Arthritis (including Lupus, Sjogren's, etc.)	☐	☐	☐	☐
☐	Fibromyalgia	☐	☐	☐	☐
☐	Inflammatory Bowel Disease (Crohn's disease, Ulcerative colitis)	☐	☐	☐	☐
☐	Liver disease	☐	☐	☐	☐
☐	Lung Disease	☐	☐	☐	☐
☐	Kidney Disease	☐	☐	☐	☐
☐	Other chronic illness:	☐	☐	☐	☐

Do you have a physical disability? NO [☐] YES [☐]

If YES, please list: _____

ICQ

Below is a list of statements of people with a long-term illness. Please indicate **the extent to which you agree** with these statements by circling one of the numbers following the statement that corresponds to your answer. Use the following scale to answer:

1	2	3	4
not at all	somewhat	to a large extent	completely

Do not spend too much time considering your answer. Your first impression is usually the best.

1. Because of my illness I miss the things I like to do the most.	1	2	3	4
2. I can handle the problems related to my illness.	1	2	3	4
3. I have learned to live with my illness.	1	2	3	4
4. Dealing with my illness has made me stronger.	1	2	3	4
5. My illness controls my life.	1	2	3	4
6. I have learned a great deal from my illness.	1	2	3	4
7. My illness makes me feel useless at times.	1	2	3	4
8. My illness has made life more precious to me.	1	2	3	4
9. My illness prevents me from doing what I would really like to do.	1	2	3	4
10. I have learned to accept the limitations imposed by my illness.	1	2	3	4
11. Looking back, I can see that my illness has also brought about some positive changes in my life.	1	2	3	4
12. My illness limits me in everything I do.	1	2	3	4
13. I can accept my illness well.	1	2	3	4
14. I think I can handle the problems related to my illness, even if the illness gets worse.	1	2	3	4
15. My illness frequently makes me feel helpless.	1	2	3	4
16. My illness has helped me realize what's important in life.	1	2	3	4
17. I can cope effectively with my illness.	1	2	3	4
18. My illness has taught me to enjoy the moment more.	1	2	3	4

COPE

The following statements are about the different ways that people cope with the stress related to living with an ongoing or long-term illness. Different people will deal with their stress in different ways. We are interested in how you deal with the more bothersome or stressful aspects of your health condition.

Please select one of the stressful areas of your life that you indicated in the previous question was causing you the most trouble and list it here: _____ (e.g., problems with symptoms, etc.).

Now, thinking just about the problems related to this area of your life, please read each of the following statements about a particular way of coping and indicate how much you do this to cope with the particular stress that you listed above. Don't answer on the basis of whether it seems to be working or not—just whether or not you're doing it. Please use the following 4-point scale to respond to each statement.

1 I usually <u>don't</u> do this at all	2 I usually do this a <u>little bit</u>	3 I usually do this a <u>medium amount</u>	4 I usually do this a <u>lot</u>
---	---	--	--

1) I turn to work or other activities to take my mind off things.	1	2	3	4
2) I concentrate my efforts on doing something about the situation I'm in.	1	2	3	4
3) I say to myself "this isn't real."	1	2	3	4
4) I use alcohol or other drugs to make myself feel better.	1	2	3	4
5) I get emotional support from others.	1	2	3	4
6) I give up trying to deal with it.	1	2	3	4
7) I take action to try to make the situation better.	1	2	3	4
8) I refuse to believe that it has happened.	1	2	3	4
9) I say things to let my unpleasant feelings escape.	1	2	3	4
10) I get help and advice from other people.	1	2	3	4
11) I use alcohol or other drugs to help me get through it.	1	2	3	4
12) I try to see it in a different light, to make it seem more positive.	1	2	3	4
13) I criticize myself.	1	2	3	4
14) I try to come up with a strategy about what to do.	1	2	3	4
15) I get comfort and understanding from someone.	1	2	3	4
16) I give up the attempt to cope.	1	2	3	4
17) I look for something good in what is happening.	1	2	3	4
18) I make jokes about it.	1	2	3	4
19) I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	1	2	3	4
20) I accept the reality of the fact that it has happened.	1	2	3	4
21) I express my negative feelings.	1	2	3	4
22) I try to find comfort in my religion or spiritual beliefs.	1	2	3	4
23) I try to get advice or help from other people about what to do.	1	2	3	4
24) I learn to live with it.	1	2	3	4
25) I think hard about what steps to take.	1	2	3	4
26) I blame myself for things that happened.	1	2	3	4
27) I pray or meditate.	1	2	3	4
28) I laugh about the situation.	1	2	3	4

IBDQ

Please indicate how your illness has affected you **during the past 2 weeks**. Circle your answer for each question according to the following scale:

1	2	3	4	5	6	7
more frequent than ever before	extremely frequent	very frequent	moderately frequent	somewhat frequent	slight increase in frequency	no increase or normal

1. How frequent have your bowel movements been?	1	2	3	4	5	6	7
2. How much of the time have your bowel movements been loose?	1	2	3	4	5	6	7
3. How often have you been troubled by cramps in your abdomen?	1	2	3	4	5	6	7
4. How often have you been troubled by pain in the abdomen?	1	2	3	4	5	6	7
5. Overall, how much of the time have you had a problem with passing large amounts of gas?	1	2	3	4	5	6	7
6. How much of the time have you been troubled by a feeling of abdominal bloating?	1	2	3	4	5	6	7
7. How much of the time have you had a problem with rectal bleeding with your bowel movements?	1	2	3	4	5	6	7
8. How much of the time have you been troubled by a feeling of having to go to the bathroom even though your bowels are empty?	1	2	3	4	5	6	7
9. How much of the time have you been troubled by accidental soiling in your underpants?	1	2	3	4	5	6	7
10. How much of the time have you been troubled by feeling sick at your stomach?	1	2	3	4	5	6	7

These questions refer to **ARTHRITIS PAIN DURING THE PAST MONTH.**

Please check the most appropriate answer for each question.

	Severe	Moderate	Mild	Mild	None
1. How would you describe the arthritis pain you usually had?					
	All days	Most days	Some days	Few days	No days
2. How often did you have severe pain from your arthritis?					
3. How often did your morning stiffness last more than one hour from the time you woke up?					

In this section we are interested in learning how your illness affects your **ABILITY TO FUNCTION IN DAILY LIFE.** Please check the response that best describes your usual abilities **OVER THE PAST WEEK:**

Are you able to:	Without ANY difficulty	With SOME difficulty	With MUCH difficulty	UNABLE to do
4. Dress yourself, including tying shoelaces and doing buttons?				
5. Shampoo your hair?				
6. Stand up from a straight chair?				
7. Get in and out of bed?				
8. Lift a full cup or glass to your mouth?				
9. Open a new milk carton?				
10. Cut your meat or other hard foods?				
11. Walk outdoors on flat ground?				
12. Climb up five steps?				
13. Wash and dry your body?				
14. Take a tub bath?				
15. Get on and off the toilet?				
16. Reach and get down a 5-pound object from just over your head?				
17. Bend down to pick up clothing from the floor?				
18. Open car doors?				
19. Open jars that have been previously opened?				
20. Turn faucets off and on?				
21. Run errands and shop?				
22. Get in and out of a car?				
23. Do chores such as vacuuming or yard work?				

Please check any AIDS or DEVICES that you usually use for any of these activities

_____ Cane _____ Walker _____ Crutches _____ Wheelchair _____ Other: _____

MHLC

The next set of statements are about the different ways people can feel about their health. Please read each statement carefully and indicate how much you agree or disagree with each one by circling a number from 1 to 6 according to the following scale:

1	2	3	4	5	6
STRONGLY DISAGREE	DISAGREE	MILDLY DISAGREE	MILDLY AGREE	AGREE	STRONGLY AGREE

Please note: Health professional can refer to either your medical doctor or an alternative health practitioner.

1. If I get sick, it is my own behaviour which determines how soon I get well again.	1	2	3	4	5	6
2. No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3. Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6
4. Most things that affect my health happen to me by accident.	1	2	3	4	5	6
5. Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6
6. I am in control of my health.	1	2	3	4	5	6
7. My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6
8. When I am sick I am to blame.	1	2	3	4	5	6
9. Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10. Health professionals control my health.	1	2	3	4	5	6
11. My good health is largely a matter of good fortune.	1	2	3	4	5	6
12. The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13. If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14. When I recover from an illness, it's usually because other people (for example, doctors, nurses family, friends) have been taking good care of me.	1	2	3	4	5	6
15. No matter what I do, I'm likely to get sick.	1	2	3	4	5	6
16. If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17. If I take the right actions, I can stay healthy.	1	2	3	4	5	6
18. Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

Health Questions

1. What type of Inflammatory Bowel Disease (IBD) do you have?

Crohn's Disease _____ Ulcerative colitis _____

2. How long has it been since you were diagnosed? _____ years _____ months

3. Have you ever had any surgeries for IBD? YES NO

a) If YES please list type of surgery and when: _____ DATE _____

4. Have you been hospitalized within the last year because of IBD? YES NO

5. Have you been hospitalized within the last year for any other reason? YES NO Reason: _____

6. Please list any medications that you are currently taking for IBD: _____

7. When was your most recent flare-up? _____ I have not had any flare-ups recently _____
(go to question 8)

How severe was this flare-up relative to usual flare-ups?

1	2	3	4	5	6	7	8	9	10
Mild									Extremely severe

8. In general, would you say your health **right now** is:

1	2	3	4	5
Poor	Fair	Good	Very good	Excellent

9. Considering all the ways that your IBD affects you,

	Very Poorly	Poor	Fair	Well	Very Well
a) how well are you doing compared to other people your age?					
b) how well are you doing compared to other people with IBD?					

Is your health currently affected by any of the following medical conditions? Please check all that apply.

☐	High blood pressure	☐	Kidney Disease
☐	Heart disease	☐	Liver Disease
☐	Diabetes	☐	Ulcer or other stomach disease
☐	Cancer	☐	Anemia or other blood disease
☐	Lung Disease	☐	Arthritis
☐	Asthma	☐	Other: _____

Do you have a physical disability? NO [] YES [] If YES, please list: _____

Health Questions

1. What is the main type of arthritis that you have? (please check one only)

☐	Rheumatoid Arthritis	☐	Osteoarthritis/Degenerative Arthritis
☐	Systemic Lupus Erthematositis	☐	Fibromyalgia
☐	Ankylosing Spondylitis	☐	Scleroderma
☐	Reiter's Syndrome	☐	Psoriatic Arthritis
☐	Gout	☐	Other: _____

2. How long has it been since you were diagnosed? _____ years _____ months
3. Have you ever had any surgeries due to arthritis? YES NO
- a) If YES please list type of surgery and when: _____ DATE _____
4. Have you been hospitalized within the last year because of arthritis? YES NO
5. Have you been hospitalized within the last year for any other reason? YES NO Reason: _____
6. Please list any medications that you are currently taking for your arthritis: _____
7. When was your most recent flare-up? _____ I have not had any flare-ups recently _____
(go to question 8)
8. How severe was this flare-up relative to usual flare-ups?

1	2	3	4	5	6	7	8	9	10
Mild					Extremely severe				

8. In general, would you say your health **right now** is:

1	2	3	4	5	6
Very Poor	Poor	Fair	Good	Very Good	Excellent

9. Considering all the ways that your arthritis affects you,

	Very Poorly	Poor	Fair	Well	Very Well
b) how well are you doing compared to other people your age?					
c) how well are you doing compared to other people with arthritis?					

10. Is your health currently affected by any of the following medical conditions? Please check all that apply.

☐	High blood pressure	☐	Kidney Disease
☐	Heart disease	☐	Liver Disease
☐	Diabetes	☐	Ulcer or other stomach disease
☐	Cancer	☐	Anemia or other blood disease
☐	Lung Disease	☐	Inflammatory Bowel Disease (Crohn's, colitis)
☐	Asthma	☐	Other: _____

Appendix N – revised control scales

CMI

The following statements concern different ideas that people have about their health. Please read each statement carefully and answer according to how much you agree with each statement by circling a number from 1 to 6. Please answer according to the following scale:

1	2	3	4	5	6
STRONGLY DISAGREE	DISAGREE	MILDLY DISAGREE	MILDLY AGREE	AGREE	STRONGLY AGREE

1. I like to know as much as possible about any health concern I have	1	2	3	4	5	6
2. Any time I spend looking after my health is time well spent	1	2	3	4	5	6
3. It is important that I feel like I am in control of my health	1	2	3	4	5	6
4. When it comes to my health, I find it easier to do what I am told to do than to think about it myself	1	2	3	4	5	6
5. I take my health seriously	1	2	3	4	5	6
6. I like to feel that I am participating in the management of my health	1	2	3	4	5	6
7. Having and maintaining good health is a life-long goal for me	1	2	3	4	5	6
8. I prefer to let other people decide what is best for my health	1	2	3	4	5	6
9. There are many things that are more important than health	1	2	3	4	5	6
10. I want to take responsibility for my own health	1	2	3	4	5	6
11. I have better things to do than to spend time on my health	1	2	3	4	5	6
12. I enjoy taking part in decisions about my health	1	2	3	4	5	6
13. Making sure that I am as healthy as I can be is an important goal for me	1	2	3	4	5	6
14. I would rather find information about a health issue on my own than leave it completely to someone else	1	2	3	4	5	6
15. Health and well-being are the most important concerns in my life	1	2	3	4	5	6
16. When it comes to my health, I enjoy making my own decisions	1	2	3	4	5	6

CBI

The following statements concern different ideas that people have about their health. Some of these statements refer to your general state of health and others refer to specific times when you are experiencing illness symptoms. Please read each statement carefully and answer according to how much you agree with each statement by circling a number from 1 to 6. Please answer according to the following scale:

1 STRONGLY DISAGREE	2 DISAGREE	3 MILDLY DISAGREE	4 MILDLY AGREE	5 AGREE	6 STRONGLY AGREE
1. I know that I can do what is necessary to improve my health					1 2 3 4 5 6
2. It is my own actions that determine how healthy I am					1 2 3 4 5 6
3. If I am lucky I will stay healthy					1 2 3 4 5 6
4. If I set my mind to it I can improve my health					1 2 3 4 5 6
5. I am confident that I can successfully look after my health					1 2 3 4 5 6
6. My health depends on forces beyond my control					1 2 3 4 5 6
7. I can take control of my health by managing my day-to-day symptoms					1 2 3 4 5 6
8. Even though there are things I can do to improve my health, I don't feel that I can do them					1 2 3 4 5 6
9. If I make the effort, I can manage my illness					1 2 3 4 5 6
10. How soon I recover from an illness depends on how lucky I am					1 2 3 4 5 6
11. There are things that I can do to make my health problem easier to deal with					1 2 3 4 5 6
12. I am able to meet the challenge of following a healthy routine					1 2 3 4 5 6
13. My health depends on how I take care of myself					1 2 3 4 5 6
14. I believe that I can do more to control my symptoms					1 2 3 4 5 6
15. People who take care of themselves stay healthy					1 2 3 4 5 6
16. When facing a health problem, I often feel overwhelmed about what to do					1 2 3 4 5 6
17. How soon I recover from an illness depends on how I look after myself					1 2 3 4 5 6
18. If I am fortunate my health will improve					1 2 3 4 5 6
19. I am confident that I could deal with any unexpected health problems					1 2 3 4 5 6
20. My current state of health is a reflection of how I look after myself					1 2 3 4 5 6
21. If I do the right things I can make my symptoms more manageable					1 2 3 4 5 6
22. Regardless of circumstances, there are things I can do to improve my health					1 2 3 4 5 6
23. I am confident in my ability to make the right decisions about my health					1 2 3 4 5 6
24. My health is determined by circumstances beyond my control					1 2 3 4 5 6
25. I am certain that with effort I can improve my health					1 2 3 4 5 6
26. When it comes to my health, I often feel unable to do what I know should be done.					1 2 3 4 5 6

MCI

The following statements **FIX** concern different ideas that people have about their health. Please read each statement carefully and answer according to how much you agree with each statement by circling a number from 1 to 6. Please answer according to the following scale:

1	2	3	4	5	6
STRONGLY DISAGREE	DISAGREE	MILDLY DISAGREE	MILDLY AGREE	AGREE	STRONGLY AGREE
1. Nobody can look after my health as well as I can			1 2 3 4 5 6		
2. I enjoy working with others to improve my health			1 2 3 4 5 6		
3. People should keep their health problems to themselves			1 2 3 4 5 6		
4. I always place the health of my friends and family above my own.			1 2 3 4 5 6		
5. I am usually the one that makes the decisions regarding my health			1 2 3 4 5 6		
6. Even when I am sick I will help a sick friend			1 2 3 4 5 6		
7. Only people who are weak ask others for help with their health problems			1 2 3 4 5 6		
8. I find that when people work together to improve their health everyone benefits			1 2 3 4 5 6		
9. When I have a health problem I turn to others for support			1 2 3 4 5 6		
10. No one but me is going to keep me healthy			1 2 3 4 5 6		
11. I often find that I can solve my health problems by getting help from others			1 2 3 4 5 6		
12. I would rather look after others when they are ill than have others look after me if I am ill			1 2 3 4 5 6		
13. Asking others for advice about my health is a waste of time			1 2 3 4 5 6		
14. I like to solve my health problems alone			1 2 3 4 5 6		
15. I prefer talking with others about any health concern I have rather than trying to deal with it on my own			1 2 3 4 5 6		
16. I am the best person to manage my health			1 2 3 4 5 6		
17. I have difficulty looking after my own health when it interferes with the health of my family			1 2 3 4 5 6		
18. Asking for help with a health problem is a sign of weakness			1 2 3 4 5 6		
19. I may listen to others' advice about my health but the final decision is always my own			1 2 3 4 5 6		
20. I often find myself getting overly involved in other people's health problems			1 2 3 4 5 6		

Appendix O

Study 5: recruitment materials for the chronic illness samples

Informed Consent Form (Arthritis)

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Social Support and Well-being: Living with Arthritis

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator, _____); Dr. M. Gick (Faculty Sponsor, _____). Should you have any ethical concerns about this study then please contact Dr. J. Wood, Carleton University Research Ethics Committee for Psychological Research, _____ (7), or Dr. K. Matheson (Chair, Dept. of Psychology, _____).

Purpose. The purpose of this study is to explore the psychological factors associated with the use of support and services and how social support influences well-being for those who live with Arthritis.

Task requirements. This study involves completing a survey package that includes background questionnaires about you and your health, as well as questions about your use of social support and health services, your personality, well-being, and health beliefs. Some of these questions contain personal information about your physical and mental health.

Duration and locale. The survey package takes approximately 30 to 45 minutes to complete. You may complete the survey package at a location of your convenience and return it by mail with the pre-addressed postage paid envelope provided.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks. Some people may experience some mild distress or discomfort when thinking about their health problems.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. Your participation in this study is voluntary and you have the right to withdraw from the study at any time, or to not answer any questions.

Signatures

I have read the above description of the Social Support and Well-being study and understand the conditions of my participation. My signature indicates that I agree to participate in the study.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Research suggests that social support may be beneficial for well-being because people who feel that they have the necessary support from friends and family may be better able to deal with the problems of day to day life. This may be especially true for those who live with the challenges of having arthritis. Such support can also take the form of support groups with others who have arthritis. However, not everyone uses support groups and different psychological factors such as one's preference for control over health, personality, and other beliefs about the usefulness of this support may influence this decision. We asked you questions about these psychological factors so that we can explore why some people with chronic health conditions such as arthritis use support groups and how the support groups may help them. As well, very little research has been done on the use of online support groups such as chat groups and message boards, and so it is not known if the same factors that influence the use of regular support groups also influence the use of these online groups.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, fuschia.sirois@carleton.ca) or Dr. M. Gick (Faculty Sponsor, mick.gick@carleton.ca). Should you have any ethical concerns about this study then please contact Dr. J. Wood, Carleton University Research Ethics Committee for Psychological Research, jwood@carleton.ca or Dr. K. Matheson (Chair, Dept. of Psychology, kmatheson@carleton.ca).

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you may wish to contact your family doctor.

Informed Consent Form (IBD)

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Present study: Social Support and Well-being: Living with Inflammatory Bowel Disease

Research personnel. The following people are involved in this research project and may be contacted at any time: Fuschia Sirois, M.A. (Principal Investigator
M. Gick (Faculty Sponsor, should you have any ethical concerns about
this study then please contact Dr. J. W. [redacted] University Research Ethics Committee for
Psychological Research, or Dr. K. Matheson (Chair, Dept. of
Psychology,

Purpose. The purpose of this study is to explore the psychological factors associated with the use of support groups and services and how social support influences well-being for those who live with Inflammatory Bowel Disease (IBD).

Task requirements. This study involves completing a survey package that includes background questionnaires about you and your health, as well as questions about your use of social support and health services, your personality, well-being, and health beliefs. Some of these questions contain personal information about your physical and mental health.

Duration and locale. The survey package takes approximately 30 to 45 minutes to complete. You may complete the survey package at a location of your convenience and return it by mail with the pre-addressed postage paid envelope provided.

Potential risk/discomfort. There is no risk or personal discomfort anticipated by completing these tasks. Some people may experience some mild distress or discomfort when thinking about their health problems.

Anonymity/confidentiality. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

Right to withdraw. Your participation in this study is voluntary and you have the right to withdraw from the study at any time, or to not answer any questions.

Signatures

I have read the above description of the Social Support and Well-being study and understand the conditions of my participation. My signature indicates that I agree to participate in the study.

Participant's Name: _____ Participant's Signature: _____

(please print)

Date: _____

DEBRIEFING

Research suggests that social support may be beneficial for well-being because people who feel that they have the necessary support from friends and family may be better able to deal with the problems of day to day life. This may be especially true for those who live with the challenges of having Inflammatory Bowel Disease (IBD). Such support can also take the form of support groups with others who have IBD. However, not everyone uses support groups and different psychological factors such as one's preference for control over health, personality, and other beliefs about the usefulness of this support may influence this decision. We asked you questions about these psychological factors so that we can explore why some people with chronic health conditions such as IBD use support groups and how the support groups may help them. As well, very little research has been done on the use of online support groups such as chat groups and message boards, and so it is not known if the same factors that influence the use of regular support groups also influence the use of these online groups.

We would like to thank you for participating in this research. Your time and efforts are greatly appreciated!

If you have any questions or comments about this research, then please feel free to contact Fuschia Sirois, M.A. (Principal Investigator, _____); or Dr. M. Gick (Faculty Sponsor, _____). Should you have any ethical concerns about this study then please contact Dr. J. Wood (Carleton University Research Ethics Committee for Psychological Research, _____), or Dr. K. Matheson (Chair, Dept. of Psychology, _____).

If you have any personal concerns about your general physical or emotional well-being that you would like to discuss with somebody, you may wish to contact your family doctor.

Study 5 – Internet notice

Social Support and Well-being: Living with Chronic Illness

Research Conducted by:

Fuschia M. Sirois, Ph.D. candidate, M.A., Mary Gick, Ph.D.

Department of Psychology, Carleton University

Thank you for your interest in our study. We are a doctoral student (Sirois) and a Psychology professor (Gick) interested in exploring the psychological factors associated with the use of social support and services for those who live with a chronic health condition. Both of us live with a chronic illness. We are looking for other people who have a chronic health condition (Diabetes, MS, Asthma, COPD, Heart disease, Liver Disease, CFS, TMJ, Meniere's, IBS, Cancer, etc.) to take part in our study so that we may better understand how social support influences well-being.

Purpose: The purpose of this study is to explore the psychological factors associated with the use of support groups and services and how social support influences well-being for those who live with a chronic health condition.

Survey Questions: . This study involves completing a survey that includes background questionnaires about you and your health, as well as questions about your use of social support and health services, your personality, well-being, and health beliefs. Some of these questions contain personal information about your physical and mental health.

Time: We estimate that the survey will take about 30 to 45 minutes to complete but there is no time limit

Your rights: Your participation in this study is voluntary and you have the right to quit the study at any time, or to not answer any questions. You may leave the web site at anytime without submitting your responses. After you complete the questions, you can choose to submit or clear your answers.

Anonymity/confidentiality. All responses you provide will be treated confidentially. Your personal responses to questions will not be shared with anyone outside of the research team. In the presentation of our results, no information that will identify participants will be revealed. We will take several steps to maintain your anonymity. If you decide to participate in this study, your responses will be emailed through a third-party server that will remove your email address from the file before forwarding your responses to us. The third-party server makes the emails anonymous; it does not open or keep any information from this survey. This way we will never know the identity of those who participate.

For More Information: If you have any questions about the study, please contact Fuschia Sirois, M.A. in the Department of Psychology at Carleton University
email at

If you would like more information about your rights as a participant, please contact Dr. J. Wood, Carleton University Research Ethics Committee for Psychological Research,

Pass it on: Feel free to send this page to other people you know who have a chronic health condition who might be interested in completing the survey.

Do you wish to continue? To acknowledge that you have read and understood this information and would like to continue with the survey, please click on I AGREE.

Appendix P

Proportions of specific disease types for the arthritis and inflammatory bowel disease samples.

Sample	% of sample
Type of chronic illness	
Arthritis ($n = 132$)	
Rheumatoid arthritis	31.3
Osteoarthritis	17.6
Psoriatic arthritis	16.0
Ankylosing spondylitis	9.9
Fibromyalgia	10.7
Systemic lupus erthematositis	5.3
Reiter's syndrome	1.5
Scleroderma	1.2
Gout	0.8
Other	3.1
Inflammatory Bowel Disease ($n = 112$)	
Crohn's disease	75.9
Ulcerative colitis	18.5
Other (microscopic/collageneous/lymphocytic colitis, diverticulitis, undifferentiated IBD)	5.6
Mixed chronic illness types ($n = 127$)	
Chronic migraines	15.9
Chronic Fatigue Syndrome/Fibromyalgia	15.0
Multiple sclerosis	10.3
Diabetes	8.7
Irritable Bowel Syndrome (IBS)	8.7
Asthma	6.3
Ear diseases (Meniere's, etc.)	5.6
Chronic back pain	5.6
Cancer	4.0
Chronic pain	4.0
Heart disease	2.4
Kidney disease	2.4
Lung disease	2.4
Immune system disorders	1.6
Other chronic conditions (seizure disorder, AIDS, Parkinson's disease, neurofibromatosis, chemical intolerance, acid reflux disease, adrenal insufficiency)	5.6

Appendix Q - Study 5 Survey materials

CES-D

For each of the following statements, tell us how often you felt or behaved this way during the **past 2 weeks**:

	Rarely or none of the time	Some or a little of the time	Occasionally or a moderate amount of the time	Most of or all of the time
1. You were bothered by things that don't usually bother you.				
2. You did not feel like eating – your appetite was poor.				
3. You felt that you could not shake off the blues even with help from your family and friends.				
4. You had trouble keeping your mind on what you were doing.				
5. You felt depressed.				
6. You felt that everything you did was an effort.				
7. You had crying spells.				
8. You enjoyed life.				
9. You felt hopeful about the future				
10. You could not get going.				

General Information

Age: Sex: ☐ Female ☐ Male

What is your highest level of education?

☐ some high school ☐ some college or university ☐ some graduate school
☐ high school graduate ☐ college/university graduate ☐ graduate degree

Are you currently employed:

☐ full-time ☐ part-time ☐ not at all ☐ retired ☐ disabled

What is your first language? _____ What is your racial background? _____

What country do you live in? _____

What is your relationship status? (please check the one that applies best to you)

☐	Married/Living with an intimate other	☐	Never married
☐	Separated/Divorced	☐	Widowed

Have you been diagnosed with any psychiatric or mental health conditions? No ☐ Yes ☐
 (e.g., clinical depression, anxiety, panic attacks, etc.)

If yes, please list all _____

Brief Health History

This section deals with health issues you have experienced that are either temporary or over a short period of time (acute), or that can repeatedly occur over a longer period of time (chronic).

ACUTE OR TRANSITORY HEALTH PROBLEMS:

Please indicate which ones you are currently experiencing, or can remember experiencing within the **past six months**. – **please check all that apply**

☐	Back problems	☐	Insomnia	☐	Allergies
☐	Sprains or muscle strains	☐	Infections	☐	Skin problems/rashes
☐	Headache	☐	Flu, cold or fever	☐	Reproductive/menstrual problems
☐	Acute digestive problems (constipation, heartburn, etc.)	☐	Dental problems	☐	Other acute problems: please specify e.g., bone fractures, etc.

CHRONIC OR RECURRING HEALTH PROBLEMS:

Please indicate which of the following health issues you have been diagnosed with – check all that apply under 'YES'. For those problems you do have please indicate how much this problem or its symptoms has bothered you in the **past month** by checking the appropriate box.

YES		mildly bothered	moderately bothered	very much bothered	extremely bothered
☐	Chronic migraines or headaches	☐	☐	☐	☐
☐	Heart disease &/or high blood pressure	☐	☐	☐	☐
☐	Asthma	☐	☐	☐	☐
☐	Diabetes	☐	☐	☐	☐
☐	Cancer	☐	☐	☐	☐
☐	Arthritis (including Lupus, Sjogren's, etc.)	☐	☐	☐	☐
☐	Fibromyalgia	☐	☐	☐	☐
☐	Inflammatory Bowel Disease (Crohn's disease, Ulcerative colitis)	☐	☐	☐	☐
☐	Liver disease	☐	☐	☐	☐
☐	Lung Disease	☐	☐	☐	☐
☐	Kidney Disease	☐	☐	☐	☐
☐	Other chronic illness:	☐	☐	☐	☐

Do you have a physical disability? NO [☐] YES [☐]

If YES, please list: _____

Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please read each statement carefully and place an "x" in the column that is closest to your situation. Give only 1 answer per row.

	As much as I would like	Almost as much as I would like	Some but would like more	Less than I would like	Much less than I would like
1. I have people who care what happens to me.					
2. I get love and affection.					
3. I get chances to talk to someone about problems at work or with my housework.					
4. I get chances to talk to someone I trust about my personal and family problems.					
5. I get chances to talk about money matters.					
6. I get invitations to go out and do things with other people.					
7.					
8. I get useful advice about important things in life.					
9. I get help when I'm sick in bed.					

Use of General Health Services

In the **past 3 months**, have you visited any of the following health services or health professionals? For those you have used, please indicate how many times you used the service, and indicate if the service used was initiated by you (your choice) or you were referred by another health professional by checking the corresponding box.

USED?			If YES, how often?	Self- initiated	Referred
YES	NO	Dentist			
YES	NO	Counsellor or Psychologist			
YES	NO	Medical doctor (General practitioner)			
YES	NO	Nutritionist/Dietician			
YES	NO	Specialist (medical doctor)			
YES	NO	Psychiatrist			
YES	NO	Physiotherapist			
YES	NO	Hospital emergency room			
YES	NO	Chiropractor			
YES	NO	Massage therapist			
YES	NO	Naturopath Homeopath			
YES	NO	Other alternative medicine practitioner: (e.g. Acupuncturist, Reflexologist, etc.)			
YES	NO	Other health professional (please specify):			

Use of Support Groups

Have you ever attended a support group (not online) for people with your health condition?

☐	No, never	☐	Sometimes attend
☐	Went once or twice	☐	Regularly attend

If you have **never attended** a support group, please skip the questions on this page and **go to the next page**.

When did you first attend a support group? _____

When was the last time you attended a support group? _____

People decide to attend a support group for different reasons. The following statements give some of these reasons. Please indicate the extent to which each of these reasons applies to you and your choice to first start attending support groups by circling the appropriate number.

1	2	3	4	5	6
STRONGLY DISAGREE	DISAGREE	MILDLY DISAGREE	MILDLY AGREE	AGREE	STRONGLY AGREE

I decided to attend a support group because . . .

1. I thought that attending a support group would help me cope with the illness	1	2	3	4	5	6
2. I felt emotionally well	1	2	3	4	5	6
3. My doctor recommended attending a support group	1	2	3	4	5	6
4. I had other problems not related to the illness	1	2	3	4	5	6
5. I hoped for an exchange with people in a similar situation as myself	1	2	3	4	5	6
6. Support groups had helped me in the past	1	2	3	4	5	6
7. I felt lonely	1	2	3	4	5	6
8. I needed to talk with people who would understand my illness	1	2	3	4	5	6
9. Family members and or friends suggested that I attend a support group	1	2	3	4	5	6
10. I felt physically unwell	1	2	3	4	5	6

Other than the reasons listed above, why did you decide to attend a support group?

Briefly, please describe what attending a support group has done for you – how has it helped you or not helped you? _____

Reasons for Not Attending a Support Group

The following statements are reasons why some people may not attend a support group. Please indicate the extent to which each of these reasons applies to you and your choice to not attend a support group by circling the appropriate number.

1	2	3	4	5	6				
STRONGLY DISAGREE	DISAGREE	MILDLY DISAGREE	MILDLY AGREE	AGREE	STRONGLY AGREE				
1. I had sufficient support from my family				1	2	3	4	5	6
2. I don't feel well enough to participate in a support group				1	2	3	4	5	6
3. I prefer to talk with my doctor about my health condition				1	2	3	4	5	6
4. I can cope on my own				1	2	3	4	5	6
5. I had sufficient support from my friends				1	2	3	4	5	6
6. I haven't been able to find one in my area				1	2	3	4	5	6
7. I want to forget my problems not talk about them				1	2	3	4	5	6
8. I prefer to talk with my clergyman about problems				1	2	3	4	5	6
9. I have no emotional problems				1	2	3	4	5	6
10. Other people are more in need of support than I am				1	2	3	4	5	6
11. I don't know what a support group can do for me				1	2	3	4	5	6
12. I do not want help from strangers				1	2	3	4	5	6
13. I want to concentrate on the medical treatment				1	2	3	4	5	6
14. Support groups cannot help me				1	2	3	4	5	6
15. I don't want to think about my illness condition				1	2	3	4	5	6

Other than the reasons listed above, why have you not attended a support group for your illness?

Do you think that you might attend a support group in the future? YES NO

If YES, what would you hope to get from going to a support group?

Use of Online Support Groups

These next questions are about the use of online support groups for your health condition, such as newsgroups, message boards, forums, and chat rooms

Have you ever visited an online support group for people with your health condition(s)?

☐	No, never	☐	I sometimes visit
☐	I visited once or twice	☐	I regularly visit

If you DO visit online support groups please skip the next question

Briefly, why do you not visit online support groups for your illness?

If you DO NOT visit online support groups please skip to the next page

If you have visited a web support group, have you ever posted comments or questions?

☐	No, never	☐	I have posted several times
☐	I have posted once or twice	☐	I regularly post

Please list all the conditions that you have visited online support groups for:

Briefly, please describe why you visit online support groups, and how has the support group helped you or not helped you?

PWB

The following set of questions deals with how you feel about yourself and your life. Please remember that there are no right or wrong answers.

1 STRONGLY DISAGREE	2 DISAGREE SOMEWHAT	3 DISAGREE SLIGHTLY	4 AGREE SLIGHTLY	5 AGREE SOMEWHAT	6 STRONGLY AGREE
1. I am not interested in activities that will expand my horizons.	1	2	3	4	5 6
2. I feel good when I think of what I've done in the past and what I hope to do in the future.	1	2	3	4	5 6
3. Maintaining close relationships has been difficult and frustrating for me.	1	2	3	4	5 6
4. In general, I feel that I continue to learn more about myself as time goes by.	1	2	3	4	5 6
5. I live life one day at a time and don't really think about the future.	1	2	3	4	5 6
6. I often feel lonely because I have few close friends with whom to share my concerns.	1	2	3	4	5 6
7. I am the kind of person who likes to give new things a try.	1	2	3	4	5 6
8. I tend to focus on the present, because the future nearly always brings me problems.	1	2	3	4	5 6
9. It is important to me to be a good listener when close friends talk to me about their problems.	1	2	3	4	5 6
10. I have a sense of direction and purpose in life.	1	2	3	4	5 6
11. I think it is important to have new experiences that challenge how you think about yourself and the world.	1	2	3	4	5 6
12. I don't have many people who want to listen when I need to talk.	1	2	3	4	5 6
13. When I think about it, I haven't really improved much as a person over the years.	1	2	3	4	5 6
14. I don't have a good sense of what it is I'm trying to accomplish in life.	1	2	3	4	5 6
15. I feel like I get a lot out of my friendships.	1	2	3	4	5 6
16. I used to set goals for myself, but that now seems like a waste of time.	1	2	3	4	5 6
17. It seems to me that most other people have more friends than I do.	1	2	3	4	5 6
18. With time, I have gained a lot of insight about life that has made me a stronger, more capable person.	1	2	3	4	5 6
19. I enjoy making plans for the future and working to make them a reality.	1	2	3	4	5 6
20. People would describe me as a giving person, willing to share my time with others.	1	2	3	4	5 6
21. I have a sense that I have developed a lot as a person over time.	1	2	3	4	5 6
22. I have not experienced many warm and trusting relationships with others.	1	2	3	4	5 6
23. I do not enjoy being in new situations that require me to change my old familiar ways of doing things.	1	2	3	4	5 6
24. I often feel as if I'm on the outside looking in when it comes to friendships.	1	2	3	4	5 6
25. For me, life has been a continuous process of learning, changing, and growth.	1	2	3	4	5 6
26. I sometimes feel as if I've done all there is to do in life.	1	2	3	4	5 6
27. I enjoy seeing how my views have changed and matured over the years.	1	2	3	4	5 6
28. My aims in life have been more a source of satisfaction than frustration to me.	1	2	3	4	5 6
29. I find it difficult to really open up when I talk to others.	1	2	3	4	5 6
30. I gave up trying to make big improvements or changes in my life a long time ago.	1	2	3	4	5 6
31. I find it satisfying to think about what I have accomplished in life.	1	2	3	4	5 6
32. My friends and I sympathise with each other's problems.	1	2	3	4	5 6
33. In the final analysis I'm not sure that my life adds up to much.	1	2	3	4	5 6