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THE PSYCHOSOCIAL VARIABLES CONTRIBUTING TO TREATMENT  
EXPECTANCIES IN INDIVIDUALS WITH IRRITABLE BOWEL SYNDROME

by

Tobi L. Wilson, M.A., B.Sc.

A Dissertation

Submitted to the Faculty of Graduate Studies

through the Department of Psychology

in Partial Fulfillment of the Requirements for

the Degree of Doctor of Philosophy at the

University of Windsor

Windsor, Ontario, Canada

2009

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The Psychosocial Variables Contributing to Treatment Expectancies in Individuals with  
Irritable Bowel Syndrome

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## Abstract

The placebo effect has become recognized as an excellent example of mind-body interaction and as a mechanism of therapeutic action in its own right. Theoretical and empirical work has shown that one's expectations of treatment are important mediators of the placebo effect, as well as treatment outcomes in diverse areas of health care. Modern theorists agree that situational and individual factors both contribute to the formation of positive treatment expectancies; however, only the former has received adequate study. The current research was designed to investigate the individual psychosocial variables that are associated with positive treatment expectations, using irritable bowel syndrome (IBS) as an illness model. People with IBS ( $n = 289$ ) were recruited online to complete a survey study. Participants read hypothetical vignettes about state-of-the-art treatments for IBS and were asked to rate their expectations to benefit from treatment on a continuous scale. They then completed a series of questionnaires measuring various individual difference factors, health belief variables and context-specific psychosocial variables, all identified from the literature as potentially relevant correlates of levels of expectation. Correlation and regression analyses revealed that several of these variables were associated with participants' ratings of expected treatment benefits, in particular, perceived somatic focus of treatment and beliefs of personal control over symptoms, as well as higher levels of optimism and self-focused attention. Weaker relationships were identified for acute health status, coping self-efficacy, catastrophizing and patient-provider relationship; whereas no relationships were found for trait anxiety, motivational factors and other health belief variables. Among those with past experience with similar treatments, previous treatment satisfaction was a strong predictor of current expectations.

Supplemental analyses revealed that among a sub-sample having previous treatment experience, along with higher levels of self-focused attention, significant relationships between treatment expectancies and independent psychosocial variables were more numerous and more robust. Results are discussed in light of contributions to theory, directions for future research as well as potential clinical applications.

## **Dedication**

I dedicate this work to my fantastic parents, Doug and Beth Wilson, and to my wonderful husband, Greg Witkowski. You were generous of time and patient of spirit in your willingness to help me sort my way through many steps of this project. Thank you for your love, interest and support.

## **Acknowledgements**

I would like to acknowledge all the folks who have helped me intellectually and emotionally with this endeavor. Thank you to Fuschia Sirois, my excellent dissertation advisor; my committee members including Josée Jarry, Alan Scoboria, Debbie Kane and Leora Swartzman, my external committee member; my family, Doug, Beth, Jamie and Janice; my husband Greg; my favourite psychologist, Helen Chagigiorgis; good and supportive friends Susan, Francis, Erin, Stacey, Angela, and Dwayne; Barb, the glue that binds in the department of psychology.



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## Chapter 1

### INTRODUCTION

#### I. Overview

The ultimate goal of this project is to increase the effectiveness of medical interventions through identifying the psychosocial factors that contribute to an individual's ability to benefit from treatment. There has been an increasing interest in the role of psychosocial factors in medicine and health due to the rise of a holistic, non-dualistic approach to conceptualizing the human organism, its illness and its healing. There is one well-known phenomenon in medicine that for years has highlighted the importance of psychological factors in healing, namely, the placebo effect. Simply, the placebo effect refers to the situation where an individual shows an improvement in their symptoms as a result of receiving a secretly inert intervention that the individual *believes* to be therapeutic. Many consider the placebo effect as a scientifically validated phenomenon of 'belief becoming biology' (Cousins, 1989), and have come to agree that the belief system of the patient is critically important (Moerman & Jonas, 2000; Ray, 2004). Placebo effects are considered some of the best examples of mind-body interaction (Ray, 2004; Mayer, 2003), and are now recognized as contributing to treatment outcome in any therapeutic situation (Benedetti, 2007). Exploring the placebo effect is thus a useful model within which to begin to explore the contribution of psychosocial factors to a patient's ability to benefit from treatment (Colloca & Benedetti, 2005; Moerman & Harrington, 2005). In this chapter it will be shown that a patient's positive expectancy of treatment outcome is one of the key mediators of the placebo

effect. On this basis, this project will seek to examine the individual psychosocial factors that are associated with the magnitude of these integral 'positive outcome expectancies.'

## II. Introduction to the Placebo Effect

Throughout the history of medicine, the first psychosocial factor recognized to contribute to health outcomes was the individual's beliefs about the effectiveness of a treatment intervention or provider. Galen, one of the forefathers of modern medicine, said, "He cures most successfully in whom the people have the most confidence." Medical scholars agree that most early medicine was predicated on the power of individuals' belief in treatment, which came to be known as the placebo effect (Shapiro & Shapiro, 1997).

Before the rise of the biopsychosocial model (Engel, 1977) and the birth of the field of health psychology, the field of medicine had already identified the importance of the elusive placebo effect in contributing to health outcomes. Although the term placebo comes from the Latin phrase 'I shall please,' the word placebo has had medical connotations for the last 200 years. An archetypal placebo is a sugar pill given to a patient with instructions that it is an active substance. Any resulting improvement in the patient's condition is termed the 'placebo effect.' In practice, a placebo can take almost any form. Some have suggested that placebos are likely the oldest treatment, as with very few exceptions, we know that ancient treatments had no intrinsic healing power (Shapiro, 1960). When successful, what these treatments had in common was that the person receiving them, and usually the healer himself, believed they might do some good (Thompson, 2005).



Early dictionaries (1785) defined a placebo as ‘a commonplace method of medicine,’ and for many years from the early 1800s to the late 1900s, the word placebo was defined as an inert substance used to ‘placate’ a patient’s need for treatment. With the rise of the medical model after World War II, the placebo effect came to be considered a nuisance variable that had to be controlled for in order to ascertain the genuine effects of supposedly active therapeutic interventions. The ‘placebo controlled clinical trial’ became the gold standard for testing the efficacy of new interventions (Kaptchuk, 2001), and the definition of the placebo expanded to include ‘a control treatment in a clinical trial.’

As recently as 1999, placebo was defined as an ‘ineffective substance that may relieve a condition because a patient has faith in its powers’ (Oxford Concise Medical Dictionary). This definition highlights that the patient’s beliefs play an important role in the generation of the placebo effect. Current definitions of placebo by scholars in the field of placebo research remain mum on the mechanisms of the effect (Stewart-Williams & Podd, 2004). These current definitions state:

A placebo is a substance or procedure that has no inherent power to produce an effect that is sought or expected.

A placebo effect is a genuine psychological or physiological effect, in a human or another animal, which is attributable to receiving a substance or undergoing a procedure, but is not due to the inherent powers of that substance or procedure.

Earnest research into the placebo effect itself has increased over the last half-century. Although much of the placebo research has been conducted in the area of pain and analgesia (see Colloca & Benedetti, 2005; Hoffman, Harrington & Fields, 2005 for

reviews), it has been demonstrated that the placebo effect is a genuine phenomenon that has been reported for a variety of health problems, across objective and subjective parameters (Stewart-Williams & Podd, 2004). Placebos have demonstrated effectiveness in the treatment of physical symptoms in a variety of medical conditions. Among the functional disorders and conditions, placebos have produced significant treatment effects in sexual dysfunction (Cranston-Cuebas, Barlow, Mitchell, & Athanasiou, 1993), insomnia (Bootzin & Herman, 1976; Kellog & Baron, 1975; Storms & Nisbett, 1970), hunger states (Heatherton, Polivy, & Herman, 1989), environmental disease (Grandjean, Guldager, Laresen, Jorgensen, & Holmstrup, 1997), asthma (Joyce, Jackevicius, Chapman, McIvor & Kesten, 2000), premenstrual syndrome (Freeman & Rickels, 1999), irritable bowel syndrome (Patel et al., 2005), chronic fatigue syndrome (Cho, Hotopf, & Wessely, 2005) and nausea (Levine, Stern, & Koch, 2006). There are also substantial placebo effects reported in the psychiatric literature (see Khan, et al., 2005; Kirsch, Moore, Scoboria & Nicholls, 2002, as examples). Furthermore, placebo treatment of medical conditions such as ulcerative colitis (Ilnyckyj, Shanahan, Anton, Cheang, & N., 1997), hypertension (Hunyor et al., 1997), post-operative swelling (Ho, Hashish, Salmon, Freeman, & Harvey, 1998), post-operative pain (Levine, Gordon, & Fields, 1978, 1979), Parkinson's disease (de la Fuente-Fernandez, 2004; Shetty, Friedman, Kieburzt, Marshall, & Oakes, 1999), infertility (Dunphy, Kay, Robinson, & Cooke, 1990; Garcia et al., 1985), duodenal ulcer (de Craen et al., 1999), functional dyspepsia (Mearin, Balboa, Zarate, Cucala, & Malagelada, 1999), inflammatory bowel disease (Hershfield, 1997), headaches (Roberts, 1994), migraines (Jhee et al., 1997), and warts (Spanos, Sternstrom,

& Johnston, 1988), has resulted in significant physiological changes and/or amelioration of symptomology.

Despite these findings, there has still been considerable debate regarding the veracity of the placebo effect in conditions other than pain (see Hrobjartsson & Gøtzsche, 2001; Wampold, Minami, Tiernery, Baskin, & Bhati, 2005, Wickramasekera, 2001). Genuine placebo effects have been differentiated from other non-specific effects of treatment, such as regression to the mean and the natural course of an illness, which are controlled for in placebo research through the use of a no-treatment control group (Fields & Levine, 1984; Kirsch, 1997; Stewart-Williams, 2004). Experimental research has also been instrumental in ruling out artifactual alternatives to genuine placebo responses, such as sampling biases, reporting biases or demand characteristics (Wager & Nitschke, 2005). Currently, most researchers agree that placebo effects are partially responsible for treatment outcomes in almost every area of medicine (Benedetti, 2007; Di Blasi et al., 2001; Thompson, 2005). Thus, understanding the mechanisms of the placebo phenomenon has become a crucial scientific endeavor (Crow, Gage, Hampson, Hart, Kimber & Thomas, 1999; Haour, 2005; Sarinopoulos et al., 2006). From the perspective of the medical model, the placebo effect was seen as a nuisance variable that can confound clinical trials. From the more modern biopsychosocial model of health, which acknowledges that biological, social and psychological factors will each contribute to health and illness, the placebo effect is viewed as something that might be harnessed to maximize current levels of clinical efficacy (Chaput de Saintonge & Herxmeimer, 1994; Hauprich, 1996; Thompson, 2005).

Early efforts to understand the placebo effect sought to identify individual traits that may make someone more likely to ‘succumb’ to placebo effects, so that these people could be identified and excluded from controlled clinical trials. Today, the identification of individuals who respond to placebos seems appealing as it may allow for safer and more economical health care delivery for those who can benefit from inert treatments. Unfortunately these early attempts (Beecher, 1955) and those since (e.g., Lasagna, Mostellar, von Felsinger & Beecher, 1954; Moertel, Taylor, Roth & Tyce, 1976; Shapiro & Shapiro, 1997) failed to identify people who consistently respond to placebos. Alternatively, researchers turned to the more fruitful pursuit of studying the situational factors that may be involved in the placebo effect. These lines of research have uncovered several interesting situational factors that appear to be related to placebo effects (Harrington, 1997). For example, placebos have been known to mimic active agents by producing undesirable side effects. They also commonly follow dose-response curves, wherein two pills are more effective than one, larger capsules produce stronger effects than smaller ones, and injections produce greater effects than placebo capsules or pills (see reviews in Stewart-Williams, 2004 or Kirsch, 2005). However, such research has not been able to isolate the ideal placebo situation, just as research could not isolate individuals who consistently respond to placebos.

The placebo effect is certainly a complex phenomenon that eludes simplistic explanations. Despite its complexity, researchers are still driven to understand the precursors and mechanisms of placebo effects, due to the recognition that placebo effects represent a means for therapeutic gain over and above the beneficial effects of an active intervention, along with the recognition that every therapeutic situation contains the

potential for placebo responding. This drive has led to some testable models that attempt to explain the role of situational and personal factors in an individual's response to treatment. It is important to remember that the placebo is by definition 'inert,' and any changes occurring within the patient must be due to the interaction of the patient and his environment (Thompson, 2005).

### III. Early Models of the Placebo Effect

#### A. Biological Model

Our earliest understanding of the placebo effect was that a patient's and/or service provider's belief or expectation of outcome was the key element that contributed to placebo effects (Kupers & Marchand, 2005; Morris, 1997). Early formal models of the placebo effect, however, focused on biological and conditioning models to explain this effect. In the late 1970s, researchers discovered that at least some forms of placebo analgesia were mediated by the brain's natural painkillers, i.e., endogenous opioids (Levine, Gordon & Fields, 1978). This proved an exciting development that spurred much research into placebo analgesia. Meta-analyses of placebo effects in controlled clinical trials have now found that placebo analgesia is one of the most common and potent instances of the placebo effect (Morris, 1997, Hróbjartsson & Gøtzsche, 2001). Pain research has consistently found that placebo effects account for an average 35% of any reported therapeutic benefit in relation to pain control (Wall, 1993), over and above the benefit provided by the active treatment. Although fascinating, these findings offer an incomplete account of the mechanisms of the placebo effect. For instance, there is no strictly biological account of *how* taking a placebo could activate the endogenous opioid system. Investigators have also discovered that not all placebo analgesia is mediated by

endogenous opioid systems (Amanzio & Benedetti, 1999; Gracely et al., 1983).

Furthermore, as reviewed above, placebo effects have been demonstrated in numerous conditions other than pain (Colloca, Lopiano, Benedetti & Lanotte, 2005; Morris, 1997).

## B. Conditioning Model

An early prominent model of the placebo effect is the classical conditioning model, which posits that in standard treatments, the physical characteristics of the environment, provider or treatment (conditioned stimulus) become paired with the active ingredients of the treatment (e.g., morphine, unconditioned stimulus) to elicit physiological effects (e.g., analgesia, unconditioned response). After ‘learning’ that such characteristics signal physiological changes in the body, a placebo with the same characteristics (conditioned stimulus) could then elicit the same changes in the organism (conditioned response) without the presence of the active treatment. This model was inspired primarily by Ader and colleagues who discovered that they could condition placebo-induced immunosuppression in rats (Ader & Cohen, 1975). Support for this model of placebo effects has been demonstrated several times in humans (e.g., Goebel et al., 2002; Voudouris, Peck & Coleman, 1985, 1989, 1990). A conditioning model cannot, however, account for all reported aspects of the placebo effect in humans. For example, this theory cannot explain placebo effects in patients that have never been exposed to the specific active treatment (Haour, 2005), nor why placebo effects are resistant to extinction, which is normally seen in classically conditioned learning (Montgomery & Kirsch, 1997).

### C. Response Expectancy Model

Irving Kirsch's (1985) response expectancy model of placebo effects was considered a main competitor to the conditioning model of the placebo effect. Response expectancies are anticipations of the occurrence of nonvolitional responses (such as pain, analgesia, sadness, joy, intoxication, vomiting, alertness, etc) that arise when, in the case of the placebo effect, an individual is presented with an intervention (Kirsch, 1997a). In a general treatment scenario where there is a suggestion that a specific treatment would lead to amelioration in one's symptoms, response expectancies (or treatment expectancies) would refer to one's expectation to benefit from that treatment. The concept of response expectancy was introduced as an extension to social learning theory. Expectancy was already a central concept in a number of influential theories of learning and behaviour. Bolles (1972) classified expectancies into two categories. Response-stimulus expectancies are beliefs about the relation between behaviour and environmental consequences. Stimulus-stimulus expectancies are beliefs that certain stimulus events predict other stimulus events. In Rotter's (1954) social learning theory, which builds on Tolman's (1932) expectancy model of reinforcement learning, expectancies are 'perceived probabilities that reinforcement will follow behaviour.' Behaviour is thus considered a function of the expectancy that behaviour will bring reinforcement, together with the perceived value of the reinforcement (an expectancy-value framework). In Bandura's (1977) social learning theory, behaviour is also guided by self-efficacy expectancies, expectancies regarding one's ability to execute behaviour that reinforcement is contingent upon. In each of these theories, expectancies involve the occurrence of a voluntary behaviour. Response expectancy theory, on the other hand,

refers to expectancies about non-volitional responses, i.e., responses that occur automatically (Kirsch, 1985). These are the types of expectancies that Kirsch considers to mediate the placebo effect.

Response expectancies are considered unmediated; this means that no additional psychological, situational or behavioural factors need be evoked to explain the influence of response expectancies on placebo responding. They are also considered self-confirming; for example, if you expect morphine to reduce pain, and you believe you are taking morphine, then you will experience reduced pain as expected. Early support for the response expectancy model has been demonstrated in various ways. First, there are studies wherein the placebo responses are more strongly related to a substance's expected effects than to the substance's actual effects. For example, responses to placebo alcohol have been found to be more closely related to a culture's beliefs about the effects of alcohol rather than its actual physiological effects (MacAndrew & Edgerton, 1969). Similarly, effects of placebo caffeine often follow individuals' beliefs about caffeine's effects (Kirsch & Weixel, 1988; Fillmore et al., 1994).

Second, Montgomery and Kirsch (1997) demonstrated that manipulating subjects' conscious expectancies could actually eliminate the effect of conditioned analgesia. In this important study, Montgomery and Kirsch first employed an established conditioning paradigm to elicit a placebo analgesia response (Voudouris et al., 1985, 1990). In this paradigm, subjects are first stimulated on several trials with an electric current to the arm, in order to determine what intensity of current is subjectively experienced as moderate pain and low pain for each individual, using a pain intensity scale of 0 (no pain) to 10 (intolerable pain). During a pre-test phase when no placebo intervention is administered,



subjects are stimulated at a level to generate moderate pain. A placebo ‘analgesia cream’ is then applied to certain areas of a subject’s arm. Then subjects undergo a series of manipulation trials where stimulus intensity is surreptitiously lowered during placebo trials so that it generates only ‘low pain,’ and kept at a higher level during no-placebo trials. In the original studies using this paradigm (Voudouris et al., 1985, 1990), these conditioning manipulations resulted in lower pain reports during placebo trials vs. no-placebo trials in a post-test phase (where the current is kept at the higher level), demonstrating that placebo responses can be conditioned. To test the contribution of verbal information to the conditioning of this placebo response, some subjects in Montgomery & Kirsch’s study were randomly assigned to an ‘informed pairing’ group, where they were explicitly informed that stimulus intensities were being reduced during placebo trials in the manipulation phase. As usual, subjects assigned to the ‘uninformed pairing’ group showed a placebo response during post-test, indicating that the conditioning trials had been successful in eliciting analgesia. In contrast, those subjects in the ‘informed pairing’ group did not show greater placebo responses in the post-test phase, indicating that the verbal information had eliminated the effect of conditioning. Montgomery and Kirsch conclude that subjects in the ‘informed’ group no longer expected the placebo cream to produce analgesia.

#### D. Resolution of the Conditioning – Expectancy Debate

For several years, the conditioning and response expectancy models were considered opposing models of the placebo effect. However, as evidence accumulated, it became clear that these models are not mutually exclusive (see Haour, 2005; Kirsch, 2005; Stewart-Williams & Podd, 2004, for reviews). Advances in theories of

conditioning have aided this shift in conceptualization. It has been recognized that at least in humans, conditioning involves conscious learning, where the individual comes to associate or *expect* certain consequences (the association of the conditioned stimulus with the unconditioned response, Rescorla, 1988).

There is now almost universal agreement that conditioning involves the production of expectancies (Benedetti, et al., 2003; Kirsch, Lynn, Vigorito & Miller, 2004). Most contemporary theorists of the placebo effect agree that the majority of placebo effects are mediated by response expectancies (i.e., expectations to see specific changes as a result of the intervention; Benedetti et al., 2003; Colloca & Benedetti, 2005; Kirsch, 2005; Pollo et al., 2001; Vase et al., 2002), although there is evidence that some placebo effects are mediated by conditioning alone (Benedetti, Pollo, Lopiano, Lanotte, Vighetti & Rainero, 2003; Pacheco-Lopez, Engler, Niemi & Schedlowski, 2006; Enck, Benedetti & Schedlowski, 2008). Although expectancies have been shown to be induced via conditioning procedures, as discussed further later they also can be formed via other information, such as prior experience, verbal suggestion, observation learning, etc (Kirsch, 1990, 1997, 2005).

The centrality of expectancies in influencing therapeutic outcomes is a central assumption of this proposed research. At this point we have reviewed the ubiquity of placebo effects in the treatment situation, as well as the theory that such placebo effects are mediated by one's expectation to see specific changes as a result of that treatment. At this point, it will be pertinent to outline the impressive evidence that supports this theory. First to be presented is the support for response expectancy-mediated outcomes arising from the placebo literature. This will be followed by evidence in non-placebo

research that demonstrates the fundamental role of expectations in influencing subjective and objective health outcomes. Throughout this review and the description of research to follow, the term ‘treatment expectancies’ will be used interchangeably with ‘response expectancies,’ and ‘treatment expectations.’ Although an individual could have several different types of expectations regarding a therapeutic situation or a treatment, herein ‘treatment expectancies’ is used to refer to one’s expectation to see benefit from treatment.

#### IV. Support for the Role of Expectancies

##### A. Placebo Literature Support

There are several studies from the field of experimental placebo research that support, either directly or indirectly, the contribution of expectancies to a placebo response. Indirect support is often demonstrated in studies where explicit expectancies are not measured, but are either assumed to be induced via verbal suggestion or are assumed to be present due to experimental procedures.

In an early study of experimental placebo analgesia, Montgomery & Kirsch (1996) demonstrated that the application of an inert cream accompanied by a verbal suggestion that the cream was a powerful topical analgesic produced a reduction in pain (induced via controlled mechanical pain stimuli) at the body site where the placebo was administered but not at a control body site. Although expectations of analgesia were not measured, the researchers assumed that verbal suggestion had produced such expectations.

Similarly, in a study examining the role of conditioning and verbal suggestion in one clinical condition (motor performance in Parkinson’s patients) as well as three

experimental conditions (placebo analgesia and placebo stimulation of growth hormone and cortisol release), it was found that verbal suggestion had no effect on hormonal secretions, whereas it did affect pain reports and motor performance. Verbal suggestions were also shown to override conditioning procedures to influence pain and motor performance; however hormonal placebo responses were only responsive to conditioning (Benedetti, et al., 2003).

In a study of post-operative pain in patients who underwent thoracic surgery for lung cancer, it was found that different verbal instructions about the certainty of receiving a painkiller produced different reported analgesic effects, and led to significant differences in the intake of opioids for pain (Pollo et al., 2001). Following surgery, every patient received a starting dose of an opioid painkiller, and over the following three days all patients received intravenous saline, and were treated with the active painkiller upon request. Patients were randomly assigned to three experimental conditions that received different verbal instructions about the saline solution that they were receiving. Those in the ‘double-blind’ condition were told that they had a 50% chance of receiving a placebo or the active painkiller, as in traditional double-blind placebo-controlled trials. Subjects in the ‘deceptive’ condition were deceptively informed that they were receiving the active painkiller (100% certainty of receiving ‘active’ treatment), and those in the ‘natural history’ condition were told that they were simply receiving a rehydrating solution. The number of doses and total dosage of active painkiller requested by each group served as the dependent variable. The double-blind group requested a significant 20.8% fewer painkillers than did the natural history group, and the deceptive administration group requested 33.8% less painkiller. This indicates that a strong placebo

effect occurred and that it was significantly larger in the deceptive group (those who were ‘certain’ that they were receiving an active painkiller). It is important to note that there was no difference in the pain intensity ratings of the three groups upon request for painkiller, further indicating that those who thought that they were receiving a painkiller were, in fact, experiencing analgesia. The authors highlight that the different placebo analgesic responses were due to the different verbal instructions, which presumably induced different expectations for pain relief.

Verbally induced variations in the ‘certainty’ of receiving an active treatment have also been shown to influence the magnitude of placebo responses on a larger scale. Vase and colleagues (2002) conducted a meta-analysis comparing the magnitude of placebo analgesia effects in controlled clinical trials (where subjects are informed that there is a 50% chance of receiving a placebo) versus in placebo analgesia studies (where subjects are deceptively told that they are certainly receiving an active analgesia). This study found that placebo effect sizes were modest in clinical trials ( $d = .15$ , range =  $-.95 - +.57$ ), but were significantly more robust in placebo studies ( $d = .95$ , range =  $-.64 - 2.29$ ;  $p < .01$ ). The authors argue that the main difference between these sets of studies is the strength of the suggestion for pain relief, and thus presumably the strength of subject’s expectations for relief.

Serendipitous support for the powerful role of patients’ expectations has surfaced in placebo-controlled trials of acupuncture for post-surgical and chronic pain (Bausell, Lao, Bergman, Lee, & Berman, 2005; Linde et al., 2007, respectively). In the first study, investigators preformed a blinding check to ascertain whether subjects thought that they had been assigned to the active acupuncture group or to the sham acupuncture group

(Bausell et al., 2005). Although there were no differences in pain reports amongst those receiving active or placebo treatment, those who *believed* they were in the active treatment group reported less pain than those who believed they were receiving the placebo treatment. In the second study, subjects randomly assigned to active or sham acupuncture were asked before, and mid-way through several weeks of treatment, whether they expected to personally benefit from the treatment. At treatment completion, regardless of group assignment, those who reported high expectations to benefit from treatment had greater odds of having responded to the treatment. The results of these studies truly highlight the importance of patients' beliefs and expectations about treatment (Benedetti, 2005, 2007).

Support that is more direct is indicated in several studies where expectations of treatment outcome are measured directly and found to be positively associated with actual treatment outcome. Montgomery and Kirsch (1997) first demonstrated a direct correlation between expected and actual treatment responses in the study that was described in part above. An additional aspect of this study involved the measurement of expected pain after conditioning trials and prior to post-test trials using an analogue scale identical to the one used to measure pain ratings (i.e., '0' = no expected pain to '10' = intolerable pain expected). Conditioning trials in the uninformed pairing group altered participant's placebo response expectancies (calculated by subtracting placebo trial expected pain ratings from no-placebo trial expected pain ratings), as well as their post-test pain reports. Regression analyses found that expected pain levels accounted for 49% of the variance in reported pain levels. In this study, although conditioning did lead to placebo analgesia, it appeared to be mediated by expectancies.

Price and colleagues (1999) conducted a similar experiment of conditioned placebo analgesia using painful thermal stimulation and a modified within-subjects design. In this study, separate areas of participant's arms were treated with different 'doses' of a placebo analgesic, versus a control solution. During conditioning trials, stimulus intensities at a personal level of 2/10 were delivered to the area treated with a 'strong' analgesic. On the area of the 'weak' analgesic, subjects received stimulation at an intensity of 5/ 10 and at the 'control' site intensities were set at 6/ 10. After manipulation trials, subjects indicated their expected pain intensity and expected pain unpleasantness on a visual analogue scale (VAS). Placebo effects, manifested both within sensory and affective dimensions of pain, were shown by reliable reductions in pain ratings after conditioning trials. Expected levels of pain intensity and unpleasantness contributed to a large proportion of the variance in sensory and affective pain ratings within the areas treated with placebo cream, providing further evidence that the conditioning effect (and the placebo effect) is mediated by expectancy (Price, Milling, Kirsch, Duff, Montgomery & Nicholls, 1999).

Similar robust associations between expected and concurrent pain intensity and unpleasantness levels have been demonstrated in other studies of experimental placebo analgesia, both in clinical (Vase, Robinson, Verne & Price, 2003) and non-clinical populations (de Jong, van Baast, Arntz & Merckelbach, 1996; De Pascalis, Chiaradia & Carotenuto, 2002). Together these studies of experimental placebo analgesia support the expectancy model by indicating that a significant amount of variance in actual pain relief following placebo treatment can be accounted for by expected pain relief. The proportion

of variance attributed to expectancies has been reported to vary from 25 to 49% (Vase et al., 2003).

## B. Health Psychology Literature Support

Fascinating studies supporting the role of expectancies in health outcomes have been reported by an Italian research group, comprising of Benedetti, Amanzio, Pollo and colleagues, who have been studying the contribution of conscious expectations to treatment outcomes. For example, Pollo et al., (2002) reported remarkable results regarding the moderating effect of positive expectations on the motor performance of Parkinson's patients receiving deep brain stimulation via electrodes implanted in subthalamic nuclei. They found that expectations of good motor performance, induced by verbal suggestion, actually led to significantly faster hand movements.

This group of researchers have also been studying the contribution of expectations to health outcomes by using an 'open vs. hidden administration' paradigm. Here, clinical patients all receive the active treatment. The 'open administration' subgroup is made explicitly aware, through verbal information and observable procedures, that they are receiving the active treatment. The 'hidden administration' subgroup receives the active treatment without their knowledge (e.g., in their intravenous saline). Using this paradigm, these investigators have been able to truly distinguish the effects of an active treatment while controlling for the effects of a patient's expectations of treatment, and have contributed valuable support for the role of expectations in the therapeutic context.

This paradigm was first used in the 1980s to study placebo analgesia. In a study of postoperative pain following oral surgery, it was found that a hidden injection of 6-8 mg of morphine was equivalent to an open injection of placebo morphine (saline). In



other words, telling a patient that a painkiller is being administered is as potent as 6–8 mg of morphine (Colloca & Benedetti, 2005)! Benedetti et al., (2003a) reported a study of the open vs. hidden administration of treatment in three clinical conditions (postoperative pain, postoperative anxiety, and subthalamic stimulation in Parkinson's patients) and two experimental conditions in healthy subjects (administration of a beta-blocker and a muscarinic antagonist). In each of these conditions it was found that the open administration was significantly more effective than the hidden administration. These results show clearly that a person's knowledge about an intervention affects their response to the intervention.

Several other independent studies where expectations have been measured also lend support to the central role of expectancies in contributing to various health outcomes (Mondloch, Cole & Frank, 2001). Briefly, it has been reported that positive treatment expectancies predict substantial amounts of variance in nurses' reports of physical health status following heart transplants (Leedham et al., 1995), expectations regarding symptoms have been found to predict symptom severity after oral surgery (McCarthy, Lyons, Weinman, Talbot & Purnell, 2003), depressed patients with high expectations of benefit show a greater response to antidepressant medication (Krell, Leuchter, Morgan, Cook, & Abrams, 2004), and positive outcome expectancies predict several outcome measures at post-treatment after cognitive-behavioural treatment for chronic fatigue syndrome (Goosens, Vlaeyen, Hidding, Kole-Snijders, & Evers, 2005). Patient expectations of the likelihood of experiencing severe nausea during chemotherapy have been found to be a strong predictor of actual nausea (Montgomery et al., 1998; Roscoe et al., 2004). Furthermore, negative expectations regarding the course of one's illness have

been found to predict poor outcome for chronic fatigue symptoms in a controlled clinical trial (Chadler, Godfrey, Ridsdale, King, & Wessely, 2003).

Additional evidence that expectancies play a role in physical symptomatology can be found in experiments where symptoms have been reduced by manipulating patient expectancies, usually via suggestion. Such experiments have found that enhancing expectations for a positive outcome can increase gastrointestinal motility in patients undergoing abdominal surgery (Disbrow, Bennet & Owings, 1993), reduce blood loss during elective spinal surgery (Bennett, Benson, & Kuiken, 1986), modulate cellular immune dysregulation (Kiecolt-Glaser, Marucha, Atkinson & Glaser, 2001), enhance immune reactions to an injection of tuberculin (Smith & McDaniel, 1983), and potentiate release of endogenous dopamine (Fuente-Fernandez et al., 2001).

## V. How Expectancies Lead to Placebo Effects

This review has clearly revealed that across a wide range of different therapeutic contexts, one's expectations about their symptoms, their illness and the outcome of their treatment can have a notable impact on one's response to treatment. Having established the association between a person's expectations and their response to interventions (see also Crow et al., 1999), we are left with the difficult question of *how* expectancies influence therapeutic outcomes. Despite Kirsch's position that response expectancies are directly self-confirming, there are several factors that have been proposed to mediate this relationship, including behavioural change, cognitive-attentional biases, emotional change and neurobiological change. Although a clear understanding of the mechanisms by which expectations influence outcome is not integral to the proposed research, they will be summarized here to satisfy the potential curiosity of the reader and strengthen our

key assumption that positive treatment expectancies contribute to positive intervention outcomes.

#### A. Behavioural Change

Some contend that positive expectations of treatment outcome contribute to better outcomes via changes in a patient's behaviours, such as improved adherence to treatment, greater activity levels or increased seeking of social support (Stewart-Williams, 2004). There are at least two studies that have shown that positive expectations are related to behaviour change. It has been demonstrated that positive expectations are related to better self-care in chronic disease patients (De Ridder et al., 2004), and that higher pre-operative expectations predict later adherence to a complex medical regimen (Leedham, Meyerowitz, Muirhead, & Frist, 1995). Although there may be a role for behaviour change, this proposed mediator of expectations cannot account for many instances of expectation-mediated placebo responding. For example, it is difficult to argue that behavior change is responsible for the significant placebo analgesia effects demonstrated using the open versus hidden paradigm for post-operative pain (Colloca & Benedetti, 2005).

#### B. Cognitive- Attentional Biases

It is suggested that expectations about the effects of a treatment may contribute to subjective changes through the creation of cognitive-attentional biases (Caspi & Bootzin, 2002). Stewart-Williams (2004) suggests that expectations may induce schematic processing changes, wherein there is an increased likelihood that subjects may perceive and recall an effect when none has occurred, or when changes are small. Alternatively,

subjects with greater expectations may overlook ambiguous or disconfirming symptoms in post-treatment reports. As discussed by Stewart-Williams (2004), the activation of these cognitive schemas (e.g., “I will experience analgesia”) may serve to direct one’s attention inward towards sensations indicative of analgesia. He notes that there is evidence that attending to internal experiences such as sensations and emotions can amplify these experiences (Franzoi, 1996). Some potential support for this theory is found in a study where individuals with greater expectations of the benefit of elective surgery reported more *perceived* improvement in their symptoms, but not fewer symptoms or better health post-surgically than individuals with lower expectations (Flood, et al., 1993). These investigators suggest that perhaps those with greater expectations place more importance on any mild symptom improvements that they experience.

Further support for the idea that expectations may influence outcomes via cognitive-attentional biases comes from cases where a reverse placebo effect is found. An example of a reverse placebo effect is when subjects are given a placebo together with the suggestion that it is a relaxant, yet some subjects report increased arousal relative to baseline (Duncan & Laird, 1980). It has been suggested that individuals who have a tendency to attend to internal stimuli, as opposed to external stimuli (e.g., verbal suggestion), may selectively attend to and notice sensations associated with arousal as opposed to relaxation, which then produces a reverse placebo effect (Sirois, 2001, 2009). It could be argued that selectively attending to and reporting disconfirming symptoms may interact reciprocally with the contingent activation and confirmation of expectations for arousal. Overall, at this time there is neither strong support nor refutation for the

account that cognitive-attentional biases mediate the expectancy-outcome relationship. However, as discussed later, such attentional biases likely modulate the strength of situationally induced expectations (Sirois, 2001, 2009).

### C. Emotional Change

It has been suggested that positive expectations may induce emotional changes, which then contribute to better health. For example, there is a strong health psychology literature that shows that lower levels of anxiety, depression or demoralization contribute to better psychological and physical health, via reduced stress hormone levels, improved sleep, greater activity, etc. (Stewart-Williams, 2004). There is certainly some evidence that suggests that expectations may influence subjective health via changes in affective states. For instance, one study found that positive outcome expectancies (measured on a general optimism scale) were related to decreased symptom reports in patients with diabetes, and that this relationship was mediated by decreased negative affectivity (DeRidder, Fournier, & Bensing, 2004). Another study found that both reduced expectation of pain and reduced fear of pain contributed to placebo analgesia (de Jong, van Baast, Arntz, & Merckelbach, 1996), yet here a mediation model was not tested. At this time, there have been no empirical studies directly testing the role of emotional change in mediating the relationship between expectations and outcome. There is reason to believe that this model of mediation is insufficient. Specifically, placebo analgesia research demonstrating the link between expectation and analgesia (Montgomery & Kirsch, 1996; Price et al., 1999) has also shown that placebo effects can be found in specific body zones but not others simultaneously, suggesting that these effects are not mediated by global mechanisms such as anxiety reduction.

#### D. Neurobiological Change

In Kirsch's (1985) response expectancy model of placebo effects, he posits that expectancies lead to placebo effects directly, (i.e., they are not mediated by other psychological or behavioural factors). This model implies that expectations induce neurophysiological events that manifest as placebo effects. This indeed is the 'black box' of this field of study, yet a lot of headway has been made in the last few years. Research has shown that placebos can produce changes in the brain similar to those of the drugs they are 'mimicking' (Lieberman et al., 2004), and brain imaging studies have shown that placebo effects are associated with specific and localized changes in brain functioning (Haour, 2005). For example, placebo dopamine administration is associated with the release of endogenous dopamine and binding to the corresponding receptors (De la Fuente-Fernandez, et al., 2001; De la Fuente-Fernandez & Stoessl, 2002). A similar effect has been shown for caffeine; placebo caffeine seems to stimulate the same neurochemical actions as does the ingestion of real caffeine (Kaasinen, Aalto, Nagren & Rinne, 2004).

Considerable progress has been made in our understanding of the neurobiological mechanisms of the placebo effect, and most of our knowledge originates from the field of pain and analgesia (see Colloca & Benedetti, 2005 for a review). Petrovic and colleagues (2002) demonstrated that placebo and opioid analgesia share a neuronal network. It has also been shown that placebo analgesia operates through both opioid and non-opioid mechanisms (Gracely et al., 1983; Amanzio & Benedetti, 1999) and researchers have begun to discuss the distinction between bottom-up pain pathways and top-down 'expectation' pathways of drug analgesia (Colloca & Benedetti, 2005). Functional neural

imaging studies (fMRI) have found that placebo analgesia is related to decreased activity in pain-sensitive brain regions (Kong et al., 2006; Wager et al., 2004), and it has been shown that expectations of analgesia correlate with opioid release in some of these areas (Zubieta, Yau, Scott, & Stohler, 2005). At this time there have been at least two theories proposed to understand the neural circuitry of expectation-induced analgesia (see Enck, Benedetti & Schedlowski, 2008; Lieberman et al., 2004; Ploghaus, Becerra, Borras, & Borsook, 2003).

Research has also begun to uncover the neurophysiological correlates of the placebo or expectation response in conditions other than pain, such as Parkinson's, depression, immunological and hormonal responses and cardiovascular responses (for reviews see Colloca, Lopiano, Benedetti & Lanotte, 2005; Pacheco-Lopez, Engler, Niemi & Schedlowski, 2006). For example, endogenous neurotransmitters released within the cortex and brain stem in response to expected pharmacologic effects have been shown to modulate immunologic and end organ function through distinct efferent neural pathways. Three of these pathways that have been extensively studied are the neocortical-sympathetic-immune axis, the brain stem-vagus-cholinergic pathway, and the hypothalamus-pituitary-adrenal immune axis, which modulate effects through the release of norepinephrine, acetylcholine, and adrenocorticotrophic hormone, respectively (Pacheco-Lopez et al., 2006). Additionally, brain-imaging studies have discovered some of the neural correlates of placebo-induced reductions in taste aversion (Nitschke et al., 2006; Sarinopoulos, Dixon, Short, Davidson & Nitschke, 2006), and visually induced anxiety (Petrovic et al., 2005). Advances in understanding the neural circuitry involved

in expectation-induced autonomic responses are thought to be relevant towards the understanding of how expectations affect the immune system (Lanotte et al., 2005).

#### E. Summary

There have been several accounts about how response expectancies may come to generate objective and subjective changes in people. A fair amount of recent research has focused on the neurobiological changes that accompany placebo administration. Despite this recent focus, it is conceivable that in the near future we will see the integration of cognitive-attentional, affective and neurobiological factors into a dynamic and reciprocal model of how response expectancies induce therapeutic changes.

### VI. Inducing Expectancies

As discussed above, modern models of placebo effects recognize that response expectancies are central (Stewart-William, 2004), and it has come to be accepted that expectations can play a role in influencing outcome in any treatment scenario. The ‘expectation effect’ account does not rule out the influence of the therapeutic relationship, the provider’s expectations, or sociocultural factors; instead it is thought that the effects of such factors come through their influence on the recipient’s expectancies (Stewart-Williams & Podd, 2004). Those who write about the expectation account of placebo responding agree that people may acquire expectancies in various ways, for example through conditioning, observational learning, direct personal experience, or verbal suggestion (Kirsch et al., 2004; Stewart-Williams, 2004; Vase, Robinson, Verne & Price, 2003). Other than this general agreement, there has not been much discussion or investigation regarding the genesis or the correlates of these important response



expectancies. As outlined above, the focus of work in this area has been on testing the role and influence of response expectancies, as well as their mechanisms of action. This line of research is crucial and intellectually interesting, and support for the role of expectancies and research into their mechanisms of action are certainly accumulating. However, it is felt that at this point, it can also be clinically relevant to examine the psychosocial factors that contribute to the magnitude of expectancies (Janzen, Silvius, Jacobs, Slaughter, Dalziel, & Drummond, 2006). Since we know that expectations regarding treatment contribute to significant amounts of variance in treatment outcome, from a clinical point of view it is important that we now begin to understand what factors contribute to these expectations. This remains an area of study that has not yet been sufficiently explored, and is the focus of the current research. In order to proceed, we will first explore theoretical accounts of expectancy formation.

#### A. Theories of Expectancy Formation

On a basic level, expectancies are defined as beliefs about a future state of affairs. They are subjective probabilities linking the future with an outcome at some level of probability ranging from merely possible to virtually certain (Olson, Roese & Zanna, 1996). It is thought that expectancies have evolutionary significance, as one of the fundamental purposes of the brain is to anticipate the future (Dennett, 1991). The capacity for memory has survival value in that it allows for the learning of contingencies between two stimuli/responses; contingencies that can be used to anticipate the future relationships between these stimuli and responses so that the organism can minimize punishment and maximize reward. Thus, it follows that evolution must have favoured

organisms that managed to construct predictions about future contingencies (i.e., expectancies).

As noted above, expectancies are considered one type of belief, namely, beliefs about the future. Not all beliefs are expectancies, but all beliefs imply expectancies (i.e., it is possible to derive an expectancy from any belief). For example, ‘Fire is hot’ is a belief, ‘If I touch fire I will be burned’ is an expectancy derived from the belief. ‘Fire is hot’ is not an expectancy itself, but a belief about the world. As expectancies are beliefs about the future, the question of how expectancies form is really a question of how beliefs are formed (Olson et al., 1996).

Beliefs themselves can be classified in an innumerable number of ways (e.g., beliefs about cats, beliefs about what people do in the spring, etc). As such, it is sometimes considered more productive to classify the sources from which beliefs are developed (Olson et al., 1996). Olson et al. outline that beliefs come from three major sources; namely, a) direct personal experience, b) indirect experience (vicarious learning, communication from others), and c) other beliefs. Moreover, ‘other beliefs’ are acknowledged to have formed from either direct experience or third-party communications, and often can be conveniently categorized as beliefs about the self, beliefs about others and beliefs about the world. Note the similarity here between the sources of belief development and the sources of response expectancy development mentioned above. Specifically, in both cases it is agreed that beliefs (and thus expectancies) can be induced via direct or indirect experience with the world. Although Kirsch (1985) comments briefly that attributional processes may also be a source of response expectancies, he doesn’t elaborate about how ‘other beliefs’ may be an

important source for expectancy development. Luckily, general expectancy theory does elaborate how other beliefs may also be a source of specific beliefs (and thus expectancies). For example, causal attributions may be a source of beliefs: if something is attributed to stable causes, similar outcomes will be expected in the future. Furthermore, logical inferences are made to derive situation-specific beliefs from other existing beliefs (e.g., nice doctors are effective doctors, thus the treatment received from this nice doctor will be effective).

Expectancies are thought to vary on certain dimensions, most notably in level of certainty, or strength/ magnitude. The source of the belief/ expectancy development is thought to be one of the determinants of the level of certainty of a particular expectancy. For instance, if the expectancy was formed based on direct personal experience, it is thought to be held with more certainty than if developed from indirect experience (Fazio & Zanna, 1981; Stewart-Williams, 2004). What is harder to predict is the relative level of certainty for expectancies derived from beliefs that are derived from other beliefs (Olson et al., 1996). Furthermore, in the general expectancy literature, there seems to be little theoretical or empirical work focused on how various relevant pieces of information are integrated to determine the level of certainty of a specific expectation. Since the strength of treatment outcome expectancy has been found to correlate substantially with subjective and objective outcome parameters, it may be clinically relevant to begin to develop an integration model.

Fortunately, there has been some initial work in this direction among placebo researchers and theorists. For instance, most researchers agree that both situational and individual factors interact to contribute to the magnitude of a placebo effect (Enck &

Klosterhalfen, 2005; Geers, Helfer, Kosbab, Weiland & Landry, 2005; Montgomery, David, DiLorenzo & Erblich, 2003; Patel et al., 2005), and most agree that the placebo effect is mediated by expectancies. As such, there has been some effort to discuss how different sources of information are used in the determination of response expectancy and placebo effects. The Belief-Activation Model, proposed by Sirois (2001, 2009), is a useful contribution to this discussion.

## B. Belief-Activation Model

The Belief-Activation Model (BAM) is the first model of placebo responding to really integrate the contribution of situational and individual factors to the strength and direction of treatment expectancies. This model highlights the interaction of contextual and individual differences in the formation of positive or negative placebo effects. Contextual differences are considered ‘placebo-salient cues,’ which include differences in the physical, informational, and interactive aspects of the intervention context, including verbal suggestions. Such placebo-salient cues are thought to activate expectations about the specific treatment and its context. Presumably, certain aspects of the environment will activate ‘other beliefs’ about what to expect in ‘this type’ of environment, beliefs that were formed previously based on direct or indirect experiences. Sirois’ Belief-Activation Model acknowledges that expectancies can also be reflections of more inclusive beliefs about healing outcomes; beliefs that are influenced both by personal experiences and culturally specific beliefs. This model is unique in that it highlights the importance of individual difference variables in the generation of a placebo response. In particular, it is posited that certain individual difference variables can either enhance or attenuate the strength of the treatment expectancies that are activated by placebo-salient

cues. This model is useful in that it can explain why there is variability in treatment expectancies and placebo responses across individuals even when contextual factors remain constant. It acknowledges that each individual will come to the treatment setting with a unique set of beliefs about illness and healing (e.g., ‘I have a weak immune system’), as well as unique psychological characteristics (e.g., low levels of self-focused attention) that can modulate the personal salience of situational cues.

## VII. Purpose of Current Research

The current research was inspired by the placebo literature, which has highlighted the importance of treatment expectancies in the generation of treatment outcomes, both in experimental and clinical contexts. Given that such treatment expectancies have been shown to play a central role in the placebo effect, as well as in the outcome of active treatments, it is thought that anything that helps activate and maintain these positive expectations may facilitate overall improved treatment outcomes across a variety of settings and conditions. Understanding the development of such expectancies is thus an important endeavor, one that has not received much empirical attention (Olson et al., 1996; Janzen et al., 2006). As noted earlier, the contextual factors that contribute to the strength of positive treatment expectancies have been well studied in the placebo literature (Harrington, 1997). However, much less empirical work has examined the contribution of personal factors. Theoretically, there has been some effort to identify those person-specific factors that will contribute to the formation of treatment expectancies. Kirsch’s Response Expectancy Model of the placebo proposes that both verbal suggestion and prior learning (via conditioning, observation or direct experience) will influence the magnitude of one’s expectations of outcome. Second, the general

expectancy literature adds that expectancies are derived from beliefs, and that beliefs are formed based on information garnered through direct experience, third-party communication, or derived from other beliefs. The Belief-Activation Model of the placebo acknowledges the influence of contextual factors but also highlights a role for both individual difference factors and health beliefs in the generation of a placebo response. The goal of this project was to combine these models of placebo responding and expectancy formation, to hold the contextual variables constant, and to really focus on identifying the psychosocial variables that contribute to treatment expectancies. It is important to note that this research was not designed to test these models, but to synthesize and extend them by identifying and testing the types of health beliefs, the range of individual difference factors and the specific context-dependent psychosocial variables that contribute to one's level of expectation to benefit from treatment.

In order to identify potential psychosocial variables that may influence the magnitude of expectancies, several literatures are reviewed herein. First, the placebo and health psychology literatures are reviewed to identify individual difference factors that have been found to contribute either to treatment expectancies, placebo responses or to health outcomes. This will be followed by a similar review identifying important health belief factors. Following this, a review will be made of the psychosocial correlates of symptom report in people with irritable bowel syndrome (IBS), the clinical population that has been chosen to be a model for this investigation.

### VIII. Identifying Individual Difference Variables

In the placebo literature, there have been many individual factors suggested to contribute to placebo effects in general and outcome expectancies in particular. One's

level of faith, optimism, trust, anxiety, and suggestibility are all concepts associated with placebo reactivity (Chaput de Saintonge & Herxheimer, 1994; Vase et al., 2003).

However, few of these variables have been tested or verified empirically. Sirois (2001, 2009) reviewed several individual difference factors that have been suggested, over the years, to influence placebo responding. It was found that factors such as demographics, hypnotizability, religiosity and acquiescence have not been reliably associated with placebo responsiveness.

#### A. Self-Focused Attention

One individual difference factor found to influence placebo responding is self-focused attention, conceptualized as a predisposition to focus on and be aware of internal states and sensations. Sirois (2001, 2009) reviewed the empirical support for the influence of self-focused attention on placebo effects and incorporated this factor into the Belief-Activation Model. Briefly, it has been found that individuals with higher levels of self-focused attention (either naturally or via induction) are less responsive to placebo suggestions (Gibbons & Gaeddert, 1984) and sometimes display a reverse placebo response (Duncan & Laird, 1980; Gibbons, Carver, Scheier, & Hormuth, 1979). The Belief-Activation Model provides an explanatory framework for understanding how self-focused attention alters placebo responsiveness. Sirois notes that attention is a limited resource; the more focus directed toward internal stimuli, the less attention is paid to external information (Carver & Scheier, 1981). Thus, although placebo-salient cues (e.g., verbal suggestion) may induce expectations for certain physiological responses, focus on internal cues may detract from, or contradict, these externally activated expectations. In order to resolve this belief conflict, it is posited that the individual combines these beliefs

into a more inclusive expectancy, for example, that ‘Although the treatment is normally effective, I will not necessarily benefit from this treatment.’

In contrast to the findings presented above, recent research suggests that greater self-focused attention can also increase placebo responding. In particular, Geers and colleagues (Geers, Helfer, Weiland, & Kosbab, 2006) describe a study wherein self-focused attention was manipulated by having half the participants tally their negative internal sensations after ingesting a (placebo) drug “known” to produce negative sensations as a side effect. Participants were also randomly assigned to conditions differing in their level of placebo suggestion. The ‘unconditional expectation’ group was told that they were receiving the active drug; whereas the ‘conditional expectation’ group was told that there was a 50:50 chance of receiving the ‘active’ drug or a placebo, and a control group was given no placebo suggestion. Placebo responding (increased negative sensation reporting) was only observed among those in the unconditional expectation group who received the manipulation designed to increase self-focus. These results suggest that increased self-focused attention led to increased placebo responding because participants with stronger expectations directed more of their attention to internal sensations that confirmed these expectations. Findings such as these are consistent with the Belief-Activation Model, which posits that an individual’s predisposition to be internally focused represents one individual difference factor that moderates the magnitude of one’s expectations of treatment outcome. An adaptation to the model that is suggested by these findings is that self-focused attention seems to be able to either increase or decrease placebo responding according to whether internal cues either



confirm or contradict one's initial expectations induced via external cues (verbal placebo suggestions).

An important point to mention is that the Belief-Activation Model proposes that the level of self-focused attention may alter the strength of the expectation activated by external information, at a point in time *after* a placebo has been administered. For instance, after receiving an intervention accompanied by information that it will result in relaxation, a highly self-focused individual would be particularly attentive to internal sensations. This intense internally focused attention may bring to awareness sensations that either contradict or confirm the initial expectation for relaxation, thus altering the strength of the expectation that the intervention will lead to relaxation. What remains unclear is which factors influence a person's tendency to attend to internal stimuli that confirm vs. contradict the initial expectations. The results of the Geers et al., (2006) study suggest that the strength of the initial expectations may be a factor that influences the attention to confirmatory or contradictory internal stimuli. This suggestion is based on their findings that increased self-focused attention was only related to increased placebo responding among those participants who were 'certain' that they were receiving an active drug with negative side effects, whereas there was no effect of increased self-focused attention among those told that they had a 50% chance of receiving the active drug.

There is evidence from the self-focused attention literature that suggests that this individual difference variable can indeed influence expectancies. In particular, it has been found that self-focus increases access to self-knowledge. According to expectancy theorists, accessibility is one of the determinants of the strength of a belief and its

corresponding expectancy (Olson et al., 1996). Furthermore, research has shown that increased self-focus (both trait and state) leads to perseverance of beliefs about self (Davies, 1982, 1993, 1994). With this in mind, it seems reasonable to suggest that personal health beliefs may be stronger predictors of treatment outcome beliefs (and expectancies) among individuals with higher levels of self-focus relative to individuals with lower levels of self-focus.

## B. Anxiety

In relation to health and treatment outcomes, the health psychology literature is replete with studies indicating that anxiety is negatively related to general health and recovery from illness (Rozanski, Blumenthal & Kaplan, 1999; Salaffi, Cavalieri, Nolli & Ferraccioli, 1991; see also Taylor, Kemeny, Reed, Bower & Grunewald, 2000). For example, anxiety has been found to exacerbate pain (Staats, Hekmat, & Staats, 1998), and to impair the immune system (Lundh, 2000). Anxiety has also been shown to influence placebo responsiveness. Studies have found that mild to moderate levels of pre-treatment state anxiety are predictive of an enhanced placebo response (Coryell & Noyes, 1988; Rickels, Baumm, Raab, Taylor & Moore, 1965; Rickels & Downing, 1967; Shipman et al., 1974; Zuckerman, 1974). On the other hand, high levels of trait anxiety have been found to reduce or eliminate the placebo response (Coryell & Noyes, 1988; Pollack et al., 1994; Uhlenhuth et al., 1998; Zuckerman, 1974), or contribute to a reverse placebo response (Loebel, Hyde & Dunner, 1986; Rickels & Downing, 1967; Uhlenhuth et al., 1998). Sirois (2001, 2009) has incorporated this individual difference variable into the Belief-Activation Model, specifying that levels of anxiety also act to moderate the strength of one's contextually-cued treatment expectancies. The role of anxiety is

explained in part by incorporating the well-established relationship between anxiety and self-focused attention. For example, it has been demonstrated that the state of anxiety is accompanied by attentional biases; individuals high in anxiety tend to selectively attend to threatening stimuli (Owens, Asmundson, Hadjistavropoulos & Owens, 2004; Mathers, May & Eysenck, 1990). Furthermore, it is noted that anxiety is thought to act in concert with self-focused attention, with the two being mutually enhancing. For example, Gibbons (1991) has suggested that self-focused attention is a necessary and integral part of the experience of anxiety, and self-attention promotes anxiety by enhancing awareness of this emotional state. Empirically, it has been demonstrated that anxiety and self-focused attention do co-occur (Mor & Winquist, 2002) and contribute to increased negative symptom reporting in medical and student populations (Ahles, Cassens, & Stalling, 1987; Martin, Ahles & Jeffery, 1991). The Belief-Activation Model proposes that the attentional deficits and biases involved with high levels of anxiety diminish an individual's ability to attend to placebo-salient cues, and thus diminish the establishment and/or maintenance of positive treatment expectancies.

Although there seems to be a reliable association between anxiety and health, and anxiety and placebo outcome (Sirois, 2001, 2009), at this time there are mixed results regarding the association of anxiety to outcome expectancies. One study found no relationship between state and trait anxiety and pre-intervention outcome expectancies for people undergoing oral surgery (McCarthy, et al., 2003); another reported no relationship between trait anxiety and expectations of nausea during chemotherapy treatment (Montgomery et al., 1998). On the other hand, fear (of re-injury) has been shown to be inversely related to expectations of treatment efficacy in a chronic pain sample (Goosens

et al., 2005). Furthermore, in a study of experimental placebo analgesia in an IBS sample, it was reported that levels of anxiety regarding upcoming pain was positively correlated with both expected and actual pain (Vase, Robinson, Verne & Price, 2005). Although the relationship between anxiety and treatment expectancies has not been clearly established, the empirically grounded Belief-Activation Model provides good theoretical support for this relationship.

### C. Optimism/ Pessimism

In the general health psychology literature, optimism has been identified as an individual difference variable that pertains to relatively stable expectations that good things will happen, whereas pessimism pertains to expectations that bad things will happen (Steed, 2002). Research has verified that dispositional optimism consists of these two separate but often negatively correlated dimensions (Bryant & Cvengros, 2004). Behavioral medicine studies that have examined these dimensions independently, frequently report that optimism and pessimism show differential relationships to various measures of health in both clinical and non-clinical samples (Mroczek, Spiro, Aldwin, Ozer & Bosse, 1993; Robinson-Whelen, Kim, MacCallum & Kiecolt-Glaser, 1997; Rääkkönen & Matthews, 2008). In general, greater optimism has been linked to more favourable health indicators and outcomes, for example: stronger immune functioning (Segerstrom, Taylor, Kemeny, & Fahey, 1998), improved survival rates for cancer and heart disease patients (Allison, Guichard, Fung & Gilain, 2003; Buchanan & Seligman, 1995, respectively); and lower risk of overall mortality in a 30-year study (Maruta, Colligan, Malinchoc, & Offord, 2000). Perhaps not surprisingly, greater pessimism has been found to be associated with less favourable health indicators and outcomes, for

example: weaker immune functioning (O'Donovan, et al., 2008), more pain and lower functionality in post-surgical heart disease patients (Mahler & Kulik, 2000) and increased mortality rates among cancer patients (Schulz, Bookwala, Knapp, Scheier & Williamson, 1996).

In the placebo literature, optimism and pessimism are two of the individual difference variables whose influence on placebo responding have been studied directly. As the personality literature suggests that pessimists are more likely to be influenced by negatively-toned information, Geers and colleagues (2005) decided to test individuals identified as optimistic or pessimistic on their responsiveness to a negative placebo (suggestion of unpleasant sensations). This study reported that although optimists in the placebo group did not report more unpleasant symptoms than the control group, individuals identified as pessimistic did show a placebo response (Geers, Helfer, et al., 2005). To explore the possible interaction of self-focused attention, half of the participants were encouraged to signal whenever they experienced a change in their level of unpleasant sensations. It was reported that this manipulation did not affect negative symptom reporting, suggesting that the influence of pessimism is not just a function of attentional biases. Geers and his research group (Geers, Kosbab, Helfer, Weiland & Wellman, 2007) subsequently looked at the relationship of optimism/ pessimism to placebo responding in a study where the placebo suggestion was positively toned (a writing task improves sleep quality). Here, it was found that greater levels of optimism were associated with improved sleep quality, yet only in the placebo group. In two non-placebo control groups (one completing the writing task without suggestion for sleep improvement, one with no writing task), optimism was not associated with improved

sleep quality, suggesting that in this sample, optimism was related to outcome only when there was a positive placebo suggestion. Although in both of these studies participants' expectations were not directly measured, it is likely that optimism/pessimism contributed to placebo responding by moderating the extent to which participants believed the experimenter's suggestions.

In another study, the relationship between optimism/pessimism and the strength of expectancies for non-volition responses was studied directly (Montgomery, David, DiLorenzo & Erblich, 2003). In this study, participants were asked how much they expected certain non-volitional outcomes (both positive and negative) to occur. For example, they were asked to rate how much alertness they expected to experience after drinking coffee (positive) or how much pain they expected to experience after undergoing surgery (negative). Here again, degree of dispositional pessimism was correlated with expectancies for negative non-volition occurrences, whereas optimism was not related to levels of expectancy.

One study has demonstrated that optimism positively influences expectations of benefit from clinical treatment. Weinfurt and colleagues (2003) conducted an interesting study examining patient characteristics that were associated with expectations of benefit from Phase I clinical trials for cancer treatment. Participants indicated their expectations of benefit on a visual analogue scale, and completed several survey measures regarding their health beliefs and personal characteristics. The authors reported a moderate positive correlation ( $r = .28$ ) between expectation of benefit and a single-item measure of general dispositional optimism. This suggests that individuals with higher levels of dispositional optimism also report higher expectations that they will benefit from treatment.

#### D. Hope

The predominant conceptualization of dispositional hope is that it is a “cognitive set that is based on a reciprocally derived sense of successful (a) agency (goal-directed determination) and (b) pathways (planning of ways to meet goals)” (Snyder et al., 1991, p. 571). Dispositional hope is a variable that has also been implicated as relevant in contributing to health outcomes (Scioli et al., 1997; Snyder, 2002; Snyder, Sympson, Michael & Cheavens, 2001), and has been suggested to play a role in the placebo response (Yahne & Miller, 1999). Hope is a construct similar to optimism, although recent research has indicated that hope and optimism are distinct constructs (Bryant & Cvengros, 2004). In particular, hope has been distinguished from optimism as it considered more of an affective state, used in situations where outcomes are deemed more important, less likely and under less personal control (Bruininks & Malle, 2005). Similarly, expectancies and hope have been shown to be independent but related constructs, and it has been shown that hope contributes to response expectancies for non-volitional responses (Montgomery et al., 2003). In a recent qualitative study examining expectations of benefit in randomized clinical trials, hope was mentioned by almost all participants as a factor that contributes to their positive treatment expectancies (Stone, Kerr, Jacobson, Conboy, & Kaptchuk, 2005). Based on the empirical and theoretical support for the contribution of hope to health, placebo responding, response expectancies and positive treatment expectancies, this individual difference variable is thought to warrant further study.

## IX. Identifying Health Belief Variables

The general literature on expectancy formation specifies that an individual's preexisting beliefs can be an important source of information in the generation of specific current beliefs and thus, expectancies. Furthermore, the Belief-Activation Model specifies that external cues will interact, either synergistically or competitively, with an individual's personal health beliefs to influence the strength of treatment expectancies. One of the purposes of the proposed research is to further extend and refine our understanding of the contribution of these various 'health beliefs' to the strength of positive outcome expectancies. As stated above, the placebo, health psychology and IBS literatures will be reviewed in order to identify additional personal health belief variables that may contribute to the strength of one's outcome expectancies.

### A. Perceptions of Health

Subjective perception of one's current health is known to be a powerful predictor of one's future health (Idler & Kasl, 1991; Kaplan & Camacho, 1983; Whittaker, Kemp & House, 2007), and has even been reported to be a better predictor than current objective health status (Mossey & Shapiro, 1982). In two similar studies, 'health-related quality of life' has been identified as a variable correlated with individuals' expectations of benefit in Phase I clinical trials (Cheng et al., 2000; Weinfurt et al., 2003). In both these studies, the Medical Outcome Study – Short Form 36, which assesses a patient's overall perception of their health and physical functioning, was used to measure health-related quality of life. One of these studies also reported that expectations of benefit were positively correlated with 'relative health stock' (Weinfurt et al., 2003). This variable was considered an index of an individual's current perceived health, including their



expected longevity and quality of life. It seems clear from these studies that a person's general perception of how healthy they are exerts an influence on expectations of treatment efficacy. It is argued here that perceptions of current health can be considered one aspect of the greater umbrella concept of 'personal health beliefs.' As such, this variable will be included in the proposed research in order to ascertain its relative contribution to positive treatment expectancies.

## B. Control beliefs

One's belief about their level of control over their illness and healing is another variable that has been found relevant to health outcomes. Such 'control beliefs' have been studied extensively over the years, usually in one of two ways. One popular way is to measure the level of control attributed to three different sources (Levenson, 1973): internal (e.g., "I am in control of my health"), external/ powerful others (e.g., "My doctor is in control of my health), and chance (e.g., "My health status is mostly dependent on luck"). Other researchers have assessed the relative presence of a sense of perceived control over one's symptoms and illness. Overall, it appears that a greater sense of personal control over one's symptoms and illness contributes to more favourable mental and physical health outcomes and more favourable symptom reports in chronic illnesses (Affleck, Tennen, Pfeiffer, & Fifield, 1987; Marshall, 1991; Taylor, Kemeny, Reed, Bower & Grunewald, 2000; Tennen, et al., 1992). Furthermore, it has been noted that better outcomes are associated with weaker 'powerful others' control beliefs (external locus of control; Härkäpää, et al., 1996; Shelley & Pakenham, 2004; So, 1998).

Here it is suggested that control beliefs are another form of belief that will influence current expectancies about treatment efficacy. This suggestion is made based

on the idea that control beliefs constitute a form of attribution, specifically attributions of therapeutic change mechanisms with regard to one's symptoms or illness. In particular, Olson et al., (1996) predict that if positive changes are attributed to internal, stable causes (e.g., 'I am in control of my symptom improvement), then future positive changes will be expected. On the other hand, if changes are attributed to external (and perhaps unstable) causes, then expectations of benefit may be less certain.

Some preliminary evidence to support the relationship between personal control beliefs and beliefs about treatment effectiveness has been demonstrated in studies using the Illness Perception Questionnaire –Revised (Moss-Morris, Weinman, Petrie, Horne, Cameron & Buick, 2002). This scale contains several subscales, one of which, labeled 'treatment control' could be considered as a measure of treatment expectancies. Three of the five items that load on this subscale refer to beliefs about the ability of one's current treatment to control aspects of one's illness (e.g., "My treatment can control my illness" and "The negative effects of my illness can be prevented (avoided) by my treatment"). Two other items that load less strongly refer more to feeling of lack of control (e.g., "There is little that can be done to improve my illness"). When this scale was validated using a large sample of mixed illness groups, it was found that the 'personal control' subscale, which contains six items pertaining to beliefs of personal control over one's illness and symptoms, was strongly positively correlated with the treatment control subscale.

### C. Self-Efficacy

In Bandura's (1977) social learning theory (now called social cognitive theory), he introduced the concept of self-efficacy as an additional type of expectancy that

contributes to guiding behaviour, in conjunction with the expectancies that a behaviour will lead to reinforcement and that the reinforcement is valuable (Rotter, 1954). Self-efficacy expectancies reflect one's confidence regarding one's ability to execute behaviour that reinforcement is contingent upon. The utility of the concept of self-efficacy in understanding health behaviours has been wide-ranging (O'Leary, 1992), so much so that self-efficacy has been adopted into most theories of health behaviour. Various types of perceived health-related self-efficacy have been found to predict adjustment to illness (Aarnold et al., 2005; Lev, Paul & Owen, 1999; Shelley & Pakenham, 2004), better self-care in the context of illness (de Ridder et al., 2004), as well as better physical health and well-being (Marshall, 1991; Schwarzer & Fuchs, 1995). In one impressive study of self-management education for arthritis sufferers, it was demonstrated that over four years, participants enjoyed an increase in their arthritis self-efficacy, which correlated with decreased pain reports and fewer visits to their physicians (Lorig, Mazonson & Holman, 1993). 'Health self-efficacy' in particular refers to the extent to which one feels confident and capable of doing what is necessary to control one's health in general (Sirois, 2003), and has been found to predict health behaviours among individuals with chronic illness (Sirois, 2008).

Another type of self-efficacy that is relevant in the context of health outcomes is coping self-efficacy, which refers to beliefs about one's ability to cope with the day-to-day aspects of their symptoms. This health belief variable has been found to be associated with improved health outcomes in illness groups, primarily through its relationship with treatment adherence. For example, coping self-efficacy is correlated with self-care in diabetics (Williams & Bond, 2002), as well as adherence to

cardiovascular health-promoting behaviors (Ewart, 2002). Although the relationships between treatment expectancies and health self-efficacy or coping self-efficacy have not been examined directly, the reported link to health outcomes and health-related variables flag both these variables as relevant targets of study for the research proposed herein. Furthermore, Olson et al (1996) note that high self-efficacy implies that success is expected and that success reflects personal capacities (Bandura, 1977); thus, individuals with high self-efficacy will attribute positive changes to internal controllable factors and will expect future positive changes.

#### X. Context-dependent Psychosocial Variables

Imagine a situation where an allopathic physician prescribes a pharmacological intervention to treat fibromyalgia, along with the suggestion that this intervention will address the generalized aches and pains (myalgia) associated with this condition. The ability of this specific intervention to elicit strong positive expectations of outcome may depend on a variety of personal factors that become relevant only in this specific context (a specific treatment administered by a specific physician); for example, whether an individual has a previous negative experience with this type of intervention or physician, or perhaps whether he/she agrees that the pain is best treated through pharmacology. These types of variables are intrinsic to the individual, but may only become relevant in a specific context. The potential relevance of several of such context-dependent psychosocial variables is explored in this section.

## A. Past Experiences with Treatment

An individual's previous experience with a specific type of treatment is assumed to exert a strong influence on their current expectations of treatment (Montgomery & Bovbjerg, 2000) and on their responsiveness to placebos (Enck & Klosterhalfen, 2005; Chaput de Saintonge & Herxheimer, 1994). In fact, in the expectancy literature, previous experiences are considered to be more effective in shaping expectancies than any informative factors such as verbal suggestion (Olson et al., 1996; Stewart-Williams, 2004). Some research has directly linked previous experience with current expectancies, both in laboratory and clinical settings. For example, past experiences with non-volitional responses have been shown to correlate with current expectancies for non-volitional responses (Montgomery et al., 2003), and in the qualitative study mentioned above, past experiences with treatment was mentioned by all participants when discussing their expectation of benefit in a Phase I clinical trial for cancer treatment (Stone et al., 2005).

Strong support for the role of previous experience has also been found in studies of placebo analgesia. In one study, some subjects were randomly assigned to receive a surreptitious lowering of the painful stimuli after receiving what they were told (deceptively) was an analgesic treatment, in order to make them believe that the treatment was effective (Colloca & Benedetti, 2006). When later given the same placebo treatment and exposed to the original higher intensity painful stimuli, a strong placebo effect was demonstrated. This effect was demonstrated after minutes and also lasted from four to seven days. In some subjects who did not receive the lowering of the pain stimulus, a placebo effect was still demonstrated, even days later, but the effect was much smaller.

Thus, small and large placebo responses were obtained, depending primarily on the previous negative or positive experience with the analgesic treatment. They emphasize that in this study, verbally induced expectancies of analgesia alone resulted in either significant placebo responses, or no response at all, depending on the previous positive or negative experience of the participant. The authors are not definitive regarding whether the influence of previous experience in this study was mediated through conditioning or expectancies, but they suggest that the conditioning procedure they used produced increased expectations of benefit.

## B. Illness Attributions

In general, expectancy theorists view causal attributions as a potential source of situational expectancies (Kirsch, 1985; Olson et al., 1996). One's attributions about the cause(s) of their symptoms and/or illness are often referred to as illness attributions, although it is recognized that attributions for one's illness may be distinct from attributions for one's symptoms (Robbins & Kirmayer, 1991). Although such attributions could feasibly be stable over time, they can be considered as context-dependent as their relevance to one's current expectancies may vary as a function of the specific intervention being presented. Such attributions are often categorized as somatic, psychological, some combination of both, or normalizing (Robbins & Kirmayer, 1991). A recent meta-analysis has implicated illness attributions as a personal variable that may influence placebo responding among individuals with chronic fatigue syndrome (CFS; Cho, Hotopf, & Wessely, 2005). Knowing that there are often strong somatic illness attributions in patients with CFS, and that these attributions are associated with poorer health reports over time (Schmaling, Fiedelak, Katon, Bader & Buchwald, 2003) these

authors speculated that illness attributions (physical, psychological, or both) may influence patients' expectancies of treatment outcome (and thus their placebo responsiveness) across different types of intervention. Their analyses were designed to estimate the average placebo response in clinical trials of CFS and to determine whether intervention type influenced the magnitude of the placebo response. They report a pooled placebo response of 19.6%, and found that intervention type contributed to the heterogeneity of placebo responses, with psychological interventions eliciting a lower placebo response. The authors suggest that these differences across intervention type are a function of the influence of illness attributions on treatment expectancies. A complementary, but somewhat distinct explanation for these results can be proffered, based on the argument that one's attributions regarding the cause of their symptoms (somatic/ psychological) do not necessarily lead directly to one's attributions for symptom change (e.g., via a somatically-focused treatment vs. a psychologically-focused treatment). For instance, one could attribute symptoms to psychological factors, yet still prefer a pharmacological treatment to manage one's symptoms (e.g., a stress headache treated with ibuprofen). With this in mind, the results presented by Cho et al (2005) could indicate that individuals with CFS hold lower expectations for outcome (and show smaller placebo responses) when offered treatments that focus on psychological targets.

Another study involving participants with CFS demonstrated more directly that illness attributions were linked with treatment outcomes. In a randomized controlled trial of cognitive-behavioural therapy for CFS, greater somatic attributions predicted poorer outcome at follow-up (Chadler et al., 2003). This study seems to provide support for the idea that one's attributions can interfere with verbal suggestions provided by the

treatment provider. Specifically, individuals who attributed their illness to a physical problem were less able to benefit from this psychological intervention. These studies suggest that it is reasonable to hypothesize that illness attributions (for either the cause of symptoms or the management of symptoms) can alter the magnitude of positive treatment expectancies.

### C. Motivation

Motivational factors, such as desire for relief or desire to please the experimenter or physician, can also be considered as context-dependent psychosocial variables as they may fluctuate from one temporal or spatial context to another. In placebo literature in particular, motivational factors have been of interest as they have been proposed as a potential mediator of placebo responses. Some authors posit that motivation is a factor that contributes to placebo responding independently of outcome expectations (Vase et al., 2003), while others incorporate the two by suggesting that one's motivation (conscious or subconscious) to respond in the suggested direction will moderate the strength of the outcome expectancy (Geers, Weiland, Kosbab, Landry & Helfer, 2005). The results of various studies examining the contribution of motivational factors have been mixed.

A study by Price and colleagues (1999) separately examined the correlations between desire for pain relief, expectations of pain relief and actual placebo analgesia. Part of their rationale for examining motivation factors included findings from the placebo analgesia literature showing that placebo responses in experimental pain increase as a function of the duration and severity of pain (Jospe, 1978). In the Price et al study, it was found that desire for pain relief was not related to the magnitude of placebo



responding. The authors suggest that despite the range of desire ratings reported, this variable may not be as potent in experimental studies of pain among healthy participants subjected to brief pain stimuli, compared to its role among populations who report clinical pain.

Addressing this issue, Vase and colleagues (2003) conducted a placebo analgesia study using evoked rectal distention in patients with irritable bowel syndrome. After baseline exposure to the noxious stimuli and treatment with a ‘powerful analgesic’ placebo, they asked patients to rate both their desire for pain relief as well as their expectations of pain relief. These authors report that together, desire for relief and expectations of pain accounted for over 70% of the variance in actual pain ratings (although expectancy had the only significant beta weight in a simultaneous regression). The data from this study was later reanalyzed to examine the contribution of expectancies and desire to placebo effects (not just pain ratings) by calculating change scores from baseline measurement to post-placebo measurement (Price, Chung & Robinson, 2005). Here, the interaction of desire and expectancy was a significant predictor of placebo effects. Unfortunately, the authors do not offer a description of this interaction; therefore, it is unclear whether motivation (desire for relief) predicts placebo analgesia independently of one’s expectations, or whether motivation contributes to placebo responding in part by strengthening one’s expectations for relief.

Others have presented a more elaborated model of how motivation can strengthen or attenuate the magnitude of one’s expectations of treatment, and subsequently one’s response to a placebo intervention. Specifically, Geers, Weiland and colleagues (2005) speculate that the placebo effect is most likely to occur when individuals have a goal that

can be fulfilled by confirmation of the placebo expectation. Their ‘goal-activation’ model posits that although situational cues may induce expectations of treatment, if a person’s goal for treatment (conscious or subconscious motivation) is incompatible with the placebo expectations, expectation will be attenuated and have less influence on one’s somatic experience. They further speculate that a placebo-compatible goal directs cognitive processing and behaviour towards the confirmation of placebo expectation. These authors tested their model in five separate experiments where some subjects were primed to have a particular goal with respect to the placebo treatment. Overall, they report that larger placebo effects were found when individuals were primed to have placebo-compatible goals. As expectations were never directly measured in these studies, it is difficult to distinguish whether goals to cooperate with the placebo suggestions enhanced expectancies and thus placebo responding, or whether goals to cooperate independently influenced placebo responding. Nevertheless, this series of studies provides support for the importance of motivation factors in the generation of placebo effects, and furthermore indicates that a closer examination of the influence of motivations on expectancies is warranted.

#### D. Patient-Provider Relationship

There is an additional context-dependent psychosocial factor whose contribution to outcome expectancies will be examined in the proposed research. It is a relational factor, specifically, the quality of the patient-provider relationship. It has been suggested in the placebo literature that ‘common factors in therapy’ (i.e., the therapeutic alliance) are additional factors that can shape treatment expectancies (Di Blasi et al., 2001; Pacheco-Lopez, Engler, Miemi & Schedlowski, 2006; Stewart-Williams, 2004; Turner,

Deyo, Loeser, Von Korff & Fordyce, 1994). Specific aspects of the patient-provider interaction that have been researched and found to be related to placebo responding include the provider's interpersonal skills (Oh, 1991), persuasive influence (Shapiro, 1971) and the time spent with the patient (Kaptchuk et al., 2006; Solomon, 2002). In the expectancy literature it has been noted that positive views about another person are found to be associated with the acceptance of that person's ideas (Harris & Rosenthal, 1985). Empirically, one study reported that more a positive perception of the patient-provider relationship contributed to greater expectations of benefiting from treatment (Beach, Keruly & Moore 2006). With this in mind, it is reasonable to hypothesize that positive beliefs about a provider would influence the degree to which a patient accepts their information (i.e., suggestions of treatment efficacy).

In the field of mental health, it is well-known that the therapeutic alliance is a strong predictor of treatment outcome (Lambert & Barley, 2002). Although this variable has not been as well studied in field of medical health, there are some reports that the quality of the patient-provider relationship is related to health outcomes (Beach et al., 2006; Sans-Corrales, et al., 2006). In the IBS literature, there have also been studies that indicate that dissatisfaction with one's provider is not uncommon and tends to contribute to negative attitudes regarding treatment (Chang et al., 2006; Dixon-Woods, & Critchley, 2000; Dhaliwal & Hunt, 2004). As this relationship variable has been identified as contributing to placebo responding, treatment expectancies and health outcomes, it is considered a relevant variable to include in the proposed research.

## XI. IBS as the Proposed Illness Model

To give a full account of the background and significance of the proposed research, it is important at this point to outline the rationale for choosing irritable bowel syndrome as the specific illness model to be explored herein. Irritable bowel syndrome (IBS) is a common functional gastrointestinal motility disorder that affects 10-20% of the general population, both males and females from a wide age-range (Cremonini & Talley, 2005). It is termed a ‘functional syndrome’ as the primary pathology is an altered physiological function (the way the body works), rather than an identifiable structural or biochemical cause. This disorder is characterized by abnormal stool consistency and frequency accompanied by abdominal pain. There are three different sub-types of IBS, including a constipation-predominant subtype (IBS-C), a diarrhea-predominant subtype (IBS-D) and an alternating sub-type (IBS-A).

IBS is an ideal illness model to study in this type of research for several reasons. First, IBS is diagnosed using a specific set of self-report symptom criteria and there are no physical findings or diagnostic tests needed to confirm the diagnosis; this makes it easier to conduct research online with this illness group. Second, IBS is known to be responsive to placebo treatment (Enck & Klosterhalfen, 2005; Mertz, 2003; Patel et al., 2005; Vase, et al., 2003), and thus presumably to variations in treatment expectancies, making it quite relevant to be studying the psychosocial correlates of treatment expectations in this sample. Although there have been relatively few studies examining the psychosocial correlates of placebo responding in people with IBS (Patel et al., 2005), one study that has directly addressed this research question identified patients’ expectations as a contributing factor (Vase, et al., 2003).

A final benefit of studying expectancies in people with IBS stems from the elusive nature of this syndrome. As there are no known organic indicators present in IBS, and since it has been shown to be responsive to psychological interventions (Lackner, Mesmer, Morley, Dowzer & Hamilton, 2004; Matsumoto, Sato, Yokoi, Yoshinaga, Shimura, & Sakano, 1998), there is a research literature examining the psychosocial correlates of IBS symptom reporting. In particular, the IBS literature is somewhat unique in that there has been a specific effort to examine the relationship of IBS symptomatology to health belief variables. As such, a review of this literature will be informative in identifying various psychosocial variables that may contribute to the activation of treatment-specific expectations. Ultimately, the results of this investigation should be able to contribute valuable information about the correlates of treatment expectancies in this sample, information that can be used to inform and improve intervention efforts in the treatment of IBS.

## XII. Psychosocial Factors Identified from IBS Literature

### A. Self-focused attention & Anxiety

Most research on the psychosocial variables relevant to IBS has focused on individual attributes that tend to present in people with IBS. Some of this research has found that individuals who seek treatment for IBS report higher than average levels of bodily preoccupation (or self-focused attention; Crane & Martin, 2002, 2004b; Gomborone, Dewsnap, Libby, & Farthing, 1995; Silverman et al., 1997) as well as higher levels of general and health anxiety (Barahmand, 2008; Crane & Martin, 2004; Hazlett-Stevens, Craske, Mayer, Chang, & Naliboff, 2003). In this literature as well, both self-focused attention and anxiety are associated with less favourable outcomes. It is

important to note, however, that this literature does not support a causative model. Crane and Martin (2002) have speculated that the relationship between body preoccupation and IBS symptomatology may be reciprocal. In particular, it is hypothesized that the sustained presence of discomforting and unexplained IBS symptoms likely contributes to increased anxiety as well as vigilance towards internal bodily states and sensations. In turn, as noted above, there is evidence that attending to internal experiences such as sensations can amplify these experiences (Franzoi, 1996). Moreover, there is an ever-expanding literature concerning the neurobiochemical relationships between emotionality, hypervigilance and gut motility (see Jones, Dilley, Drossman & Crowell, 2006; Mulak & Bonaz, 2004).

#### B. Illness Attributions

There have been a handful of studies investigating the illness attributions of people with IBS. In general, there has been an informal consensus that people with IBS tend to make somatic attributions for their symptoms, and this has been confirmed in early research (van Dulmen, Fennis, Mokkink & Bleijenberg, 1996). It has also been noted that individuals who seek treatment for their IBS make more somatic attributions for their IBS symptoms (as well as for non-IBS symptoms) than do non-treatment seekers (Martin & Crane, 2003). More recent research has contradicted this assumption somewhat; in one study it was found that people with IBS did not make more somatic interpretations of their symptoms than did other patients presenting to a GI clinic (Bray, Nicol, Penman & Ford, 2006). Another recent study found that levels of somatic symptom attribution were unrelated to quality of life in an IBS sample, whereas levels of psychological symptom attribution were positively correlated with quality of life

(Barahmand, 2008). The results have also been mixed when attributional styles have been examined in relation to symptom severity; in one study symptom severity was more strongly correlated with levels of somatic attributions (Gerson et al., 2006), yet in another it was more strongly correlated with levels of psychological interpretations (Bray et al., 2006). Although limited, this research suggests that illness attributions may be a relevant variable for individuals with IBS, as has been demonstrated for individuals with chronic fatigue syndrome (reviewed above).

### C. Control Beliefs

As in the general health psychology literature, control beliefs have been studied among individuals seeking treatment for IBS. As we would perhaps expect, it has been shown that a weaker perception of personal control over one's IBS symptoms is associated with less favourable outcomes (lower quality of life, lower satisfaction with health; Rutter & Rutter, 2002). Again, it should be noted that this relationship is not presumed to be unidirectional; on the contrary it is logical that increased symptom severity can be accompanied by a decreased sense of control over symptoms. Individuals with IBS have been found to endorse greater external locus of control than healthy participants (Hobbis, Turpin, & Read, 2003). Thus, here again, control beliefs have been associated with health status. However, the relationship between control beliefs and outcome expectancies has not been studied in this illness population.

### D. Vulnerability to Illness

Another finding that has emerged is that individuals seeking treatment for IBS show high levels of what could be called beliefs of 'vulnerability to illness.' In

particular, this patient group reports greater levels of disease phobia (fear of contracting a disease), and perceive themselves as being more at risk of developing health problems unrelated to their IBS symptoms (Crane & Martin, 2004b; Gomborone et al., 1995; Martin & Crane, 2003). One study found that an IBS patient group reported greater perceived illness vulnerability than other groups with chronic health problems, even while controlling for levels of self-focused attention, anxiety, depression, as well as levels of recent and current symptoms. Crane and Martin (2002) argue that if these beliefs are a part of one's enduring 'illness schema,' they are likely to reduce an individual's expectations for their own recovery.

#### E. Catastrophizing

Similarly, studies report that individuals with IBS often present reporting belief in the presence of serious pathology, as well as catastrophizing beliefs about their symptoms (Gomborone et al., 1995; Kolowski, Boyce & Talley, 2005). Such catastrophizing beliefs have been linked to poorer health outcomes among women with gastrointestinal disorders (Drossman et al., 2000; Rutter & Rutter, 2002), and have been found to partially mediate the relationship between depression and pain severity among individuals with IBS (Lackner, Quigley & Blanchard, 2004). By virtue of the fact that these negative health beliefs have been found to influence health outcomes, an empirical investigation of their contribution to outcome expectancies seems warranted.

### XIII. Identifying Additional Variables

This study also included a qualitative component, primarily designed to identify relevant psychosocial variables that may not have been identified in the literature review.



An open-ended question format was used, designed to provide participants with the opportunity to directly communicate their thoughts about their treatment expectancies. This type of qualitative research can be of great value in uncovering information in new areas of investigation such as this. Recently there has been one qualitative study examining factors that influence expectations to benefit from treatment among individuals participating in a Phase I randomized clinical trial for cancer medication (Stone et al., 2005). This study was among the first to demonstrate that several different variables (e.g., past experiences) may affect one's expectations of treatment, whereas previously it was thought that expectations were primarily a function of one's hope for benefit. This example highlights how qualitative research can complement a quantitative approach in identifying factors that contribute to the strength of treatment expectancies.

#### XIV. Aims

The global aim of this study was to work towards better and more cost effective medical interventions by encouraging increased attention to and improvement of a patient's expectations of treatment outcome. To facilitate this global aim, this project has surveyed several literatures to provide support for the central role of treatment expectancies in health interventions and to identify psychosocial variables that may contribute to the formation of such expectancies. Three models of placebo responding/expectation formation were combined into a single model that was used to guide this literature review, which has resulted in the identification of several psychosocial variables that may be relevant correlates of treatment expectancies. Many of these variables have been shown to directly influence the formation of treatment expectancies, whereas others are presumed to influence expectancies based on their relationship to

placebo responding, health outcomes, symptom reporting or to each other. Please refer to Table 1 for a summary of the type of support available in the literature to inform the inclusion of each variable in the current study.

Table 1

*Summary of the Type of Empirical Results Available in the Literature to Link Each Independent Variable to Outcome Expectancies*

Independent Variable	Differential Placebo Responses	Differential Health Outcomes	Association with Outcome Expectancies
Self-focused Attention	Yes		
Anxiety	Yes	Yes	Yes / No
Optimism	Yes	Yes	Yes
Pessimism	Yes	Yes	Yes
Hope		Yes	Yes
Perceptions of Health		Yes	Yes
Control Beliefs		Yes	Yes
Self-Efficacy (Health & Coping)		Yes	
Vulnerability Beliefs		Yes	
Catastrophizing		Yes	
Past Experiences	Yes	Yes	Yes
Illness Attributions	Yes	Yes	Yes
Motivation	Yes		
Patient-Provider Relationship	Yes	Yes	Yes

Note. A ‘Yes’ in a particular column indicates that the specific variable has been shown to be associated with the result in that column. A ‘No’ indicates that that the specific variable has been found to not be associated with the result in that column. An empty cell indicates that the relationship between a specific variable and the result in that column has not been studied.

Figure 1 displays the resulting complex model that includes each of the variables identified as potentially relevant contributors to the magnitude of one’s treatment expectancies. One of the main purposes of the current investigation was to test the relationships of each of these variables to the magnitude of one’s treatment expectancies.

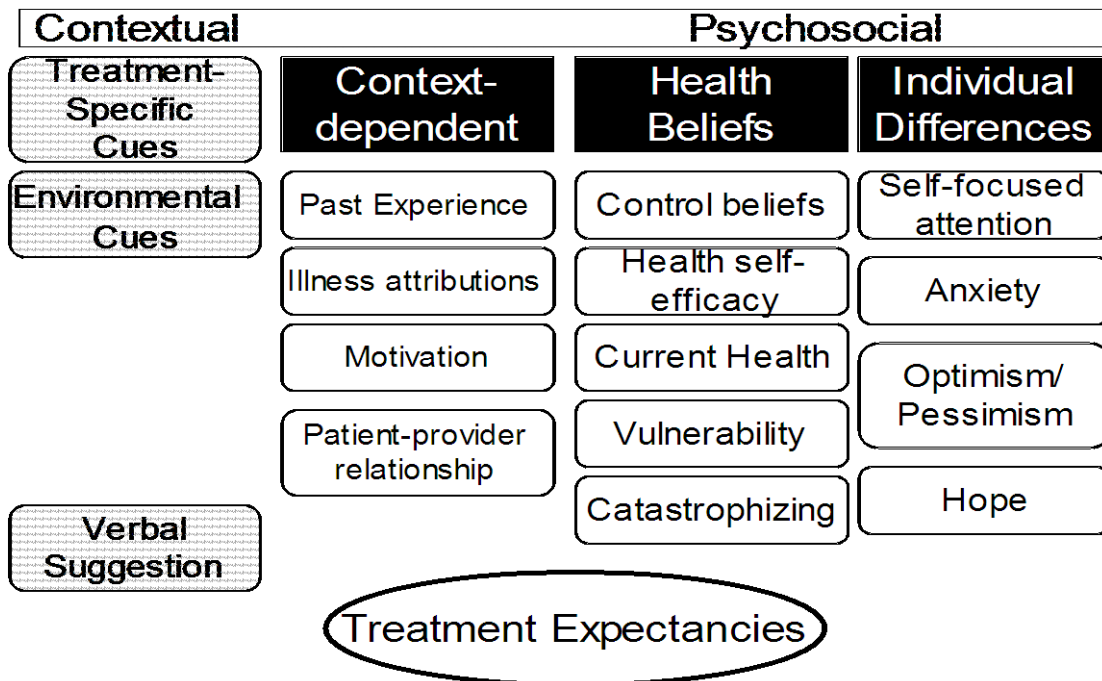


Figure 1. The full model of potentially relevant psychosocial variables contributing to treatment expectancies.

A further purpose was to create a more parsimonious list of relevant variables by ascertaining the relative contributions of each of these variables. The objective of creating a more parsimonious list of variables was to increase the feasibility of assessing these relevant factors in a clinical setting. This focus on parsimony and feasibility fits well with the global aim of increasing the efficiency and effectiveness of medical interventions.

The qualitative data was used to facilitate the aforementioned aims through accomplishing two additional specific aims. One specific aim of this component was to identify any additional psychosocial variables that may influence treatment expectancies that have not been identified from the literature. Secondly, this data was used to shed light on null or unexpected quantitative findings.

## XV. Research Questions:

This research was designed to address these aforementioned aims through addressing the following specific research questions:

1. Which of the identified psychosocial variables are related to the magnitude of positive treatment expectancies in an IBS sample?
2. What is the relative contribution of these psychosocial variables for predicting levels of treatment expectancies in an IBS sample?
3. Are there additional psychosocial variables that are commonly cited by IBS sufferers as contributing to expectations of treatment benefit in this context?

## XVI. Design

To address these specific research questions, a sample of individuals meeting criteria for a diagnosis of irritable bowel syndrome were recruited to participate in this cross-sectional research by completing an online battery of self-report questionnaires. Individuals were presented with two vignettes describing hypothetical treatments for irritable bowel syndrome; they were then asked to rate their expectations of personally benefiting from the proposed treatments<sup>1</sup> on two visual analogue scales (dependent variables), and asked to identify the treatment that they would hypothetically prefer. The self-report questionnaire battery that followed contained measures of all independent variables (identified psychosocial variables). Finally, individuals were asked an open-ended question regarding factors they felt influenced their expectations of treatment benefit in this hypothetical context.

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<sup>1</sup> Also referred to throughout as ‘treatment expectancies.’

## XVII. Hypotheses

A number of specific hypotheses, informed by the literature review, follow from the aforementioned specific research questions.

Research Question 1: Which of the identified psychosocial variables are related to the magnitude of positive treatment expectancies in an IBS sample?

Hypothesis 1a: Levels of self-focused attention would be correlated with levels of treatment expectancies<sup>2</sup>.

Hypothesis 1b: Levels of trait anxiety would be negatively correlated with levels of treatment expectancies.

Hypothesis 1c: Levels of optimism will be positively correlated with levels of treatment expectancies and levels of pessimism would be negatively correlated with levels of treatment expectancies.

Hypothesis 1d: Levels of hope would be positively correlated with levels of treatment expectancies.

Hypothesis 1e: Levels of perceived current health would be positively correlated with levels of treatment expectancies. Number of acute health problems will be negatively correlated with levels of treatment expectancies.

Hypothesis 1f: Levels of perceived personal control over health and symptoms would be positively correlated with levels of treatment expectancies.

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<sup>2</sup> The direction of this relationship was not specified as findings in the literature have been mixed.

Hypothesis 1g: Levels of health and coping self-efficacy would be positively correlated with levels of treatment expectancies.

Hypothesis 1h: Levels of perceived vulnerability to illness would be negatively correlated with levels of treatment expectancies.

Hypothesis 1i: Levels of symptom catastrophizing would be negatively correlated with levels of treatment expectancies.

Hypothesis 1j: Levels of past satisfaction with similar treatments would be positively correlated to levels of treatment expectancies. Number of previous treatments attempted would be negatively correlated with levels of treatment expectancies.

Hypothesis 1k: Levels of illness attribution (somatic and psychological) and the treatment's perceived focus (somatic and psychological) would be correlated with levels of treatment expectancies<sup>3</sup>.

Hypothesis 1l: Levels of desire to see relief would be positively correlated with levels of treatment expectancies. Levels of symptom severity and interference of IBS symptoms in daily activities would be negatively correlated with levels of treatment expectancies.

Hypothesis 1m: Levels of social desirable responding would be positively correlated with levels of treatment expectancies.

Hypothesis 1n: Level of positive perception of treatment provider would be positively correlated with levels of treatment expectancies.

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<sup>3</sup> Again, directionality was not hypothesized due to mixed findings in the literature.

Research Question 2: What is the relative contribution of these psychosocial variables for predicting levels of treatment expectancies in an IBS sample?

Hypothesis 2: This research question was largely exploratory, as not all variables had been empirically linked to treatment expectancies at the time of this study. However, several hypotheses were made based on the literature review presented above. For example, in accord with the general expectancy literature, past satisfaction with a similar treatment was hypothesized to be a strong predictor of current expectations of treatment. In addition, personal illness attributions and the perceived focus of the preferred treatment (i.e., somatic vs. psychological) were hypothesized to be moderate predictors of current expectations to benefit from treatment.

Research Question 3: Are there additional psychosocial variables that are commonly cited as contributing to one's expectations of treatment benefit in this context?

Hypothesis 3: Due to the exploratory nature of this research question, no specific hypotheses were generated a priori.

## Chapter 2

### METHOD

#### I. Overview of Studies

Prior to initiation of the main study, a pilot study was conducted to assess the credibility of three hypothetical treatment vignettes, and to ensure that the outcome expectancy ratings generated from these vignettes followed a relatively normal distribution and demonstrated adequate variance. Many features of the two studies were

the same, including participant recruitment and inclusion criteria, informed consent procedures, vignette presentation, and the assessment of treatment expectancies and treatment preference. These features will thus be described together in more detail in the following sections of this chapter. Areas of departure in study methods will also be described. In particular, the main study used only two of the hypothetical treatment vignettes, chosen based on results of the pilot study, and measured an expanded set of demographic and psychosocial variables.

## II. Participants

### A. Participant Recruitment (Pilot & Main Study)

The current research was focused on individuals with irritable bowel syndrome (IBS). After securing clearance from the University of Windsor Research Ethics Board, participants were recruited to participate using recruitment messages posted on three types of websites, as well as in gastroenterology clinics for the main study. First, websites designed to provide online support and information to individuals suffering from IBS were contacted. In this instance, if appropriate, the IBS support site board moderator was contacted via email and presented with information about the study, a link to the study website and a request to post recruitment messages. The information provided to the moderator is presented in Appendix A and contains information regarding the rationale and aims of the current study, data collection timelines, and informed consent and anonymity. The board moderator was asked to return an email to the study investigator providing written ‘consent to post.’

The second venue for posting online recruitment messages was on social science Internet research sites. Such sites usually follow a specific protocol for allowing study



recruitment messages to be posted; these protocols were observed in attempting to have this study's recruitment message posted. The final Internet recruitment venue was online sites where researchers can post free classifieds advertisements to recruit participants, such as 'craigslist.com,' and 'kijiji.com.'

For the main study, participants were also recruited from gastroenterology clinics in major urban centres throughout Canada. A list of gastroenterologists in one major city from each province was compiled from the College of Physicians and Surgeons online membership lists. These gastroenterologists were contacted by phone in order to access an email address or fax number where a description of the study procedures, as well as a recruitment flyer, could be sent. Each physician who provided a contact address was sent these materials and asked to participate in the study by posting the recruitment flyer in the waiting area of their office. The phone script, the letter of study description and the recruitment flyer are presented in Appendix B.

The recruitment messages explained that the study was looking for individuals with diagnosed IBS to participate in a study interested in assessing factors that contribute to an individual's thoughts and beliefs about particular treatments. The recruitment message also specified the predicted amount of time to complete the study, as well as the potential for remuneration. Potential minimal remuneration for participation was offered in the form of a draw. Participants were informed that at the end of the data collection period, participants would be selected at random to receive a 20 CAD (18 USD, 14 EUR, or 10 GBP) gift certificate to a major book retailer (e.g., Amazon.com). The number of participants selected in the draw was two for the pilot study and ten for the main study.

Please note that the recruitment messages (for the pilot and main study) can be found in Appendix C.

Participants were recruited for the pilot study over a 4-month period in early 2007, and over a 9-month period for the main study. Inclusion criteria specified that participants be over 16 years of age and have a diagnosis of IBS. Verification of illness status was accomplished by having participants complete a self-report survey of the Rome III criteria for this diagnosis, which is the standard criteria for making this diagnosis, created by an international group of experts in functional gastrointestinal motility disorders. The Rome III questionnaire of IBS criteria is presented in Appendix D, along with the diagnostic scoring procedures (Appendix E). These criteria also allow for IBS sub-type diagnosis. Individuals were excluded who a) did not meet criteria for IBS, b) who clearly responded to the study questionnaires in a random or careless fashion, or c) did not provide a response for at least 80% of study items. Table 2 presents the percentage of respondents recruited from each venue for the pilot and main study.

#### B. Participant Numbers and Characteristics (Pilot and Main)

Of the 35 participants recruited for the pilot study and who completed the survey online, 31 met criteria for IBS and were retained in the dataset. In the main study, a total of 358 participants were recruited; however, only 294 met inclusion criteria.<sup>4</sup>

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<sup>4</sup> Five participants later excluded during data screening in results section, leaving  $N = 289$ .

Table 2

*Source of Participant Recruitment by Percentage in Pilot and Main Study*

Source	Study	
	Pilot	Main
Online classifieds	64.5	73.1
IBS support website	3.2	14.4
Research website	22.6	6.1
Friend / Relative referral	9.7	3.3
Undisclosed	0	2.5
Gastroenterology clinic	n/a	0.6

*General demographic characteristics.*

Table 3 summarizes the demographic characteristics of the samples for both the pilot and main study. In both samples, the majority of participants were women, Caucasian, well educated, employed full-time and residing in North America. In the main sample, the majority of participants were married, whereas in the pilot sample, more participants had never been married.

*IBS-related demographic characteristics.*

Table 4 presents IBS-related demographic characteristics of the pilot and main samples. Although all participants met the Rome III criteria for a diagnosis of IBS, a small percentage of participants in both samples reported that they had not been diagnosed with IBS.

Table 3

*Demographic Characteristics of the Pilot and Main Samples*

Characteristic	Sample	
	Pilot	Main
<i>N</i>	31	294
Sex (% [ <i>N</i> ])		
Women	28 (90)	250 (85.0)
Age		
<i>M</i> ( <i>SD</i> )	37.1 (13.5)	33.9 (11.4)
Range	20-63	16-68
Country of residence (% [ <i>N</i> ])		
USA	20 (64.5)	143 (48.5)
Canada	7 (22.6)	135 (45.9)
Europe	2 (6.5)	13 (4.4)
Australia	2 (6.5)	1 (0.3)
Other	0	1 (0.3)
Ethnicity (% [ <i>N</i> ])		
White	25 (80.6)	253 (86.1)
Hispanic	1 (3.2)	10 (3.4)
Asian	1 (3.2)	8 (2.7)
Other	1 (3.2)	8 (2.7)
Mixed	1 (3.2)	6 (2.0)
East Indian	0	5 (1.7)
Black	2 (6.5)	3 (1.0)
Marital Status (% [ <i>N</i> ])		
Married/ living with intimate partner	11 (35.5)	149 (50.7)
Never married	14 (45.2)	116 (39.5)
Separated/ divorced	5 (16.1)	25 (8.5)
Widowed	1 (3.2)	3 (1.0)
Level of Education (% [ <i>N</i> ])		
High school	5 (16.1)	38 (12.9)
College/ university	20 (64.5)	190 (64.6)
Graduate	6 (19.4)	65 (22.1)
Employment Status (% [ <i>N</i> ])		
Full-time	14 (45.2)	152 (51.7)
Not at all	3 (9.7)	46 (15.6)
Part-time	7 (22.6)	42 (14.3)
Disabled	2 (6.5)	24 (8.2)
Student	5 (16.1)	24 (8.2)
Retired	0	5 (1.7)

The majority of participants reported being diagnosed by a physician and having diarrhea predominant IBS (43.0%). Interestingly, when IBS subtype was diagnosed based on the Rome III diagnostic criteria, the majority of both samples met criteria for alternating subtype IBS. On average, in the main sample participants reported that they had symptoms of IBS for 11.4 years ( $SD = 9.18$ ; range = 1-51) and had been diagnosed with IBS for 6.56 years ( $SD = 6.80$ ; range = 1-18).

Table 4

*IBS –Related Demographic Characteristics of the Pilot and Main Samples*

Characteristic	Sample	
	Pilot	Main
IBS diagnosis (% [N])		
Yes	27 (87.1)	269 (91.5)
No	3 (9.7)	24 (8.2)
Undisclosed	1 (3.2)	1 (0.3)
Source of diagnosis (% [N])		
Physician	26 (83.9)	251 (85.4)
Self	5 (16.1)	43 (14.6)
History of misdiagnosis (% [N])		
Yes	12 (38.7)	76 (25.9)
No	19 (61.3)	214 (72.8)
Undisclosed	0	4 (1.3)
Self-report IBS subtype (% [N])		
Constipation predominant	4 (12.9)	56 (19.0)
Diarrhea predominant	17 (54.8)	129 (43.9)
Alternating subtype	9 (29.0)	91 (31.0)
Unknown	1 (3.2)	18 (6.1)
Rome III IBS subtype (% [N])		
Constipation predominant	3 (9.7)	23 (7.8)
Diarrhea predominant	8 (25.8)	60 (20.4)
Alternating subtype	20 (64.5)	211 (71.8)
Years with symptoms		
M (SD)	12.6 (8.47)	11.4 (9.2)
Range	1 -35	1-51
Years since diagnosed		
M (SD)	10.0 (9.5)	6.5 (6.8)
Range	1-35	1-18

### III. Procedures

After receiving permission to recruit participants on the target websites, brief recruitment messages were posted on each website. The brief recruitment messages included a link to the University of Windsor server where the online survey study was hosted. Interested individuals could click on the link provided in the recruitment message and be directed to the study homepage. Here, potential participants were first informed that should they wish to participate in the study using hardcopy forms and surveys, they should indicate so by sending an email, containing their mailing address, to the principal investigator with 'IBS Study' written in the subject line. A study package (consent form and study survey) was then mailed to the participant along with a self-addressed postage paid return envelope. In the main study, 11 participants requested a paper version of the survey; only one was returned and included in the dataset.

Participants willing to participate in the online version of the study were directed to click on the 'continue' button, which directed them to the consent form. Participants were asked to read the informed consent form for the proposed study. The consent forms (presented in Appendix F) contained information regarding the purpose of the study, the procedure, potential risks and benefits of participating, and the rights of the participant including withdrawal from the study without penalty. In addition, participants were informed about the potential for remuneration, the exclusion criteria, the anonymous nature of the study, and the researcher's identity and contact information. Participants were instructed that in order to participate, they must 'click' on the box provided to indicate their informed consent. After indicating their consent to participate, they were automatically directed to the first page of one of two versions of the survey that were

counterbalanced in terms of the order of presentation of the treatment vignettes and the study scales. The link to the survey was set up to direct participants to one version of the two versions of the survey in a random fashion.

The following is an overview of the procedures involved in the current studies; more detailed descriptions of the specific measures and components are provided in the following section. After providing information regarding their general and IBS-related demographic characteristics (Appendix G), participants were then asked to read vignettes detailing hypothetical treatment protocols for irritable bowel syndrome. Following these vignettes there were several questions specifically regarding the treatment vignettes, including their expectation of benefiting from each treatment, and the treatment option that they would personally prefer. In the pilot study, participants rated the credibility levels for each treatment vignette. In the main study, participants were asked to complete a series of questionnaires (counterbalanced and each on their own webpage) that measured the independent variables of interest in the current study. They were also presented with the opportunity to express, in a narrative fashion, their thoughts about what factors they felt contribute to their expectations of benefit for the treatment that they had chosen as their preference. This is described further in the next section.

At the end of the survey participants in both studies were then given the opportunity to be included in the draw for potential remuneration. It was explained that participation would remain anonymous even if they choose to be entered in the draw. If they chose not to participate in the draw by clicking on the 'No Thanks' button, they were thanked for their time and consideration, and participation was over. An individual could choose to participate in the draw by clicking on the 'Sign me up!' button. This

action caused a pop-up window to open describing the options for draw participation. Specifically, participants were asked whether they would prefer to be contacted via mail or email should they be selected for remuneration. It was described that at the time of the draw, the draw winners would be contacted by their preferred method to ascertain how they would prefer to receive remuneration. Individuals who preferred to be contacted by email were asked to provide their email address. Individuals who preferred to be contacted by mail were asked to provide their address, but to withhold their name. In the latter case, a letter was sent to the ‘Study Participant’ at the given address. In either case, this first contact was used to inform selected individuals of their ‘winning status,’ and to request that an email be sent to the study administrator indicating whether an electronic or a hard copy of the gift certificate was preferred, and in what currency (USD, CAD, GBP, Euro). Participants were reassured that their contact information would be stored separately from their survey information to maintain the anonymity of their responses. Once contact information was entered, clicking the ‘submit’ button registered this information in a designated data file on the server, and participants were directed to the ‘letter of explanation’ page, which was designed to debrief participants about the purpose of the study. At the end of the letter of explanation, participants were thanked for their time and consideration, thus ending study participation. The letter of explanation can be found in Appendix H.

#### IV. Measures

##### A. Treatment Vignettes

Participants were asked to read hypothetical treatment vignettes while imagining they were participating personally in the scenario. Treatment vignettes are presented in



Appendix I. These vignettes were created by the author, and designed to represent a thorough and credible treatment planning and procedure scenario. The first part of the vignette described a thorough clinical interview by a gastroenterologist, as well as the possibility for additional data collection as needed. Research has found that individuals with IBS often feel that their treatment provider does not pay adequate attention to their illness experience (Chang et al., 2006; Dixon-Woods & Critchley, 2000), thus efforts were made to present the hypothetical specialist as being thorough. Efforts were also made to describe the hypothetical provider and the interaction in a way as to minimize affective aspects of the relationship, in order to a) reduce demand characteristics (e.g., desire to please the provider) and b) allow participants to potentially project their own perceptions of such a provider into the scenario.

It was then described that based on all the information that is provided, the participant would be assigned to one of the possible treatments for their IBS. Each of the three treatment vignettes included a dietary consult along with dietary recommendations, as well as an educational component relating to what is currently understood about the biopsychosocial contributors to IBS symptom presentation (Barahmand, 2008). These treatment components were emphasized in each treatment to increase treatment credibility, as they are accepted as the first plan of action in any treatment of IBS. Over and above the dietary and educational components, each treatment vignette described a detailed treatment plan that contained a pharmacological approach, a psychological approach, or a combined pharmacological and psychological approach. More than one treatment vignette was used as there are no accepted prescribed treatments for IBS at this time, and it is fairly well known that both pharmacological and psychological approaches

can be beneficial. All treatment plans included comparable treatment timelines and regular monitoring by the provider, and were designed to provide equal amounts of information. Each treatment was labeled using only a letter (i.e., Treatment A). Three vignettes were presented in the pilot study, with the aim of choosing two vignettes to use in the main study (to reduce sample fragmentation).

The ‘pharmacological treatment’ involved the prescription of one of two state-of-the-art pharmaceutical drugs (depending on IBS subtype) designed to provide global symptom improvements. The descriptions of the drugs included information about the drug’s performance in clinical testing and potential side effects. The drug information in this vignette was taken directly from reviews of current promising drug treatments for IBS (Gilkin, 2005; Tack, Fried, Houghton, Spicak & Fisher, 2006). The drugs that were offered have been tested for use with either the diarrhea – predominant subtype (IBS-D) or the constipation – predominant subtype (IBS-C). At the time of the study, there were no drugs of this caliber designed for use specifically with the alternating subtype (IBS-A; Gilken, 2005). However, in the treatment vignette, it is indicated that one drug is designed for use with both IBS-C and IBS-A. Although this is somewhat counterfactual, it is not incredible. For example, research has found that individuals with alternating subtype IBS (25% of IBS sufferers), typically report symptoms very similar to those reported by IBS-C sufferers, with the exception of reporting defecatory urgency (Mearin, et al., 2003). In addition, there have been very few pharmacological studies aimed at treating IBS-A specifically, and often the same agent is tested among IBS-C and IBS-A groups (Tack, et al., 2006).

The ‘psychological treatment’ involved a combined trial of cognitive-behavioural therapy and hypnotherapy. The latter treatment was described only as relaxation training with guided imagery, as the term ‘hypnotherapy’ has been found to produce biased responses in other studies (see Gandhi & Oakley, 2005). These treatments were chosen as they have both been found to be effective in treating IBS in quantitative and narrative reviews of the literature (Blanchard, 2001; Blanchard & Scharff, 2002; Lackner, Mesmer, Morley, Dowzer & Hamilton, 2004; Whitehead, 2006). The vignette provided information about the empirical support for this approach, and a description of the specific components of the treatment, modified slightly from a paper describing the successful use of this approach (Taylor, Read & Hills, 2004). These first vignettes were counterbalanced in both studies.

The ‘combined treatment’ involved the prescription of a pharmaceutical drug as well as a trial of cognitive-behavioural therapy. This option was presented as it is accepted that a multimodal approach can be helpful (Levy et al., 2006; Spanier, Howden & Jones, 2003). To minimize a false advantage to this treatment due to a dose-response phenomenon (i.e., larger expectations for this treatment because it provides more treatment than either of the others), this treatment offered the combination of smaller ‘doses’ of the other treatments. In particular, the subtype-specific drug was offered at a lower dose, specifically 50% of the dose offered in the pharmacological only treatment. The ‘relaxation training with guided imagery’ component of the psychological treatment was removed, and fewer sessions of therapy were offered. This vignette was used only in the pilot study; the rationale for excluding it is described in the results section.

## B. Expectancy Ratings

After reading treatment vignettes, participants were asked to rate how much they expected those specific treatments to ameliorate their symptoms of IBS. As is often done in placebo research (De Pascalis et al., 2002; Goosens et al., 2005; Price et al., 1999; Vase et al., 2003; Weinfurt et al., 2003), expectations were measured on a visual analogue scale (VAS). The VAS is a horizontal line drawn from 0 (no expected benefit) to 10 (excellent expected benefit). Participants indicated their level of expectation of benefit for each treatment by making a mark along such lines. The expectancy rating scales are presented in Appendix J.

## C. Treatment Credibility

Treatment credibility, assessed only in the pilot study, was also measured using a VAS from 0 (not at all credible) to 11 (completely credible). Participants were asked to rate the credibility of each treatment vignette by making a mark on the appropriate scale. The credibility rating scales are presented in Appendix K.

## D. Treatment Preference

Both in the pilot study and in the main study, participants were asked to indicate what their treatment preference would be, should they actually be participating in the hypothetical treatment scenario. The rationale for this question was as follows. Hypothetically, the sample could be divided as to their preferred treatment scenario. It is likely that preferred treatment would vary as a function of an individual's illness attributions, i.e., what they consider to be causing their IBS symptoms, or their recovery attributions, i.e., what type of treatment they consider to be the best approach to treating

their IBS symptoms. It is also likely that these attribution variables could influence one's expectations to benefit from a particular treatment. For example, for an individual who considers their symptoms to be caused mainly by psychological factors, a pharmacological treatment may not be expected to be of much benefit. On the other hand, for those who feel their symptoms are influenced mainly by organic causes, a psychological treatment may not be expected to be of benefit. Without controlling for these likely important contributors to expectations of benefit, there is a risk that the majority of the variance in expectancies could be predicted by illness and/ or recovery attributions. This would significantly limit the variance in expectations that may be predicted by other independent variables, and thus limit the utility of the study to accomplish its aims. In order to avoid this situation, participants were given a choice of preferred treatment, and their expectations of benefit for this preferred treatment then served as the main dependent variable. Furthermore, by using 'expectations of benefit for preferred treatment' as the main outcome variable, data from the entire sample could be collated for analysis, preserving statistical power.

#### E. Individual Difference Variables

##### *Self-focused attention.*

Self-focused attention was measured using the Revised Self-Consciousness Scale (SCS-R; Scheier & Carver, 1985). The original scale (Fenigstein, Scheier & Buss, 1975) was comprised of 23 items that loaded on three subscales, the private self-consciousness subscale, the public self-consciousness subscale and a social anxiety subscale. This scale was revised as it was found that the original wording was too abstract for non-college samples, thus it was revised for use with non-college samples. For the purposes of the

present study, only the private self-consciousness subscale was used. This subscale is designed to measure one's dispositional tendency to attend to inner thoughts and feelings, with higher scores indicating greater levels of self-focused attention. There have been several studies examining the factor structure of the total scale, as well as the private self-consciousness subscale (for a review see Martin & Debus, 1999). Each study has confirmed that the private self-consciousness subscale can be divided into two related factors, although there is disagreement regarding how the items on the subscale should be divided and conceptualized. The most commonly used factor structure contains a 'Self-reflectiveness' factor and an 'Internal state awareness' factor. Self-reflectiveness is seen as a disposition to think about the self; it contains 4 items thought to reflect negative private self-consciousness (Anderson, Bohon & Berrigan, 1996; Ben-Artzi, & Hamburger, 2001-2002). Internal state awareness is seen as a dispositional awareness of one's inner feelings and states; it contains 3 items thought to reflect neutral or positive private self-consciousness.

This is the most popular measure of dispositional self-focused attention in the literature and the only one to differentiate between public and private self-focused attention. It has been found to have adequate psychometric properties, with internal reliability ranging from .73 to .84, and test-retest reliability ranging from .77 to .79 (Govern & Marsch, 2001; Martin & Debus, 1999; Mor & Winqvist, 2002). The Private Self-Consciousness Scale is presented in Appendix L.

#### *Trait anxiety.*

Two separate scales were used to measure trait anxiety in the current study. The Anxious Arousal subscale of the Mood and Anxiety Symptom Questionnaire (MASQ;

Watson & Clark, 1991) was used to capture the somatic anxiety symptoms that are unique to the construct of anxiety. To capture the cognitive aspect of the anxiety disorders, the Penn State Worry Questionnaire was employed (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). The decision to use these two scales was based on two trends emerging in a growing literature regarding the measurement of anxiety and depression. First, several studies have found that common measures of anxiety typically do not have adequate discriminant validity to distinguish between the constructs of anxiety and depression (e.g., Watson et al., 1995; Nitschke, Heller, Imig, McDonald & Miller, 2001). For example, the commonly used State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983) has been shown to be more strongly related to general symptoms of distress, depression and negative affect than to measures more specific to anxiety (Nitschke et al., 2001). In contrast, the Anxious Arousal subscale of the Mood and Anxiety Symptom Questionnaire has been found to have excellent discriminant validity across several samples (Keogh & Reidy, 2000; Nitschke et al., 2001; Ruth & Mehrotra, 2001; Watson et al., 1995). Secondly, analysis of the symptom patterns among the anxiety disorders have demonstrated that cognitive anxiety (anxious apprehension or worry) is more characteristic of certain anxiety disorders (i.e., generalized anxiety disorder and obsessive-compulsive disorder), whereas somatic anxiety (anxious arousal) is more characteristic of other anxiety disorders (e.g., panic disorder, specific phobias; Andrews & Borkovec, 1988; Nitschke, Heller, Palmieri & Miller, 2000). A recent study has confirmed that anxious apprehension (as measured by the PSWQ) is relatively unrelated to anxious arousal (measured using the MASQ-AA) and Anhedonic Depression (depression-specific symptom subscale of the MASQ;

Nitschke et al., 2001). In light of these findings, it is reasoned that the use of these two separate anxiety subscales was best able to capture the specific symptom clusters of trait anxiety that present in various anxiety disorders and have also been found to be distinct from symptoms that are unique to the presentation of depression.

The Anxious Arousal subscale of the MASQ (MASQ-AA) consists of 17 items that represent symptoms that, as mentioned, are relatively unique to the somatic arousal aspects of the construct of anxiety. Respondents indicated to what extent they have experienced each symptom on a 5-point scale ranging from 1 (not at all) to 5 (extremely), with a higher score indicating more anxious arousal. To capture a more stable ‘trait’ aspect of anxious arousal, respondents were asked to complete each item while considering to what extent they experience each symptom ‘generally.’<sup>5</sup> This subscale has been found to have good internal reliability (Cronbach’s alpha = .86 - .90; Watson et al., 1995). The MASQ-AA is presented in Appendix M.

The Penn State Worry Questionnaire (PSWQ) was designed as a measure of trait worry for general use. It contains 16 items; respondents indicate to what extent each statement applies to them on a 5-point scale ranging from 1 (not typical of me) to 5 (very typical of me). Several items are reverse scored and a higher sum score represents greater levels of trait anxious apprehension. The scale has been found to have excellent psychometric properties (internal reliability = .93; test-retest = .92) and good convergent and discriminant validity (Meyer et al., 1990; Nitschke et al., 2001). The PSWQ is also presented in Appendix M.

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<sup>5</sup> Using a ‘general’ frame as opposed to a specific time frame (i.e. in the last week) is how the STAI distinguishes the trait versus the state version of the scale.



### *Optimism / Pessimism.*

Dispositional optimism and pessimism were measured using the popular Life Orientation Test – Revised (LOT-R; Scheier, Carver & Bridges, 1994). The scale was originally designed to assess optimism and pessimism as a bipolar unidimensional construct with high scores representing optimism and low scores representing pessimism. However, the authors of the LOT-R also reported that the optimism and pessimism items could be used in analyses as separate constructs. There has been a fair amount of research that confirms that the LOT-R is best considered to measure optimism and pessimism as two related but distinct constructs (e.g., Creed, Patton, Wendy & Bartrum, 2002), including a large sample confirmatory factor analysis with findings consistent across gender, age and medical diagnosis (Herzberg, Glaesmer & Hoyer, 2006).

This scale has 10 items; three positively worded optimism items, three negatively worded pessimism items and four filler items. Respondents indicated their level of agreement with each item on a four-point scale from 1 (strongly disagree) to 4 (strongly agree). Subscale (optimism or pessimism) scores were calculated by summing the scores for each item on that subscale. These subscales have demonstrated only adequate internal reliability (Cronbach's alpha = .71 & .68 for optimism and pessimism, respectively; Herzberg et al., 2006). The LOT-R is presented in Appendix N.

### *Hope.*

Hope was measured using the Adult Hope Scale – Trait version, considered a measure of dispositional hope (AHS; Snyder et al., 1991). The scale represents the conceptualization of hope as consisting of a successful sense of agency (goal-related determinism; 4 items) and pathways (ability to generate means to reach goals, 4 items).

Respondents indicated the veracity of each statement (including 4 filler items) on an 8-point scale ranging from 1 (definitely false) to 8 (definitely true). A total hope score was calculated by summing the scores for each of the 8 hope items. Factor analytic studies have confirmed that the scale consists of an overarching hope construct and two underlying factors (Babyak, Snyder & Yoshinoba, 1993). Internal consistency has been found to be good (Cronbach's alpha = .74 to .84) and the scale has been reported to have good test-retest reliability (.85). The two subscales are moderately correlated in clinical samples ( $r = .46 - .57$ ; Steed, 2002). The Adult Hope Scale is presented in Appendix O.

#### F. Health Belief Variables

##### *Current health.*

Current health was assessed by asking about participants' perception of their health as well as about their current health problems. To measure 'Perceptions of Health,' three questions were used, adapted from questions used in previous research with illness groups (Sirois, 2003). These questions asked participants to rate: 1) How good their health is relative to others their age, 2) How good their health is relative to others with IBS, and 3) In general how they would rate their health. Participants indicated their perceived health for each item on a 5-point scale ranging from 1 (very poor) to 5 (excellent). A total score was calculated by summing scores for the individual items. It has been established that brief measures of overall health such as this are highly reliable and strongly correlated with other measures of health, such as physicians' assessments (Kubzansky, Kubzansky & Maselko, 2004). These items are presented in Appendix P.

As another measure of current health, participants were asked to complete a brief health history checklist. This measure had participants indicate with a check the presence of acute / transitory health problems experienced in the last six months. This second current health variable, 'Acute health problems' represented the sum of the health problems endorsed on this checklist. The Brief Health History Checklist (Sirois & Gick, 2002) is presented in Appendix Q.

### *Control Beliefs.*

Health-related control beliefs were measured using two subscales of the Control Beliefs Inventory (CBI; Sirois, 2003). The six-item general control subscale measured perceived control over health in general. A sample item from this subscale is "If I set my mind to it, I can improve my health." This subscale correlates highly ( $r = .73$ ) with the internal locus of control subscale of the Multidimensional Health Locus of Control Scale (Wallston, Wallston & De Vellis, 1978), but it is free from the self-blame bias found in the traditional scale. Internal consistency has been found to be good in samples with various chronic health conditions (Cronbach's alpha = .85 - .91; Sirois, 2003; Sirois, Davis & Morgan, 2006).

Perceived control over symptoms was assessed with the five-item symptom control subscale of the CBI. This scale assessed the perceptions that one can manage the symptoms of a specific illness (here, IBS). For this study, participants were instructed that the term 'symptoms' refers specifically to IBS symptoms. Sample items include 'If I make the effort, I can manage my symptoms' and 'There are things that I can do to make my symptoms easier to deal with.' This scale has demonstrated good internal consistency with alphas ranging from .80 to .89 in chronic health samples (Sirois, 2003). For both

subscales, participants were asked to rate their agreement with each item on a six-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Higher scores represent greater perceived control over one's health in general and one's symptoms, respectively. These two subscales are presented in Appendix R.

### *Self-Efficacy.*

Health-related self-efficacy was measured using the Health Efficacy subscale of the Control Beliefs Inventory (CBI; Sirois, 2003). This 8-item scale assessed feelings of competence and confidence to carry out actions important for maintaining and taking care of one's health. Five items are scored in the positive direction and three items are reversed scored. Respondents rate the extent to which each statement applies to them on a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). This scale has been found to have good psychometric properties; internal consistency is high in various chronic health conditions (Cronbach's alpha = .82 - .86), and it shows good convergent validity (Sirois, 2003; Sirois, Davis & Morgan, 2006). A total self-efficacy score was calculated by summing the scores for each item, with higher scores representing higher levels of self-efficacy. The Health Efficacy subscale is presented along with the other Control Beliefs Inventory subscales in Appendix R.

Coping self-efficacy was assessed using three questions regarding how well participants were coping with their IBS. This Coping Efficacy scale (Gignac, Cott & Badley, 2000) has been used in research regarding adaptation to chronic illness, and was found to have adequate internal reliability (Cronbach's alpha = .79). Respondents rated their agreement with each coping question on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores were calculated by summing the score for

each item, with higher scores representing greater levels of coping. The Coping Self-efficacy scale is presented in Appendix S.

#### *Vulnerability to Illness.*

Beliefs about vulnerability to illness refer to the extent that individual feels that they are vulnerable to health problems. To measure this health belief variable, the Resistance to Illness subscale of the Health Perceptions Questionnaire was used (Ware, 1976). Participants rated their agreement with each of four items (e.g., 'I seem to get sick a little easier than other people) on a 5-point scale from 1 (definitely false) to 5 (definitely true). Two of the items are reversed scored; a total score is the sum of scores on each item, with higher scores indicating greater 'vulnerability to illness.' Although the psychometric properties of this scale are only adequate (internal consistency = .71; test-retest reliability = .73), this subscale is the only published English scale to measure general beliefs about perceived vulnerability to illness. This subscale is presented in Appendix T.

#### *Catastrophizing.*

The tendency to catastrophize about bodily sensations and symptoms was measured by the Catastrophizing Interpretation of Bodily Complaints (CIBC) subscale of the Cognitions about Body and Health Questionnaire (Rief, Hiller & Margraf, 1998). This 14-item scale contains a series of statements about the interpretation of bodily complaints and asks the respondent to indicate the accuracy of such statements on a 5 - point scale from 0 (completely wrong) to 4 (completely right). A total score was obtained by summing the scores for each item, with higher scores representing an

increased tendency to catastrophize about bodily sensations and symptoms. This scale has been shown to have good internal consistency in a clinical sample (Cronbach's alpha = .88), and to have good construct validity (Rief et al., 1998). The CIBC subscale is presented in Appendix U.

## G. Context-Dependent Variables

### *Treatment Experience.*

Participants' previous experiences with treatment were measured using several author-created questions. The main measure of the influence of previous treatment experience was labeled Previous satisfaction with preferred treatment. First participants were asked to recall one of the treatment plans presented in the vignettes (e.g., drug treatment), and were asked if they had previous experience with a similar treatment. If they responded in the affirmative, they were directed to rate their satisfaction with that treatment on a visual analogue scale from 0 (not at all successful) to 10 (completely successful). They were also asked a similar question about the other treatment plan (e.g., psychological treatment). The response that corresponded to the treatment they chose as their 'preferred' treatment was then used to create the variable Previous satisfaction with preferred treatment.

As a second measure of treatment experience, participants were also asked about current and past treatments. A list of common treatments for IBS was presented and participants were asked to check off any treatments they were currently using. Participants were also asked to rate their satisfaction with each treatment on a 6-point scale ranging from 1 (very dissatisfied) to 6 (very satisfied). Following this section was an identical section pertaining to past treatments. Several indices were calculated from

these items, including: Number of current treatments and Satisfaction with current treatments, Number of past treatments and Satisfaction with past treatments. Finally, participants were asked whether or not they had previously been treated by a gastroenterologist, and to rate satisfaction with this treatment on a 5-point scale ranging from 1 (not satisfied) to 5 (extremely satisfied). These items are presented in Appendix V.

#### *IBS Symptom Attributions.*

Symptom attributions refer to what an individual perceives to be the cause(s) of their illness-specific symptoms. For example, illness-specific symptoms may be attributed to physical/ somatic causes (such as genetics, bacteria, viruses, structural abnormalities, etc) or to psychological causes (such as stress or anxiety). Individuals may also attribute their symptoms to a combination of somatic and psychological causes, or to more transitory causes (poor sleep, diet changes, lack of exercise, etc). Two questions were used to assess participants' personal illness attributions for their symptoms of IBS. These questions present a particular symptom of IBS and are followed by three explanatory statements that describe a somatic, psychological or transitory reason for the symptom. (Two filler questions also were presented that describe non-IBS symptoms). For each statement, respondents indicated on a 10-point VAS how much they felt that the reason explained each symptom from 0 (Not at all true) to 10 (Very much true). Averaging ratings across the two questions resulted in two variables labeled Somatic symptom attribution and Psychological symptom attribution. These symptom attribution items are presented in Appendix W.

### *Perception of Treatment Focus.*

Further taking into account individuals' different illness / symptom attributions, participants were asked to identify how much they perceived their preferred treatment as targeting the somatic or psychological causes of IBS. Two 10-point visual analogue scales were used to measure these perceptions. On one scale, labeled 'Perceived somatic focus of treatment,' participants were asked to indicate how much they believed that the treatment targeted the physical causes of IBS from 0 (not at all true) to 10 (very much true). On another scale, labeled 'Perceived psychological focus of treatment,' they were asked to indicate how much they perceived that their preferred treatment targeted the psychological causes of IBS. These items are presented in Appendix X.

### *Motivation.*

There are three aspects of motivation that were assessed in the current study. The first aspect is motivation to benefit from treatment, or Desire for relief. This was measured similarly to how it has been measured in placebo research, on a visual analogue scale (VAS; Price et al., 1999; Vase et al., 2003). Participants were asked to indicate on a 10-point VAS: 'How strong is your desire to see relief from your IBS symptoms at this time?'

As a second measure of motivation/ desire for relief, current IBS Symptom Severity was also assessed. A 7-item scale was used to assess the severity of participant's IBS symptoms within the last week (Dancey, Whitehouse, Painter & Backhouse, 1995) on a 8-point scale ranging from 0 (no symptoms) to 7 (extremely severe). A mean score was calculated, with higher scores indicating more severe IBS symptomatology. Internal consistency has been found to be acceptable, Cronbach's alpha = .74. To complement



this aspect of motivation, participants were also asked, “To what extent has IBS affected your daily activities” and were directed to respond on a 4-point scale from 1 (not at all) to 4 (a lot). These items are presented in Appendix Y.

The third aspect of motivation that was examined concerns the general area of demand characteristics. This refers to a subject’s perception of what the experimenter’s hypotheses might be, along with the participants’ desire to help confirm those hypotheses, or otherwise ‘please the experimenter.’ There are currently no self-report survey measures to assess the impact of demand characteristics. To approximate an assessment of this motivational factor, this study first attempted to minimize demand characteristics, and second measured participants’ tendency towards socially desirable responding. Demand characteristics were minimized through the use of neutral language in the recruitment messages, consent forms and treatment vignettes.

Socially desirable responding was measured using the newly developed Social Desirability Scale – 17 (SDS-17; Stober, 1999). This scale was developed to address criticisms and overcome the limitations of the two currently most popular measures of social desirability, the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960) and the Balanced Inventory of Desirable Responding (Paulhus, 1998). Although popular, both of these measures have been criticized for having weak psychometric properties (see Barger, 2002; Leite & Beretvas, 2005; Pauls & Crost, 2004). The SDS-17 contains 16 true-false items. High scores represent a greater tendency to present oneself in a desirable light. It has been found to be internally reliable ( $KR-20 = .70$  to  $.92$ ) and to have good construct validity (Blake, Valdiseei, Neuendorf & Nemeth, 2006; Stober, 2001). This scale is presented in Appendix Z.

### *Patient-Provider Relationship.*

Perceived quality of the patient-provider relationship was measured using a modified version of the Patient Reactions Assessment (PRA; Galassi, Schanberg, & Ware, 1992). This 15-item measure contains three subscales, each of which is designed to assess an important component of the patient-provider relationship. The Patient Information Index (PII) contains items concerning the quality and clarity of the information provided to the patient with regards to a specific treatment. For example, items query whether the patient feels that the treatment procedure has been clearly explained, whether potential side effects are adequately understood. The Patient Affective Index (PAI) assesses socio-emotional aspects of the relationship and includes items regarding the perceived warmth and interest of the provider, and the patient's comfort discussing personal issues, etc. The Patient Communication Index (PCI) contains items assessing the perceived ease with which the patient can solicit or provide additional information regarding symptoms or the treatment. Coefficient alpha for the 15-item PRA was .91. For the PII, PCI, and PAI, the values are .91, .90, & .87, respectively. Respondents were asked to respond to each item on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), and total scores are computed by summing the item scores.

For the proposed research, this measure was modified to reflect the hypothetical nature of the treatment scenario. Participants were asked to respond to items while considering how they imagine the patient-provider interaction would occur. Because the treatment vignettes do not provide enough information to respond to each item, it is likely that participants' implicit beliefs were activated in completing this measure, or their

beliefs formed through previous treatment experiences, if applicable. The modified version of the PRA is presented in Appendix AA.

#### H. Qualitative Component

In the main study, a narrative regarding factors that may contribute to expectations of benefit was requested from participants. A single open-ended question was used. The purpose of this question was to have participants express, in a narrative format, what they thought influenced their expectations of treatment benefit. The question was designed to elicit responses that do not only focus on treatment or situation-specific variables (e.g., preference for the treatment type), but also on personal psychosocial variables. Participants were provided with a blank space in which to write their responses. There was no word limit for this question. The specific question was as follows:

People have different reasons for why they expect treatments to work.

Often people have unique characteristics, such as their personal history, personality or beliefs that affect their expectations about whether treatment will work. Some characteristics may increase expectations while some may decrease expectations. Either way, we think it is important to learn more about these unique characteristics so we can better understand people's expectations about treatment.

Think back to the treatment that you chose earlier as the one that you preferred.

Think back to whether you thought it would work well for you or not.

In the space provided, we would appreciate if you could share your thoughts by answering the following question: Why did you think that that treatment may or may not work for you? Try to keep in mind how your personal characteristics may influence your opinion.

## V. Data Analyses

### A. Preliminary Analyses

After data screening, descriptive analyses were run on all main variables and tests of mean differences were run on the main dependent variable to assess for possible order, gender, IBS subtype and recruitment source effects. Simple analyses were conducted to compare the mean expectations of benefit for the preferred treatment among those who prefer one treatment or the other. There were no mean differences on levels of expectation for preferred treatment between those preferring one treatment vs. the other. Thus, a new dependent variable was created capturing participant's expectations to benefit from their preferred treatment, also referred to as 'treatment expectancies.'

### B. Analysis of Hypothesis One

A series of Pearson zero-order correlations between the independent and dependent variables were used to test the hypotheses that each of the measured independent variables would be correlated with the main dependent variable.

### C. Analysis of Hypothesis Two

Hierarchical multiple regression analysis was used to answer the second research question regarding the relevant contributions of these psychosocial variables for

predicting levels of treatment expectancies. All independent variables identified as having a significant zero-order correlation with the dependent variable were included in the regression in three steps. Relevant individual difference variables were entered in the first step, relevant health belief variables were entered in the second step, and relevant context-specific psychosocial variables were entered in the last step. The rationale behind this hierarchy is as follows. Individual difference variables are thought to be the most stable of the psychosocial variables being tested in the model. These are the variables that are presumed to be context-independent and have been theorized to alter treatment-specific expectations through their effects on cognitive processing, particularly attention. Health belief variables were entered in the second step as they are presumed to exert an influence on context-specific expectations in conjunction with/ conditional upon the role of individual difference variables (Sirois, 2001, 2009). Furthermore, there is also the least amount of empirical support for the relationship between these variables and treatment expectations; including them in the second step allows for an assessment of what they contribute over and above the stable individual difference variables. The context-dependent variables (e.g., previous treatment experiences, perception of treatment focus, patient-provider relationship) were entered in the final step of the regression. These variables were hypothesized to be strongly related to treatment expectancies, due in part to their context-specific relevance to 'expectations about the current treatment' and based on prior theory and research. Including them in the last step allows for this research to identify which of the more internal psychosocial variables remain significant predictors of treatment expectancies after these presumably strongly relevant variables are included in the model.

In order to ascertain the relative importance of each independent variable in predicting variance in the dependent variable, a number of indicators were examined. The standardized regression coefficients (beta weights) and the associated significance levels were examined to ascertain the contribution of each IV to the DV while the other IVs are held constant. This allowed for a comparison of the relative predictive power of each IV. The squared semipartial correlations (and their significant levels) were also examined, as they reflect the amount of unique and joint variance explained by each IV when other IVs are held constant. The joint variance is important to consider, as some of these variables will likely be correlated with each other and thus contribute joint variance to the DV.

#### D. Analysis of Research Question Three

The third main research question concerned the narrative data that was solicited from participants regarding their thoughts about what influenced their expectations of treatment benefit. Two independent raters examined the qualitative responses from a random sample of 100 participants from the total sample. Responses ranged in length from a few words to a few sentences. The transcripts were read multiple times by the principle investigator and a trained graduate student, guided by the research question regarding whether there were additional psychosocial variables, over and above the variables identified as potentially relevant throughout the literature review in Chapter 1, that are commonly cited as contributing to one's expectations of treatment benefit. The responses were first explored deductively through a qualitative content analysis. Responses were deductively tagged for common themes and placed in pre-defined conceptual categories, specifically corresponding to the pre-identified independent

variables. In addition, responses were reviewed in search of emergent categories that became apparent in the data but that did not fit into any of the preset categories. The goal of this conceptual analysis was to a) enumerate the number of references made to each of the pre-set categories and to b) identify themes as they emerged from the data that represented ‘additional psychosocial variables’ related to treatment expectations. Discrepancies were discussed and consensus about category codes was reached. Cohen’s (1960) kappa (*K*), which corrects for agreement by chance, was used to assess inter-rater reliability of the coding categories. The percent agreement was 88.9%, with Cohen’s kappa = .88, which indicates very good agreements beyond chance (Fleiss, 1981). The final coding manual includes (a) a list of all categories (independent variables plus emergent categories), (b) definitions of each category, and (c) examples of each category (see Appendix AB).

### Chapter 3

## RESULTS

The results of the statistical analyses are presented in four sections of this chapter. The first section presents results of the pilot study. The second section presents the steps taken to clean and normalize the dataset. The third section outlines preliminary analyses conducted to assess scale reliability, order and gender effects, the identification of potential confounds and the creation of one main dependent variable. This section includes information about participant treatment experiences. The analysis of the main hypotheses is presented in the fourth section, and includes supplementary analyses.

## I. Pilot Study Results

### A. Selection of Treatment Vignettes

The selection of two treatment vignettes for use in the main study was informed through the examination of the distribution of treatment expectancy scores for each of the three treatment vignettes and of the treatment preferences of the pilot sample.

Exploratory analyses were conducted to examine the distribution of expectancy ratings for each treatment vignette. Descriptive statistics, presented in Table 5, indicate that expectancy ratings were normally distributed for each treatment vignette. Shapiro-Wilk tests for normality confirmed the normality of these distributions.

Table 5

*Descriptive Statistics for Treatment Expectancy Scores Across Pilot Treatment Condition*

Treatment Condition	<i>M</i>	<i>SD</i>	Variance	Skew/ <i>SE</i>	Kurtosis/ <i>SE</i>
Pharmacological	5.52	2.48	6.12	-.55	-1.17
Psychological	5.23	2.76	7.65	.32	-1.31
Combined	6.03	2.87	8.23	-.56	-1.37

Frequency analyses were then conducted to examine participants' preferences among the three possible hypothetical treatments. Figure 2 illustrates that only 3% of the sample chose the combined treatment as their least preferred treatment (shown in the right-most cluster on the graph).



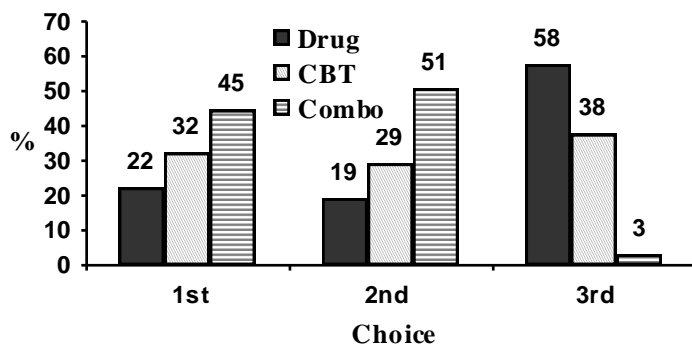


Figure 2. Treatment preferences in order of choice in pilot sample.

Thus, the majority of participants chose the combined treatment as either their first or second choice. Although it may seem counterintuitive, this is the vignette that was excluded from the main study. The rationale for this choice is as follows. It was preferable that the two vignettes employed in the main study generate an approximately equal split in the sample of participants preferring one or the other treatment. Also, it was desired that the treatment vignettes generate a full distribution of treatment expectancy scores and scores on the measures of ‘perceived somatic/ psychological focus’ of treatment. Therefore, it was decided to employ the pharmacological (Drug) and psychological (CBT plus relaxation) treatment vignettes as the two vignettes in the main study. It was thought that if the combined treatment (strongly preferred in the pilot study) was presented in the main study, this treatment would be again strongly preferred, potentially creating skewed distributions of treatment expectancies, losing some variance in the dependent variable and inhibiting to power to examine the influence of attributions on expectations of treatment benefit.

## B. Examining Treatment Credibility

Another component of the pilot study analyses was looking at the relationship between treatment credibility and expectation to benefit from treatment. The purpose of this analysis was to serve as a manipulation check to confirm that the treatment vignettes were credible as veritable potential IBS treatment scenarios.

The distributions of treatment credibility ratings for each treatment were first examined and all were normally distributed. Correlation analyses revealed that credibility ratings (range = 1- 11) were moderately to strongly positively correlated with ratings of expectation of benefit (Drug treatment:  $r = .625, p < .001$ ; CBT:  $r = .739, p < .001$ ; Combined treatment:  $r = .871, p < .001$ ). These results indicate that an individual's expectation of benefiting from treatment is related to the individual's judgment regarding the credibility of that treatment for their condition, and confirm the credibility of the treatment vignettes.

## II. Participant and Dataset Screening

### A. Participant Screening

An initial sample of 358 participants provided data. All subjects were over 16 years of age. A total of 62 participants did not meet the inclusion criteria and were excluded from the study. Specifically, 53 respondents were removed from the dataset as they did not meet the Rome III criteria to qualify for a diagnosis of IBS. In addition, 8 participants failed to complete at least 80% of survey items and 1 participant who had clearly responded in a careless fashion were removed from the dataset. This left 296 participants in the dataset (17.3% bad data).

### B. Data Screening

All main variables were examined through various SPSS programs for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis. The majority of variables were missing values on some cases. For variables missing less than 5% of cases (all but two variables, described below), SPSS

missing value analysis (MVA) was run and values for missing cases were imputed using expectation maximization (EM) method. As part of this procedure, Little's MCAR Chi-square statistic was found to be non-significant, indicating that missing values on these variables were indeed missing in a random fashion.

The two variables missing values on more than 5% of cases were 'Years since diagnosis' and 'Years with symptoms.' As these two variables were not main variables of interest, the decision was made to exclude these variables from the analysis of main hypotheses.

Exploring the distributions of the main variables revealed that several variables displayed significant skew and /or kurtosis, and that many also contained univariate outliers. Variables that displayed both departures from normality as well as outliers were transformed to improve normality before addressing outliers. Reflection and square root transformation was applied to 8 variables to improve moderate negative skew<sup>6</sup>. Reflection and inverse transformation was applied to one variable to correct severe negative skew (Desire for relief). One variable with moderate positive skew was transformed using square root transformation (Number of current treatments used). Finally, three variables with substantial positive skew were corrected using logarithmic transformation (Number of past treatments used, Satisfaction with gastroenterologists, Anxious arousal). For seven of these variables, transformation eliminated univariate outliers, whereas for five variables, outliers remained despite improvements in normality (Number of current treatments used, Number of past treatments used, Satisfaction with

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<sup>6</sup> Variables include: Treatment expectancy: CBT, Treatment expectancy: Drug, Perceived somatic focus of treatment, Perceived psychological focus of treatment, IBS: Interference in daily activities, Satisfaction with current treatments, Control over health, Control over symptoms.

current treatments, Control over health, Control over symptoms). Standardized ( $z$ ) scores were calculated for these univariate outliers and none were found to be in excess of 3.29, the criterion recommended Tabachnick and Fidell (2001). Thus these outliers were left in the dataset as is.

Univariate outliers were also identified on seven variables that were otherwise normal<sup>7</sup>. Again, a standardized ( $z$ ) score was calculated for each outlier; five cases with standardized scores greater than 3.29 were identified. To improve variable distributions while maintaining sample size, the ‘deviance’ of these cases was minimized, as recommended by Tabachnick and Fidell (2001). This was accomplished by assigning the outlying cases a raw score on the offending variable that was one unit larger (or smaller) than the next most extreme score in the distribution. Variables containing cases that were minimized include: Patient-provider relationship (2), Socially desirable responding (1), Hope (1) and Symptom severity (1).

With transformed variables in the variable set, two cases were identified as multivariate outliers by using Mahalanobis distance with  $p < .01$ . Both cases were deleted, leaving 294 cases in the dataset. Pairwise linearity and homoscedasticity was checked using bivariate and residual scatterplots and was found satisfactory.

### III. Preliminary Analyses

Before proceeding to analyses of main hypotheses, several preliminary analyses were performed. This included creating new variables that would control for treatment preference, further examining the distributional and psychometric properties of main

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<sup>7</sup> Variables include: IBS symptom severity, Perception of health, Socially desirable responding, Hope, Health self-efficacy, Catastrophizing, Patient-provider relationship.

variables in the dataset, and checking for possible confounding variables (e.g., gender and order effects). These analyses are presented in this section.

#### A. Treatment Preference Variables

To minimize the impact of treatment preference while exploring the relationships between treatment expectancies and individual psychosocial variables, a new dependent variable was created, labeled Expectancy for preferred treatment. This variable represents participants' treatment expectancy ratings for the treatment that they reported that they would prefer based on the two treatment vignettes. Participant treatment preference was split nearly equally between those preferring psychological treatment (CBT; 48.6%) and those preferring the pharmacological treatment (Drug; 51.1%). A univariate GLM (general linear model) was run to test for mean differences in preferred treatment expectancy ratings across groups preferring one or the other treatment. This confirmed the null hypothesis that the mean treatment expectancy rating among those preferring CBT ( $M = 6.75$ ,  $SD = 2.11$ ) was not significantly different from the mean rating among those preferring the Drug treatment ( $M = 7.00$ ,  $SD = 1.81$ ),  $F(1,292) = 1.25$ ,  $p = ns$ . The two treatment preference groups were thus combined into one main sample with Expectancy for preferred treatment as the main dependent variable. The distribution of Expectancy for preferred treatment was found to be negatively skewed (skew/  $SE$  of skew = -5.00) and to contain outliers ( $9 > = 3.00$ ). Reflection and square root transformation was applied to this variable, which improved skewness (skew/  $SE$  of skew = 0.36) but did not eliminate outliers. Five of these outliers with standardized ( $z$ ) score greater than 3.29 were deleted from the dataset, leaving a total sample size of 289.

As described above, based on participants' reports of past experience and satisfaction with their preferred treatment, a variable labeled 'Previous satisfaction with treatment' was created. Although 120 participants had reported experience with drug treatment, and 68 participants had reported experience with CBT treatment, only 93 participants reported that they had had experience with their 'preferred' treatment. The distribution of this variable (Previous satisfaction with treatment) was adequate and contained no outliers.

#### B. Participant Treatment Experiences

Table 6 provides a summary of participants' treatment experiences. Participants reported that they used an average of 2.74 current treatments ( $SD = 2.00$ ; range = 0-12) and 2.42 past treatments ( $SD = 2.42$ ; range = 0-12). The most popular treatments were 'diet changes' (current = 78.9%; past = 57.8%) and the use of 'laxative/ antidiarrheals' (current = 43.5%; past = 48.3%). Average satisfaction ratings were calculated among those who reported current or past treatment use ( $n = 254$ ,  $n = 230$ , respectively). Participant's average satisfaction with their current treatments was between 'mildly dissatisfied' and 'mildly satisfied' ( $M = 3.64$ ;  $SD = 1.23$ ; range = 1-6) and their satisfaction with past treatment was between 'dissatisfied' and 'mildly dissatisfied' ( $M = 2.89$ ;  $SD = 1.39$ ; range = 1-6). The highest satisfaction ratings among both current and past treatments were for 'diet changes,' making this treatment strategy both the most common and perceived as most successful. Participants were also asked about their experience and satisfaction being treated by a gastroenterologist. Just over half of the participants (55.4%) reported having been treated by a gastroenterologist, and on average

participants rated their satisfaction with that treatment as ‘mildly satisfied’ ( $M = 1.97$ ;  $SD = 1.07$ ; range = 1-5).

Table 6

*Participant Treatment Experiences*

Treatment	Current		Past	
	Use	Satisfaction	Use	Satisfaction
	<i>n</i> (%)	<i>M</i> ( <i>SD</i> )	<i>n</i> (%)	<i>M</i> ( <i>SD</i> )
Diet changes	232 (78.9)	3.62 (1.36)	170 (57.8)	3.28 (1.55)
Relaxation training	74 (25.2)	3.45 (1.36)	46 (15.6)	2.89 (1.64)
Biofeedback training	17 (5.8)	2.59 (1.46)	16 (5.4)	2.38 (1.78)
Laxative/ antidiarrheals	128 (43.5)	3.45 (1.59)	142 (48.3)	2.94 (1.62)
Herbal/ mineral/ vitamin supplements	96 (32.7)	3.59 (1.62)	75 (25.5)	2.77 (1.55)
Probiotics	83 (28.2)	3.54 (1.45)	60 (20.4)	2.42 (1.43)
Acupuncture	13 (4.4)	3.08 (1.89)	20 (6.8)	2.05 (1.47)
Antispasmodics	53 (18.0)	3.21 (1.66)	66 (22.4)	2.61 (1.50)
Serotonin (ant)agonists	14 (4.8)	2.29 (1.90)	17 (5.8)	1.94 (1.56)
Hypnotherapy	9 (3.1)	3.67 (1.94)	6 (2.0)	2.83 (1.72)
Psychotherapy	18 (6.1)	2.83 (1.92)	28 (9.5)	2.43 (1.64)
Antidepressants	69 (23.5)	3.07 (1.56)	66 (22.4)	2.29 (1.58)

C. Checking the Variables

Table 7 provides a description of all main variables, including: number of items on the scale, mean, standard deviation, range and Cronbach’s alpha for internal reliability. It was noted that the symptom attribution scales had low values of internal reliability (Cronbach’s alpha = .30 and .59, for somatic symptom attribution and psychological symptom attribution, respectively). A number of steps were taken to attempt to validate these symptom attribution variables. Analyses examining the relationships between participants’ symptom attribution scores, treatment preferences and expectations to benefit from both the CBT and drug treatments, found that neither Somatic symptom attribution nor Psychological symptom attribution were significantly

related to Treatment expectations (transformed) for the CBT or drug treatment.<sup>8</sup>

Furthermore, contrary to conventional wisdom, levels of psychological and somatic symptom attributions were not different among those who chose the psychological  $t(287) = 1.35, p = ns$  or the drug treatment  $t(287) = -.98, p = ns$ . Although it is feasible that the lack of relationships between symptom attributions and treatment preferences or expectancies is a valid finding, clearly any results generated using these variables would be inconclusive. These symptom attribution variables were thus dropped from the main analyses.

Univariate GLM (general linear model) analyses were conducted to assess for any order or gender effects on the main dependent variable (Expectancy for preferred treatment – transformed). There were no main effects for either order,  $F(1, 287) = .03, p = ns$ , or gender,  $F(2, 286) = .31, p = ns$ .

Several other univariate GLM tests were conducted to ascertain whether there were any significant relationships between demographic variables and the main dependent variable. Variables tested included: Referral source, Source of diagnosis, IBS subtype (self-report and Rome III criteria), Country of residence, Marital status, Ethnicity, Education, or Employment status. No significant main effects were identified. For continuous demographic variables (i.e., age,) a correlation was run to check for a significant relationship to expectations for preferred treatment (transformed). No significant relationship was identified at the .05 level.

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<sup>8</sup> Correlation of Treatment expectation: drug with Somatic symptom attribution ( $r = -.045, p = ns$ ). Correlation of Psychological symptom attribution with Treatment expectation: CBT ( $r = -.11, p = ns$ ).



Table 7

*Description of Main Variables*

Variable	No. items	<i>M</i>	<i>SD</i>	Range	Cronbach's alpha
Treatment expectancy					
CBT	1	5.42	2.63	1-10	
Drug	1	6.03	2.37	1-10	
Preferred	1	6.88	1.97	1-10	
Self-focused attention	7	17.71	5.07	7-28	.844
Trait anxiety					
Trait worry	16	53.38	14.13	20-80	.930
Anxious arousal	16	32.18	10.76	16-72	.868
Optimism	3	7.53	1.89	3-12	.727
Pessimism	3	7.13	2.16	2-12	.849
Hope	8	45.50	9.34	19-64	.856
Current Health					
Perception of health	3	9.44	2.38	3-15	.851
Acute health problems	12	5.15	2.52	0-10	
Control Beliefs					
Health	6	26.53	6.00	6-30	.884
Symptoms	5	22.01	5.62	5-25	.925
Health self-efficacy	8	31.22	6.43	14-47	.737
Coping self-efficacy	3	9.17	3.06	3-15	.883
Vulnerability to illness	4	12.35	3.94	4-20	.874
Catastrophizing	14	26.89	5.49	14-42	.798
Treatment experience					
Previous satisfaction with preferred tx <sup>a</sup>	1	6.19	2.75	0-11	
Number of current treatments		2.74	2.00	0-12	
Satisfaction with current treatments <sup>c</sup>	<sup>b</sup>	3.64	1.23	1-6	
Number of past treatments		2.42	2.42	0-12	
Satisfaction with past treatments <sup>d</sup>	<sup>b</sup>	2.89	1.39	1-6	
IBS symptom attribution					
Somatic	2	5.76	2.05	1-10	.302
Psychological	2	4.83	2.38	1-10	.594
Perceived focus of treatment					
Somatic	1	7.02	2.39	1-10	
Psychological	1	6.23	3.04	1-10	
Motivation					
Desire for relief	1	8.80	1.69	1-10	
Symptom Severity	7	33.40	7.95	9-56	.592
Interference in daily activities	1	3.13	.76	1-4	
Socially desirable responding	16	6.94	1.98	0-14	
Patient- provider relationship	15	54.71	8.42	15-75	.878

*Note.* Statistics presented are for untransformed variables. tx = treatment.

<sup>a</sup>*n* = 93. <sup>b</sup>Number of items used to create average varied by participant. <sup>c</sup>*n* = 254. <sup>d</sup>*n* = 230.

## IV. Analysis of Main Hypotheses

### A. Testing Hypothesis 1

The first main hypothesis was that each of the measured independent variables would be correlated with the main dependent variable (DV; Expectancy for preferred treatment – transformed)<sup>9</sup>. To test this hypothesis, a series of zero-order Pearson correlations were run to test for linear relationships between the main dependent variable and each independent variable.

#### *Self-focused attention.*

Hypothesis 1a proposed that levels of self-focused attention would be correlated with treatment expectancies.<sup>10</sup> Results of the correlational analysis for the total sample ( $N = 289$ ) support this hypothesis, as it was found that higher levels of self-focused attention were *positively* correlated with higher levels of treatment expectancies ( $r = .16$ ,  $p < .01$ ). In other words, it was found that participants who report a greater dispositional tendency to attend to their inner thoughts and feelings also reported greater expectations to benefit from treatment.

#### *Trait anxiety.*

Hypothesis 1b proposed that levels of trait anxiety would be negatively correlated with positive treatment expectancies. To test this hypothesis, separate correlations were run examining the relationship between treatment expectancies and both levels of anxious arousal (transformed) and trait worry. This hypothesis was not supported, as levels of

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<sup>9</sup> All analyses with this variable were done using the transformed variable.

<sup>10</sup> The DV will alternatively be called ‘treatment expectancies/ expectancy’

treatment expectancy were not related to either Anxious arousal ( $r = -.01, p = ns$ ) or Trait worry ( $r = .03, p = ns$ ).

#### *Optimism / Pessimism.*

Hypothesis 1c proposed that levels of optimism would be positively correlated with levels of treatment expectancy and that levels of pessimism would be negatively correlated with treatment expectancy. This hypothesis was partially supported; levels of optimism were positively correlated with levels of treatment expectancy ( $r = .17, p < .01$ ). However, levels of pessimism were not significantly correlated with levels of treatment expectancy ( $r = -.10, p = ns$ ). Thus, respondents who reported greater levels of optimism also reported higher positive expectations of benefiting from their preferred treatment, whereas levels of pessimism were not related to positive treatment expectancies.

#### *Hope.*

Hypothesis 1d proposed that levels of hope would be positively related to levels of treatment expectancy. This hypothesis was unsupported as hope was found to be unrelated to levels of treatment expectancy ( $r = .07, p = ns$ ).

#### *Current health.*

Hypothesis 1e proposed that levels of treatment expectation would be positively correlated with Perceived current health and negatively correlated with number of Acute health problems. This hypothesis was not supported as analyses revealed that levels of treatment expectancy were not related to either Perception of health ( $r = .10, p = ns$ ), nor Acute health problems ( $r = -.05, p = ns$ ). These results suggest that in this sample, one's

perceived level of current health is not related to one's expectation of benefiting from treatment.

*Control beliefs.*

Hypothesis 1f proposed that treatment expectancies would be positively correlated with both Control over health and Control over symptoms. Correlational analyses supported these hypotheses, as it was found that greater levels of treatment expectancies were positively correlated with both Control over health (transformed;  $r = .22, p < .01$ ) and Control over symptoms (transformed;  $r = .27, p < .01$ ). This suggests that in this sample, greater expectations to benefit from treatment were related to greater level of perceived control over health and perceived control over IBS symptoms.

*Self-efficacy.*

Hypothesis 1g proposed that levels of health self-efficacy and coping self-efficacy would be positively correlated with treatment expectancies. This hypothesis was unsupported as neither levels of health self-efficacy nor coping self-efficacy were related to treatment expectancies ( $r = .03, p = ns$ ;  $r = .11, p = ns$ ).

*Perceived vulnerability to illness.*

Hypothesis 1h proposed that levels of perceived vulnerability to illness would be negatively correlated with treatment expectancies. This hypothesis was unsupported as the zero-order correlation between these variables was non-significant ( $r = .03, p = ns$ ).

### *Catastrophizing.*

Hypothesis 1i proposed that levels of symptom catastrophizing would be negatively correlated with treatment expectancies. Correlational analysis did not support this hypothesis. In contrast, it was found that levels of symptom catastrophizing were positively related to treatment expectancies ( $r = .12, p < .05$ ). This suggests that in this sample, the tendency to catastrophize about bodily symptoms and sensations was related to higher levels of treatment expectancies.

### *Treatment Experiences.*

Hypothesis 1j proposed that levels of satisfaction with previous similar treatments would be positively correlated with current treatment expectancies. Among the 93 participants who did report previous experience with their preferred treatment, there was a strong positive correlation between Previous satisfaction with preferred treatment and current treatment expectancies ( $r = .50, p < .01$ ). Thus, greater satisfaction with similar treatments in the past was strongly related to one's level of expected benefit from their preferred hypothetical treatment.

Also relevant to treatment experiences, Hypothesis 1j proposed that past treatment history (Number of past treatments, transformed) would be negatively correlated with current treatment expectancies. Using the full sample (including those who report using zero treatments in the past), this hypothesis was not supported, ( $r = .02, p = ns$ ). Similarly, there was no relationship found between current treatment expectancies and Number of current treatments (transformed;  $r = .00, p = ns$ ).

Unplanned analyses examined the relationships between treatment expectancies and average satisfaction levels for past ( $n = 230$ ) and current treatments (transformed;  $n =$

254). Neither relationship with was significant (current:  $r = .11$ , past:  $r = .05$ ,  $p$ 's = ns). These results suggest that treatment experiences, particularly past satisfaction with treatment, are relevant only in the context of a treatment situation that is similar to the one previously experienced. Also unplanned, the relationship between treatment expectancies and Satisfaction with gastroenterologists (transformed;  $n = 159$ ) was non-significant ( $r = .06$ ,  $p = ns$ ).

#### *Illness attributions.*

Hypothesis 1k proposed that illness attribution variables, particularly IBS Symptom attributions (level of somatic or psychological attribution) and Perceived somatic/ psychological focus of treatment, would be correlated with expectancies for preferred treatment. The relationships with IBS Symptom attributions could not be tested due to the poor psychometric properties of the scale used to measure these constructs. This hypothesis was supported, however, when tested using the variables tapping the levels to which participants perceived their preferred treatment as focusing on the somatic or psychological aspects of their IBS symptoms. Specifically, Expectation to benefit from preferred treatment was moderately positively correlated with Perceived somatic focus of treatment (transformed;  $r = .51$ ,  $p < .01$ ) and weakly positively correlated with Perceived psychological focus of treatment (transformed;  $r = .16$ ,  $p < .01$ ). These findings suggest that overall, participants' treatment expectations were influenced by how much they perceived their preferred treatment as targeting the somatic or psychological roots of their IBS symptoms, but more so by the perceived degree of somatic focus of the treatment.

### *Motivation.*

Hypothesis 1l proposed that various measures of motivation would be positively correlated with positive treatment expectancies. Correlational analyses revealed that this hypothesis was unsupported, as treatment expectancies were not related to levels of desire for relief (transformed;  $r = -.01, p = ns$ ), Symptom severity ( $r = -.03, p = ns$ ), or IBS: Interference in daily activities (transformed;  $r = -.04, p = ns$ ). Hypothesis 1m proposed that levels of socially desirable responding would be positively related to levels of treatment expectancy. This hypothesis was also unsupported, as these variables were uncorrelated in this sample ( $r = -.04, p = ns$ ).

### *Patient-provider relationship.*

Hypothesis 1n proposed that a more positive perception of the treatment provider would be positively correlated to treatment expectancies. Results from correlation analysis supported this hypothesis; more positive perceptions of the treatment provider were positively correlated with treatment expectancies ( $r = .12, p < .05$ ).

### *Summary for Findings of Hypothesis 1.*

In the full sample the following variables were significantly correlated with treatment expectancies (transformed) as hypothesized: Optimism, Self-focused attention, Control over health (transformed), Control over symptoms (transformed), Perceived somatic focus of treatment (transformed) and Perceived psychological focus of treatment (transformed) and Positive perception of the treatment provider. Among those who had past experience with their preferred treatment ( $n = 93$ ), there was a strong positive correlation identified between treatment expectancies and Previous satisfaction with

treatment. One variable was identified as having significant relationship with treatment expectancies, although not in the hypothesized direction. Specifically, tendency towards catastrophizing over symptoms demonstrated a weak positive correlation with treatment expectancies.

The following variables did not show a significant linear relationship to levels of treatment expectancy: Trait anxiety (both trait worry and anxious arousal), motivation (including Desire for relief, Symptom Severity, IBS: Interference with daily activities and Socially desirable responding), Pessimism, Hope, Number of past treatments, perceived current health (including Perception of health and number of Acute health problems), Health self-efficacy, Coping self-efficacy and beliefs of Vulnerability to illness.

## B. Testing Hypothesis 2

Research question 2 asked: What are the relative contributions of these psychosocial variables for predicting levels of treatment expectancies in an IBS sample? As only some of the psychosocial variables included in the current study had been previously empirically linked with treatment expectancies, the hypotheses made regarding this research question were limited. Based on the literature review, two specific hypotheses were made: 1) Past satisfaction with a similar treatment was hypothesized to be a strong predictor of current expectations of treatment, and 2) illness attribution variables (now Perceived somatic/ psychological focus of treatment) were hypothesized to be strong predictors of current expectations of treatment.

As described above, in testing the various hypotheses under Hypothesis 1, several other variables were found to demonstrate linear relationships to treatment expectancies. In order to answer research question 2, a hierarchical regression was conducted using the



relevant variables identified from research question 1 as predictor variables and Expectancies for preferred treatment (transformed) as the criterion variable. In the first step of the regression, the following individual difference variables were entered: Self-focused attention and Optimism. In the second step of the regression, the following health belief variables were entered: Control over health (transformed), Control over symptoms (transformed), and tendency to Catastrophize over symptoms. In the final step, the context-specific variables were entered: Perceived somatic focus of the preferred treatment (transformed), Perceived psychological focus of the preferred treatment (transformed) and Patient-provider relationship.

Unfortunately, the main treatment experience variable (Previous satisfaction with treatment) contained data from only 93 participants. Thus, initial regression analyses proceeded using the full sample ( $N = 289$ ), without including a treatment experience variable. Subsequent to the results from the analyses with the full sample, a supplemental analyses section provides the results of conducting these analyses using a sample with previous experience versus a sample without previous experience.

Table 8 displays the results of this hierarchical regression, including the unstandardized regression coefficients and their standard errors ( $B$  and  $SE B$ ), the standardized regression coefficients ( $\beta$ ), the squared semipartial correlations ( $sr^2$ ), and  $R^2$  after each step.  $R$  was significantly different from zero at the end of each step. After step 3, with all IVs in the equation,  $R = .63$ ,  $F(8, 280) = 22.88$ ,  $p < .01$ , with  $R^2 = .40$  indicating that 40% of the variance (37.8% adjusted) in the criterion variable was explained using these 8 independent variables.

After step 1, with Self-focused attention and Optimism in the equation,  $R = .24$ ,  $F(2, 286) = 8.73$ ,  $p < .01$ . Beta weights for each predictor variable were examined to assess their relative importance in the prediction of treatment expectancies. Both Self-focused attention ( $\beta = .17$ ) and Optimism ( $\beta = .18$ ) were significant predictors of treatment expectancies ( $p$ 's  $< .01$ ), together accounting for 6% of the variance in the dependent variable.

When the health belief variables were entered in step 2, the proportion of explained variance increased significantly, to 13% ( $\Delta R^2 = .07$ ;  $F(3, 283) = 7.64$ ,  $p < .01$ ). Among the health belief variables, the two significant predictors were: Control over symptoms (transformed) ( $\beta = .21$ ,  $p < .05$ ) and Catastrophizing ( $\beta = .17$ ,  $p < .01$ ); Control over health was not a significant predictor ( $\beta = .04$ ,  $p = .65$ ). Both individual difference variables remained significant during this second step, although their predictive power decreased somewhat (Self-focused attention:  $\beta = .12$ ,  $p < .05$ ; Optimism:  $\beta = .14$ ,  $p < .05$ ).

The addition of the context-specific variables in the third step contributed to significant amounts of explained variance ( $\Delta R^2 = .27$ ;  $\Delta F(3, 280) = 41.23$ ,  $p < .01$ ). Patient-provider relationship was not a significant predictor of treatment expectancies, both Perceived focus of treatment variables were. Perceived somatic focus of treatment was a much stronger predictor than Perceived psychological focus of treatment ( $\beta = .55$ ,  $p < .01$  and  $\beta = .27$ ,  $p < .01$ , respectively).

Table 8

*Summary of Hierarchical Regression Analysis for Variables Predicting Treatment**Expectancies<sup>a</sup> in Total Sample (N = 289)*

Variable	B	SE B	$\beta$	$sr^2$	$R^{2b}$	$\Delta R^2$
Step 1					.06**	
Self-focused attention	.02	.00	.17**	.03		
Optimism	.05	.01	.18**	.03		
Step 2					.13**	.07**
Self-focused attention	.01	.00	.12*	.02		
Optimism	.04	.02	.14*	.02		
Control over health <sup>a</sup>	.02	.04	.04	.00		
Control over symptoms <sup>a</sup>	.10	.04	.21*	.02		
Catastrophizing	.01	.00		.03		
			.15**			
Step 3					.40**	.27**
Self-focused attention	.00	.00	.07	.01		
Optimism	.02	.01	.10*	.01		
Control over health <sup>a</sup>	.01	.04	.03	.00		
Control over symptoms <sup>a</sup>	.04	.03	.08	.00		
Catastrophizing	.01	.00	.13**	.03		
Patient- provider relationship	.00	.00	.00	.00		
Perceived somatic focus of tx <sup>a</sup>	.42	.04	.55**	.30		
Perceived psychological focus of tx <sup>a</sup>	.18	.03	.27**	.09		

Note. tx = treatment

<sup>a</sup>Transformed. <sup>b</sup>Adjusted  $R^2$  after step 1 = .05, after step 2 = .11, after step 3 = .38.

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

In the full model, Optimism was the only remaining significant predictor among the individual difference variables ( $\beta = .10, p < .05$ ). Among the health belief variables, Catastrophizing remained the only significant predictor ( $\beta = .13, p < .01$ ).

Squared semi-partial correlations ( $sr^2$ ) were examined to ascertain the proportion of variance each significant predictor contributed uniquely to treatment expectancies, controlling for joint variance shared between variables. As hypothesized, the illness attribution variables contributed the most unique variance to the model, with the somatic

attribution variable contributing uniquely to 30% of the variance in treatment expectancies and Perceived psychological focus of treatment contributing to 9%. The tendency to catastrophize about symptoms independently accounted for 3% of the variance in treatment expectancies, while Optimism uniquely contributed to 1% of the variance. The total amount of unique variance contributed by these independent variables was 43%.

### C. Supplemental Quantitative Analyses: By Experience

Analyses presented above do not consider the important contribution of previous treatment experiences in predicting levels of treatment expectancies. Thus, the analyses were repeated using the sample of those who reported having previous experience with their preferred treatment ( $n = 93$ ; Experienced group) as well as with a sub-sample of participants reporting no prior experience with either treatment ( $n = 134$ ; Inexperienced group).

#### *Preliminary analyses.*

Prior to repeating the analyses from Hypothesis 1 and 2 with these two samples, preliminary analyses were conducted to assess whether the two samples differed on any demographic variables, on the dependent variable or treatment preference or on any of the main independent variables. These analyses were done using SPSS Univariate GLM and independent sample t-tests for mean comparisons, as well as Crosstabs for frequency comparisons. The groups were found to differ on three variables. First, the Experienced group reported greater numbers of current treatments ( $M = 3.49$ ,  $SD = 2.38$ ) than the Inexperienced group ( $M = 2.06$ ,  $SD = 2.36$ ), Kruskal-Wallis Chi-square (1) = 27.42,  $p <$

.01. Similarly, the Experienced group reported greater numbers of past treatments ( $M = 3.29, SD = 2.77$ ) than the Inexperienced group ( $M = 1.79, SD = 1.34$ ), Kruskal-Wallis Chi-square (1) = 19.13,  $p < .01$ . Thus, it appears that the Experienced was not only more experienced with respect to the preferred treatment, but was also more experienced with treatment overall. Note that the groups did not differ in the number of years that they had been experiencing IBS symptoms or the number of years since diagnosis. Thus, they were not necessarily more experienced with IBS despite being more experienced with IBS treatments. The only other significant difference identified was that those in the Experienced group reported significantly higher levels of self-focused attention than those in the Inexperienced group ( $t(225) = 2.79, p < .01$ ). It is important to note that these groups did not differ in their levels of expectations to benefit from their preferred treatment.

#### *Correlational analyses.*

The correlational analyses of Hypothesis 1 were repeated with the two new subsamples. These results are presented in Table 9, along with the correlation results from the full sample. In terms of the individual difference variables, analyses revealed that the Inexperienced group had no significant relationships, compared to the Experienced group that showed three significant relationships. Specifically, it was found that levels of treatment expectancies were positively correlated with levels of self-focused attention ( $r = .32, p < .01$ ), Optimism ( $r = .27, p < .01$ ), as well as levels of hope ( $r = .22, p < .05$ ). It is interesting to note that the size of the correlations found in this sub-sample ( $n = 93$ ) were noticeably larger than the size of the correlations found in the full sample, and in the

case of Hope, a significant relationship emerged among the Experienced that wasn't identified in the full sample.

Among the health belief variables, the significant relationships identified among the Experienced group were more numerous than those in the Inexperienced group. In the Experienced sample only, levels of treatment expectancies were negatively correlated with Acute health problems ( $r = -.21, p < .05$ ), and positively correlated with Coping self-efficacy ( $r = .42, p < .01$ ). Significant relationships between treatment expectancies and the control belief variables (transformed) were identified in both samples; the magnitudes of these associations were larger in the Experienced group (Control over health:  $r = .32, p < .01$ ; Control over symptoms:  $r = .42, p < .01$ ) than in the Inexperienced group (Control over health:  $r = .23, p < .01$ ; Control over symptoms:  $r = .21, p < .01$ ). In fact, the 21-point difference between the correlations with Control over symptoms in the two groups reached statistical significance ( $z = 1.71, p < .05$ ). The difference in the correlations with Control over health did not ( $z = 0.71, p = .24$ ).

Finally, when looking at the context-dependent psychosocial variables, both groups showed significant positive relationships between treatment expectancies and Perceived somatic focus of treatment (transformed). In the Experienced sample, Previous satisfaction with preferred treatment displayed a robust positive correlation with levels of positive treatment expectancies ( $r = .50, p < .01$ ). None of the other treatment experience variables were related to treatment expectancies in either of the sub-samples.

Table 9

*Zero-order Correlations between Treatment Expectancies<sup>a</sup> and Independent Variables in Three Samples.*

Variable	Sample name ( <i>n</i> )		
	Full (289)	Inexperienced (134)	Experienced (93)
<b>Individual difference variables</b>			
Self-focused attention	.16*	-.03	.32**
Trait Anxiety			
Anxious apprehension <sup>a</sup>	-.01	-.02	-.06
Trait worry	.03	-.01	-.00
Optimism	.17*	.11	.27**
Pessimism	-.10	-.08	-.14
Hope	.07	-.02	.22*
<b>Health Belief Variables</b>			
<b>Current Health</b>			
Perception of health	.10	.12	.14
Acute health problems	-.05	.02	-.21*
<b>Control Beliefs</b>			
Health <sup>a</sup>	.22**	.23**	.32**
Symptoms <sup>a</sup>	.27**	.21*	.42**
Health self-efficacy	.03	-.05	.14
Coping self-efficacy	.11	.04	.42**
Vulnerability to illness	.03	.03	-.03
Catastrophizing	.12*	.06	.19
<b>Context-dependent variables</b>			
<b>Treatment Experience</b>			
Previous satisfaction with tx	n/a	n/a	.50**
Number of current tx <sup>a</sup>	-.02	-.11	-.08
Number of past tx <sup>a</sup>	.00	-.06	-.06
Satisfaction with current tx <sup>a</sup>	.13 <sup>b</sup>	.16 <sup>d</sup>	.17 <sup>f</sup>
Satisfaction with past tx	.05 <sup>c</sup>	.13 <sup>e</sup>	.05 <sup>g</sup>
<b>Perceived treatment focus</b>			
Somatic <sup>a</sup>	.51**	.55**	.40**
Psychological <sup>a</sup>	.16**	.16	.15
<b>Motivation</b>			
Desire for relief <sup>a</sup>	-.01	.12	.10
Symptom severity	-.03	-.15	.15
IBS: Interference with daily activities <sup>a</sup>	-.04	.02	.18
Socially desirable responding	-.04	.03	-.12
Patient-provider relationship	.12*	.11	.11

Note. tx = treatment(s)

<sup>a</sup>Transformed. <sup>b</sup>*n* = 254. <sup>c</sup>*n* = 230. <sup>d</sup>*n* = 111. <sup>e</sup>*n* = 98. <sup>f</sup>*n* = 86. <sup>g</sup>*n* = 80.

\**p* < .05. \*\**p* < .01.

*Regression analyses.*

The regression analyses used in testing Hypothesis 2 with the full sample were repeated for both the Experienced and Inexperienced sample. In order to compensate for the relatively small sample sizes of both samples, the bootstrap method was used when performing these regression analyses. The bootstrap method was described by Efron in 1979 and is defined as a general procedure that mimics the sampling distribution of a statistic through successive resampling (Dalglish & Chant, 1995). This procedure is a means of estimating statistical accuracy from a single sample (Diaconis & Efron, 1983). That is, bootstrapping mimics the process of selecting many samples when it actually uses only one sample to find the probability that the values of a given test statistic fall within a certain interval. Bootstrapping is a method that resamples with replacement, meaning that each time an observation is taken to resample it, the procedure replaces it before taking the next observation. Because each observation is replaced, it means that the same observation can appear in the sample more than once. Thus, the empirical distribution that consists of the bootstrapped samples can be treated as if it were a distribution constructed from many samples (Diaconis & Efron). The bootstrap method produces a 95% confidence interval for each statistic of interest (e.g., regression coefficients and  $R^2$ ); if this interval contains '0,' the statistic cannot be considered significantly different from zero.

For the Experienced sample, as there were significant correlations identified for variables from each category, a three-step hierarchical regression was used, as with the full sample, with treatment expectancies (transformed) as the criterion variable. The results of the hierarchical regression are presented in Table 10. The amount of variance



explained ( $R^2$ ) was significant after each step. After step 1, with the three individual difference variables (Self-focused attention, Optimism and Hope) in the equation, an average of 22% of the criteria was explained (mean  $R^2 = .22$ , 95%  $CI = .09-.31$ ). Only Self-focused attention and Optimism had significant beta values (Self-focused attention: mean  $\beta = .32$ , 95%  $CI = .11-.45$ ; Optimism:  $\beta = .31$ , 95%  $CI = .10-.45$ ). When the health belief variables (Control over health, Control over symptoms, Catastrophizing and Coping self-efficacy) were entered in step 2, the proportion of explained variance increased to 43% (38% adjusted). Among the health belief variables, Control over symptoms and Acute health problems had significant beta values. In the full model (including Previous satisfaction with treatment and Perceived somatic focus of treatment) the average  $R^2 = .62$  ( $SD = .04$ ; 95%  $CI = .52-.68$ ), indicating that 62% (57% adjusted) of the variance in treatment expectancies was explained by these 10 variables.

Beta weights for each predictor variable were again examined to assess their relative importance in the prediction of treatment expectancies. In the full model, there were five variables that were significant predictors of treatment expectancies, including (in descending order) Previous satisfaction with treatment ( $\beta = .36$ , 95%  $CI = .20-.50$ ), Perceived somatic focus of treatment ( $\beta = .27$ , 95%  $CI = .12-.38$ ), Self-focused attention ( $\beta = .26$ , 95%  $CI = .13-.33$ ), Optimism ( $\beta = .21$ , 95%  $CI = .04-.46$ ) and Acute health problems ( $\beta = -.12$ , 95%  $CI = -.28-.01$ ). Control over symptoms was not a significant predictor of variance in this full model.

Table 10

*Summary of Hierarchical Regression Analysis for Variables Predicting Treatment**Expectancies<sup>a</sup> in Sample with Previous Experience with Preferred Treatment (N = 93)*

Variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>sr</i> <sup>2</sup>	<i>R</i> <sup>2b</sup>
Step 1					.22*
Self-focused attention	.04	.01	.32*	.11	
Optimism	.09	.03	.31*	.08	
Hope	.00	.00	.00	.00	
Step 2					.43*
Self-focused attention	.03	.01	.27*	.11	
Optimism	.05	.03	.18	.03	
Hope	-.01	.01	-.14	.02	
Control over health <sup>a</sup>	-.05	.08	-.08	.00	
Control over symptoms <sup>a</sup>	.19	.08	.36*	.07	
Coping self-efficacy	.04	.02	.22	.05	
Acute health problems	-.02	.01	-.11*	.02	
Step 3					.62*
Self-focused attention	.03	.01	.26*	.12	
Optimism	.06	.02	.21*	.05	
Hope	.00	.00	-.08	.01	
Control over health <sup>a</sup>	.00	.07	.02	.00	
Control over symptoms <sup>a</sup>	.14	.06	.14	.05	
Coping self-efficacy	.00	.02	.05	.00	
Acute health problems	-.02	.02	-.12*	.02	
Previous satisfaction with preferred tx	.07	.02	.36*	.18	
Perceived somatic focus of treatment <sup>a</sup>	.22	.06	.27*	.13	

Note. tx = treatment.

<sup>a</sup>Transformed. <sup>b</sup>Adjusted *R*<sup>2</sup> after step 1 = .19, after step 2 = .38, after step 3 = .57.

\*95% confidence interval does not include zero.

Examining squared semi-partial correlations identified Previous satisfaction with treatment as predicting the most amount of unique variance in current treatment expectancies (18%), as predicted in the original hypotheses. Perceived somatic focus of treatment was the second most important unique predictor ( $sr^2 = .13$ ). Self-focused attention uniquely accounted for 12% of variance in levels of treatment expectancies. Although Optimism and Control over symptoms both uniquely accounted for 5% of

variance in the criterion variable, only Optimism was a significant predictor in the full model. Acute health problems uniquely contributed to 2.0% of variance. The total unique variance contributed by these independent variables was 50%.

Table 11

*Summary of Hierarchical Regression Analysis for Variables Predicting Treatment Expectancies<sup>a</sup> in Sample without Previous Experience with Preferred Treatment (N = 134)*

Variable	B	SE B	$\beta$	$sr^2$	$R^2$
Step 1					.09*
Control over health <sup>a</sup>	.08	.05	.17	.02	
Control over symptoms <sup>a</sup>	.06	.05	.13	.01	
Step 2					.32*
Control over health <sup>a</sup>	.05	.05	.10	.01	
Control over symptoms <sup>a</sup>	.01	.06	.02	.00	
Perceived somatic focus of treatment <sup>a</sup>	.38	.05	.52**	.27	

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .08, after step 2 = .31.

\*95% confidence interval does not include zero.

The results for the Inexperienced group were quite different, and are presented in Table 11. A two-step hierarchical regression was used for this analysis, as there was no individual difference variables identified as significant correlates of treatment expectancies in this sample. Although the two control belief variables predicted a significant amount of variance when entered alone in step 1 ( $R^2 = .09$ , 95% CI = .03-.16), neither had significant beta weights. This suggests that individually, neither contributes

enough unique variance in the criterion variable. In step two, the somatic illness attribution variable uniquely contributed to 27% of the variance in treatment expectancies ( $R^2 = .32$ , 95% CI = .20-.44; Adjusted  $R^2 = .31$ ).

*Comparing regression results between the three samples.*

The purpose of these analyses was to use a hierarchical regression to identify the best predictors of treatment expectancies (TE) from among those variables identified as having significant zero-order correlations with this criterion variable. However, comparing the results of the full sample with the results from the two sub-samples has revealed differential findings regarding which variables are the best predictors, based on which sample is examined. Although some variables were identified as significant correlates and/or predictors of treatment expectancies in all three samples (e.g., Perceived somatic focus of treatment and the two control belief variables), the relevance of several variables (the size of their correlation with TE or their significance in a regression model predicting TE) was found to vary based on which sample was used in the analysis. For instance, three variables that were not significant correlates in the full sample emerged as such when considering only those participants with previous experience with their preferred treatment (i.e., Hope, Acute health, and Coping self-efficacy). In addition, two of the individual difference variables that were identified as having a significant but weak relationship with TE in the full sample (Self-focused attention and Optimism) displayed more robust relationships in the Experienced group. As none of the variables were significant correlates among those in the Inexperienced group, these results suggest that the inclusion in the full sample of participants without previous treatment experience has, for lack of a better term, diluted the relationships that are relevant among the

Experienced. In contrast, three variables were identified as significant correlates of treatment expectancies in the full sample, but were not significant correlates in either of the two sub-samples (i.e., Catastrophizing, Perceived psychological focus of treatment and Patient-provider relationship). This suggests a sort of additive effect, where trends towards significance in either one or both sub-samples are combined in the full sample to reach a level of statistical significance. Alternatively, this finding could be a function of increased power to detect a significant effect provided by the larger sample size of the full sample. Overall, these differential results suggest that previous experience with treatment had some influence on the number of psychosocial variables that were found to show a significant relationship to the dependent variable.

#### *Testing for Moderation.*

A series of hierarchical regressions were conducted to assess whether Previous experience with preferred treatment truly moderated some of the relationships between the DV and the IVs, as suggested by the results presented above. To test for moderation, first Previous experience with preferred treatment was coded as a dichotomous variable (0= Inexperienced; 1 = Experienced), and interaction terms were created to represent the interaction between Previous experience and the IV of interest (e.g., Experience\*SFA). The IVs of interest included those variables that displayed significant relationships with the DV in the Experienced group but not the Inexperienced group (i.e., SFA, Optimism, Hope, Acute health problems and Coping self-efficacy). Other variables of interest were those where the size of the correlations with the DV were notably larger or smaller in one group or the other (Control over symptoms, Perceived somatic focus of treatment). In each hierarchical regression, the IV of interest and the dichotomous Experience variable

were entered into the model predicting treatment expectancies in the first step, and then their interaction term was entered into the second step. Moderation is confirmed if the interaction term is significant.

The full results of these analyses can be found in Appendix AC. In brief, Previous experience with preferred treatment was confirmed as moderating the relationship between Treatment expectancies and i) SFA, ii) Coping self-efficacy (interaction terms significant at .05 level). The interaction between Experience and Control over symptoms was almost significant ( $p = .06$ ), whereas Treatment experience was not found to moderate the relationships between TE and Optimism, Hope, Acute health problems, or Perceived somatic focus of treatment.

#### V. Examining the Qualitative Data

Qualitative analysis was conducted using responses from 100 participants chosen randomly from the total sample. The examination of the qualitative data was guided by the question of whether there were additional psychosocial variables, beyond those independent variables identified in the literature review, which were commonly cited as contributing to one's expectations of treatment benefit. Among the 100 participants, 98 participants offered at least one factor contributing to their expectations that could be coded. The average number of factors generated was 1.96 ( $S.D. = .90$ ), and the maximum number of factors mentioned was four. The specific factors, both pre-set and emergent, are presented in Table 12.

## A. Emergent Categories

After coding the qualitative responses using the pre-set categories established in the introduction as potentially relevant psychosocial variables, the narrative responses were reviewed to identify additional psychosocial variables that may be mentioned as contributing to participants' expectations of benefiting from treatment. These emergent categories captured statements provided by participants that were not appropriate for any of the pre-set categories. Seven of such emergent categories were identified, falling under five general categories. Although 'treatment experiences' was a pre-set umbrella category, two new sub-categories Treatment experience: Vicarious and Treatment experience: Inexperience emerged from the qualitative data. Similarly, two new sub-categories, Attribution: Holistic and Attribution: Situational emerged to join the other two pre-set Illness Attribution categories. Three emergent categories were original, not having been measured in the quantitative analysis. These three categories were Convenience, Aversion and Side effects.

### *Treatment Experience.*

Several participants made statements that can be considered to fall under the broader category of past treatment experiences, but were not appropriate for the pre-set categories of Past experience with similar treatment or Number of treatments previously attempted. In particular, three participants cited vicarious experience with certain treatments as factors influencing their treatment expectancies. The Treatment experience: Vicarious emergent category included statements such as 'I have seen a lot of drug treatment in my family and friends be unsuccessful...' and 'I have worked in the medical field in the past, and basically lost most confidence in medications.' Another

five participants made reference to previous inexperience with a treatment when asked to comment on why they thought a treatment may work for them. Statements such as ‘It is one that I have not tried...’ and ‘I have never tried cognitive/relaxation therapy and feel that this might help me’ were coded on the emergent Treatment experience: Inexperience category.

### *Attribution.*

The second most commonly cited emergent factor encompassed statements considered to refer to participants’ attributions regarding the cause of their IBS symptoms. It was found that some participants made attributional statements that did not fit into the pre-set categories of Attribution: Somatic and Attribution: Psychological, but instead made reference to either the holistic/ mind-body aspects (Attribution: Holistic) or the situational aspects (Attribution: Situational) of the treatments and/or their IBS symptoms. Fourteen participant statements (14%) were coded as belonging to one of the two new attribution categories, with 11 (78%) coded as Attribution: Holistic statements and 3 (22%) coded as Attribution: Situational statements. Examples of Attribution: Holistic statements include: ‘I believe all treatments should deal with the mind and body,’ or ‘I feel that my IBS is not only a symptom of my intestines but rather a symptom of my body as a whole,’ or ‘I do not believe this can be cured by counseling or thoughts alone, I think that you need to combine both treatments together to get the best results.’ The statements coded as Attribution: Situational include: ‘I believe firmly that the symptoms of IBS can be best treated through diet and lifestyle...’ and ‘...it is mostly the behaviours that make IBS “attacks” somewhat more frequent,’ and ‘When a lot is going on in my life, I do have more stomach pain...’



Table 12

*Number of Qualitative Statements in Each of the Pre-set and Emergent Categories*

Category	<i>n</i>
<i>Pre-set Categories</i>	
Self-focused attention	0
Trait Anxiety	11
Optimism/ Pessimism	6
Hope	4
Current health	10
Perception of self as 'healthy' or 'sick'	4
Other acute health problems	6
Control beliefs	6
General health	1
Symptoms	5
Health self-efficacy	6
Perceived vulnerability to illness	0
Catastrophizing	2
Treatment Experience	42
Previous experience with similar treatments	34
Number of treatments attempted	8
Illness Attributions	29
Somatic	10
Psychological	19
Motivation	12
Desire to see relief/ Symptom Severity	11
Socially desirable responding	1
Perceptions of the treatment provider	11
<i>Emergent Categories</i>	
Aversion	17
Side effects	5
Illness Attributions	14
Holistic	11
Situational	3
Convenience	11
Treatment Experience	8
Vicarious	3
Inexperience	5

*Convenience.*

Another category to emerge captured statements referring to the convenience or inconvenience associated with a certain treatment regimen. Examples of these statements

include: 'Seems user friendly,' 'Fits into my lifestyle better,' 'It may be too difficult to maintain if it involves strict dietary restrictions,' and 'I sometimes do not have the time or finances to go through relaxation therapy.' A total of 11 participants made statements that were coded in this category.

#### *Aversion.*

The emergent variable most commonly cited by participants was labeled Aversion, which was endorsed by 17 (17%) participants. This category encompasses statements regarding a participant's aversion to or bias against certain treatments, either drug treatments or psychological treatments. Examples of statements coded as Aversion include: "I prefer treatments without the use of drugs," or "I am sometimes resistant to therapy," or "If I could solve the problem with drugs I would," or "I feel medications only mask the symptoms and don't provide a cure." Of the 17 statements coded as Aversion, 11 of those (65%) were coded as aversion to drug treatment while 6 (35%) were coded as aversion to psychological treatment.

#### *Side effects.*

Another five percent of participants mentioned side effects in their narrative statements. Examples include: "I have had negative side effects from conventional medications thus far..." and "My experience with drugs is ... they can have side effects or be unpleasant or intrusive." Statements in this category are somewhat similar to ones in the Aversion category. However, these statements contained explicit mention of 'side effects' and were noted not to occur exclusively in the context of an Aversion statement.

For example, ‘I think medication would probably be the route to go as long as side effects did not interfere more with my life...’

## B. Exploring Illness Attributions

The second specific aim of including a qualitative component in the current research was to use participants’ narrative responses to shed light on null or unexpected quantitative findings. The following is a brief exploration of one instance where the qualitative data was useful in clarifying the nature of the relationships between the pre-identified psychosocial variables and expectations to benefit from treatment.

In the narrative data, illness attributions in general were mentioned by 29% of respondents ( $n = 29$ ), making this general category the second most frequently referenced. Including the statements coded into the emergent Illness Attribution categories (Holistic and Situational) raises the count to 43 statements that made reference to illness attributions. In the quantitative analyses reported above, it was found that Perceived somatic focus of treatment was moderately related to treatment expectancies, whereas Perceived psychological focus of treatment was only weakly related. In contrast, narrative statements regarding psychological illness attributions were somewhat more common than statements regarding the somatic aspects of symptoms/ treatments (19 and 10 statements, respectively).

Examination of the statements themselves speculatively sheds some light on this apparent discrepancy between the relevance of the perceived somatic vs. psychological focus of treatment. For one, all of the Attribution: Somatic statements seemed to make reference to how the perceived somatic aspects of treatment or symptoms positively influence expectations of benefit (e.g., “Medications are geared specifically towards the

illness, therefore should work better than anything else” and “To me, physical symptoms are to be treated with physical remedies”). In contrast, while some statements coded as Attribution: Psychological seemed to reference psychological aspects of treatment/ symptoms as positive influences on treatment expectancies (e.g., “I think the treatment may work because my IBS symptoms are mostly triggered by stress...), other statements in this category seemed to refer to factors that diminished one’s expectation of benefiting from treatment (e.g., “I think I already have enough basic grasp of stress management and hearing a re-hash of it won’t improve my ability to chill out... I believe there is a psychological aspect, but...”). Still other statements in this category suggest some participants feel that the psychological contributors to their symptoms actually would impinge on their ability to benefit from a psychological treatment (e.g., “Sometimes my nerves and my poor ability to reason with stress affect me harshly. It is easier on me to take medication to get through my issue”). This variety in statements regarding the psychological aspects of attributions / treatments seem to suggest that for some, the psychological foci of a treatment may contribute to greater expectations to benefit from a psychologically-based treatment, whereas for others, this perception may contribute to lower expectations from such a treatment.

## Chapter 4

### DISCUSSION

#### I. Overview

In the last fifty years, our conceptualization and understanding of the placebo effect has come a long way. We have gone from considering a placebo as a ‘sham’ or ‘inert’ treatment that must be ‘controlled for’ in clinical trials, to discovering that a

placebo response is largely mediated by expectations and viewing the placebo (or expectation) effect as playing an active role in any treatment context (Papakostas & Daras, 2001). The goal of much placebo research is not to ultimately justify the ethical use of placebos in medicine, but to understand the neurological, contextual and psychosocial correlates of placebo responding so that these factors can be targeted and enhanced to promote greater responsiveness to any therapeutic intervention (Price, Finniss & Benedetti, 2008). Historically, much of this research has focused on identifying the contextual or ‘placebo-salient’ factors that contribute to a greater placebo response. In the last several years, there has also been increasingly more research focused on the neurophysiological processes that mediate placebo/ expectation effects. Although recent reviews now emphasize that the study of placebo responding and expectations effects should be focused on understanding the role of the individual in the context (Miller & Kaptchuk, 2008), there has been relatively little empirical research dedicated to this end. The current research has been successful in contributing to our understanding of these processes by identifying a set of personal psychosocial factors that are associated with expectations for treatment benefit in an IBS sample.

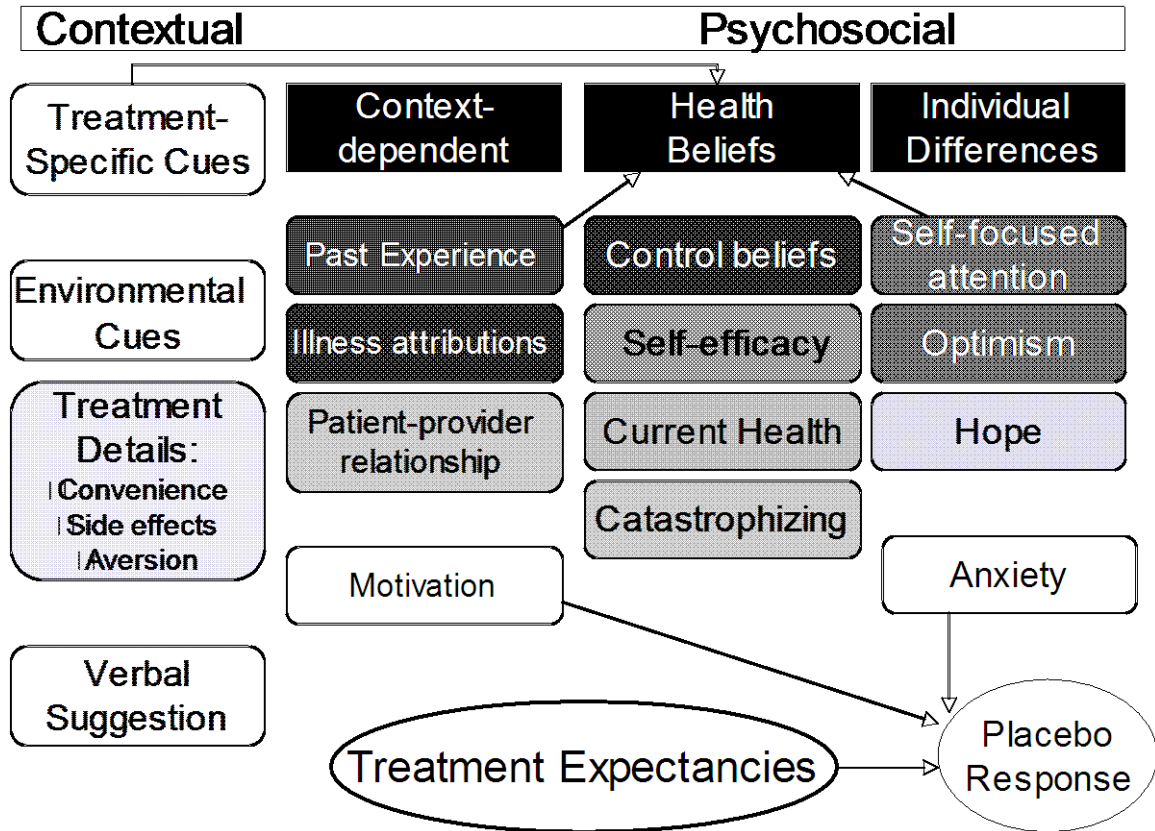
To accomplish this, two models of placebo responding (Kirsch, 1985; Sirois, 2001, 2009) and one model of expectancy formation (Olson et al., 1996) were combined into a broad model that encompasses the contextual and psychosocial factors thought to contribute to expectation formation in the context of therapeutic interventions. The psychosocial variables suggested by these combined models included the broad category of health beliefs, some specific individual difference factors (individual differences and anxiety) as well as certain context-dependent variables (such as previous learning and

attributions). This combined model was used to guide a thorough literature review designed to identify the range of individual difference factors, the types of health beliefs, and the important context-dependent variables that, through their association with either placebo responding, health outcomes or expectations of treatment, could be considered as potentially relevant correlates of treatment expectancies (see figure 1). The current research was then focused on empirically testing which of these psychosocial factors contribute to expectations regarding a hypothetical treatment in a sample of individuals with irritable bowel syndrome.

The first research question asked which of the psychosocial factors, identified as relevant from the literature review, would be correlated with treatment expectancies (TE) in this sample. The second research question asked which of these correlated variables would be the best predictors of treatment expectancies in a regression model. The qualitative research question asked whether there were additional factors that participants reported as relevant. Together these research questions were focused on identifying a parsimonious set of relevant psychosocial variables that had the strongest relationships to treatment expectancies in this sample. Interestingly, the analyses associated with the first two research questions resulted in somewhat disparate findings when repeated in two sub-samples of the main sample, namely those with experience with their preferred treatment and those without experience with the hypothetical treatments.

Figure 3 provides a visual summary of the main findings of the current research. In terms of psychosocial variables, this research has been successful in identifying a range of individual difference variables, the types of health belief variables as well as the important context-dependent variables that are associated with one's expectations to

benefit from treatment (research question 1), as well as their relative ability to predict variance in treatment expectancies (research question 2).



*Figure 3.* Summary of results. Variables that were identified as having a relatively greater contribution to the magnitude of one’s treatment expectancies are displayed higher in the figure, and in text boxes of increased shading. Directional arrows specify proposed interactions that will be discussed herein. Briefly, treatment-specific cues are proposed to activate specific health beliefs, and when one has previous experience with a similar treatment, specific related health beliefs are proposed to be activated more strongly. Increased self-focused attention is also proposed to enhance the association of specific health beliefs to treatment expectancies. Any influence of motivation and anxiety on placebo responding is proposed to occur unmediated by expectancies.

In keeping with the study goal of identifying the psychosocial variables that are the best predictors of treatment expectancies, the discussion will first focus on those variables that were relevant across each of the samples (full sample, Experienced sample and Inexperienced sample), and next turn to examine those variables found to be relevant

correlates and/or predictors of TE in at least two samples, as so on. Possible explanations for the disparate findings across samples will also be explored.

## II. Discussion of Main Findings

### A. Attributions for Symptom Improvement.

One variable that stood out as an important correlate and predictor of treatment expectancies in all three samples was Perceived somatic focus of treatment. In addition, both in the full sample and the Inexperienced sample, this variable explained the largest amount of unique variance in levels of treatment expectancies. These results suggest that in this IBS sample, there was a strong relationship between how much one perceived their preferred treatment as focusing on the somatic roots of their IBS symptoms and how much one expected that treatment to work, with a greater somatic focus being associated with a greater expectation to benefit. In comparison, Perceived psychological focus of treatment was a significant but weaker correlate and predictor of treatment expectancies in the full sample, but not in the other samples. These variables cannot be considered direct measures of how much one attributes their IBS symptoms to somatic or psychological causes; instead they may capture participants' recovery attributions, or perhaps more aptly, their attributions for symptom improvement. The specific question used to measure Perceived somatic/psychological focus of treatment asked participants to rate to what extent they agreed that their preferred treatment 'targeted the physical/psychological causes of IBS.' As the questions referred specifically to one's preferred treatment, it may be that participants' responses to these items were indeed inspired by their causal attributions for their symptoms of IBS. On the other hand, it may be that participants' responses were inspired more by their preference for a treatment that



targeted somatic vs. psychological contributors to IBS, regardless of what causal attributions they use to understand their own symptoms. It should also be noted that it is impossible to determine, using the current data, how much a person considered the dietary recommendations (offered in both treatment scenarios) as targeting the ‘somatic causes of IBS.’ As diet changes are commonly accepted to be the first and most effective approach to managing IBS symptoms, it makes sense that greater level of perceived focus on these aspects of symptom management would be associated with greater expectations to benefit from these treatments. Given the sizable amount of variance in treatment expectancies that was predicted by Perceived somatic focus of treatment (up to 27%), it seems that these relationships should be considered more closely.

If we consider these findings as representing, at least to a certain extent, a link between illness attributions and treatment expectancies, they would be consistent with a large study of mixed illness groups wherein expectations regarding treatments in general were correlated with both organic and psychological illness attributions, although less so with the latter (Moss-Morris et al., 2002). Without the need to make such a conceptual leap, these results echo the findings of a meta-analysis of placebo-controlled treatment studies for chronic fatigue syndrome (Cho et al., 2005), where it was found that on average, psychological interventions elicited lower placebo responses than somatically-focused interventions. The authors speculated that participant illness attributions influenced their expectations to benefit from the different types of treatment and thus their therapeutic response to placebo interventions. Here also, it cannot be determined whether patients expectations to benefit were influenced more so by personal symptom attributions, attributions for improvement, or even preferences for certain types of

treatment perhaps based on factors such as aversion or convenience (as suggested by the qualitative data analysis).

Nevertheless, the current results are unique as they represent the first empirical findings linking treatment expectations with perceived somatic/ psychological focus of treatment in an IBS sample. They are important results as they clearly suggest that for individuals with IBS, one's positive expectations to benefit from treatment (and thus one's ability to benefit from the expectation effect) are related to the perceived somatic, and to a lesser extent psychological, focus of the proposed treatment. The implications for the treatment of IBS that seem to follow from these findings are that in order to maximize positive expectations of treatment, practitioners should consider the patients' perspectives on what type of intervention and/ or what type of causal factor (somatic or psychological) is worth targeting, and in what degree.

An interesting result of this study was the discrepancy between the influences of somatic attributions versus psychological attributions (be them attributions for the cause of symptoms or the improvement of symptoms). This discrepancy is not unique to an IBS sample, as it has also been found in other research, such as the stronger associations between somatic attributions and treatment expectations in a mixed illness group (Moss-Morris et al., 2002), as well as the stronger influence of somatic attributions to treatment success in a chronic fatigue sample (Chadler et al., 2003). Results from a recent study of health attributions among laypersons suggest that this discrepancy is not necessarily unique to certain illness populations (Shiloh, Peretz, Iss & Kiedan, 2007). In the Shiloh et al. study, four groups of healthy students were asked to estimate the chances of recovery of a hypothetical person with an unnamed severe disease on a scale from 0 to

100. Groups were presented with different vignettes that varied by the quality of medical care (high/low) or the quality of the person's psychosocial resources (both personal and social; high/low). Their ratings of 'chance for recovery' were considered an indirect assessment of recovery attributions. The same participants were then asked to rate (from 0 to 100) the relative importance of a) biomedical factors, and b) psychosocial resources in effecting the recovery of a different hypothetical person with the same illness. This was considered an explicit measure of participants' recovery attributions. Comparing ratings derived from the indirect assessment of recovery attributions across groups, there was only a main effect of psychosocial resources, with higher psychosocial resources being related to higher ratings of chance for recovery. In fact, the effect size for the influence of psychosocial factors on recovery was 60 times stronger than the effect size for biomedical factors. On the explicit measure of recovery attributions, the importance of quality biomedical care was rated as twice as important as the quality of psychosocial resources. This interesting study highlights, among other things, the tendency of people to overestimate the influence of medical/organic factors, and underestimate the importance of psychosocial factors, when asked explicitly to communicate their attributions for improvement. This tendency may have been at play in the current research, as individuals were explicitly asked to rate the perceived somatic/psychological foci of their preferred treatment. Interestingly, when asked to comment freely about factors they perceived as contributing to their expectations of benefit, there were a greater number of references made to psychological attributions or holistic attributions than to medical/organic attributions of illness/ recovery.

## B. Control Beliefs

The control belief variables were also correlated with expectations to benefit from treatment across all three samples. Furthermore, in both the full sample and the Experienced sample, Control over symptoms was a significant predictor of treatment expectancies when entered with other health belief variables in the second step of the regression. Thus, in this IBS sample, the greater one's beliefs about having control over one's symptoms, and to a lesser extent, control over one's health, the higher one's expectations to benefit from the treatment. The general link between control beliefs and expectations of treatment has previously been demonstrated in a large sample of mixed illness groups (Moss-Morris et al., 2002), but this is the first empirical evidence to support a link between treatment expectancies and control beliefs in an IBS sample.

These results regarding the general influence of control beliefs on expectations of treatment fit nicely with theories of expectancy formation (e.g., Olson et al, 1996) if we consider variations in control beliefs as constituting a form of change attribution, from more internal (I am in control of my symptoms) to less internal (low scores on control belief measures). Olson and colleagues propose that if changes are attributed to internal, stable causes, then future positive changes will be expected. With less personal and internal change attributions, expectations of benefit are less certain. Health psychology research has emphasized that better adjustment to chronic illness is related not only to possessing more internal causal attributions, but also to having stronger attributions regarding the controllability of symptoms (Roesch & Weiner, 2001). In other words, better adjustment has been noted among those who attribute to themselves a greater amount of control over their illness. These results are also in line with findings that

greater control beliefs are inversely related to symptom severity in certain chronic illnesses (e.g., tinnitus; Sirois, Davis & Morgan, 2006), and that weaker personal control over symptoms are associated with less favourable outcomes in IBS samples (Rutter & Rutter, 2002).

The finding that beliefs of control over symptoms are more strongly related to outcome (here expectations of outcome) than are beliefs of control over health in general is consistent with both theory and research (Sirois et al., 2006). Folkman (1984) suggests that different types of control beliefs influence cognitive appraisals in different ways. General control beliefs may lead someone to consistently perceive ambiguous situations as more manageable, but situation-specific control beliefs can be considered as coping resources to be drawn on only under certain conditions. It follows that control over IBS symptoms would be more relevant when considering expectations regarding a treatment designed to improve IBS symptoms; in this case control over health in general is obviously not as specific and not as relevant.

It is possible that these findings may not generalize to other illness populations, or that the magnitude of the relationships would vary across samples or treatment contexts. Moss-Morris and colleagues (2002) suggest that beliefs about personal control may be more relevant in situations where treatment choices themselves can be seen as a personal decision of how best to manage or control symptoms. For example, in situations where there is no one proscribed treatment (e.g., in IBS), treatment choices themselves can be seen as a personal decision of how best to manage or control symptoms. In contrast, in chronic illnesses like HIV or diabetes where treatment is very prescriptive, beliefs about treatment effectiveness may be conceptually distinct from beliefs about personal ways of

controlling or managing symptoms. One can also consider how symptom-specific control beliefs could overlap or combine with beliefs about self-efficacy to carry out or adhere to treatment recommendations (French & Weinman, 2008). For example, if following diet recommendations is an important part of a treatment plan for IBS, then one's expectations to benefit from the treatment should vary with one's sense of their ability to manage their symptoms by following the diet recommendations. References to these types of self-efficacy concerns did surface in the qualitative data as statements in the emergent category labeled Convenience. Examples include 'Fits better into my lifestyle' and 'I sometimes do not have the time or finances to go through relaxation therapy' or 'It may be too difficult to maintain if it involves strict dietary restrictions.' Following from these findings, it may be desirable in future research to more explicitly examine the relationship between treatment expectancies and one's level of self-efficacy to adhere to specific aspects of the proposed treatment.

Although these results may not be as robust in another illness group, this study has clearly shown that in this sample of individuals with IBS, control beliefs, particularly beliefs of control over symptoms, are important psychosocial variables to consider when aiming to strengthen expectations of treatment benefit.

### C. Optimism

Optimism is one of two individual difference variables that were identified as relevant in both the full sample and the sub-sample of participants who had more experience with treatment. In particular, in the Experienced sample, optimism was found to be a moderate predictor of variance in treatment expectancies and to retain its significance in the full regression model. The results were the same, although less robust,

in the full sample. It was found that greater levels of reported optimism were associated with greater expectations about benefiting from the proposed treatment.

This is the first time that optimism has been linked with treatment expectancies in an IBS sample. This result is consistent with research where treatment expectancies have been correlated with optimism in cancer patients (Weinfurt et al., 2003) as well as in non-clinical populations (Hyland, Whalley & Geraghty, 2007). Furthermore, it corresponds with the results from a recent study where levels of optimism were correlated with levels of positive placebo responding (Geers et al., 2007). Thus this finding is an important contribution to a growing literature regarding the importance of dispositional optimism and its relationship to expectations of treatment.

The fact that optimism was linked with treatment expectancies while pessimism was not is also consistent with empirical research wherein pessimism is only linked to negative outcome expectancies (Montgomery et al., 2003) and related to negative placebo suggestions (Geers, Helfer, et al., 2005). Overall, it seems that dispositional optimism is relevant in the context of a suggestion for positive outcomes. It has been suggested that optimists are more likely to be persuaded by positively framed suggestions (Geers, Helfer, et al., 2005), for example information regarding treatment benefits, as optimism itself pertains to relatively stable expectations that good things will happen. Perhaps dispositional optimism can be considered as an information processing bias towards information that confirms and strengthens initial positive expectations. This theory of how optimism may affect the magnitude of expectancies is similar to cognitive-attentional bias theories of how expectations may lead to placebo responses (Sirois, 2001, 2009; Stewart-Williams, 2004).

#### D. Self-Focused Attention

Self-focused attention (SFA) is another individual difference variable hypothesized to influence levels of expectation of benefit through its effect on cognitive-attentional processing. In the present study, this variable was found to be just as relevant as optimism in its association to expectations to benefit from treatment, if not more so. In particular, in addition to displaying a modest correlation and regression coefficient in relation to treatment expectancies in the full sample, one's level of self-focused attention was found to be a fairly robust positive correlate in the Experienced sample, and to remain a significant predictor in the full regression model, uniquely accounting for 12% of the variance in the criterion. These findings indicate that those who reported being more internally focused also reported greater expectations to benefit from treatment. This strong finding needs to be replicated in another IBS sample and in other illness groups, as it seems that this is the first finding of a positive correlation between levels of self-focused attention and levels of expectations of treatment benefit.

Despite its novelty, this finding is consistent with both placebo research and theory. In particular, the Belief-Activation Model of placebo responding posits that levels of self-focused attention influence placebo responding as those with higher levels of SFA may direct attention away from external information (i.e., placebo suggestions) towards more internal sensations and cues, which may contradict externally introduced expectations, thus moderating the degree or direction of one's expectations regarding the intervention (Sirois, 2001, 2009). In one study of placebo responding (Geers et al., 2006), it has been demonstrated that greater levels of induced self-focused attention are associated with increased placebo responding. However, this relationship was found only



among those in the deceptive placebo group (versus the conditional placebo group). To explain this latter finding, Geers and his colleagues speculated that among those with stronger (or more certain) initial placebo expectations (the deceptive placebo group), greater SFA guided information processing towards internal stimuli that confirmed these initial expectations.

It is possible that this explanation regarding the results of the ‘certainty’ manipulation could be used to explain the current differential results regarding self-focused attention found across groups, in particular that self-focused attention (among other variables) displayed a stronger relationship to treatment expectancies in the Experienced group than in the full sample or the Inexperienced sub-sample. In particular, it could be that those with previous treatment experience also had ‘stronger’ or ‘more certain’ initial expectations. If this was the case, then the results of this study mirror those from the Geers study; specifically, level of self-focused attention displayed a relationship with treatment expectancies, but only among those with more certain/stronger initial expectations.

According to expectancy theory, previous experience is considered to be the most effective factor in shaping expectancies, much more effective than other informative factors, such as third-party communication (Olson et al., 1996). One can imagine that qualitatively, the ‘strength’ or ‘level of certainty’ of a specific expectation can vary from little more than a guess or hunch (no prior experience), to a moderate level of certainty (some prior experience) to the point where an expectation is subjectively equivalent to knowledge (extensive prior experience). With this in mind, we would predict that those with previous experience with a similar treatment would likely have developed the most

‘certain’ or strongest expectations regarding the benefits of that specific treatment, regardless of the ‘level of benefit’ that is expected. Note that the ‘strength’ of participants’ treatment expectancies was not measured, but only the level of the expected benefit (from no expected benefit to excellent expected benefit). It may have been useful to also have asked participants to rate how certain they felt about achieving that level of benefit or ‘how strong is your expectation to benefit at this level?’

Why would the strength of one’s initial expectations influence whether self-focused attention has an impact on placebo responding or level of treatment expectation? As described above, it has been suggested that stronger initial expectations guide information processing to confirm themselves; this, along with greater SFA (induced or trait) may lead to even stronger internally-directed expectation-confirmation biases. Before exploring this possibility further, it seems timely to discuss the relevance of previous treatment experience to current treatment expectancies in this sample.

#### E. Previous Experience with Treatment

In terms of the relevance of psychosocial variables in the prediction of treatment expectancies, it seems that ‘previous experience with treatment’ has been found herein to be relevant in more than one way. First is the strong positive correlation between Previous satisfaction with preferred treatment and current expectations of treatment, along with the fact that this variable uniquely contributed to almost 20% of variance in treatment expectancies in the full regression model, among those who reported having had previous experience with their preferred treatment. The second way that previous experience stands out as potentially quite relevant is that it was found to moderate the relationships of TE to two of the psychosocial variables, and by way of the observation

that several other relationships that this study has attempted to quantify seem to vary based on whether the sample has had more or less previous experience with treatment. These findings will be addressed in turn.

The strong relationship identified between previous satisfaction and current expectations is fully consistent with both theory and empirical literature. Both expectancy and placebo theorists posit that previous personal experience has the strongest influence on a person's beliefs and thus on their expectations about the outcomes of similar experiences (Olson et al., 1996; Price et al., 2008; Stewart-Williams, 2004). Quantitative research has confirmed that previous experience is an important correlate of outcome expectancies (Montgomery et al., 2003; Montgomery & Bovbjerg, 2003; Whalley, Hyland & Kirsch, 2008) and can have a strong and sustained influence on placebo responding (Colloca & Benedetti, 2006). The qualitative findings are similar to those found in other studies, wherein past experience is mentioned in a narrative by most participants who are asked about expectations to benefit from treatment (Liddle et al., 2007; Stone et al., 2005). Together these results suggest that previous experience is an important factor to consider if one is interested in maximizing treatment expectancies in a therapeutic context.

Other than this direct relationship between previous treatment satisfaction and current treatment expectations, also of interest and potential relevance is how the significance of many relationships in the full sample fall out (are teased apart) when the full sample was examined as those with treatment experience versus those without. Note that the experience level of the two groups differed in several ways. For one, the Experienced sample had previous experience with the preferred treatment, while the

Inexperienced sample did not have previous experience with either treatment. Also, the Experienced sample reported higher average numbers of current treatments and higher average numbers of past treatments. With respect to the differential results, recall that previous treatment experience was shown in regression analyses to moderate the relationship between treatment expectancies and both Self-focused attention and Coping self-efficacy. In both cases, a significant positive relationship was found in the Experienced group while no relationship was found in the Inexperienced group. Three other variables displayed a significant relationship to treatment expectancies only in the Experienced group (Optimism, Acute health problems, and Hope), although regression analyses did not confirm a true moderating effect of treatment experience for these relationships. It thus appears that having had previous experience with a similar treatment may create a context wherein certain psychosocial variables become more or less relevant in their associations with levels of treatment expectancy. This again highlights the importance of considering one's previous treatment experiences, yet leaves us pondering the explanation.

Turning back to theories of expectancy formation suggests a possible explanation. In particular, Olson and colleagues (1996) describe how previous experience can shape expectations also by influencing 'other beliefs.' Perhaps among those whose memories of a previous similar treatment experience are activated, the beliefs that were influenced by/ are associated with that experience are also more strongly activated and thus more available to influence current expectations of treatment. This model also fits with theories of illness representations (Leventhal, Meyer & Nerenz, 1980), which posit that people have a collection of beliefs (sometimes implicit) about their illness that are formed

and later activated in response to stimulus information about the illness (which could include practitioner suggestions, proposed treatments, etc). It has been found that the activation of a certain illness representation (e.g., one associated with a particular previous treatment) depends on the specificity of the stimulus information that is presented (Henderson, Hagger & Orbell, 2007), with very specific illness representations being activated by specific stimuli. Thus, in the current context, it is possible that a specific treatment could activate a specific illness representation containing not only memories of one's previous experience with that treatment, but also the beliefs that were influenced by that experience. Once those associated beliefs are activated, they are accessible to influence current beliefs and expectations.

There is an alternative, but not incompatible, explanation of why stronger associations between psychosocial variables and treatment expectancies are found among those with more treatment experience. Returning to the concept that prior experience with a specific treatment can result in 'stronger' or 'more certain' expectations about being able to benefit from that treatment, it is suggested that the beliefs that may be associated with that treatment (e.g., control beliefs, self-efficacy beliefs) may also become stronger or come to be held with greater certainty. In that case, it may be that those who 'know' more about treatments also know more about their ability to control and cope with their symptoms in the context of those treatments. Whereas for the less experienced, whose beliefs and expectations may be less certain, the task of rating one's expectations and beliefs may involve more guess work leading overall to weaker relationships between these variables.

It is estimated that approximately 50% of individuals with IBS seek treatment for their symptoms (Cremonini & Talley, 2005). Specifically taking into account the greater treatment experience of the Experienced group, it should be noted that there have been some studies documenting differences among individuals with IBS who seek treatment vs. those who do not. For example, individuals who seek treatment for IBS have been found to make more somatic attributions for their IBS symptoms (Martin & Crane, 2003), and to report higher levels of bodily preoccupation (Crane & Martin, 2002, 2004b) higher levels of general anxiety and symptom-specific anxiety (Crane & Martin, 2004; Hazlett-Stevens et al., 2003), as well as lower levels of quality of life and coping resources (Ringström, Abrahamsson, Strid & Simrén, 2007) than do non treatment seekers. Although these findings should be taken into account when considering the more numerous relationships identified herein in the Experienced vs. Inexperienced groups, this explanation on its own cannot be used to explain the current results. For one, having less experience with treatment cannot be considered the equivalent of being a ‘non treatment seeker.’ Furthermore, in the current study, SFA was the only psychosocial variable found to differ between these groups.

#### F. Interaction of Previous Experience and SFA

Returning for a moment to considering the role of SFA, both Geers and colleagues (2006) and the Belief-Activation Model suggest that greater levels of SFA guide information processing toward internally generated information (e.g., sensations, cues) which then influence one’s expectations, and thus placebo responding. It is important to note that both models discuss how SFA should influence outcome expectations at a point in time after the intervention. However, in the current study, trait

SFA was examined (and found to be relevant) at a point prior to intervention, and thus would not be guiding information processing towards expectation-confirming or disconfirming sensations, per se.

In this case it is plausible that greater self-focused attention would guide information processing towards other internal aspects of the self, (such as beliefs about the self or beliefs about treatments) for confirmation or disconfirmation (and thus modulation) of externally-derived expectations for the current situation (e.g., “This treatment will work for you”). Indeed it has been shown that greater self-focus increases access to self-knowledge (Gibbons, 2006) and according to expectancy theorists, accessibility is one of the determinants of the strength of a belief and its corresponding expectancy (Olson et al., 1996). With this in mind, it seems reasonable to suggest that personal health beliefs may be stronger predictors of treatment outcome beliefs (and expectancies) among individuals with higher levels of self-focus relative to individuals with lower levels of self-focus. Consistent with this hypothesis, recall that SFA was the only variable (other than the treatment experience variables) on which the Experienced and Inexperienced groups differed, with those with previous experience reporting higher average levels of SFA. Thus, it could be that differential levels of SFA can account for the fact that among the Inexperienced very few individual difference and health belief variables contributed to TE, whereas among the Experienced there were several significant variables.

There may be a third, more inclusive, possible explanation. Namely, it is proposed that in the Experienced sub-sample, a combination of previous experience and increased self-focused attention was responsible for the greater number of relevant

relationships between psychosocial variables and current treatment expectancies. As described above, it has been proposed that previous experience with a certain treatment would create a) stronger initial expectations that may then guide information processing towards their confirmation, and b) the activation of treatment-specific associated beliefs in one's illness representation, and c) more certain treatment-related beliefs and more certain associations between those beliefs and treatment expectations. It may also be, as in the Geers et al study, that presumably 'stronger' or 'more certain' and more specific initial expectations then combine with greater SFA to produce these differential results. In other words, among those with previous experience with their preferred treatment, their stronger and more specific initial expectations, coupled with greater SFA, led to a situation where individuals had more access to, more certainty regarding, and thus consulted their related illness and treatment beliefs when asked to explicitly rate their level of expectation. As 'strength' or 'certainty' of treatment expectancies were not manipulated or assessed in the current study, this model remains only speculative and in need of further study.

#### G. Current Health

Returning to an examination of the relative importance of different psychosocial variables in the prediction of treatment expectancies, first we will examine the factors that were significant in the Experienced group only, potentially as a result of the action of the just-proposed mechanisms. Current health, measured by totaling the number of acute common health problems endorsed by the participant, did show a significant inverse relationship with TE in the Experienced sample. Despite a relatively modest zero-order correlation, this was the only health belief variable to remain a significant predictor of TE



in the full regression model. As hypothesized, those who reported experiencing more acute health problems in the last six months also reported lower expectations to benefit from the current treatment. These results are consistent with research reporting that one's relative health stock is positively correlated with expectations regarding treatment outcome (Weinfurt et al., 2003).

#### H. Self-Efficacy

Coping self-efficacy was another variable found to be a modest positive correlate of TE in the Experienced sample, but not in the other samples. It was not a significant predictor in the regression model, however. This variable was included to capture an aspect of symptom management to complement the measure of symptom severity. This coping self-efficacy scale assesses the belief that one is successfully coping with the day-to-day aspects of one's condition. Although coping self-efficacy has been previously linked to health outcomes in illness populations, such as quality of life (Henderson, 2003) and overall functioning (Strahl, Kleinknecht, & Dinnel, 2000) this is the first time that this variable has been linked specifically with expectations to benefit from treatment. This result fits with expectancy theory in a manner similar to how control beliefs are thought to influence expectancies. In particular, Olson et al. (1996) note that high self-efficacy implies that success is expected and that success reflects personal capacities; thus, individuals with high self-efficacy will attribute positive changes to internal factors and will expect future positive changes. In addition, as described above with reference to control beliefs, it may be that confidence about managing one's symptoms is related to expectations to benefit from treatment by way of treatment adherence self-efficacy (French & Weinman, 2008). For example, if relaxation exercises are a part of the

treatment plan and one is confident about engaging in relaxation, then one may report higher levels of confidence in being able to cope with the day-to-day aspects of one's condition (coping self-efficacy) as well as higher levels of expectation to benefit from treatment.

Interestingly, scores on the health self-efficacy scale, which assessed feelings of competence and confidence to carry out actions important for maintaining and taking care of one's health in general, were not related to TE in any sample. These results confirm that self-efficacy regarding one's ability to do what needs to be done to be healthy in general are distinct from self-efficacy beliefs that are specific to coping with one's illness (Chesney, Neilands, Chambers, Taylor, & Folkman, 2006), and suggest that the latter beliefs are more relevant with regards to expectations regarding specific treatments. This pattern is similar to the one noted above regarding the relatively stronger influence of symptom-specific control beliefs versus general health control beliefs on TE.

## I. Hope

The final variable found to be positively correlated with expectations of benefit in the Experienced sample was Hope. It did not however, contribute to significant amounts of variance in TE when in a model with the other individual difference variables. The finding that higher levels of dispositional hope were correlated with more positive treatment expectancies is consistent with one other study where levels of hope were correlated with expectancies for positive non-volitional outcomes (Montgomery et al, 2003). The relatively weak relationship identified herein between levels of hope and levels of positive expectation for treatment suggests that although hope may be somewhat

relevant among those with greater self-focused attention and previous treatment experience, it is not as relevant as its conceptual cousin, optimism.

#### J. Catastrophizing

Two other variables to be discussed are those for which there was a significant correlation with the dependent variable in the full sample only. One of these is ‘catastrophizing,’ which was the only other health belief variable to show a significant correlation to treatment expectancies in the full sample and to remain a significant predictor of TE in the full regression model. Its relationship with expectations was fairly weak, it uniquely contributed to only 3% of the variance; yet this was more than was contributed by optimism in the full sample. The direction of the relationship was surprisingly in the opposite direction to what was hypothesized. It was found that those who endorsed more catastrophizing beliefs about their symptoms also reported higher levels of TE. This is the first time that catastrophizing has been linked with treatment expectancies, thus the directionality of this relationship cannot be compared with findings from other studies. It was included in the current research because it has been studied in samples with gastrointestinal disorders, and found to be related to less favourable health outcomes (Drossman, et al., 2000; Rutter & Rutter, 2002). ‘Catastrophizing’ is the short title used herein for the ‘catastrophizing interpretation of bodily complaints’ scale, which measured the tendency to interpret physical symptoms and sensations as indicators of serious illness. It could perhaps be argued that this scale assesses a tendency to be anxious about one’s symptoms (i.e., trait symptom anxiety). If so, this finding may echo the mixed findings that have been described regarding the influence of anxiety on expectations and placebo responding.

## K. Patient-Provider Relationship

Perceived quality of the patient-provider relationship was one context-dependent psychosocial variable that was positively correlated with TE in the full sample, but not a significant predictor when entered with the context-dependent variables in the full regression model. This factor was not correlated with TE in either of the other samples, suggesting that very weak effects in both the Experienced and Inexperienced group may have combined additively to result in a weak but statistically significant finding in the full sample. These weak relationships between treatment expectancies and the patient-provider relationship is likely an artifact of a) the hypothetical nature of the provider, and b) efforts to minimize the emotional/ relational aspects of the provider in the treatment vignettes.

The finding that higher levels of perceived quality in the patient-provider relationship was related to greater expectations to benefit from treatment is consistent with theory in both the placebo (Miller & Kaptchuk, 2008) and expectancy literatures (Harris & Rosenthal, 1985). Empirically, provider interactions have been linked with both greater expectations to benefit from treatment (Beach et al., 2006) and greater placebo responding (e.g., Colloca et al., 2004; Kaptchuk et al., 2008). Some authors have even suggested that the placebo effect be renamed the ‘contextual healing’ effect and have emphasized that placebo research should focus its efforts on examining the contextual aspects of the therapeutic situation, especially aspects of the relationship (Miller & Kaptchuk, 2008).

#### L. Variables Not Related to Treatment Expectancies

Before moving on to summarize and discuss the potential implications of the significant findings found in the current study, it is important to note that several of the psychosocial variables hypothesized to be correlated with levels of treatment expectations were not found to be relevant correlates in this sample. For some of these variables, these findings are not a great surprise; in particular, the non-significant relationships of TE with Perceptions of health, Health self-efficacy and beliefs of Vulnerability to illness. Both Health self-efficacy and Vulnerability to illness were included in the current study as potentially relevant psychosocial variables based on some demonstrated relationships with health outcomes. Neither had been previously associated with placebo responding or treatment expectancies themselves. Perceived levels of general health had been previously documented to show a relationship to treatment outcome expectancies in studies using different measures of overall health, particularly ‘relative health stock’ and the Medical Outcome Scale –Short Form 36 (Cheng et al., 2000; Weinfurt et al., 2003). Seeing that in this study, treatment expectancies were related to current health using the other index (number of acute health problems), suggests that perhaps the three author-created questions used to measure ‘perception of health’ did not accurately capture participant’s overall sense of their general health.

The null findings regarding both trait anxiety and motivation are of more interest in the context of understanding placebo mechanisms, as both have been linked with placebo responding and have been frequently cited as potential mediators of the placebo effect. The finding that trait anxiety was unrelated to treatment expectancies is consistent with some studies that have reported no relationships between trait anxiety and treatment

expectancies (McCarthy et al., 2003; Montgomery et al., 1998). It is inconsistent, however, with the results of an experimental placebo study with an IBS sample where levels of anxiety regarding experimental pain were positively correlated with levels of expectation of pain, and where together anxiety and expectation predicted significant levels of variance in reported pain (Vase, Robinson, Verne & Price, 2005). Perhaps these differential results are due to a study's focus on either trait anxiety (no relationship) vs. treatment or symptom-specific anxieties (some relationship). Another possible explanation for these differential results (which may work in conjunction with this first suggestion) is the negative or positive valence of the treatment/ intervention. In the Vase et al study (2005), participants were told to expect pain, whereas in the current study participants were presented with a potentially beneficial treatment. Whereas the former suggestion may understandably lead to increased anxiety, the latter would likely not. Recently, neurobiological findings have revealed that at least in the context of placebo hyperalgesia (or nocebo hyperalgesia) where one is told to expect pain, the expectation of pain leads to anxiety itself, which then increases pain through neurobiological processes of its own. In particular, anxiety regarding pain leads to increased activation of cholecystokinin, a peptide hormone that facilitates pain transmission (Colloca & Benedetti, 2007; Enck, Benedetti & Schedlowski, 2008). These recent findings suggest that although anxiety and expectation may work together to influence outcome in situations where outcomes are considered adverse, they may not necessarily be correlated in situations where the outcomes themselves are not anxiety-producing.

The other potentially meaningful null result in the current study is the finding that none of the measures of motivation (i.e., Desire for relief, Symptom severity, IBS:

Interference with daily activities, or Socially desirable responding) were related to levels of expectation to benefit from treatment. These findings are not necessarily inconsistent with placebo research. In particular, previous research has documented that motivational factors, such as desire for relief or desire to please the experimenter, contribute to enhanced placebo responding. In one of these studies, expectations were not directly measured, thus the authors could only speculate that the motivational element influenced placebo responding through its interaction with outcome expectations. Specifically it was suggested that when goals and expectations are in line there will be greater placebo responding as opposed to when goals and expectations are out of line (Geers et al., 2005). In three other studies where expectations were measured explicitly, although it was reported that both expectancies and desire for relief (as well as their interaction) predicted levels of placebo responding, it was not reported whether there was a significant relationship between the two variables (Price et al., 2005; Vase et al., 2003; Vase et al., 2005).

In the current study it was hypothesized that motivational factors might be related to treatment expectancies as these previous studies have not indicated otherwise and this hypothesis is in keeping with placebo theories wherein expectations (conscious or unconscious) represent the final common pathway in placebo responding (Kirsch, 1985). Other researchers, however, have suggested that motivational factors contribute to placebo responding directly (Vase et al., 2003). The contribution of motivational factors to placebo responding in earlier studies, combined with the null relationship between motivation and treatment expectations in this study, together lend support to the theory that such motivation factors work either independently or in concert with expectations to

contribute to placebo responding, as opposed to being mediated by expectations. Recent brain imaging studies further support this view; it has been documented that there is activation of expectations areas as well as motivation/emotion areas during placebo responding (see Price et al., 2008).

#### M. Qualitative Findings

It is interesting to note that in the narrative responses, it was the context-dependent factors that were mentioned most frequently. Specifically, when asked to comment on what personal factors may contribute to one's own expectations to benefit from treatment, a great number of participants gave statements referring to aspects of the treatment itself, and how this meshed with their perspectives/experiences/lifestyles. The two most referenced pre-set categories were Treatment experience and Illness attributions. Furthermore, all of the emergent categories were either extensions of these themes of previous experience and illness attributions or referred directly to aspects of the treatment (side effects, aversion, and convenience) that weren't manipulated or measured in this study.

### III. Summary and Implications

This research was designed to identify and quantify the relative contributions of various personal psychosocial variables to expectations to benefit from treatment in an IBS sample. In the pursuit of this end, this research has been successful in several ways. For one, this research has successfully achieved its specific aims and answered its main research questions focused on identifying a parsimonious set of psychosocial variables that are associated with treatment expectancies in an IBS sample. Second, it has both



supported and extended the conceptual models that together guided this research in its aims. Importantly, it has provided valuable information that can be used to clinically in the treatment of IBS. And lastly, it has highlighted areas of study that are in need of more empirical investigation.

Consistent with Response Expectancy Model (Kirsch, 1985) and Olson et al., (1996) expectancy formation theory, past direct experience was an important context-dependent variable in this model predicting treatment expectancies. For one, previous experiences with a specific treatment (i.e., previous satisfaction) were directly positively associated with current treatment expectancies. Although Olson et al., outlined that prior experience will have an important influences on one's beliefs, the current findings regarding the moderating effect of prior treatment experience on the relationships of various psychosocial variables to treatment expectancies add a unique and important piece to our understanding of the role of previous experience in this model. Both Kirsch and Olson et al. gave some consideration to the potential role for attributions in a model predicting (treatment) expectations. The current research has made a contribution by providing empirical support for this theorized association, namely by linking treatment expectancies to individuals' perceptions of the somatic/ psychological focus of their treatment. A strong inspiration for the current research, the Belief Activation Model (Sirois, 2001, 2009) suggested that individual difference variables and health belief variables have a role to play in influencing one's expectations regarding a proposed intervention. The current research has supported and extended this model by a) providing empirical support for the associations between TE and self-focused attention and optimism, and b) identifying several health belief variables that contribute to treatment

expectancies (control beliefs, coping self-efficacy, perceptions of current health). The findings regarding the null relationships of motivation and anxiety to treatment expectations may provide support for models of the placebo effect that suggest that these variables influence placebo responding without being mediated by expectancies (e.g., Price, Finniss & Benedetti, 2008). Finally, although it is well accepted that contextual factors are important variables in a model predicting treatment expectancies and placebo responding, the current research has identified some further treatment-specific variables reported to influence an individuals' positive expectations about treatment (e.g., convenience, aversion, side-effects). This research further contributes to our understanding of why placebo research has been unable to identify a consistent placebo responder, or to isolate the individual difference or personality traits that can be consistently used to predict placebo responsiveness. In particular, this research highlights that the treatment expectations that mediate placebo effects are influenced by a variety of individual difference and health belief factors whose individual influences may vary considerably according to the impact of important context-dependent psychosocial factors. Truly it seems that expectations effects are influenced by a dynamic interaction of person and context.

In terms of the implications of this research for the treatment of irritable bowel syndrome, the current research findings are unique in that they specifically demonstrate which psychosocial factors contribute to treatment expectancies in this sample (and their relative contributions). This information can be translated into informing treatment providers about psychosocial factors that should be addressed if one's goal is to maximize the expectation effect in the therapeutic context of treating individuals with

IBS. First these results highlight the importance of assessing patients' perceptions of the extent to which the proposed treatment targets what are perceived as the somatic causes of IBS symptoms. It has also been proposed herein that it may be relevant to assess and understand a patient's preference for a more somatically or psychologically focused treatment. These results also highlight the importance of assessing whether a patient has had previous experiences with the proposed treatment(s), and if so, assessing how successful they perceived the previous treatment to be.

This research has demonstrated that personal health beliefs do indeed have a role in influencing one's expectations to benefit from treatment. Overall, specific health beliefs, as opposed to more general health beliefs, seem to be more relevant to TE for specific treatments. The results suggest that control beliefs, particularly beliefs about one's ability to control and manage one's symptoms, are one of the more relevant health beliefs to consider. Other research, guided by Leventhal's Common-Sense Model of health (CSM; Nerenz & Leventhal, 1983; Meyer, Leventhal & Gutmann, 1985), has demonstrated that control beliefs are an important aspect of one's illness representation that can be ameliorated through intervention, resulting in improved health outcomes (Petrie, Cameron, Ellis, Buick & Weinman, 2002). In the CSM, illness representations are related to outcome via changes in people's coping actions and efforts. However, accumulating research has suggested that illness representations may be associated with outcomes independently of coping strategies (Hagger & Orbell, 2003). The current research findings suggest that certain aspects of one's illness representation (e.g., control beliefs and attributions) may influence outcomes through their positive influence on expectations for treatment benefit.

Another important individual difference factor to consider, according to the results of this study and others (i.e., Geers et al., 2006) is one's level of self-focused attention. The present research found that among those with more previous treatment experience, people with higher levels of self-focused attention also reported greater expectations to benefit from treatment. Thus, contrary to the idea encountered in IBS literature that increased bodily preoccupation is a pathological attribute of IBS treatment seekers, the current findings suggest that people with more self-focus are more optimistic about their ability to benefit from treatment. It makes sense that with more treatment experience, people who are more internally-focused may become more skilled at monitoring their IBS symptoms, discriminating them from non-IBS symptoms, and making useful connections about how symptoms respond to different aspects of a treatment intervention. It follows that such people would then report more confidence in their ability to benefit from treatment. Although it may not always be easy or practical to assess a patient's level of dispositional self-focused attention, other research studies have shown that greater SFA can be induced (e.g., Geers et al., 2006). In fact, enhancing body/ somatic awareness is an increasing popular component of treatment in several areas of healthcare.

The findings of this research also point to a role for some other health belief variables that demonstrated a relationship to treatment expectancies. In particular, one might consider assessing a patient's tendency to catastrophize about their bodily symptoms, how many acute health problems they are dealing with, as well as the degree to which they feel they can cope with the day-to-day aspects of their symptoms. This research suggests that individuals with 'stronger' initial expectancies (for example due to

prior personal experience) and greater levels of self-focused attention may be more in touch with these intrinsic health beliefs that can alter their expectations for treatment.

Another potential implication for the treatment of IBS concerns the treatment preferences that were expressed by participants during the pilot study. Healthcare providers should be aware that the majority of participants in the pilot sample expressed a preference for a treatment that combined both pharmacological and psychological approaches to the management of their IBS symptoms. This finding was further supported by the qualitative data, wherein several participants made reference to a preference for a holistic approach to treating their IBS, and/or discussed their symptom attributions as having both physical and psychological components.

The implications for clinical practice that are suggested by these overall findings are that it is important to provide patients with opportunities to enhance their sense of control over their illness and their symptoms. For people with IBS, because of the elusive etiology of symptoms and the range of treatment approaches that are available, being able to make decisions regarding the choice of treatment may be a simple and effective strategy to engender enhanced feelings of control. It is suggested that a clinical interview include an exploration of a person's understanding of the success or failure of previous treatments, attributions for symptom causes and management, preferences for different treatment approaches, confidence for day-to-day coping and success with bodily awareness. If available, cognitive-behavioural interventions could be used to address any emergent maladaptive beliefs in the service of fostering a strengthened sense of control.

#### IV. Limitations and Suggestions for Future Research

The present results add to existing literature by extending our knowledge of which psychosocial variables display relationships to treatment expectancies in an IBS sample. There are, however, limitations of the present work that should be highlighted. First, several aspects of the design of the study limit the generalizability of these findings. Although efforts were made to recruit participants from the community, and to offer individuals the opportunity to complete a paper version of the study, the majority of the data was collected online and the majority of participants were recruited from the ‘volunteer’ section of websites that host free online classified ads. One issue regarding this type of sampling method is potential bias introduced as participants had to have access to the Internet, be savvy to Internet classifieds sites and also be interested in volunteering. This may have resulted in the generally higher level of education of the sample, and may have contributed to the sample being predominantly Caucasian and female. The ratio of female to males in this study (5.7:1) is higher than what would be expected if sampling from the general IBS population (where prevalence estimates by gender range from 2:1 female predominance to a ratio of 1:1 (Saito, Schoenfeld & Locke, 2002)). It has been suggested that participants who volunteer to complete an online survey may differ in systematic ways from those recruited from patient populations in the community (Soetikno, Mrad, Pao & Lenert, 1997). Evidence from other studies suggests that individuals with gastrointestinal disorders that are recruited from the Internet report more serious symptomatology and less functionality than those recruited in the community (Jones, Bratten & Keefer, 2007). However, some research on the characteristics of participants from Internet studies suggest that such samples are more

heterogeneous that their community based counterparts (Krantz & Dalal, 2000), and that data collected online are of as good quality as community-collected data (Gosling, Vazire, Srivastava & John, 2004). 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 (Sirois, 2003).

The use of a cross-sectional design in the context of an Internet survey allowed for the recruitment of a large sample of individuals with IBS over a relatively small amount of time and with little financial investment. A limitation of this design, however, was that the main dependent variable (expectation to benefit from treatment) was elicited using fairly generic hypothetical treatment scenarios. It is possible that both the significance and the magnitudes of the relationships found herein may not generalize to an in vivo treatment scenario or to a real-world therapeutic context. For example, it is presumed that the fairly weak relationship between TE and Patient-provider relationship may be a function of the hypothetical nature of the provider (and thus the relationship). In addition, the cross-sectional nature of the design certainly precludes any conclusions regarding causality. It also may have limited this study's ability to identify a relationship between TE and the psychosocial variables that are theorized to influence treatment outcomes either after the administration of an intervention (e.g., self-focused attention, anxiety) or by way of an interaction with TE (e.g., motivational factors). Future studies may wish to explore these relationships in a more naturalistic environment using a prospective design, which would allow for further clarification of the relationships and relative roles of these variables in a real-life treatment context. It would certainly be of

interest to see whether these more intrinsic psychosocial variables (e.g., health beliefs, illness attributions) remain relevant predictors over and above the presumably powerful influence of a strong patient-provider relationship.

Limiting this investigation to one illness population has allowed for increased control over several possibly confounding sources of variance. It has also allowed for a greater understanding of what may be the most relevant psychosocial variables for this illness group, potentially contributing to improved management of this syndrome. However, it does limit the generalizability of these results to other illness populations. It may be that some of the relationships are relevant only in an IBS sample. For example, catastrophizing about bodily complaints has been noted and studied primarily in IBS samples (Gomborone et al., 1995; Kolowski et al 2005), and it may be that it is not a relevant factor influencing TE in other illness groups. Furthermore, as suggested above, certain variables such as control beliefs may show stronger relationships to TE among illness groups where there is more treatment choice or where treatment adherence requires more day-to-day personal effort (French & Weinman, 2008). Additional research is needed to ascertain which of these relationships are confirmed in other illness samples, both functional and organic. It may also be of interest to explore these relationships in the context of the treatment of an acute illness or injury.

It is also important to take into account the fact that the majority of participants in the pilot study chose the combined treatment (with both pharmacological and psychological aspects), yet this treatment was not offered in the main study. As such, it is possible that participants in the main study may have felt that they were being offered the choice between two less-than-ideal treatments, as opposed to the type of treatment



they would actually prefer. This situation could have contributed to low engagement during survey completion, jeopardizing the validity of study findings. Although this is a possibility, it should be noted that several efforts were made to increase the credibility and acceptability of the treatment vignettes. For example, each proposed treatment contained dietary components (consultation and specific recommendations), as this is considered the most important line of treatment for the management of IBS symptoms. In addition, each treatment plan involved a thorough assessment of personal triggers for IBS symptoms as well as an educational component, and each treatment plan was based on actual state-of-the-art treatment approaches.

This research also had some methodological limitations. The main problem that arose with methodology was the weak psychometric properties of the original measure of illness attributions. Although the analysis was unable to proceed as planned due to the failure of this instrument, perceived somatic/psychological foci of treatment was available for use as an approximation of a participant's illness attributions. Additional work may be needed to develop and/or validate a sound measure of illness attributions. Responses in the qualitative data also highlighted the need to measure a participant's holistic illness attributions (mind-body interaction), and to a lesser extent, situational symptom attributions. Future work should consider including these aspects of illness attributions and assessing their contribution to treatment expectancies.

An additional methodological limitation is the failure to measure the 'strength' of one's expectation to benefit from treatment. This research was originally interested in how 'positive' one's treatment expectancies were, ranging from no expected benefit to excellent expected benefit, as this is how treatment and outcome expectancies are

typically measured. However, it may be advisable for future researchers to include a measure of the ‘certainty’ or ‘strength’ of an expectation, as this aspect of the expectation has been proposed to play a role in the extent to which expectancies guide information processing (Geers et al., 2006).

One further potential limit to the generalizability of some of these findings is that the relationships of psychosocial variables to outcome expectancies were only examined in the context of suggestions for positive outcomes (i.e., “This treatment will help with those symptoms.”) It has been shown throughout the literature that some relationships that stand in the context of positive suggestions may not hold up under conditions including negative suggestions (e.g., Geers et al., 2007; Montgomery et al., 2003). Further work investigating the correlates of expectations for negative outcomes in an IBS sample would likely be clinically relevant, as most treatments (especially pharmacological ones) are associated with negative side effects. Sensitivity to side effects could potentially be reduced if contextual and psychosocial correlates of negative expectations could be identified and managed.

## V. Conclusion

The placebo literature has clearly highlighted the important role that outcome expectancies play in enhancing one’s response to an intervention. As such, interest has been growing in regards to identifying the factors that contribute to or interact with these expectations. The current study was designed to identify, in particular, the salient psychosocial variables that are relevant in influencing expectations to benefit from a proposed treatment. This research has been successful in identifying a manageable set of psychosocial variables that contribute to positive treatment expectancies in an IBS

sample. In several instances this was the first time these variables had been linked in an IBS sample. Two of the context-specific psychosocial variables identified as relevant in this sample included previous satisfaction with similar treatments and the level of perceived somatic focus of the treatment. In addition, control beliefs, self-focused attention and optimism were identified as variables intrinsic to the individual that had an influence on whether one expected to benefit from treatment. If the relevance of these variables can be confirmed in a naturalistic IBS treatment context, the next steps would be to assess whether these important variables can be addressed efficiently in a therapeutic context. This work would ideally lead towards the development and implementation of guidelines and interventions designed to target and utilize these idiosyncratic beliefs and information-processing biases in an effort to maximize expectations of treatment success and therefore the effectiveness of the therapeutic intervention.

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APPENDICES

Appendix A. Letter of Information to Site Moderators

I am contacting you to request your assistance with recruiting participants for an on-line research study on expectations of treatment for irritable bowel syndrome (IBS).

The purpose of this study is to investigate the personal factors that influence an individual’s expectations of benefiting from treatment. Previous research has shown that expectations regarding treatment play an important role in treatment success, but little is known about what individual factors contribute to the magnitude of positive expectations. The main study will look closely at the individual factors that may influence treatment expectations. We expect data collection to take approximately 12 months. Before we conduct the main study, a pilot study will be conducted to validate the treatment vignettes to be used in the main study. This pilot study will last approximately three weeks. Individuals who participate in the first study would not be eligible to participate in the second study.

A link placed on your message board to the following website [mylinkhere](#) would be of great assistance. Interested participants would simply click on the link if you agree to post it on your board, and then after reading the letter of information they can make an informed decision about participating. The survey for the first study takes about 10 minutes to complete and the survey for the main study takes about 25 minutes to complete. All information provided will be kept confidential. We will also produce a brief on-line report of our findings for anyone interested by June 2009. More information about the study is available on our web site.

As an incentive participants will be given a chance to win one of several gift certificates from a major on-line bookseller.

This research has been approved by the University of Windsor Research Ethics Board.

If you have any questions or require more information about the study, please contact me at (519) 256-2586, or by email at wilso2c@uwindsor.ca.

Please send a reply to this email, regardless of your intent to participate. Please check below your participation interests:

- Agreement to post recruitment message for main study \_\_\_\_\_
- Agreement to post recruitment message for pilot study \_\_\_\_\_
- No interest in participating \_\_\_\_\_

Thank you for your time and assistance.  
Tobi Wilson, M.A.  
Fushia Sirois, Ph.D.  
Department of Psychology  
University of Windsor



Appendix B. Materials for Recruiting via Gastroenterology Clinics

Letter of Recruitment to Gastroenterologists

I am contacting you to request your assistance with recruiting participants for an on-line research study on treatment expectations among individuals with irritable bowel syndrome (IBS). The purpose of this study is to investigate the relationships between individual difference factors (optimism, hope, anxiety, etc), health beliefs (beliefs of vulnerability to illness, control over symptoms, health self-efficacy, catastrophizing, etc) and treatment expectations among individuals with IBS. There is a considerable literature supporting the link between treatment expectancies and treatment outcomes. This study is designed to investigate whether certain psychosocial variables, unique to each patient in a treatment situation, influence the strength of a patient's expectations of treatment. Should this study be able to identify a parsimonious list of psychosocial variables that are correlated to the strength of one's treatment expectancies, these variables can then become potential targets of assessment and intervention in the service of maximizing treatment effectiveness.

Posting our attached recruitment flyer in your clinic would be of great assistance. Interested participants would simply go to the website listed on the flyer to access the letter of information explaining the study, at which time they can make an informed decision about participating. Should they decide to participate, they would read about hypothetical IBS treatment scenarios, rate their expectations of each treatment, and complete an online survey containing questionnaires designed to measure various individual difference and health belief variables. The survey takes about 25 minutes to complete and all information will be kept confidential. If preferred, participants can elect to complete a paper version of the package.. More information about the study is available on our web site.

As an incentive participants will be given a chance to win one of several gift certificates from a major on-line book seller.

This research has been approved by the University of Windsor Research Ethics Board. If you have any questions or require more information about the study, please contact me by email at [wilso2c@uwindsor.ca](mailto:wilso2c@uwindsor.ca).

Please send a reply to this email, regardless of your intent to participate. Please check below your participation interests:

Agreement to post recruitment message for study \_\_\_\_\_  
No interest in participating \_\_\_\_\_

Thank you for your time and assistance,  
Tobi Wilson, M.A.  
Fuschia Sirois, Ph. D.  
Department of Psychology  
University of Windsor

## Would these Treatments Work for You Too?

### ‘IBS Treatment Study –Two’

The University of Windsor is looking for individuals age 16 and above with diagnosed irritable bowel syndrome to participate anonymously in an online survey study about individual’s thoughts and beliefs about IBS treatments.

Your participation would take about 25 minutes, and you would be entered into a draw to win one of several \$20 gift certificates. Please go to [mylinkhere.com](http://mylinkhere.com) for more information.

Please note that you may also complete a paper version of the study that we will mail to you along with a postage paid return envelope. Go to [mylinkhere.com](http://mylinkhere.com) for more information.

## Appendix C. Recruitment Messages

### 1. Pilot Recruitment Message

#### **Would these IBS Treatments Work for You?**

The University of Windsor ‘IBS Treatment Study - One’ is looking for individuals age 16 and above with diagnosed IBS to participate in an online survey study about individual’s thoughts and beliefs about IBS treatments. Your participation would take about 10 minutes, and you would be entered into a draw to win one of several \$20 gift certificate. Please click on the following link for more information:

[mylinkhere](#)

### 2. Main Study Recruitment Message

#### **Would these IBS Treatments Work for You Too?**

The University of Windsor ‘IBS Treatment Study –Two’ is looking for individuals age 16 and above with diagnosed IBS to participate in an online survey study about individual’s thoughts and beliefs about IBS treatments. Your participation would take about 25 minutes, and you would be entered into a draw to win one of several \$20 gift certificates. Please click on the following link for more information:

[mylinkhere](#)

Appendix D. Rome III IBS Criteria

**IBS Symptom Questionnaire**

For each question, please 'check' the number that applies best to you:

<p>1. In the last 3 months, how often did you have discomfort or pain anywhere in your abdomen?</p>	<p><input type="checkbox"/> 0 Never  <input type="checkbox"/> 1 Less than one day a month  <input type="checkbox"/> 2 One day a month  <input type="checkbox"/> 3 Two to three days a month  <input type="checkbox"/> 4 One day a week  <input type="checkbox"/> 5 More than one day a week  <input type="checkbox"/> 6 Everyday</p>
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*If you answered 'never' to the above questions, please skip remaining questions*

<p>2. For women: Did this discomfort or pain occur only during your menstrual bleeding and not at other times?</p>	<p><input type="checkbox"/> 0 No  <input type="checkbox"/> 1 Yes  <input type="checkbox"/> 2 Does not apply to me because I have had the change of life</p>
<p>3. Have you had this discomfort or pain 6 months or longer?</p>	<p><input type="checkbox"/> 0 No  <input type="checkbox"/> 1 Yes</p>
<p>4. How often did this discomfort or pain get better or stop after you had a bowel movement?</p>	<p><input type="checkbox"/> 0 Never or rarely  <input type="checkbox"/> 1 Sometimes  <input type="checkbox"/> 2 Often  <input type="checkbox"/> 3 Most of the time  <input type="checkbox"/> 4 Always</p>
<p>5. When this discomfort or pain started, did you have more frequent bowel movements?</p>	<p><input type="checkbox"/> 0 Never or rarely  <input type="checkbox"/> 1 Sometimes  <input type="checkbox"/> 2 Often  <input type="checkbox"/> 3 Most of the time  <input type="checkbox"/> 4 Always</p>
<p>6. When this discomfort or pain started, did you have less frequent bowel movements?</p>	<p><input type="checkbox"/> 0 Never or rarely  <input type="checkbox"/> 1 Sometimes  <input type="checkbox"/> 2 Often  <input type="checkbox"/> 3 Most of the time  <input type="checkbox"/> 4 Always</p>
<p>7. When this discomfort or pain started, were your stools (bowel movements) looser?</p>	<p><input type="checkbox"/> 0 Never or rarely  <input type="checkbox"/> 1 Sometimes  <input type="checkbox"/> 2 Often  <input type="checkbox"/> 3 Most of the time  <input type="checkbox"/> 4 Always</p>
<p>8. When this discomfort or pain started, how often did you have harder stools?</p>	<p><input type="checkbox"/> 0 Never or rarely  <input type="checkbox"/> 1 Sometimes  <input type="checkbox"/> 2 Often  <input type="checkbox"/> 3 Most of the time  <input type="checkbox"/> 4 Always</p>
<p>9. In the last 3 months, how often did you have hard or lumpy stools?</p>	<p><input type="checkbox"/> 0 Never or rarely  <input type="checkbox"/> 1 Sometimes  <input type="checkbox"/> 2 Often</p>

	<input type="checkbox"/> 3 Most of the time <input type="checkbox"/> 4 Always
10. In the last 3 months, how often did you have loose, mushy or watery stools?	<input type="checkbox"/> 0 Never or rarely <input type="checkbox"/> 1 Sometimes <input type="checkbox"/> 2 Often <input type="checkbox"/> 3 Most of the time <input type="checkbox"/> 4 Always

Appendix E. Rome III Diagnostic Criteria & Scoring Criteria

**Diagnostic Criteria**

- Recurrent abdominal pain or discomfort at least 3 days/ month in the last 3 months associated with two or more of criteria #1 - #3 below:

*Pain or discomfort at least 2-3 days / month (Question 1 > 2)*

*For women, does pain occur only during menstrual bleeding? (Question 2 = 0 or 2)*

1. Improvement with defecation

*Pain or discomfort gets better after BM at least sometimes (Question 4 > 0)*

2. Onset associated with a change in frequency of stool.

*Onset of pain or discomfort associated with more stools at least sometimes*

*(Question 5 > 0) OR*

*Onset of pain or discomfort associated with fewer stools at least sometimes*

*(Question 6 > 0)*

3. Onset associated with a change in form (appearance) of stool.

*Onset of pain or discomfort associated with looser stools at least sometimes*

*(Question 7 > 0) OR*

*Onset of pain or discomfort associated with harder stools at least sometimes*

*(Question 8 > 0)*

- Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis.

*(Question 3 = 1)*

**Criteria for IBS- C:** *(Question 9 > 0) and (Question 10 = 0)*

**Criteria for IBS- D:** *(Question 9 = 0) and (Question 10 > 0)*

**Criteria for IBS- A:** *(Question 9 > 0) and (Question 10 > 0)*

## Appendix F. Informed Consent Forms

### LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH

#### **IBS Treatment Study** Study One

You are asked to participate in a research study conducted by Tobi Wilson, graduate student, and Dr. Fuschia Sirois, research supervisor, from the Department of Psychology at the University of Windsor. The results of this research will contribute to Ms. Wilson's doctoral dissertation.

If you have any questions or concerns about the research, please feel free to contact Dr. Fuschia Sirois at 519-253-3000 X 2224.

#### PURPOSE OF THE STUDY

The purpose of this study is to look at what people with irritable bowel syndrome (IBS) think about some of the options that are available for treating IBS. Specifically, this study is interested in people's thoughts about whether different treatments will work for them.

#### PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things: First you would be asked to read about some hypothetical treatment options for IBS. Then you would be asked to rate how much you thought each treatment would work for you, and pick the one you would prefer. You would also be asked some questions about whether you found these treatments credible, and would be given the opportunity to tell us your thoughts about these treatment options.

If you volunteer to participate in this study, you would click on the I AGREE button below and would be directed to the study webpage to complete the study online. It would take about ten minutes to complete, and you would only be asked to participate once. A similar study will be conducted again in the near future, but you would only be asked to participate in this study.

#### POTENTIAL RISKS AND DISCOMFORTS

Participating in this study may make you feel slightly uncomfortable. We have tried to minimize this risk by making your participation anonymous, and by only asking you to provide your opinions.

#### POTENTIAL BENEFITS TO PARTICIPANTS AND/OR SOCIETY

Participating in this study will be of no direct benefit to you.

We think that the results of this study could potentially be of benefit to society. For example, we think that IBS treatments could be improved if we had more knowledge about what people with IBS think about different treatment options.

#### PAYMENT FOR PARTICIPATION

In return for your participation, at the end of the study you will have the option to be entered into a draw for one of several gift certificates from a major international bookseller. The value of these gift certificates is 18 USD (20 CAD, 14 EUR or 10 GBP).

#### CONFIDENTIALITY

The information you provide in this study will remain anonymous. This means that you will NOT be asked to provide your name. If you choose to be contacted by regular mail in the case that you win a gift certificate, your address will be stored separately from your study information so that your information cannot be linked to you. All data will be stored securely and may only be accessed by the main investigator and faculty supervisor. Data will be stored securely for a period of 10 years, as required, at which time it will be destroyed.

#### PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study.

The investigators may withdraw you from this research if circumstances arise which warrant doing so. Your information would be withdrawn from the study if you do not complete at least 80% of the survey items. As this study is interested only with individuals who have been diagnosed with IBS, your information could be withdrawn if you do not currently meet criteria for a diagnosis of IBS.

#### FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

The results of this study will be available to the participants in May 2007 on the following website: <http://athena.uwindsor.ca/fsirois>

#### SUBSEQUENT USE OF DATA

This data will not be used in subsequent studies.

#### RIGHTS OF RESEARCH SUBJECTS



You may withdraw your consent to participate at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, CA, N9B 3P4; telephone 519-253-3000, ext. 3916; e-mail: [lbunn@uwindsor.ca](mailto:lbunn@uwindsor.ca)

#### SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Tobi Wilson, M.A.  
Department of Psychology  
University of Windsor

**It is recommended that you print out a copy of this letter of information for your records.**

**Pass it on:** Feel free to send this page to other people you know with IBS 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.”

*I AGREE*

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## LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH

### **IBS Treatment Study** Study Two (online version)

You are asked to participate in a research study conducted by Tobi Wilson, graduate student, and Dr. Fuschia Sirois, research supervisor, from the Department of Psychology at the University of Windsor. The results of this research will contribute to Ms. Wilson’s doctoral dissertation.

If you have any questions or concerns about the research, please feel free to contact Dr. Fuschia Sirois at 519-253-3000 X 4447 or email [sirois12@uwindsor.ca](mailto:sirois12@uwindsor.ca).

#### PURPOSE OF THE STUDY

The purpose of this study is to look at what people with irritable bowel syndrome (IBS) think about some of the options that are available for treating IBS. Specifically, this study is interested in people's thoughts about whether different treatments will work for them. In addition, this study is designed to assess how individual's expectations and preferences for different treatments vary due to individual's unique personal characteristics.

## PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things: First you would be asked to read about some hypothetical treatment options for IBS. Then you would be asked to rate how much you thought each treatment would work for you, and pick the one you would prefer. You would be asked to provide some basic demographic information about yourself and your experience of IBS symptoms and treatments. You would then complete a survey that asks questions about your unique characteristics. Finally, you would be given the opportunity to tell us your thoughts about these treatment options.

If you volunteer to participate in this study, you would click on the I AGREE button below and would be directed to the study webpage to complete the study online. It would take about 25 minutes to complete, and you would only be asked to participate once. A similar study has been conducted not long ago, (IBS Treatment Expectations – Study One) and if you participated in that study, we ask that you do not participate in this one.

## POTENTIAL RISKS AND DISCOMFORTS

Some people may experience some mild distress when asked to think about their IBS. We have tried to minimize this risk by making your participation anonymous, and by only asking you to provide your opinions.

## POTENTIAL BENEFITS TO PARTICIPANTS AND/OR SOCIETY

Participating in this study will be of no direct benefit to you.

We think that the results of this study could potentially be of benefit to society. For example, we think that IBS treatments could be improved if we had more knowledge about what people with IBS think about different treatment options, and what individual factors affect these expectations.

## PAYMENT FOR PARTICIPATION

In return for your participation, you will have the option to be entered into a draw for one of several gift certificates from a major international bookseller. The value of these gift certificates is 18 USD (20 CAD, 14 EUR or 10 GBP).

## CONFIDENTIALITY

The information you provide in this study will remain anonymous. This means that you will NOT be asked to provide your name. If you choose to be contacted by regular mail in the case that you win a gift certificate, your address will be stored separately from your study information so that your information can be linked to you. All data will be stored securely and may only be accessed by the main investigator and faculty supervisor. Data will be stored securely for a period of 10 years, as required, at which time it will be destroyed.

## PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study.

The investigators may withdraw you from this research if circumstances arise which warrant doing so. Your information would be withdrawn from the study if you do not complete at least 80% of the survey items. As this study is interested only with individuals who have been diagnosed with IBS, your information could be withdrawn if you do not currently meet criteria for a diagnosis of IBS.

## FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

The results of this study will be available to the participants in June 2009 on the following website: <http://athena.uwindsor.ca/fsirois>

## SUBSEQUENT USE OF DATA

The data for this study may be used in subsequent research on treatment expectations. By completing and submitting the survey package you agree that this data can be used in subsequent studies.

## RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent to participate at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, CA, N9B 3P4; telephone 519-253-3000, ext. 3916; e-mail: [lbunn@uwindsor.ca](mailto:lbunn@uwindsor.ca)

## SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Tobi Wilson, M.A.  
Department of Psychology  
University of Windsor

**It is recommended that you print out a copy of this letter of information for your records.**

**Pass it on:** Feel free to send this page to other people you know with IBS 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.”

*I AGREE*

## CONSENT TO PARTICIPATE IN RESEARCH

### **IBS Treatment Study**

Study Two

(Paper version)

You are asked to participate in a research study conducted by Tobi Wilson, graduate student, and Dr. Fuschia Sirois, research supervisor, from the Department of Psychology at the University of Windsor. The results of this research will contribute to Ms. Wilson's doctoral dissertation.

If you have any questions or concerns about the research, please feel free to contact Dr. Fuschia Sirois at 519-253-3000 X 4447 or email [sirois12@uwindsor.ca](mailto:sirois12@uwindsor.ca).

### PURPOSE OF THE STUDY

The purpose of this study is to look at what people with irritable bowel syndrome (IBS) think about some of the options that are available for treating IBS. Specifically, this study is interested in people's thoughts about whether different treatments will work for them. In addition, this study is designed to assess how individual's expectations and preferences for different treatments vary due to individual's unique personal characteristics.

### PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things: First you would be asked to read about some hypothetical treatment options for IBS. Then you would be asked to rate how much you thought each treatment would work for you, and pick the one you would prefer. You would be asked to provide some basic demographic information about yourself and your experience of IBS symptoms and treatments. You would then complete a survey that asks questions about your unique characteristics. Finally, you would be given the opportunity to tell us your thoughts about these treatment options.

If you volunteer to participate in this study, it would take about 25 minutes to complete, and you would only be asked to participate once. You would then be asked to seal the completed study materials (consent form and survey package) in the postage-paid envelope provided, and place the package in the mail. A similar study has been conducted not long ago, (IBS Treatment Expectations – Study One) and if you participated in that study, we ask that you do not participate in this one.

### POTENTIAL RISKS AND DISCOMFORTS

Some people may experience some mild distress when asked to think about their IBS. We have tried to minimize this risk by making your participation anonymous, and by only asking you to provide your opinions.

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We think that the results of this study could potentially be of benefit to society. For example, we think that IBS treatments could be improved if we had more knowledge about what people with IBS think about different treatment options, and what individual factors affect these expectations.

## PAYMENT FOR PARTICIPATION

In return for your participation, when you return your package by mail, you will be entered into a draw for one of several gift certificates from a major international bookseller. The value of these gift certificates is 20 CAD (18 USD, 14 EUR or 10 GBP).

## CONFIDENTIALITY

The information you provide in this study will remain anonymous. This means that you will NOT be asked to provide your name. If you choose to be contacted by regular mail in the case that you win a gift certificate, your address will be stored separately from your study information so that your information cannot be linked to you. All data will be stored securely and may only be accessed by the main investigator and faculty supervisor. Data will be stored securely for a period of 10 years, as required, at which time it will be destroyed.

## PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study.

The investigators may withdraw you from this research if circumstances arise which warrant doing so. Your information would be withdrawn from the study if you do not complete at least 80% of the survey items. As this study is interested only with individuals who have been diagnosed with IBS, your information could be withdrawn if you do not currently meet criteria for a diagnosis of IBS.

## FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

The results of this study will be available to the participants in June, 2009 on the following website: <http://athena.uwindsor.ca/fsirois>

## SUBSEQUENT USE OF DATA

The data for this study may be used in subsequent research on treatment expectations. By completing and submitting the survey package you agree that this data can be used in subsequent studies.

#### RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent to participate at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, CA, N9B 3P4; telephone 519-253-3000, ext. 3916; e-mail: [lbunn@uwindsor.ca](mailto:lbunn@uwindsor.ca)

#### SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study **IBS Treatment Study - Two** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

---

Signature

---

Date

#### SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

---

Tobi Wilson, M.A.

Department of Psychology  
University of Windsor

Appendix G. Demographic & Background Questions

We would like to know a little bit about you. Please fill in the information below.

Age: \_\_\_\_\_

Date of Birth: Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_

Recruited by: \_\_\_ IBS website \_\_\_ Research website \_\_\_ Other

Ethnicity: (check one)

Asian \_\_\_\_\_

Black \_\_\_\_\_

East Indian \_\_\_\_\_

Hispanic \_\_\_\_\_

Mixed \_\_\_\_\_

Native \_\_\_\_\_

White \_\_\_\_\_

Employment Status: (check one)

Employed Full-time \_\_\_\_\_

Employed Part-time \_\_\_\_\_

Unemployed \_\_\_\_\_

Disabled \_\_\_\_\_

Retired \_\_\_\_\_

Student \_\_\_\_\_

Education (check one)

Some high school \_\_\_\_\_

High school graduate \_\_\_\_\_

Some college/ university \_\_\_\_\_

College / university graduate \_\_\_\_\_

Graduate / professional school \_\_\_\_\_

Marital Status: (check one)

Never married \_\_\_\_\_

Married/ Common law \_\_\_\_\_

Separated / Divorced \_\_\_\_\_

Widowed \_\_\_\_\_

About your IBS:

Diagnosed IBS? Yes \_\_\_ No \_\_\_ By: Physician \_\_\_\_\_ Self \_\_\_

Have you ever been misdiagnosed? Yes \_\_\_ No \_\_\_

Time since diagnosis (years) \_\_\_\_\_

Time experiencing symptoms (years) \_\_\_\_\_

IBS subtype?

Constipation predominant \_\_\_\_\_ Alternating subtype \_\_\_\_\_

Diarrhea predominant \_\_\_\_\_ Unknown \_\_\_\_\_



**EXPLANATION OF THE STUDY**  
**IBS Treatment Study - One**

Research has found that a person's beliefs about a treatment can have an important effect on his or her response to that treatment. For example, if someone believes that a treatment will be of benefit, he/she is more likely to actually benefit from that treatment than is someone with less positive beliefs. There has been a lot of interest in this relationship between beliefs and health outcomes. So far, however, very little is known about what how someone's personal characteristics may influence one's beliefs about treatment. This study was designed to be followed by a larger study that will look at how strongly one's personality and thoughts about health influence one's beliefs about treatment. For example, the larger study may find that, on average, those with higher levels of anxiety show less positive beliefs about treatment. Or maybe people who think of themselves as generally pretty healthy (despite having an illness) have more positive beliefs about treatment, compared to people who think of themselves as generally unhealthy.

Before doing the larger study, we had to make sure that the hypothetical treatment scenarios that we had written were credible. Also, we wanted to check that not everyone had the same beliefs about these treatments, as we want to know whether certain personal characteristics or thoughts strengthen or weaken someone's beliefs about treatment.

In order to make sure that the treatment scenarios were reasonable, we conducted this small study that you have just participated in. This study will provide some important information that we will use in the larger study. For example, this study was interested in your thoughts about the different treatment options. Based on the reactions of all participants in this small study, we will be able to figure out if these treatment scenarios are OK or if they need to be changed. This study may also provide some important information about IBS treatment. For example, we were also interested in your comments about the treatments and your beliefs about whether the treatments would be a benefit to you. Knowing what types of treatments people prefer, and whether these preferences are related to their history of treatment, their diagnosis, or the severity of their symptoms, can be potentially useful information for those health care providers that want to offer the best IBS treatment to their patients.

Thank you so much for participating in this research. We greatly appreciate your time and effort!

*Tobi Wilson, M.A.*  
*Fuschia Sirois, Ph. D*  
*Department of Psychology, University of Windsor*

## EXPLANATION OF THE STUDY

### IBS Treatment Study - Two

Research has found that a person's expectations about a treatment can have an important effect on his or her response to that treatment. For instance, if an individual expects that a treatment will be of great benefit, he/she is more likely to actually benefit from that treatment than is an individual with less positive expectations. Although this finding has been well established, very little is known about what sort of personal characteristics may influence one's expectations of treatment. This study was designed to investigate how strongly one's personality and beliefs influence one's treatment expectations. For example, we may find that, on average, those with higher levels of anxiety show less positive treatment expectations. Perhaps people who think of themselves as generally pretty healthy (despite having a particular illness) have more positive expectations about the outcomes of treatment. The questionnaires you have just completed are designed to measure certain aspects of your personality (e.g., level of hope, optimism, anxiety, motivation), as well as aspects of your beliefs about health and illness (e.g., your general health, sense of control over your symptoms, belief in your own ability to manage your illness). Your responses will help us to figure out whether on average, certain personality traits or beliefs are strongly related to treatment expectations. With this information, we can develop ways to boost people's expectations about their treatment. For example, if it turns out that anxiety really interferes with treatment expectations, then we will encourage treatment providers to assess a person's anxiety and address it, in order to help that person get the most out of treatment.

Thank you so much for participating in this research. We greatly appreciate your time and effort!

*Tobi Wilson, M.A.*  
*Fuschia Sirois, Ph. D*  
*Department of Psychology*  
*University of Windsor*

## Appendix I. Treatment Vignettes

Please read the following treatment vignettes and imagine that you are participating in this scenario.

*(Note that this treatment scenario is hypothetical; your participation in the current study will not involve participating in any treatments).*

Please imagine that these treatment scenarios would occur free of charge and at a location convenient for you.

**In this treatment scenario, first you would be invited into a local clinic...**

**An interview will be conducted by a gastroenterologist (IBS specialist) to assess:**

- a) Your IBS symptomatology (severity, IBS subtype, history of symptoms and treatment, and how much your IBS gets in way of your life);
- b) Potential contributors (dietary habits, personal trigger factors, stress management knowledge and behaviours);
- c) Other health concerns; and
- d) Differential diagnosis (Your family history of health problems, and symptoms associated with organic diseases will be assessed via interview to ensure that a diagnosis of IBS is appropriate for you.

If necessary you will be referred for physical tests to aid in this differential diagnosis or asked to track potential contributors in a daily diary for the period of one week. This supplemental information will be reviewed in a follow-up clinical interview.

If you do not meet diagnostic criteria for IBS, you will no longer be eligible to participate in this treatment scenario. You would be provided with an external follow-up referral if indicated.

**Based on the information provided in the interview(s), you will be assigned to one of three treatment options:**

- a) **Treatment A**
  - You would receive a dietary consult, and be provided with specific dietary recommendations as well as other suggestions regarding lifestyle factors known to affect global symptom reporting in individuals with IBS

- You would be prescribed a pharmaceutical drug, specific to your IBS subtype (IBS-D or IBS C/A) that is designed to provide global IBS symptom improvement
- Both drugs have been shown in clinical trials to improve global symptom reports in both men and women, as compared to placebo treatments.
- Specifically, both drugs have been shown to significantly improve pain/discomfort, abnormal bowel habits, and bloating.
- After extensive clinical testing, neither drug has been associated with serious health consequences
- Both drugs are associated with mild-moderate side-effects in some people.
- The most common side-effect for the IBS-D drug is constipation (in about 15% of participants). For the IBS-C/A drug, the most common side-effect is diarrhea (in about 10% of participants)
- Other, less common side effects associated with these drugs include headache, abdominal pain, nausea or flatulence.
- If prescribed the IBS-D drug, you would take the drug three times a day in tablet form. If prescribed the IBS-C/A drug, you would take the drug twice a day, in tablet form.
- Once per week, for eight weeks, you would be asked to visit the local clinic to talk with the gastroenterologist for 20 minutes about your IBS symptoms and any side-effects.

**b) Treatment B**

- You would first receive a dietary consult, and be provided with specific dietary recommendations as well as other suggestions regarding lifestyle factors known to affect global symptom reporting in individuals with IBS.
- You will then be prescribed a short course of individual therapy with a professional, designed to provide global IBS symptom improvement.
- The therapy will involve cognitive-behavioural therapy for IBS combined with guided relaxation.
- This type of treatment has been shown in clinical trials to improve global symptom reports in both men and women, as compared to placebo treatments.
- This treatment has been found to improve bowel symptoms and quality of life significantly for IBS sufferers.
- The cognitive-behavioural component involves the identification of environmental triggers and the modification of self-defeating patterns of thought and behaviour underlying IBS symptoms.
- The relaxation component uses guided imagery to promote relaxation, reduce pain and regulate bowel function.
- Neither component has been associated with serious side-effects

- You would be asked to attend a 50-minute therapy session once per week and to complete approximately one hour of homework per week
- You would meet with the professional for therapy at the local clinic for 8 weeks.

**c) Treatment C**

- You would first receive a dietary consult, and be provided with specific dietary recommendations as well as other suggestions regarding lifestyle factors known to affect global symptom reporting in individuals with IBS.
- You will then be prescribed a short course of individual therapy with a professional, as well as a pharmaceutical drug, both designed to provide global IBS symptom improvement.
- Both types of treatment have been shown in clinical trials to contribute to global symptoms improvements in both men and women
- In this treatment, you will be prescribed the same drug as above (specific to your IBS subtype), except that the dose will be reduced to 50% of the dose for the above treatment
- In this treatment, you will be prescribed a 6 - week course of therapy, and will only receive the cognitive-behavioural component of the therapy
- The cognitive-behavioural component involves the identification of environmental triggers and the modification of self-defeating patterns of thought and behaviour underlying IBS symptoms
- The drug treatment has been associated with mild-moderate side-effects (described above)
- The cognitive-behavioural therapy has not been associated with any side-effects
- You would be asked to attend a 40 – minute therapy session once per week for 6 weeks, and to complete approximately one hour of homework per week
- Once per week, for 8 weeks, you would talk with the gastroenterologist for 10 minutes about your IBS symptoms and any side-effects.

## Appendix J. Expectancy Rating Scales

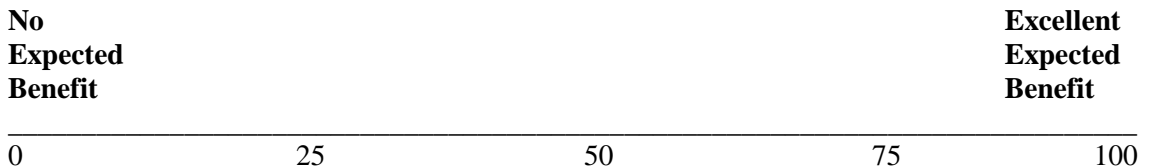
Think back to the treatments in the vignettes. We are interested in how much you think each treatment would work for you and your IBS symptoms, if you were in the hypothetical treatment situation.

This is no right or wrong answer; we are just interested in your opinion.

Think about the treatment that offered a **drug** specific to your IBS subtype.

How much do you expect that this treatment would work for you and your symptoms of IBS?

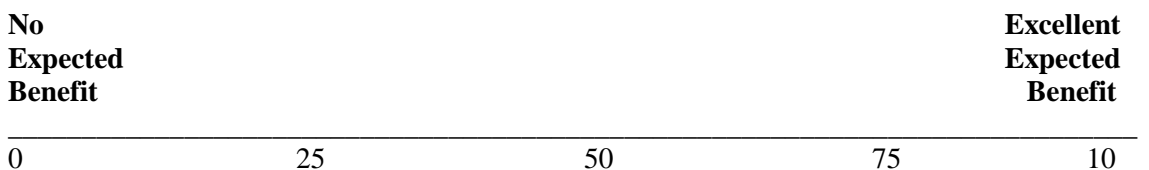
On the line below, please show how much you expect this treatment to work, by making a mark along the line somewhere between 'No Expected Benefit' and 'Excellent Expected Benefit.'



Think about the treatment that offered both **cognitive-behavioural therapy** and **guided relaxation**.

How much do you expect that this treatment would work for you and your symptoms of IBS?

On the line below, please show how much you expect this treatment to work, by making a mark along the line somewhere between 'No Expected Benefit' and 'Excellent Expected Benefit.'





Appendix K. Treatment Credibility Questions

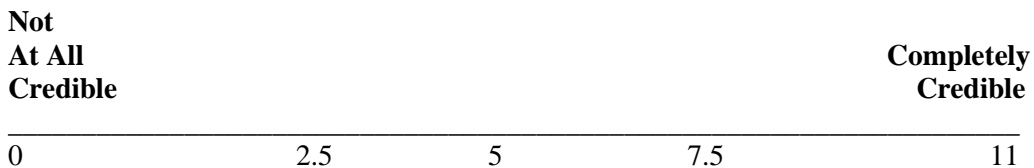
Think back again to the treatments in the vignettes. We are also interested in how credible you think each treatment description was.

There is no right or wrong answer; we are just interested in your opinion.

Think about the treatment that offered a **drug** specific to your IBS subtype.

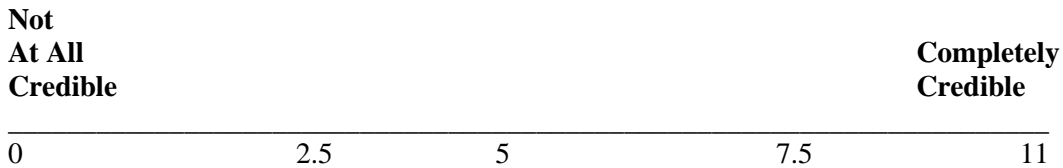
How credible is this treatment for IBS?

On the line below, please show how much you thought this specific treatment was credible for IBS, by making a mark along the line somewhere between ‘Not At All Credible’ and ‘Completely Credible.’



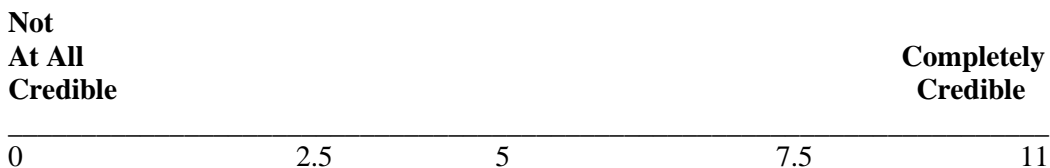
Think about the treatment that offered both **cognitive-behavioural therapy** and **guided relaxation**.

How credible is this treatment for IBS?



Think about the treatment that offered a **drug** specific to your IBS subtype as well as **cognitive-behavioural therapy**.

How credible is this treatment for IBS?





Appendix L. The Private Self- Consciousness Scale

Please indicate how much each of these statements describes you, by checking the appropriate box.

	<b>Not at all like me</b>	<b>Kind of like me</b>	<b>Much like me</b>	<b>A lot like me</b>
I'm always trying to figure myself out.				
I think about myself a lot.				
I often daydream about myself.				
I generally pay attention to my inner feelings.				
I'm constantly thinking about my reasons for doing things.				
I sometimes step back (in my own mind) in order to examine myself from a distance.				
I'm quick to notice changes in my mood.				

Appendix M. Trait Anxiety Measures

Anxious Arousal subscale of the Mood and Anxiety Symptoms Questionnaire

Below is a list of feelings, sensations, problems and experiences that people sometimes have. Read each item and then mark the appropriate choice in the space next to that item. Use the choice that best describes how much you have feel or experience things this way *generally*.

	<b>Not at all</b>	<b>A Little Bit</b>	<b>Moderatel y</b>	<b>Quite a Bit</b>	<b>Extremel y</b>
Startled Easily					
Faint					
Numbness or tingling in my body					
Pain in my chest					
Hot or cold spells					
Dizzy or lightheaded					
Short of breath					
Unable to relax					
Like I was choking					
A very dry mouth					
Afraid I was going to die					
Heart racing or pounding					
Trembling or shaking					
Need to urinate frequently					
Trouble swallowing					



## Appendix N. The Life Orientation Scale – Revised

Please indicate how much you agree with each of the statements below by checking the appropriate box. Try to be as honest and accurate as your can, and try not to let your answer to one question influence your answer to other questions. There are no right or wrong answers.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
In uncertain times, I usually expect the best				
It's easy for me to relax				
If something can go wrong for me, it will				
I'm always optimistic about my future				
I enjoy my friends a lot				
It's important for me to keep busy				
I hardly ever expect things to go my way				
I don't get upset too easily				
I rarely count on good things happening to me				
Overall, I expect more good things to happen than bad				

## Appendix O. The Adult Hope Scale

Directions: Read each item carefully. Using the scale shown below, please select the number that best describes YOU and put that number in the blank provided.

- 1. = Definitely False
- 2. = Mostly False
- 3. = Somewhat False
- 4. = Slightly False
- 5. = Slightly True
- 6. = Somewhat True
- 7. = Mostly True
- 8. = Definitely True

- \_\_\_ 1. I can think of many ways to get out of a jam.
- \_\_\_ 2. I energetically pursue my goals.
- \_\_\_ 3. I feel tired most of the time.
- \_\_\_ 4. There are lots of ways around any problem.
- \_\_\_ 5. I am easily downed in an argument.
- \_\_\_ 6. I can think of many ways to get the things in life that are important to me.
- \_\_\_ 7. I worry about my health.
- \_\_\_ 8. Even when others get discouraged, I know I can find a way to solve the problem.
- \_\_\_ 9. My past experiences have prepared me well for my future.
- \_\_\_ 10. I've been pretty successful in life.
- \_\_\_ 11. I usually find myself worrying about something.
- \_\_\_ 12. I meet the goals that I set for myself.

## Appendix P. Perception of Health items

These questions are about how healthy you perceive your self to be. Please read each question and indicate your response by checking the appropriate box. There are no right or answers; we are interested in your opinion.

	<b>Very Poor</b>	<b>Poor</b>	<b>Average</b>	<b>Good</b>	<b>Excellent</b>
Compared to other people your age, how would you rate your health?					
Compared to other people with IBS, how would you rate your health?					
In general, how would you rate your health?					

## Appendix Q. Brief Health History Checklist

This section deals with health issues you have experienced that are either temporary or over a short period of time (acute).

### ACUTE 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 health problems

Appendix R. Control Beliefs Inventory

The following statements concern the 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	2	3	4	5	6
<b>STRONGLY DISAGREE</b>	<b>DISAGREE</b>	<b>MILDLY DISAGREE</b>	<b>MILDLY AGREE</b>	<b>AGREE</b>	<b>STRONGLY AGREE</b>

<b>Control Over Health Items</b>
1. My health depends on how I take care of myself.
2. It is my own actions that determine how healthy I am.
3. People who take care of themselves stay healthy.
4. How soon I recover from an illness depends on how I look after myself.
5. My current state of health is a reflection of how I look after myself.
6. If I make the effort, I can manage my illness.
<b>Control Over Symptoms Items</b>
7. If I do the right things I can make my symptoms more manageable.
8. If I make the effort, I can manage my symptoms.
9. There are things that I can do to make my symptoms easier to deal with.
10. I believe that I can do more to control my symptoms
11. I can take control of my health by managing my day-to-day symptoms.
<b>Health Self-Efficacy Items</b>
12. Even though there are things I can do to improve my health, I don't feel that I can do them.
13. I am able to meet the challenge of following a healthy routine
14. When facing a health problem, I often feel overwhelmed about what to do.
15. I am certain that with effort I can improve my health.
16. I am confident that I could deal with any unexpected health problems.
17. When it comes to my health, I often feel unable to do what I know should be done.
18. I am confident in my ability to make the right decisions about my health.
19. Regardless of circumstances, there are things I can do to improve my health.



Appendix S. Coping Self-Efficacy Scale

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.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
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					

Appendix T. Resistance to Illness Subscale

Please read each of the following statements carefully and indicate how true is statement is for you by checking the appropriate box.

	<b>Definitely False</b>	<b>Mostly False</b>	<b>Don't Know</b>	<b>Mostly True</b>	<b>Definitely True</b>
I seem to get sick a little easier than other people					
Most people get sick a little easier than I do					
My body seems to resist illness very well					
When there is something going around I usually catch it					

Appendix U. Catastrophizing Interpretation of Bodily Complaints Subscale

	<b>Completely Wrong</b>	<b>Mostly Wrong</b>	<b>Mostly Right</b>	<b>Completely Right</b>
A suddenly appearing joint pain can be a sign of a beginning paralysis				
I'm healthy when I don't have any bodily sensations				
My doctor or I must be capable of finding an explanation for all my bodily complaints.				
When suffering from constipation, one should consult an expert immediately to be certain that one doesn't have intestinal cancer.				
Bodily complaints are always a sign of disease.				
Red blotches on the skin are a threatening sign of skin cancer				
When suffering from joint pain, one should take good care of oneself.				
When one sweats a lot, it can be due to an overburdened heart.				
The most common reason for discomfort is a serious illness.				
If a doctor refers me for further examinations, then he is convinced that there is a serious problem.				
Only persons who do not exert themselves physically stay healthy in the long run.				
A healthy body doesn't cause complaints.				
A tingling sensation in the legs can be a serious sign of a nerve disorder.				
The most serious diseases develop unnoticed and then break out at some time or other.				

Appendix V. Treatment Experience Questions

Think about the treatment that offered a **drug** specific to your IBS subtype.

**Do you have experience with this type of treatment? \_\_\_ Yes \_\_\_ No (Check One)**

**If Yes, Please rate how successful that treatment was for you (by making a mark on the line below):**

**0** **10**

---

**Not at all Successful** **Completely Successful**

Think about the treatment that offered both **cognitive-behavioural therapy** and **guided relaxation**.

**Do you have experience with this type of treatment? \_\_\_ Yes \_\_\_ No (Check One)**

**If Yes, Please rate how successful that treatment was for you (by making a mark on the line below):**

**0** **10**

---

**Not at all Successful** **Completely Successful**

This section deals with your current and past IBS treatment experiences, as well as how successful they were for helping with your symptoms.

Please check off any treatments that you are **CURRENTLY** using to treat your symptoms of IBS. For treatment that you are using, rate your satisfaction with this treatment by checking the appropriate box.

YES		very dissatisfied	dissatisfied	mildly dissatisfied	mildly satisfied	satisfied	very satisfied
	Diet Changes						
	Relaxation Training						
	Biofeedback Training						
	Laxatives / Antidiarrheals						
	Herbal / Mineral /Vitamin Supplements						
	Probiotics						
	Acupuncture						
	Antispasmodics						
	Serotonin Agonists/ Antagonists						
	Hypnotherapy						
	Psychotherapy						
	Antidepressants						

Please check off any treatments that you have used in the **PAST** to treat your symptoms of IBS. For treatment(s) that you have used, rate your satisfaction with this treatment by checking the appropriate box.

<b>YES</b>		<b>very dissatisfied</b>	<b>dissatisfied</b>	<b>mildly dissatisfied</b>	<b>mildly satisfied</b>	<b>satisfied</b>	<b>very satisfied</b>
	Diet Changes						
	Relaxation Training						
	Biofeedback Training						
	Laxatives / Antidiarrheals						
	Herbal / Mineral /Vitamin Supplements						
	Probiotics						
	Acupuncture						
	Antispasmodics						
	Serotonin Agonists/ Antagonists						
	Hypnotherapy						
	Psychotherapy						
	Antidepressants						

Please indicate below if you have been treated by a gastroenterologist before, as well as your satisfaction with this treatment.

<b>YES</b>		<b>not satisfied</b>	<b>mildly satisfied</b>	<b>moderately satisfied</b>	<b>very much satisfied</b>	<b>extremely satisfied</b>
	Treated by Gastroenterologist					

Appendix W. Symptom Attribution Questions

Listed below are symptoms you may or may not have ever experienced. Below each symptom are three possible reasons for this symptom. For each reason, please indicate how much the reason might explain your symptom, by making a mark along the line beside the reason. Please mark every item for each symptom.

**If I had trouble sleeping, I would probably think that is because:**

	<b>Not true At all</b>	<b>Very Much True</b>
Some kind of pain or physical discomfort is keeping me awake	0 _____	<b>10</b>
I'm not tired or I had too much coffee	0 _____	<b>10</b>
I'm worrying too much or I must be nervous about something	0 _____	<b>10</b>

**If I were constipated or irregular, I would probably think that it is because:**

	<b>Not true At all</b>	<b>Very Much True</b>
There is not enough fruit or fiber in my diet	0 _____	<b>10</b>
Nervous tension is keeping me from being regular	0 _____	<b>10</b>
There is something wrong with my Bowels or intestines	0 _____	<b>10</b>

**If I were sweating a lot, I would probably think that it is because:**

	<b>Not true At all</b>	<b>Very Much True</b>
I must have a fever or infection	0 _____	<b>10</b>
I'm too anxious or nervous	0 _____	<b>10</b>
The room is too warm, I'm Overdressed or working too hard	0 _____	<b>10</b>

**If I had abdominal pain or discomfort, I would probably think that it was because:**

	<b>Not true At all</b>	<b>Very Much True</b>
I've worried myself sick	0 _____	<b>10</b>
I have the flu or stomach irritation	0 _____	<b>10</b>
I've had something to eat that did not agree with	0 _____	<b>10</b>



Appendix X. Perception of Treatment Focus Rating Scales

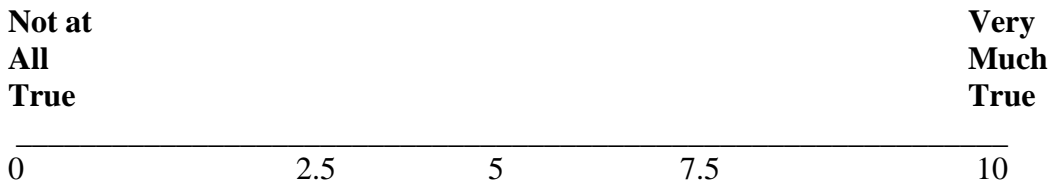
Think back to the treatment that you said you would hypothetically prefer.

While thinking about the treatment that you chose, consider how true the following statements are.

This is no right or wrong answer; we are just interested in your opinion.

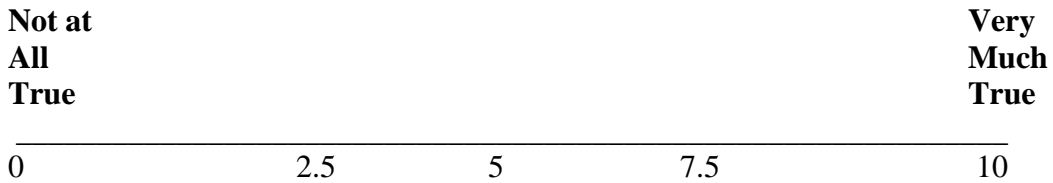
**“This treatment targets the physical causes of IBS.”**

On the line below, please show how much you feel this statement is true, by making a mark along the line somewhere between ‘Not at All True’ to ‘Very Much True.’



**“This treatment targets the psychological causes of IBS.”**

On the line below, please show how much you feel this statement is true, by making a mark along the line somewhere between ‘Not at All True’ to ‘Very Much True.’



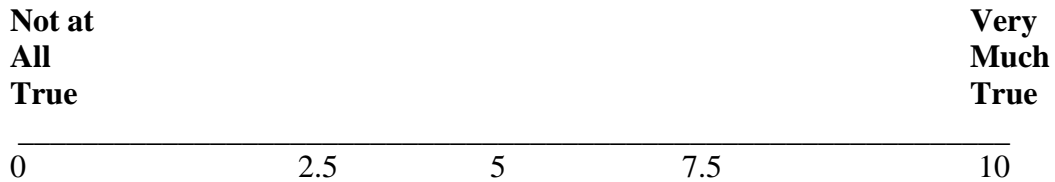
Think back to the other treatment that was offered, the one you did not choose as your preferred treatment.

While thinking about the treatment that you did **not** choose as preferred, consider how true the following statements are.

This is no right or wrong answer; we are just interested in your opinion.

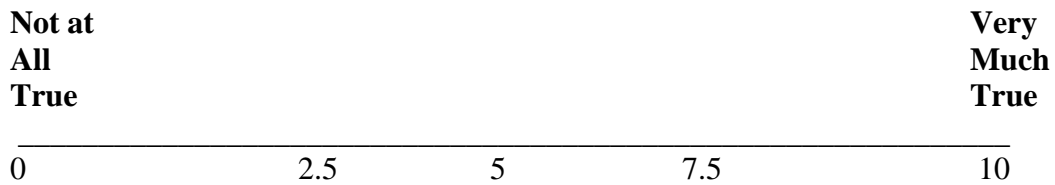
**“This treatment targets the physical causes of IBS.”**

On the line below, please show how much you feel this statement is true, by making a mark along the line somewhere between ‘Not at All True’ to ‘Very Much True.’



**“This treatment targets the psychological causes of IBS.”**

On the line below, please show how much you feel this statement is true, by making a mark along the line somewhere between ‘Not at All True’ to ‘Very Much True.’



Appendix Y. Current IBS Symptom Severity Scale

**Current Symptoms Questionnaire**

For each question, please 'check' the number that best describes your symptoms over this past week. Please answer all questions.

**1. ABDOMINAL PAIN**

No symptoms    1    2    3    4    5    6    7    8    Extremely severe

**2. CONSTIPATION**

No symptoms    1    2    3    4    5    6    7    8    Extremely severe

**3. DIARRHEA**

No symptoms    1    2    3    4    5    6    7    8    Extremely severe

**4. INCOMPLETE EVACUATION AFTER A BOWEL MOVEMENT**

No symptoms    1    2    3    4    5    6    7    8    Extremely severe

**5. BLOATING**

No symptoms    1    2    3    4    5    6    7    8    Extremely severe

**6. FLATULENCE**

No symptoms    1    2    3    4    5    6    7    8    Extremely severe

**7. URGENCY WHEN NEEDING A BOWEL MOVEMENT**

No symptoms    1    2    3    4    5    6    7    8    Extremely severe

To what extent has IBS affected your daily activities? (check one):

<b>Not at all</b>	<b>A little</b>	<b>Somewhat</b>	<b>A lot</b>
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Appendix Z. The Social Desirability Scale -17

Below you will find a list of statements. Please read each statement carefully and decide if this statement describes you or not. If it describes you, check the "true"; if not, check the word "false."

	<b>TRUE</b>	<b>FALSE</b>
I sometimes litter		
I always admit my mistakes openly and face the potential negative consequences		
In traffic I am always polite and considerate of others		
I sometimes only help because I expect something in return		
I always accept others' opinions, even when they don't agree with my own		
I take out my bad moods on others now and then		
There has been an occasion when I took advantage of someone else		
In conversations I always listen attentively and let others finish their sentences		
I never hesitate to help someone in case of emergency		
When I have made a promise, I keep it - no ifs, ands or buts		
I occasionally speak badly of others behind their back		
I would never live off other people		
I always stay friendly and courteous with other people, even when I am stressed out		
During arguments I always stay objective and matter-of-fact		
There has been at least one occasion when I failed to return an item I borrowed		
I always eat a healthy diet		



Appendix AA. Modified Patient Reactions Assessment

Please think back to the treatment vignettes that you read. Imagine that you were actually involved in the treatment scenario, having a clinical interview with a gastroenterologist who later referred you to a particular treatment. Imagine yourself interacting with the treatment provider. Please keep this in mind while reading the following statements and indicate your level of agreement (hypothetically) by checking the appropriate box.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understand the treatment side-effects					
I have been told what the treatment would do					
I understand the treatment plan for me					
I have a good idea about the changes to expect in my health					
The treatment procedure has been clearly explained					
It is difficult to get conflicting information straightened out					
I have difficulty asking about something I don't understand					
It is hard for me to tell about new symptoms					
It is difficult asking the provider questions					
The provider is warm and caring towards me					
The provider makes me comfortable discussing personal issues					
This person really respects me					
I sometimes feel insulted when talking to this person					
The provider doesn't seem interested in me as a person					
It is hard for me to ask how treatment is going					

Pre-set categories

Self-focused attention.

Definition: a tendency to tendency to focus on attending to inner thoughts, feelings and sensations.

*Examples:* I'm always checking in with what is going on in my body.  
I pay a lot of attention to whether I'm feeling stressed.

Anxiety.

Definition: a tendency towards feeling apprehensive about situations and potentialities, accompanied by worries, negative affect and physiological feelings of anxiety.

*Examples:* I've always been a worrier.  
When I get to feeling anxious...

Optimism/ Pessimism.

Definition: a tendency to expect good things will happen; a tendency to expect bad things will happen.

*Example:* I tend to look on the bright side.  
If something bad could happen, it usually will.

Hope.

Definition: a cognitive set based on reciprocally derived sense of successful agency (goal-directed determination) and pathways (ways to meet goals).

*Example:* Any mention of the word 'hope.'

Current Health: Perception of health.

Definition: beliefs about one's general level of overall health

*Examples:* I'm pretty healthy overall.  
My health is not what I'd call good.

Current Health: Acute health problems.

Definition: current health problems other than IBS

*Example:* Any mention of any other health condition.

Control Beliefs: Health.

Definition: a belief that one generally knows how to manage their health.

*Example:* It's up to me to get healthy.

Control Beliefs: Symptoms.

Definition: a belief that one can manage their symptoms of IBS

*Example:* I've always been aware of how I affect my IBS symptoms...

Health self-efficacy.

Definition: a belief that one has the ability to be healthy, to reduce symptomatology, to recover from illness, etc.

*Example:* I can do what it takes to get control of my health.

Vulnerability to illness.

Definition: a belief that one is more susceptible to illness or poor health

*Example:* If it's going around, I'll catch it for sure.

Catastrophizing.



Definition: a belief that bodily sensations and symptoms are indicative of a serious illness or problem.

*Example:* I tend to get really worried when my body feels differently.

Treatment experience: Previous experience with similar treatment.

Definition: having tried or been offered a similar in the past.

*Example:* I've tried therapy for my IBS and it did nothing.

Treatment experience: Number of treatments attempted.

Definition: having tried any number of treatments in the past.

*Example:* I've tried so many treatments already....

Illness attributions: Somatic.

Definition: a perception that one's symptoms are caused by organic factors or that the treatment is targeting the somatic aspects of one's symptoms.

*Example:* The drug treatment really gets at the root of my problem

Illness attributions: Psychological.

Definition: a perception that one's symptoms are caused by psychological factors or that the treatment is targeting the psychological aspects of one's symptoms.

*Example:* I know that stress really affects my IBS symptoms...

Motivation: Desire for relief.

Definition: a state of wanting to see relief

*Example:* I have to see some sort of improvement!

Motivation: Symptom severity.

Definition: a state of varying severity of symptoms

*Example:* My symptoms aren't so bad these days anyways

Motivation: Socially desirable responding.

Definition: a tendency to present oneself in the most favourable light

*Example:* I always adhere to all treatment recommendations

Patient-provider relationship.

Definition: any aspect of the provider that is salient to the patient

*Example:* If my doctor recommends it, I trust him

### Emergent Categories

Aversion.

Definition: a preference against / dislike of something

*Examples:* I prefer to treat my symptoms without drugs.  
I don't do for that therapy stuff

Side effects.

Definition: undesirable consequences of a therapeutic agent

*Example:* It sounds like the side effects would be as bad as my symptoms

Illness attributions: Holistic.

Definition: a perception that one's symptoms are caused by a combination of somatic and psychological factors or that the treatment is targeting the somatic and psychological aspects of one's symptoms.

*Example:* I really think one needs to address the mind and the body together

Illness attributions: Situational.

Definition: a perception that one's symptoms are caused by factors that are neither somatic nor psychological factors.

*Example:* My IBS is due to my poor lifestyle

Convenience.

Definition: a perception that a treatment may or may not be best due to lifestyle, personality, financial, or social factors

*Example:* I don't have the time to do relaxation  
Weekly therapy would be too expensive for me

Treatment experience: Vicarious.

Definition: having known someone who has tried something similar in the past

*Example:* Therapy has done very little to help my mom with her symptoms

Treatment experience: Inexperience.

Definition: having not tried something in the past

*Example:* I haven't yet tried that approach...

Appendix AC. Testing for Moderation

*1. Summary of Hierarchical Regression Analysis to Test Moderation of Self-focused Attention to Treatment Expectancies<sup>a</sup> by Treatment Experience (N = 227)*

Variable	B	SE B	$\beta$	$R^2$	$\Delta R^2$
Step 1				.02	
Experience	.08	.06	.08		
Self-focused attention	.01	.01	.12		
Step 2				.06**	.04**
Experience	.76	.24	.76**		
Self-focused attention	.00	.01	.03		
Experience*Self-focused attention	.04	.01	.77**		

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .01, after step 2 = .04.

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

*2. Summary of Hierarchical Regression Analysis to Test Moderation of Optimism to Treatment Expectancies<sup>a</sup> by Treatment Experience (N = 227)*

Variable	B	SE B	$\beta$	$R^2$	$\Delta R^2$
Step 1				.04*	
Experience	.05	.06	.05		
Optimism	.05	.02	.18**		
Step 2				.05*	.01
Experience	.40	.26	.41		
Optimism	.03	.02	.10		
Experience*Optimism	.05	.03	.38		

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .03, after step 2 = .03.

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

3. Summary of Hierarchical Regression Analysis to Test Moderation of Hope to Treatment Expectancies<sup>a</sup> by Treatment Experience (N = 227)

Variable	B	SE B	$\beta$	$R^2$	$\Delta R^2$
Step 1				.01	
Experience	.06	.06	.06		
Hope	.00	.00	.01		
Step 2				.03	.01
Experience	.61	.31	.63		
Hope	.00	.00	.02		
Experience*Hope	.01	.01	.59		

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .03, after step 2 = .03.

4. Summary of Hierarchical Regression Analysis to Test Moderation of Acute Health Problems to Treatment Expectancies<sup>a</sup> by Treatment Experience (N = 227)

Variable	B	SE B	$\beta$	$R^2$	$\Delta R^2$
Step 1				.01	
Experience	.05	.06	.06		
Acute health problems	.02	.01	.09		
Step 2				.03	.01
Experience	.05	.06	.05		
Acute health problems	.00	.02	.01		
Experience*Acute health problems	.04	.02	.16		

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .00, after step 2 = .01.

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

5. Summary of Hierarchical Regression Analysis to Test Moderation of Coping self-efficacy to Treatment Expectancies<sup>a</sup> by Treatment Experience (N = 227)

Variable	B	SE B	$\beta$	$R^2$	$\Delta R^2$
Step 1				.03*	
Experience	.08	.06	.08		
Coping self-efficacy	.03	.01	.16*		
Step 2				.09**	.06**
Experience	.84	.21	.87**		
Coping self-efficacy	.01	.01	.04		
Experience* Coping self-efficacy	.08	.02	.88**		

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .02, after step 2 = .08.

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

6. Summary of Hierarchical Regression Analysis to Test Moderation of Control over Symptoms<sup>a</sup> to Treatment Expectancies<sup>a</sup> by Treatment Experience (N = 227)

Variable	B	SE B	$\beta$	$R^2$	$\Delta R^2$
Step 1				.10**	
Experience	.05	.06	.05		
Control over symptoms	.14	.03	.30**		
Step 2				.11**	.02
Experience	.05	.06	.05		
Control over symptoms	.09	.04	.20*		
Experience* Control over symptoms	.12	.06	.16		

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .09, after step 2 = .10.

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

7. Summary of Hierarchical Regression Analysis to Test Moderation of Perceived Somatic Focus of Treatment<sup>a</sup> to Treatment Expectancies<sup>a</sup> by Treatment Experience (N = 227)

Variable	B	SE B	$\beta$	$R^2$	$\Delta R^2$
Step 1				.23**	
Experience	.08	.06	.08		
Perceived somatic focus of tx	.37	.05	.48**		
Step 2				.23**	.00
Experience	.22	.18	.23		
Perceived somatic focus of tx	.41	.06	.52**		
Experience* Perceived somatic focus of tx	.08	.09	.16		

<sup>a</sup>Transformed. Adjusted  $R^2$  after step 1 = .22, after step 2 = .22.

\*\* $p < .01$ .

### **Vita Auctoris**

Tobi Lyn Wilson was born February 4, 1976 in Toronto, Ontario and grew up in Mississauga, Ontario. In 2000, she obtained her Honours Bachelor of Science degree from the University of Toronto, specializing in Psychology and majoring in Human Biology. She obtained her Master's degree in Clinical Psychology from the University of Windsor in 2004 and her Doctorate degree in Clinical Psychology from the University of Windsor in 2009.