UNIVERSITY OF SOUTHAMPTON

Emotional Processing Deficits in Colorectal Cancer: A Theoretical Overview and Empirical Investigation

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Thesis for the degree of Doctorate in Clinical Psychology

Department of Psychology

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September 2002

Words: 19,529

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OVERVIEW

The literature review focused on the role of emotional processing deficits in cancer. It concluded that there was an association between cancer and the control of emotional experience and expression through suppression, repression or alexithymia. The evidence was stronger for the association between cancer progression and the control of emotions, rather than on cancer onset. Most of the studies to date have been carried out on women with breast cancer, limiting the generalisability of the findings. Only one study to date has explored the role of emotional processing deficits on patients with colorectal cancer, and found a relationship between colorectal cancer and difficulties in the expression of emotion.

The literature review concluded with a review of the methodological problems, which have hampered research in this area, and an examination of future research directions.

The empirical paper aimed to investigate emotional processing deficits, including emotional control and alexithymia, in men and women with non-metastatic colorectal cancer. The study also aimed to investigate the relationship between these emotional processing deficits and psychological disturbance (depression and anxiety). Patients with non-metastatic colorectal cancer were compared with a non-clinical healthy control group. Participants completed four different questionnaires, which measured emotional

processing deficits, emotional control, alexithymia, and anxiety and depression. It was predicted that patients with colorectal cancer would have significantly higher mean scores on these measures of emotional processing deficits, compared to the healthy control group. It was also predicted that there would be a relationship between measures of anxiety and depression, and the emotional processing deficit scores. Patients with colorectal cancer evidenced significantly more disengagement from their emotions, and control over their emotional expression using one measure of emotional control, but this was not evidenced in another measure. There were no significant differences between groups on measures of alexithymia or on the control of the experience of emotion. There was a significant relationship between anxiety and depression and emotional processing deficits. These results were considered in relation to previous research findings in this area. Methodological considerations were discussed as well as clinical implications and directions for future research.

Acknowledgements

I would like to thank Professor Roger Baker, Mrs Sandra Horn and Dr Sarah Thomas for their support and advice at every stage of the project, from advice on my research design to advising on drafts of my literature review and empirical paper.

I would also like to thank Professor Peter Thomas and Dr Tony Roberts for their statistical help and advice and to Professor Peter Thomas for reading through drafts of my empirical paper.

Many thanks also to Dr Tamas Hickish for his help in recruiting participants to the study, to Mrs Jan Boot, Miss Caroline Hurrell and Mrs Lin Purundare for their help in data collection at the two hospitals, and to Mr Richard Winward, Mrs Pauline Winward and Mrs Laura Lothian for their help in data collection for the control group.

Finally, my sincere thanks to all those participants who gave up their time to take part in the study and discuss their experiences with me, and to Gordon, who was a constant source of support and inspiration, and who allowed me the time and space to complete my degree.

CONTENTS

EMPIRICAL PAPER

Full Title: Emotional Processing Deficits in Colorectal Cancer: A Critical Review

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Prepared as if in submission for: British Journal of Health Psychology

Running title: Emotional processing deficits in colorectal cancer

ABSTRACT

This paper is concerned with an exploration of the role of emotions and emotional processing deficits in colorectal cancer. The paper initially introduces the concepts of emotion and emotional processing, before focusing on more specific aspects of emotional processing deficits, including emotional suppression, repression and alexithymia. The impact of these deficits on physical and psychological health is then considered. An overview of colorectal cancer is presented before reviewing empirical studies examining the association between these deficits and cancer onset and progression. It is concluded from the research that the evidence is stronger for the association between emotional processing deficits and cancer progression, rather than cancer onset. Evidence is also strongest for the role of control of emotional expression, with less conclusive evidence for the role of alexithymia. However, current studies investigating emotional processing deficits in cancer have methodological limitations, which prevent strong conclusions being drawn from the research and only one study to date has focused on the role of emotional processing deficits in colorectal cancer. Implications for future research are suggested.

INTRODUCTION

The idea that psychosocial factors may be implicated in the development and progression of cancer is not a new one. Galenus, over 2000 years ago, wrote that 'melancholic' women were prone to breast cancer (Mettler & Mettler, 1997). Whereas it is widely agreed that initial disease severity is likely to be the most important factor in influencing the course of cancer, a growing literature is developing around the idea that psychological factors such as stressful life events, negative emotional states and repression, social relationships, coping and adjustment to illness, locus of control and personality factors, might also exert an influence (for a review, see Bleiker & Van der Ploeg, 1999; Garsen & Goodkin, 1999; Geyer, 1997; McKenna, Zevron, Corn & Rounds, 1999). The most consistent finding in the literature is for the positive relationship between progression of cancer and emotional processing deficits, such as the control over, or failure to express negative emotion through denial, repression, suppression or avoidance (Dattore, Shontz & Coyne, 1980; Epping-Jordon, Compass & Howell, 1994; Jansen & Muenz, 1984; Jensen, 1987; Stavraky, Donner, Kincade & Stewart, 1988; Weihs, Simmens & Reiss, 1996).

To date, most of the research investigating the association between cancer and emotional processing deficits, such as emotional control, has focused on women with breast cancer (Epping-Jordon et al., 1994; Meyerowitz & Hart, 1995). This, of course, limits the generalisability of research to women mostly between the ages of 40-50. In contrast, colorectal cancer occurs equally in men and women and affects an older age group, at an

average age of seventy years. It is also the second most common cause of cancer deaths in the United Kingdom (Department of Health, 1997) making it an important cancer to study.

This review is concerned with an exploration of the role of emotions and emotional processing deficits in colorectal cancer. The concepts of emotion and emotional processing will be introduced, before focusing on more specific aspects of emotional processing deficits, including emotional suppression, repression and alexithymia. The impact of these deficits on physical and psychological health will then be considered. An overview of colorectal cancer will then be presented, before reviewing studies examining the association between these deficits and cancer onset and progression. Finally, the research and clinical implications will be explored. Given the paucity of research on the role of emotional factors in colorectal cancer, the review will be broadened to consider the role of these factors on other cancers as well.

EMOTIONS

What are emotions?

There are numerous different theories of emotion and emotion experience. Many of the differences in the theories and models relate to the issue of the definition of emotion, its conceptualisation and operationalisation, and the particular aspects of emotion studied. For example, neurological theorists consider emotions to be a discrete set of distinct, universal effects that are innate, language free, and defined by physiology (Ekman, 1993;

Izard, 1977). Cognitive theorists consider emotions to be the result of an appraisal process (Lazarus, Coyne & Folkman, 1984; Lazarus, 1991). It is not within the scope of this review to consider the different theories and functions of emotion in detail, and only a brief overview will be given here. There is, however, some convergence between theories, which allows for some synthesis. Most recent theorists agree that emotions are multidimensional systems (Frijda, 1987, 1988; Lang, 1977; Lazarus, 1991; Mayne, 2000; Scherer, 1984) which generally include a triggering event, which can be internal or external; physiological arousal; motor expression; and subjective feeling. More recent theorists have extended the scope of necessary components to include motivational factors, such as action tendencies and the role of cognitive factors (Buck, 1993; Frijda, 1987, 1988; Lazarus, 1991; Oatley, 1998; Scherer, 1993). The cognitive theories of emotion posit that emotions are elicited by a cognitive, (but not necessarily conscious), evaluation of antecedent situations and events, and that the patterning of the reactions in the different response domains (physiology, expression, action tendencies, and feeling), is determined by the outcome of this evaluation process. Ochsner and Barrett (2001) hypothesise that this cognitive evaluation involves an initial quick and automatic process, followed by a slower and more deliberative process, which modify and/or monitor ongoing activity. Appraisal theories postulate that organisms evaluate events and situations in a number of given dimensions, such that the result of the appraisal process determines the nature of the ensuing emotion. The appraisal model proposed by Lazarus, for example, (Lazarus et al., 1984; Lazarus, 1991) suggests that an event is subjectively appraised by a person, in relation to the significance of the event for that person, and their

appraisal of their ability to cope with the event. He assumes that the outcome of this appraisal process will determine the ensuing emotion.

Cognitive theories of emotion have been criticised because of the presumed cognitive bias, without consideration of other factors such as the role of neurological factors. In response to this, models are being proposed which integrate the various theoretical standpoints. They suggest for example, that emotions are the result of an integration of the neural, information-processing, and behavioural systems (Oschner & Barrett, 2001).

The issue of what functions emotions serve has also generated considerable interest. At one extreme it has been argued that emotions serve no useful function, lacking the logic and rationality of other putatively more cognitive processes (Hebb, 1947). At the other extreme, it has been argued that emotions serve critical functions, enabling individuals to react optimally to their environment (Ekman, 1993; Johnson-Laird & Oatley, 1989; Lazarus, 1991; Oatley & Jenkins, 1997).

The debate has also focused on aspects of emotional regulation, and the impact this may have on psychological and physical health. The debate centres around whether emotions are best attended to, experienced, and expressed, or suppressed, inhibited or ignored (Baumeister, Heatherton & Tice, 1994; Littrell, 1998; Wortman & Silver, 1989). There is ample evidence that the processing of emotions is an important part of coping with distressing emotions, and that the active control over emotions, through their inhibition, can have adverse health consequences by preventing emotions from being fully

processed. Before considering this research, the concept of emotional processing will be introduced.

EMOTIONAL PROCESSING THEORIES

Horowitz (1979a, 1986, 1990), in considering the role of emotional controls in emotional processing, proposed that when faced with a stressful situation or trauma, the event is constantly replayed in a person's consciousness and is accompanied by strong arousal and intense emotions. He suggests that this is an attempt to integrate the meaning of the trauma into pre-existing schemas. Inhibitory controls are initiated to regulate the flow of information so that it does not become overwhelming, and can be integrated slowly. However, Horowitz (1986) suggests that excessive control of the flow of information can lead to a reverberation of the emotional experience for an extended amount of time, a failure to emotionally process the event, and the persistence of negative emotional reactions. Several other researchers, on the basis of clinical and empirical investigation, have postulated that the excessive control of emotion may be a factor that impedes emotional processing (Baker, 2001; Horowitz, 1979a, 1986; Pennebaker, Barger & Tiebout, 1989; Rachman, 1980). Pennebaker (1993a) proposed that the inhibition or control of negative emotions could occur as an enduring behaviour, as well as in response to traumatic events.

Rachman regards emotional processing as, *"...a process whereby emotional disturbances are absorbed, and decline to the extent that other experiences and behaviour can proceed without disruption"* (Rachman, 2001). He states that if an emotional disturbance is not

absorbed satisfactorily, then certain characteristic signs become evident. These signs can be regarded as falling within normal limits if they occur shortly after the initial emotional disturbance takes place. However, their failure to subside constitutes unsatisfactory emotional processing. Signs of unsatisfactory emotional processing include the persistence or return of intrusive signs of emotional activity, such as obsessions, flashbacks, nightmares, pressure of talk, inappropriate expressions or experiences of emotion that are out of context, or out of proportion and maladaptive avoidance. The indirect signs include an inability to concentrate on the task at hand, restlessness and irritability. Rachman proposes that broadly successful processing can be gauged from a person's ability to talk about, see, listen to or be reminded about the significant events, without experiencing distress or disruptions. He points out that most people successfully process the overwhelming majority of disturbing events that occur in their lives. However, he also believes that the use of excessive emotional controls, such as excessive avoidance of emotion or the suppression of appropriate emotional expression, will prevent their reintegration and resolution through emotional processing.

Foa and Kozac, (1986) elaborated on Rachman's original model of emotional processing, in relation to anxiety disorders. They defined emotional processing as the modification of memory structures that underlie emotions. They argued that recovery from anxiety disorders is dependent on the person actively experiencing their anxiety, whilst facing their fears. They argued that for fear to be adequately processed, the "fear structures" must be activated, and then information incompatible with its pathological elements must be incorporated, so that a new memory can be formed. This concept is similar to the

ideas of Lang's bio informational theory of emotion (1977, 1998). His framework conceptualises emotion as a series of interconnections between the stimulus, response and meaning units. His model assumes that the emotion network must be fully activated in order to be restructured.

Teasdale and Barnard (1993) have incorporated the roles of both cognitions and emotion into their interactive cognitive subsystems (ICS) model. The ICS distinguishes between three tiers of information; 1) raw sensory information, 2) structural description codes, and 3) meaning structures, which are explicit and propositional, or are implicit and implicational. Propositional meaning codes represent semantic concepts that correspond to linguistic statements. Implicational meaning structures represent a more global, holistic level of experience and have more affective connotations. It is the implicational structures which are most related to emotion and emotional processing. Teasdale and Barnard propose that because the implicational codes are rarely explicit, sensory and emotional experiencing become the most direct way of accessing implicational meanings, and that for emotional processing to occur, change also needs to occur at the implicational level, through the accessing of the implicational meanings. They suggest that restructuring cognitions related to propositional meanings only (appealing to the rational mind), may temporarily relieve fear, but may not necessarily eliminate the underlying emotional context of the meaning, and the fear may persist, through inadequate emotional processing. Teasdale and Barnard (1993) have applied the ICS framework to depression, and suggest that the model is able to explain why people sometimes have difficulty changing negative self-perceptions, even though they may be

able to rationally evaluate the truth-value of their beliefs and verbalise evidence to the contrary.

Epstein, (1994, 1998) also makes the distinction between two parallel systems of information processing; an emotionally driven experiential system and a rational system. He suggests that a personally meaningful emotional experience, through in-session emotional expression, is more likely to produce therapeutic change, than information provided at a rational level, through strategies such as cognitive restructuring (cited in Samoilov & Goldfried, 2000). Results from research studies lend support to these ideas (Bower, 1981; Clark & Teasdale, 1982; Teasdale & Rezin, 1978; Teasdale, Lloyd & Hutton, 1998). For example, experiential and psychodynamic theories focus on the therapeutic role of emotional arousal in therapy (Greenberg & Safran, 1987) and the more contemporary cognitive behavioural theories are now recognising that the long term effectiveness of cognitive behaviour therapy may be enhanced by looking beyond symptoms at the cognitive level and also focusing on affective processes (Samoilov & Goldfried, 2000) in facilitating therapeutic change. Young's (1999) focus on the emotional aspects of cognitive schemas, and the use of in-session emotional arousal as a way of accessing and challenging clients' emotional structures, is one such example (Greenberg & Paivio, 1997; Kennedy-Moore & Watson, 1999). Research on the relationship between emotional expression in experiential therapy and outcome, highlights the importance of intense emotional expression in the resolution of schematic memories (Mohr, Shohamn-Solomon, Engle & Beutler, 1991; Paivio & Greenberg, 1995). Research studies have demonstrated the benefits of this with patients with a

number of disorders, such as anxiety (Foa & Kozac, 1986), depression (Castonguay, Goldfried & Hayes, 1996; Hayes & Strauss, 1998), post-traumatic stress disorder (Foa & Jaycox, 1998), binge eating (Castonguay, Pincus, Agras & Hines, 1998) and bereavement (Fleming & Robinson, 1991; Horowitz, Bonanno & Holen, 1993). All approaches made use of exposure to the emotion, followed by restructuring of implicational meanings.

Summary. Together, these models suggest that through emotional processing, emotional disturbances decline. Research evidence provides support for the idea that emotions can most successfully be modified only when the emotion structure is activated, and information incompatible with the original structure is incorporated (Foa & Kozac, 1986; Lang, 1977; Rachman, 1980). If the emotional experience or expression is rigidly controlled or suppressed, then emotional processing cannot occur, and psychological disturbances are a consequence. Therapies aimed at bringing about therapeutic change through in-session emotional experiencing have proved to be beneficial (Kennedy-Moore & Watson, 1999; Samoilov & Goldfried, 2000), and highlight the benefits of emotional experiencing and expression on the reduction in distress. However, although the above studies indicate the effectiveness of the role of affect in CBT and the benefits of emotional processing approaches, Samoilov and Goldfried (2000) caution that the role of in-session emotional processing remains largely under-researched and only a few studies have examined the role of emotional processes within therapy. They conclude that, *"...although these findings hold promise, the overall effectiveness of the ...therapeutic techniques, as well as considerations of how, when and with whom they are to be applied remains an empirical question"*. Both Rachman's (1980) and Horowitz's (1993) models

were largely based on clinical and experimental observation and they remain hypothetical constructs, which require validation. None of the above models outline the precise mechanisms by which emotional processing occurs. This aspect of emotional processing has not been clearly defined.

Baker (2001), in response to this, has developed a model of emotional processing which attempts to explain the psychological mechanisms involved in processing negative life events, and this will be explained below.

Mechanisms involved in emotional processing

This working model of emotional processing was developed in the context of research with panic disorder patients. It identifies crucial emotional processing mechanisms, which are necessary for successful emotional processing, and which, if faulty, could cause potential problems. It conceptualises the various stages in experiencing and expressing emotion. The different elements of the model include:

1. Input

The negative emotional event is regarded as the input, which needs to be registered by the individual as a prerequisite for emotional experience. Problems in input include the failure to register and respond to important events or interpersonal cues, blockage in feeling emotions, or feeling too much emotion because of exaggerated input.

2. Emotional experience

The emotional event and the meaning the person attributes to that event determines the type of emotion experienced. Problems in control of emotional experience will mean that although the emotional event is initially registered, the experience of emotion is aborted, suppressed or constricted. Baker suggests that the degree to which the person allows himself or herself to experience an emotion will be affected by their attitude to having emotions.

3. Labelling of emotions

The ability to label emotions and physical sensations is regarded as important within the model. Some individuals may be unable to label an emotion at a psychological level and instead experience it as constituent bodily reactions and sensations.

4. Linkage

The degree to which a person is aware of their feelings and the concomitant ability to link emotional feelings with trigger events, are other key components of the model. If an individual has difficulty in labelling their own emotions, it is unlikely that they will be able to accurately link an event with undifferentiated physical sensations, or be able to accurately identify the emotions of others. Being under aware of emotions is seen in alexithymic individuals.

5. Emotional expression

This refers to the degree to which the person gives bodily expression to their emotional experience.

This model suggests that problems in emotional processing can emerge if there is some deficit or blocking in any of those processes. Different problems may be assumed to occur, depending on the nature of the blockage. Failure to label emotions correctly may result in confusion about one's experiences; suppression of the experience may lead to tension; failure to input events properly may produce emotional blankness.

This model goes some way to detailing the precise mechanisms, which are involved in the emotional processing of stressful or traumatic events. There is considerable evidence in support of this model. Emotional insight through being aware of one's own emotions, to link them to events and understand their components, is associated with better individual and interpersonal functioning. Recognising and expressing one's own emotional experience is a prerequisite to being able to draw upon it to guide behaviour (Watson & Greenberg, 1996). Being able to label and understand one's emotions is necessary for regulation of affect (Kennedy-Moore & Watson, 1999), and in developing a coherent sense of self (Watson & Greenberg, 1996).

Of the above deficits, two aspects have received attention in the research literature in relation to their effects on psychological and physical health, and more specifically, in research on cancer and emotions. They are the concepts of emotional control and

alexithymia. These will be described in more detail below, before examining their impact on health.

Emotional control

The regulation of emotions through excessive emotional control has been highlighted in the above literature as being a factor which impedes satisfactory emotional processing, resulting in continued psychological disturbance in response to traumatic or stressful events. Emotional control or regulation has been defined in a number of ways in the literature. These will be described below, before examining the empirical evidence related to the impact of emotional control on physical and psychological health.

Watson and Greer (1983) defined emotional control as the extent to which individuals control their reactions when a particular emotion is experienced. This is a clinically derived concept based on their work with women with breast cancer, who were found to have difficulty expressing their emotions, compared to women with benign breast disease (Greer & Morris, 1975; Watson & Greer, 1983).

Emotional control has also been referred to in the literature as emotional suppression (Freud & Breuer, 1895/1974; Gross & Levenson, 1993), emotional inhibition (Pennebaker, Barger & Tiebout, 1989), emotional constraint (Beutler, Engel, Oro-Beutler, Daldrup & Meredith, 1986), emotional repression (Freud, 1915/1957) and the repressive coping style (Weinberger, 1990). These differences in terms and definitions

have hampered the research in this area, as it is not often clear how the terms are being defined and used.

Whereas emotional suppression, inhibition and constraint are generally used to refer to conscious attempts to avoid emotional expression, emotional repression and the repressive coping style, are often used to refer to an unconscious process of keeping distressing feelings and thoughts from coming into awareness (Singer & Sincoff, 1990; Weinberger, 1990). Individuals who have a repressive coping style report low levels of distress, but are physiologically highly reactive (Asendorpf & Scherer, 1983; Jamner & Schwartz, 1986a; Newton & Contrada, 1992).

Alexithymia

A related construct is that of alexithymia. The alexithymic individual may experience high levels of emotions, but has difficulty labelling and describing those emotions.

The alexithymia construct was first developed during the early 1970's on the basis of clinical observations of patients with classic psychosomatic diseases, who manifested an externally oriented cognitive style and an inability to describe and differentiate feelings (Nemiah, Freyberger & Sifneos, 1976). In the process of evolving from a hypothetical construct it has undergone further theoretical refinement and empirical testing. Taylor, Bagby and Parker (1997) describe alexithymia as being composed of the following elements:

1. Difficulty identifying feelings
2. Difficulty communicating feelings to others
3. Constricted internal and subjective experiences
4. An externally oriented cognitive style.

It has been proposed that these characteristics reflect a deficit in the cognitive capacity to process and regulate emotions (Krystal, 1988; Lane & Schwartz, 1990; Taylor et al., 1997). Friedlander, Lumley, Farchione and Doyal (1997) propose that alexithymia may be specifically associated with difficulties in processing affective states, which give rise to problems in differentiating, articulating, understanding and modulating emotional experiences. Studies in support of this idea have found that alexithymia correlates negatively with measures that assess a person's propensity and ability to reflect upon their emotional and psychological experiences (Bagby, Taylor & Parker, 1988; 1994; Kirmayer & Robbins, 1993; Yelsma, 1996). It is suggested that alexithymia increases a vulnerability to a range of clinical disorders (Taylor et al., 1997).

Prevalence rates of alexithymia of around 13-18% have been found in non-clinical adult and student populations (Salminen, Saarijarvi, Aarela, Toika & Kauhanen, 1999). Levels are higher amongst males, in older age groups, in those less well educated and in those with lower socio-economic status (Bagby, Parker & Taylor, 1994; Lane, Sechrest & Riedel, 1998; Saarijarvi, Salimen, Tamminen & Aarela, 1993).

IMPACT OF EMOTIONAL EXPRESSION, EMOTIONAL CONTROL AND ALEXITHYMIA ON HEALTH

A wide range of empirical evidence has accumulated using clinical and non-clinical populations, which has demonstrated the mental and physical health benefits associated with emotional expression, as well as psychophysiological costs associated with inhibited expression. A summary of this evidence will be presented below.

Emotional Expression

The overt expression of negative or painful emotions is widely assumed to be necessary for mental health in the clinical field (Shedler, Mayman & Manis, 1993) and a wide range of therapeutic approaches are based on the premise that revisiting painful emotion is beneficial to mental health. Lane and Schwartz (1990) suggest that psychotherapy, *"...consists of helping patients to clarify what they are feeling, understand the origins of their feelings, and tolerate their intense emotional states better while minimising the tendency to exclude these states from conscious awareness" (pp 133, cited in Littrell, 1998).* The idea of emotional experiencing and expression is an important part of therapy for therapists within psychodynamic and experiential traditions (Greenberg & Safran, 1987; Greenberg, Rice & Elliott, 1993), as well as contemporary cognitive behavioural therapies (Kennedy-Moore & Watson, 1999; Linehan, 1993; Salkovskis & Clark, 1991; Young, 1999). Research has highlighted the benefits of emotional awareness and expression as a therapeutic strategy with patients with a number of disorders, such as in the aftermath of highly stressful or traumatic events (Freud, 1957; Horowitz, 1986;

Littrell, 1998; Pennebaker et al., 1989; Raphael, 1983), anxiety (Foa & Kozac, 1986), depression (Castonguay, Goldfried & Hayes, 1996; Hayes & Strauss, 1998), binge eating (Castonguay et al., 1998), with adults with personality disorders (Linehan, 1993) and bereavement (Fleming & Robinson, 1991; Horowitz, Bonanno & Holen, 1993; Raphael, Middleton, Martinek & Misso, 1993). The benefits of emotional expression have also been found within the physical health field. Sherman, Bonanno, Weiner & Battles, (2000), for example, found that children who disclosed and discussed their HIV/AIDS status to friends during a 1 year period of study showed greater increases in immune response compared to children who had not disclosed their HIV/AIDS status. Psychological interventions in which a component involves the expression of emotion, have also been associated with reductions in distress and longer survival time (Fawzy et. al., 1990; 1993; Spiegel, Bloom, Kraemer & Gotthail, 1989)

Pennebaker (1989, 1990, 1993a) has highlighted the important health benefits of talking or writing about traumatic or stressful events. He found that writing about traumatic experiences was associated with short-term increases in physiological arousal and negative mood, but over the long term, writing about trauma resulted in decreased health problems and increased immune system responsiveness. He suggests that writing helps individuals to structure, and ultimately understand and control their emotional reactions (Pennebaker, 1993a). In support of his ideas, it is argued that writing involves an elaborate cognitive restructuring of emotional experiences, so as to allow their integration with existing cognitive schematic structures, and to facilitate anticipated control efforts (Sgoutas-Emch & Johnson, 1998). These studies have been replicated and extended in a

number of other studies (Esterling, Antoni, Fletcher, Margulies & Schneiderman, 1994; Greenberg & Stone, 1992).

However, there is also support for the idea that emotional expression can be maladaptive by intensifying distress, interfering with active coping efforts and causing difficulties with interpersonal relationships. Kraemer and Hastrup (1988), for example, induced female undergraduates to cry or suppress crying while watching an emotionally provocative film. Those who cried showed higher levels of sadness. Tesser, Leone and Clary (1978) found that those who had talked about their fear of public speaking were more anxious than a control group when actually engaging in public speaking. Nolen-Hoeksema (1991) showed that depressed individuals who were induced to talk about their depressed mood, were more depressed than a control group who engaged in a neutral task. Others have found that focusing on negative emotions prolonged negative mood more than engaging in distraction (Morrow & Nolen-Hoeksema, 1990; Rohde, Lewinsohn, Tilson & Seeley, 1990; Teasdale & Fennell, 1982). It is also generally accepted that the unrestrained expression of the emotions associated with distressing events may also impede psychological recovery from those events (Van der Kolk, 1996). It has become clear that in some types of highly stressful situations, the overt expression of negative emotions may be maladaptive (Bonanno & Siddique, 1999), and that the unrestrained expression of emotion can also lead to social rejection by others as a response to disclosing (Silver, Wortman & Crofton, 1990). Boudewyns and Hyer (1990) suggested that exposure to traumatic material, when conducted in an unsystematic fashion without additional controlled exposure, could be harmful. Additionally, concerns

have been expressed about the possibility of harm through re-exposure. For example, in people suffering from psychiatric disorders in addition to PTSD, enhancement of depression, panic disorder and alcoholic relapse after therapeutic exposure has been noted (Solomon, Gerrity & Muff, 1992a).

There are thus inconsistencies in findings, with some researchers finding a beneficial effect of evoking emotion, and others finding that evoking emotion can lead to an increase in distress. Littrell (1998), in summarising the literature, concludes that the disparate findings can be understood in terms of whether emotion is simply evoked, or whether opportunity is provided for restructuring the emotional schema. *"If a new response to painful material can be achieved, then calling up a painful emotion can have a salubrious effect"*. However, expression that involves a rehearsal of entrenched feelings, without opportunity for cognitive restructuring, is likely to exacerbate distress and prove counter-productive. This idea fits with the emotional processing theories, where unrestrained emotion can have harmful effects if not coupled with cognitive restructuring. This is further supported by research, which has found a curvilinear relationship between expressed emotion and health (Lutgendorf, Antoni, Ironson & Klimas, 1997; Shea, Burton & Girgis, 1993), and a linear relationship between cognitive processing of emotion and health (Esterling et al., 1994). Solano et al., (2001) discuss these findings and suggest that intermediate levels of expression seem to predict more favourable outcomes, while both high and low levels appear correlated with worse outcomes. Further research is needed to determine the optimum level of emotional expression and how emotion should be revisited to make restructuring more likely.

Emotional control

A whole range of research has led to an increasing acknowledgement that excessive emotional regulation through suppression of emotional experience or expression, may also be related to poor psychological functioning (Beutler, Engle, Oro-Buetler, Daldrup & Meredith, 1986; Grassi & Molinari, 1988), and may also be related to a number of major illnesses, including cardiovascular disease (Friedman & Booth-Kewley, 1987a; Friedman, Hall & Harris, 1985), cancer (Greer & Morris, 1978; Pettingale, Watson & Greer, 1984), and arthritis (Udelman & Udelman, 1981).

Research has also found an association between the repressive coping style and the development and course of disease. Studies have linked the repressive coping style to impaired immune function, high basal cortisol levels (Jamner, Schwartz & Leigh, 1988), and cardiovascular disease risk (King, Taylor Albright & Haskell, 1990; Murphy, Fishman & Shaw, 1989). An impaired immune function is thought to be particularly important in the predisposition to malignant growth in cancer (Ader, Felten & Cohen, 1991; Cohen & Herbert, 1996; Pettingale, Greer & Tee, 1977; Rabin, Cohen, Ganguli, Lysle & Cunnick, 1989).

A growing literature has found an association between emotional control and the onset and development of cancer. This research has been hampered by the lack of definition of emotional control or using different terms interchangeably. For the purpose of this review, emotional suppression, control and inhibition will be used interchangeably to

refer to conscious attempts to avoid expressing emotions. Emotional repression or the repressive coping style will be used to refer to the unconscious processes, as outlined previously. This literature will be examined in detail below. However, before the research is considered, an overview of colorectal cancer, its incidence, mortality and treatment will be presented.

COLORECTAL CANCER

Incidence and mortality rates

Colorectal cancer is responsible for about 10% of all new cancer cases in the United Kingdom population overall. It is the second most common cause of cancer deaths after deaths from lung cancer, being responsible for over 19,000 deaths per year in the United Kingdom. Its incidence is 48 per 100,000 per year, rising sharply with age. The mean age of patient diagnosis is just under seventy years (Department of Health, 1997). Five-year survival rates for colorectal cancer in England and Scotland are worse than in many other parts of Europe, with less than 50% of patients living for five or more years after diagnosis (Landis, Murray, Bolden & Wingo, 1988)

Characteristics and prognosis

All cancers are defined by unregulated cell growth and the eventual spreading of these abnormal cells to other parts of the body (Spratt, Donegan & Sigdestad, 1995). Colorectal cancer refers to any unregulated cell growth within any part of the large bowel, including the colon and rectum. About two thirds of tumours occur in the colon and one third in the

rectum and rectosigmoid. Colon cancer occurs at roughly equal rates in both men and women, and rectal cancer is more common in men (Department of Health, 1997).

The most common presenting symptoms are blood on, or mixed with stools, change in bowel habit, anaemia, weight loss, nausea; and abdominal pain (Department of Health, 1997).

Patients survive, on average, for three years after diagnosis (Mountney, Sanderson & Harris, 1994). The prognosis and effectiveness of treatment depend largely on the degree to which the cancer has spread.

Epidemiological risk factors

Approximately 5% of patients suffer from genetic syndromes associated with an exceptionally high risk of colorectal cancer and 1% have bowel disease, which increases susceptibility. In general, the risk is greater for people with a family history of the disease (Department of Health, 1997). However, around 75% of patients have neither a positive family history, nor any condition known to predispose them to developing colorectal cancer (Winawer et al., 1997). Given that the above risk factors cannot account for the development of cancer in such a large number of cases, other risk factors continue to be hypothesised about, including the role of psychological factors.

Treatment

Surgery, radiotherapy and chemotherapy have all been shown to improve long-term survival and reduce recurrence in certain groups of patients. Surgery to remove the tumour is the principle line of treatment for those 80% of cases where the disease is not too far advanced for any curative intervention. Of those patients where no curative intervention can be offered, most die within a few months (Mountney, Sanderson & Harris, 1994).

Chemotherapy as an adjuvant to surgery is offered to some patients where there is a high risk of recurrence. Adjuvant radiotherapy may also be used to treat rectal cancer in a minority of cases. There is no known research that has evaluated any psychological treatments to reduce cancer mortality in patients with colorectal cancer, although effectiveness of psychological treatments has been found for patients with other cancers (Fawzy et. al., 1990; 1993; Spiegel et al., 1989).

Physical and psychological problems

A diagnosis of cancer is a stressful experience, where thoughts of mortality, concerns about the future and fears about the disease surface (Dunkel-Schetter, Feinstein, Taylor & Falke, 1992; Silberfarb & Greer, 1982). Colorectal cancer is associated with particular difficulties. Cancer surgery can adversely affect several aspects of well being in the weeks after treatment, including problems with mobility, bowel function, fatigue and pain. It often causes problems with diarrhoea and faecal leakage and may cause problems

in the areas of sexual function. The condition may thus be embarrassing and distressing for patients, and may evoke anxieties compounding fears about the cancer.

Mechanisms by which psychological factors may exert an influence

There is mounting evidence that psychosocial variables and stress can suppress the immune system and an impaired immune system predisposes to malignant growth (Ader et al, 1991; Cohen & Herbert, 1996; Morley, Benton & Solomon, 1991; Pettingale, Greer & Tee, 1977; Rabin et al., 1989). A failure to express emotions by their suppression, repression or denial has been associated with decreased immune efficiency (see Schwartz, 1990 for a review), and emotional disclosure has been associated with improved immune function (Esterling, Antoni, Kumar & Schneiderman, 1990). There are considerable data now to suggest that when individuals actively inhibit emotional expression, they show measurable immunological change consistent with poorer health outcomes, such as higher serum antibody titers in subjects with latent Epstein-Barr virus infection (indicating poor immunological control). (Esterling et al., 1990). Jamner, Schwartz and Leigh (1988) found that repressive patients demonstrated significantly decreased monocyte counts. Shea, et al. (1993) also reported that subjects classified as repressors showed lower cell-mediated immune responses than other groups of subjects.

This evidence therefore suggests that psychological factors may influence cancer onset or progression via the immune system.

Emotional suppression has most frequently been associated with the onset or progression of cancer (Gross, 1989). A number of investigations have found a repressive personality style was significantly associated with poorer natural killer (NK) cell activity, the most readily measurable element of immune function with relevance to the control of tumours (Levy, Heberman, Maluish, Schlien & Lipman, 1985). It was also associated with the diagnosis of malignancy (Greer & Morris, 1975; Kissen, Brown & Kissen, 1969) and with subsequent death from cancer (Graves & Thomas, 1981; Pettingale, Morris, Greer & Haybittle, 1985; Shaffer, Graves, Swank & Pearson, 1987).

Summary. Colorectal cancer is the second most common cause of cancer deaths in the United Kingdom, with a low survival rate. It affects both men and women equally, and occurs mainly in the older age groups. It affects many areas of physical and psychological well-being. The known risk factors account for only 25% of cases, leaving 75% of cases unexplained. Research into the role of psychological factors on cancer has consistently found that cancer patients have difficulty in expressing their emotions, and often over control them by suppressing or repressing them. These factors have been linked to the onset and progression of cancer via association with down-regulation of aspects of immune function.

EMOTIONAL CONTROL AND CANCER

Kissen called attention to the fact that patients with lung cancer appeared to have traits associated with an inability to express true emotions, or to get things off their chest (Kissen, Brown & Kissen, 1969). LeShan (1959) concluded that the most important

factors in the development of malignancy were hopelessness/helplessness, an inability to express anger or resentment, and a marked amount of self-dislike and distrust. Bacon, Pennebaker and Cutler (1952) provided one of the earliest suggestions of a cancer personality, which was elaborated on by other researchers. These studies have suggested the role of a cancer prone personality type - the Type C personality and its link with the onset or progression of cancer (Bleiker, 1995; Eysenck, 1988, 1994; Greer & Morris, 1975; Grossarth-Maticek, Bastiaans & Kanazir, 1985; Kissen, et al., 1969; LeShan, 1959; Schmale & Iker, 1961; Van der Ploeg, Kleijn, Mook, Van Donge, Pieters & Leer, 1989). After an extensive research programme on personality and cancer, Eysenck (1994), summarised the various traits that constitute Type C as follows:- *'being over-co-operative, appeasing, unassertive, over-patient, avoiding conflict, suppressing emotions like anger and anxiety, using repression and denial as coping mechanisms, self-sacrificing, rigid, predisposed to experience hopelessness and depression' (p168).*

In relation to the Type C personality, Kneier and Temoshok (1984), pointed out that, *'...coping strategies in which anxiety-provoking events, emotions, or ideas are denied, suppressed, repressed, minimised, rationalised away or otherwise avoided, are often associated with higher incidences of cancer with poorer prognosis" (p 145).* Greer and Watson (1985) emphasised that, *'suppression of emotional responses, particularly when angry, appears to be central to this behaviour pattern' (p774).* Bleiker (1995), after an extensive study with women with breast cancer and healthy women, in which several type C dimensions were assessed, concluded that, *'...anti-emotionality was found to be a significant predictor of cancer' (p174.).* Most of the research findings have been

conducted on women with breast cancer, (Jansen & Muenz, 1984; Scherg, Cramer & Blohmke, 1981; Wirsching, Hoffman, Stierlin, Weber & Wirsching, 1985) but this emotional style has also been found in women with mixed gynaecological cancers and men and women with lung cancer (Mastrovito et al., 1979).

Of all the factors that constitute the Type C personality, only the inability to express emotions has been consistently reported. Because of this, research is now beginning to focus more specifically on aspects of emotion and emotional processing deficits and their relationship to cancer. The studies discussed below are organised according to whether their designs are retrospective, quasi prospective or prospective.

Retrospective designs

Jansen and Muenz (1984) compared the self-perceptions of personality characteristics of women with breast cancer, with healthy women and those with fibrocystic disease. Women with breast cancer consistently described themselves as timid, non-assertive, non-competitive, calm, easy-going and as keeping anger inside. They reported an inability to express anger or other negative emotions. This was in comparison to healthy women, who described themselves as calm, relaxed, easy-going and able to express anger, and women with fibrocystic disease who described themselves as tense, restless, outgoing and expressing anger.

Using psychometric measures of emotion characteristics, rather than self perceptions, Watson, Pettingale and Greer (1984) compared thirty breast cancer patients with thirty

healthy controls, for differences in personality, reported emotional state and autonomic responses occurring under experimental stress conditions. The Courtauld Emotional Control Scale (CECS; Watson & Greer, 1983) was used to measure control over reactions when feeling angry, anxious and sad. The trait version of the Spielberger State-Trait Personality Inventory (Spielberger et al., 1979) was used as a measure of generalised tendency to feel angry, anxious and sad, and the Marlowe-Crowne Scale (Crowne & Marlowe, 1960) was used as a measure of a repressive coping style. The results indicated that patients with breast cancer were more likely than the control group to report a tendency to control emotional reactions, particularly anger, and to respond to stress using a repressive coping style. The breast cancer group reported that they hid their feelings during the stress manipulation, and were more inclined to do this than the controls. Despite this, they reported higher levels of anxiety and disturbance following the stress manipulation, when compared to the control group. The authors suggested that as the emotional responses were reported to have occurred, but the behavioural responses were inhibited, that this indicated that emotional expression was consciously suppressed or inhibited, rather than a more unconscious repression of emotions.

Fernandez-Ballesteros, Ruiz and Garde (1998) also studied retrospectively, differences in emotional expression in patients with breast cancer, and healthy women. Using a different scale, Spielberger's Lifestyle Defence Measures Scale, which includes scales that measure 'Rationality/Emotional Defensiveness' and Need of Harmony', they also found that women with breast cancer reported that they did not express emotions. In comparing these results with the previous studies, however, it is unclear whether they

were measuring the same emotional concepts, as different measurement questionnaires were used and no definition was given.

Servaes, Vingerhoets, Vreugdenhil, Keuning and Broekhuijsen (1999), suggested that the precise nature of emotional inhibition was unclear in previous studies. They stated that when authors, such as those cited above, talk about the lack of emotional expression in cancer patients, it is not made clear whether the non-expression of emotions occurs as a result of a deficit in the ability to process and regulate emotions cognitively (alexithymia), or as a more wilful inhibition of emotions. They conducted their study in order to examine more closely different concepts related to non-expression of emotions, in breast cancer patients and healthy controls. They operationalised non-expression in four different ways: willingness to talk with others about emotions; alexithymia; the general tendency to express emotions; ambivalence with regard to expressing emotions. They found no statistically significant differences between the two groups with regard to willingness to talk with others about their emotions, the general tendency to express emotions, or alexithymia. But they did find that the breast cancer patients were in conflict when it came to expressing emotions. As a consequence, they deliberately chose not to express their emotions. This study begins to pinpoint more precisely where the emotional processing difficulties lie for patients with breast cancer.

Taken together, these studies indicate that patients with breast cancer are more likely to report suppressing their feelings, particularly anger, in comparison to control groups.

However, being retrospective studies, no conclusions can be drawn regarding whether this pattern of emotional non-expression is a cause or consequence of having cancer.

Quasi-prospective designs

In order to account for the criticisms of retrospective studies, a number of researchers have employed quasi-prospective designs, in which investigations of psychological characteristics were carried out on participants with suspicious lesions, but who were unaware of their diagnosis. Greer and Morris (1975, 1978) studied 160 women who attended hospital for a breast biopsy. Of these, 69 were subsequently diagnosed as having breast cancer. They found a statistically significant association between a diagnosis of breast cancer and extreme suppression of anger. When age was controlled for, this extreme suppression was still seen in those under the age of fifty, but not for those over fifty.

In an attempt to explore these findings further, Morris, Greer, Pettingale and Watson (1981) conducted another study on patients prior to their diagnosis being known, and found that cancer patients reported less frequently than the patients with a benign disease, that they experienced feelings of anger. This tendency was stronger for younger patients. Wirsching et al., (1985) using a similar design, found that breast cancer patients were characterised by observer rating as being inaccessible and denying or suppressing their feelings. However, results obtained by questionnaires did not support this finding.

Grassi and Capellari (1988) used the CECS to measure emotional control in patients with breast cancer, compared with a healthy control group and found that they showed a greater tendency to suppress their feelings of anger, anxiety and depression. However, they did not control for age or education, which may account for the differences between the groups.

Todarello, La Pesa, Zaka, Martino and Lattanzio (1989), studied the concept of alexithymia and its relationship to breast cancer, in addition to emotional control. Using the Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994; Taylor et al., 1997), they found that women with breast cancer had more pronounced alexithymic traits, than the control group. However, as in Grassi and Capellari's study, the authors gave no information about differences in the mean age of the groups, which may have accounted for the differences.

Anagnostopoulous, Vaslamatzis, Markidis, Katsouyanni, Vassilaros and Stefanis (1993) also examined alexithymic traits in women with breast cancer, using the TAS-20. In contrast, they found no significant association between alexithymia and breast cancer occurrence.

Together, these results indicate that patients with breast cancer may have difficulties in the areas of experiencing anger, and suppress feelings of anger, anxiety and depression. However, one study found a relationship between alexithymia and breast cancer and the other did not, and the retrospective study by Servaes et al. (1999) also failed to find an

association between alexithymia and breast cancer, making interpretation of the role of alexithymia difficult. Difficulties with emotional expression seem to be related to a conscious suppression of feelings, but this research does not make clear what processes lie behind difficulties in experiencing negative emotions. It also highlights the differences that can be found, dependent on the method of data collection used. As these studies were all conducted with patients in the early stages of breast cancer, the generalisability of the findings is limited. Given that different assessment measures were used, this also limits the comparisons that can be made across studies.

Quasi-prospective designs have been criticised along similar lines as the retrospective design. Bleiker and Van der Ploeg (1999), for example, suggest that they are limited because of the possible effects of social interactions, which occur during medical consultations prior to psychological examinations. They argue that although patients may not have been told their diagnosis, patients with breast cancer may have picked up some hint about it while talking to the medical practitioner. This suggests that, as in retrospective studies, assessment of psychological factors may reflect the patients' reaction to the expected diagnosis, rather than premorbid personality traits. They also argue that the cancer itself may have influenced the individual's personality traits through hormonal changes. They state that the most preferred designs, which can rule out the above factors, are the prospective designs.

Prospective designs

Few studies have employed a prospective design when considering the role of emotions in cancer. Jensen (1987) and Weihs et al., (1996) considered the role of repression and its relationship to survival. Both studies found a significant effect on cancer progression. Similarly, Dattore et al. (1980) examined repression in patients with mixed cancers. They too, found that individuals from the cancer group showed greater repressive tendencies according to the Repression-Sensitisation Scale (Byrne, 1961). It appears that in this study, repression was defined as a forceful repression of depressive content and affect.

Weihs, Enright, Simmens and Reiss (2000), in a more recent study, examined the joint effects of negative affectivity and restriction of emotions on survival after recurrent breast cancer. Results showed that negative affectivity, when added to the restriction of emotions, strengthens the prediction of shortened survival based on disease severity. Patients reporting low chronic anxiety differed in their survival time, depending on their level of constraint, with low emotional constraint and low chronic anxiety characterising those with longer survival than all the others. Low reported chronic anxiety and high emotional constraint characterised those with shorter survival than all others, including those reporting high chronic anxiety. The results, therefore, show increasing mortality associated with emotional constraint and control of feelings, and as such, suggest that both voluntary and involuntary patterns of emotional regulation are implicated. These concepts may be similar to studies, which use suppression to refer to voluntary control

over emotions, and repression, to refer to the more involuntary pattern of emotion regulation.

Epping-Jordan et al. (1994) measured a concept related to repression, in men and women with mixed cancers. They examined the role of psychological symptoms, avoidance of emotions and feelings, and intrusive thoughts as predictors of cancer progression over a one-year period. Longitudinal findings revealed that, after controlling for disease parameters and age, avoidance of emotions predicted disease status at one year. However, neither psychological symptoms, nor intrusive thoughts and emotions, accounted for additional variance in disease outcomes. These findings are consistent with the previously reviewed research in relation to emotional non-expression. It is not clear from this study whether the authors were suggesting that avoidance was a voluntary or involuntary method of controlling emotional experience or expression.

Other studies have failed to find a relationship between repression and cancer. Persky, Kempthorne-Raeson and Shekelle (1987) did not find a relationship between repression, as measured by the Minnesota Multiphasic Personality Inventory (MMPI) and later onset of cancer. Similarly, Hahn and Petitti (1988), using the same questionnaire, also failed to find a relationship. In reviewing these findings, Persky's study contained only males, but with mixed cancers, and using a heterogeneous group, which may have affected the results. Butow, Hiller, Price, Thackaway, Kricker and Tennant (2000) commented that the MMPI has a theory base not in wide current use, and which does not directly measure repression. Similarly, Watson and Greer (1983) assessed the comparative validity of a

number of repression scales, including the MMPI, and found that it did not correlate well with the criterion scores, and correlated variably with the other scales.

Summary. Taken together, the findings, in relation to suppression of emotion, are generally consistent in showing a relationship with cancer. Of two studies that failed to find a relationship, the measures used may not be valid measures of suppression. However, in interpreting the overall results, different measures and definitions of suppression or repression were used, making comparison across studies difficult. As these concepts were measured before the onset of cancer, this highlights that the difficulties experiencing and expressing emotions may not be a consequence of the cancer, because they pre-dated it. Causal inferences, however, cannot be drawn, due to the correlational nature of the studies.

Intervention studies

Intervention studies have provided the most convincing evidence regarding a causal link between emotion factors and cancer. Two studies are of importance. The first by Spiegel et al. (1989) involved randomising women with metastatic breast cancer to either weekly group support sessions for a year, or to a control condition. Both groups received standard medical care. After a year, the women in the support group reported decreased mood disturbance and fearfulness, less pain and suffering and engaged in fewer maladaptive coping strategies such as denial, in comparison to the control group. But most significantly, women in the initial support group survived, on average, 18 months longer than those in the control group, after controlling for disease related variables.

Fawzy et al., (1993) obtained similar results with women with malignant melanoma. Six months after the intervention, those in the support group showed improved psychological adjustment and enhanced immune functioning, compared with those in the control group. Five years later, those in the support group had a lower recurrence rate and a longer survival time than those in the control group.

Even though these findings are encouraging, they require interpreting with caution. Although both studies involved support groups where the facilitation of emotional awareness and expression was a part, the support groups were multifaceted and it was not possible to tease out which were the effective components.

The role of emotional processing deficits in colorectal cancer

Only one known study to date has examined the relationship between personality or emotional factors and colorectal cancer. Kune, Kune, Watson and Bahnson (1991) compared 637 new cases of colorectal cancer with 714 age and sex matched controls, for repression and suppression of emotions. The findings indicated a modest but significant difference in denial and repression of emotions, suppression of reactions that may offend others and an avoidance of conflict in the cancer group, as compared to the control group. These factors were able to significantly discriminate between the cancer and control groups. However, the questionnaire used to measure these concepts has not undergone psychometric testing and as such, it is not known whether this is a valid or reliable measure. The authors did not report how they defined the concepts of repression or suppression, making it difficult to draw any firm conclusions from the research.

SUMMARY

The relationship between emotional processing deficits and cancer, has been studied in a number of ways. Concepts assessed have included alexithymia, denial, suppression or repression of emotion, and the repressive coping style. A number of methodological issues make a synthesis of the literature difficult. For example, most of the research has been carried out on women with breast cancer, limiting the generalisability of the findings. Little research has been undertaken where results are given for both men and women, and only one study to date has used patients with colorectal cancer. Many researchers have used patients with benign disease as a comparison group, and the appropriateness of this has often been questioned in view of the fact that benign disease may serve as a risk factor for later malignancies. Most studies have been retrospective or quasi-prospective and such study designs cannot prove causation. Few studies describe the assessments they used or had evidence for their validity and reliability. Other methodological issues include not specifying the time period selected, using small sample sizes and not controlling for potential confounds such as age, stage of illness and treatment. One of the largest shortcomings, however, is the lack of construct, and measure definition, which Eysenck (1994) suggests can obscure important findings. For example, repression and suppression of emotion are thought to be conceptually different, yet are often used interchangeably. However, given these limitations, a number of interesting findings have emerged. Together, the research from retrospective, quasi-prospective, prospective and intervention studies indicate that patients with cancer are more likely to report suppressing, repressing, inhibiting or denying their emotions and

feelings, most particularly anger, in comparison to control groups. This effect has most prominently been seen in women under the age of fifty. Whereas some studies indicate that patients do experience emotions, but consciously suppress them, others have suggested that patients have difficulties in the experiencing and labelling of emotions, and more unconsciously repress them. It is not clear why these differences in findings occur, but is likely to occur in part due to differences in the definition and measurement of emotion concepts. However, given the correlational nature of these studies, no causal inferences can be drawn.

Future research directions

Most of the research to date has been conducted on women with breast cancer. Given that there is a different set of epidemiological risk factors for breast cancer as compared with other cancers, it is not possible to infer that the same psychosocial factors will be important (Goodkin, Antoni & Blaney, 1986). The studies to date have studied some aspects of emotional processing deficits, such as control of expression and alexithymia, yet have failed to look at others, which are implicated, in Baker's emotional processing model. It would seem important to find out whether emotional difficulties are only related to alexithymia and emotional control, or whether there are more pervasive emotional processing deficits. In addition, the importance of studying a single cancer is important (Cella & Holland, 1988), as well as studying patients at different ages to the breast cancer group.

The influence of emotional factors on colorectal cancer is an important area for future study. Using patients with colorectal cancer affords the opportunity to study a cancer, which is the second most common cause of cancer deaths in the United Kingdom. The effects on both men and women can be researched, and as the mean age of onset is seventy, the impact on an older age group can also be studied. As the only study conducted on people with colorectal cancer used unvalidated measures, it would be important to use validated measures of emotional control, alexithymia, and a measure of more pervasive emotional processing deficits, such as that based on Baker's model of emotional processing. Although prospective longitudinal studies are considered the gold standard, it would be appropriate to conduct a smaller scale study to examine whether emotional factors are correlated with colorectal cancer, before placing resources in a larger scale prospective study. This is an interesting and important area for future research.

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Full Title: Emotional Processing Deficits in Colorectal Cancer

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Prepared as if in submission for: British Journal of Health Psychology

Running title: Emotional processing deficits in colorectal cancer

ABSTRACT

Objective. The study aimed to explore difficulties in emotional processing, emotional control and alexithymia in men and women with non-metastatic colorectal cancer, and to examine the relationships between these difficulties, and psychological disturbance (depression and anxiety).

Design. A cross sectional design was used to compare patients with non-metastatic colorectal cancer with a non-clinical healthy control group.

Method. Standardised measures were completed by the cancer group and the healthy control group.

Results. Significant differences were found between the two groups on the subscales of the Emotional Processing Scale (EPS), measuring uncontrolled emotional expression, and disengagement from emotion, with the cancer group being significantly more controlled in their emotional expression, and disengaged from their emotions than the control group. There were no significant differences between groups on emotional control using the Courtauld Emotional Control Scale (CECS) or on alexithymia using the Toronto Alexithymia Scale-20 (TAS-20). There were significant relationships between psychological symptomatology using the Symptoms of Anxiety and Depression Scale (SAD) and emotional processing, emotional control and alexithymia.

Conclusions: These findings suggest that patients with non-metastatic colorectal cancer control the experience and expression of their emotion significantly more than a healthy control group and that there is a significant relationship between some emotional processing difficulties and psychological symptomatology.

INTRODUCTION

A substantial literature exists which has examined the role of psychological factors in the onset and progression of cancer. Whereas it is widely accepted that initial disease severity is likely to be the most important factor in influencing the course of cancer, a growing literature is developing around the idea that psychosocial factors such as stressful life events, negative emotional states and repression, social relationships, coping and adjustment to illness, locus of control and personality factors might also exert an influence (for a review, see Bleiker & Van der Ploeg, 1999; Garsen & Goodkin, 1999; Geyer, 1997; McKenna, Zevron, Corn & Rounds, 1999). The most consistent finding in the literature is for the positive relationship between progression of cancer and emotional processing deficits such as extreme emotional control, (including the failure to express negative emotion, denial, repression, suppression or avoidance) (Epping-Jordan, Compass & Howell, 1994; Jansen & Muenz, 1984; Jensen, 1987; Stavraky, Donner, Kinkade & Stewart, 1988; Weihs, Simmens & Reiss, 1996) and alexithymia (Kreitler, Samario & Krietler, 1990; Todarello, La Pesa, Zaka, Martino & Lattanzio, 1989).

Emotional control has been defined in a number of ways in the literature. Watson and Greer (1983) defined emotional control as the extent to which individuals control their reactions when a particular emotion is experienced. This is a clinically derived concept based on their work with women with breast cancer, who were found to have difficulty expressing their emotions, compared to women with benign breast disease (Greer & Morris, 1975; Watson & Greer, 1983). Emotional control has also been referred to in the literature as emotional suppression (Freud & Breuer, 1895/1974; Gross & Levenson,

1993), emotional inhibition (Pennebaker, 1993a), emotional constraint (Beutler, Engle, Oro-Buetler, Daldrup & Meredith, 1986), emotional repression (Freud, 1915/1957) and the repressive coping style (Weinberger, 1990). The terms are often used interchangeably in research to describe the same concept of emotional control, with little explanation of how the researcher is using the term. They are actually thought to represent a number of different aspects of emotional processing. Whereas emotional suppression, inhibition and constraint are generally used to refer to conscious attempts to avoid emotional expression, emotional repression and the repressive coping style often are used to refer to an unconscious process of keeping distressing feelings and thoughts from coming into awareness, and relate more to the control of emotional experience (Singer & Sincoff, 1990; Weinberger, 1990). These differences in the usage of the terms have hampered the research in this area.

A related construct to emotional control is alexithymia, which literally translates to "no words for mood". The alexithymic individual may experience high levels of emotions, but has difficulty labelling and describing those emotions. The alexithymia construct was first developed during the early 1970's on the basis of clinical observations of patients with classic psychosomatic diseases, who manifested an externally oriented cognitive style, and an inability to describe and differentiate feelings (Nemiah, Freyberger & Sifneos, 1976). In the process of evolving from a hypothetical construct it has undergone further theoretical refinement and empirical testing. Taylor, Bagby and Parker (1997) describe alexithymia as being composed of the following elements: 1) difficulty

identifying feelings; 2) difficulty communicating feelings to others; 3) constricted internal and subjective experiences and 4) an externally oriented cognitive style.

It has been proposed that these characteristics reflect a deficit in the cognitive capacity to process and regulate emotions (Krystal, 1988; Lane & Schwartz, 1987, Taylor et al., 1997). Friedlander, Lumley, Farchione and Doyal (1997) propose that alexithymia may be specifically associated with difficulties in processing affective states, that give rise to the problems in differentiating, articulating, understanding and modulating emotional experiences. Studies in support of this idea have found that measures of alexithymia correlate negatively with measures that assess a person's propensity and ability to reflect upon their emotional and psychological experiences (Bagby, Taylor & Parker, 1988, 1994; Kirmayer & Robbins, 1993; Yelsma, 1996). It is suggested that alexithymia increases a person's vulnerability to a range of clinical disorders (Taylor et al., 1997).

Emotional control and alexithymia have both been associated with difficulties in emotional processing (Krystal, 1988; Lane & Schwartz, 1987, Taylor et al., 1997). Horowitz (1979a, 1986, 1990), in considering the role of emotional controls in emotional processing, proposed that when someone is faced with a stressful situation or trauma, the event is constantly replayed in consciousness and is accompanied by strong arousal and intense emotions. He suggests that this is an attempt to integrate the meaning of the trauma into pre-existing schemas. Inhibitory controls are initiated to regulate the flow of information so that it does not become overwhelming, and can be integrated slowly. However, Horowitz (1986) suggests that excessive control of the flow of information can lead to a reverberation of the emotional experience for an extended amount of time, a

failure to emotionally process the event, and the persistence of negative emotional reactions.

Rachman regards emotional processing as "...a process whereby emotional disturbances are absorbed, and decline to the extent that other experiences and behaviour can proceed without disruption" (Rachman, 2001). He suggests that most people successfully process the overwhelming majority of disturbing events that occur in their lives. However, he also believes that the use of excessive emotional controls, such as excessive avoidance of emotion or the suppression of appropriate emotional expression, will prevent their reintegration and resolution through emotional processing.

Several other researchers, have elaborated on these models, in relation to anxiety and depression, and have also postulated that if the emotional experience or its expression is rigidly controlled or suppressed, then emotional processing cannot occur and psychological and/or physical disturbances are a consequence (Foa & Kozac, 1986; Horowitz, 1979a, 1986; Lang, Cuthbert & Bradley, 1998; Pennebaker, Barger & Tiebout, 1989; Rachman, 1980; Teasdale & Barnard, 1993). However, none describe the exact mechanisms behind emotional processing. In response to this, Baker (2001) has developed a model based on clinical observation and empirical testing, which identifies with more specificity the psychological operations necessary for successful emotional processing. The model separates emotional control into aspects of emotional experience and expression, but also identifies earlier emotional processing mechanisms such as identification of the emotion, awareness of and labelling of emotion, and ability to link

emotions with events (which relate more to the alexithymia concept). Baker suggests that blockages or deficits in any of these areas can lead to difficulties in emotional processing.

A wide range of empirical evidence has accumulated using clinical and non-clinical populations, which has demonstrated the psychophysiological costs associated with inhibited emotional experience or expression through emotional control, and the mental and physical health benefits associated with emotional expression. Excessive emotional control through suppression of emotional experience or expression has been related to poor psychological functioning, including anxiety and depression (Beutler et al., 1986; Grassi & Molinari, 1988), and may also be related to a number of major illnesses including cardiovascular disease (Friedman & Booth-Kewley, 1987; Friedman Hall & Harris, 1985), cancer (Greer & Morris, 1975; Pettingale, Watson & Greer, 1984) and arthritis (Udelman & Udelman, 1981). There is considerable data now to suggest that when individuals actively inhibit emotional expression, they show measurable immunological change consistent with poorer health outcomes, such as higher serum antibody titers in subjects with latent Epstein-Barr virus infection (indicating poor immunological control (see Schwartz (1990) for a review). An impaired immune function is thought to be particularly important in the predisposition to malignant growth in cancer (Ader, Felten & Cohen, 1991; Cohen & Herbert, 1996; Rabin, Cohen, Ganguli, Lysle & Cunnick, 1989; Pettingale, Greer & Tee, 1977). A number of investigations have found a repressive personality style was significantly associated with poorer natural killer (NK) cell activity, the most readily measurable element of immune function with relevance to the control of tumours (Levy, Heberman, Maluish, Schlien & Lipman,

1985). It was also associated with the diagnosis of malignancy (Greer & Morris, 1975; Kissen, Brown & Kissen, 1969) and with subsequent death from cancer (Graves & Thomas, 1981; Pettingale, Morris, Greer & Haybittle, 1985; Shaffer, Graves, Swank & Pearson, 1987).

In contrast, emotional disclosure or expression has been associated with improved immune function (Esterling, Antoni, Kumar & Schneiderman, 1990; Sherman, Bonanno, Weiner & Battles, 2000), decreased health problems (Pennebaker, 1986, 1989, 1990) and increased survival time for patients diagnosed with cancer (Fawzy et. al., 1990; 1993; Spiegel, Bloom, Kraemer & Gotthail, 1989). The overt expression of negative or painful emotions is widely assumed to be necessary for mental health in the clinical field (Shedler, Mayman & Manis, 1993), and a wide range of therapeutic approaches are based on the premise that revisiting painful emotion is beneficial to mental health. However, it is also recognised that unrestrained emotional expression can also be maladaptive to physical or psychological health, and that a balance between emotional expression and emotional control is likely to be most adaptive to health (Nolen-Hoeksema, 1991; Morrow & Nolen-Hoeksema, 1990; Teasdale & Fennell, 1982; Rohde, Lewinsohn, Tilson & Seeley, 1990; Van der Kolk, 1996).

A growing body of research has found a relationship between the emotional processing deficits of emotional control and alexithymia, and cancer onset or progression. Most of this research has been conducted on samples of women with breast cancer. Watson, Greer Pettingale and Morris have conducted a number of studies using women with breast

cancer, to examine the relationship between emotional control and cancer (Greer & Morris, 1975, 1978; Pettingale, Watson & Greer, 1984). Using the Courtauld Emotional Control Scale (CECS; Watson & Greer, 1983), their results indicate that patients with breast cancer are more likely than a healthy control group to report a tendency to control emotional reactions, particularly anger, despite experiencing the emotion. However, they often did not control for age, which may be accounting for the differences seen between groups. When age was controlled for, this effect only remained for women under the age of fifty, indicating that age is a factor, which needs to be taken into account (Greer & Morris, 1975; 1978; Morris, Greer, Pettingale & Watson, 1981).

Other studies have replicated these findings with women with breast cancer (Fernandez-Ballesteros, Ruiz & Garde, 1998; Grassi & Capellari, 1988). However, again, age was not controlled for and in Fernandez-Ballesteros et al's study, it was not clear from the measures what aspect of emotional control was being measured, as no definitions were given.

Servaes, Vingerhoets, Vreugdenhil, Keuning and Broekhuijsen (1999) also suggested that the precise nature of emotional inhibition or control was unclear in previous studies. They stated that when authors, such as those cited above, talk about the lack of emotional expression in cancer patients, it is not made clear whether the non-expression of emotions occurs as a result of a deficit in the ability to process and regulate emotions cognitively (alexithymia), or as a more wilful inhibition of emotions. They conducted their study in order to examine more closely different concepts related to non-expression of emotions,

in breast cancer patients and healthy controls. They operationalised non-expression in four different ways: willingness to talk with others about emotions; alexithymia; the general tendency to express emotions; ambivalence with regard to expressing emotions. They found no statistically significant differences between the two groups with regard to willingness to talk with others about their emotions, the general tendency to express emotions, or alexithymia. But they did find that the breast cancer patients were in conflict when it came to expressing emotions. As a consequence, they deliberately chose not to express their emotions. This study begins to pinpoint more precisely where the emotional processing difficulties lie for patients with breast cancer.

Todarello et al., (1989) studied the concept of alexithymia and its relationship to breast cancer, in addition to emotional control. Using the Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994), they found that women with breast cancer had more pronounced alexithymic traits than the control group. However, as in Grassi and Capellari's study, the authors gave no information about differences in the mean age of the groups, which may have accounted for the differences.

Anagnostopoulous, Vaslamatzis, Markidis, Katsouyanni, Vassilaros and Stefanis (1993) also examined alexithymic traits in women with breast cancer, using the TAS. In contrast, they found no significant association between alexithymia and breast cancer occurrence. Again, it was not clear whether they controlled for age.

Few studies have employed a prospective design when considering the role of emotions in cancer. Jensen (1987) and Weihs et al. (1996) considered the role of repression and its relationship to survival. Both studies found a significant effect on cancer progression. Weihs, Enright, Simmens and Reiss (2000) in a more recent study, examined the joint effects of negative affectivity and restriction of emotions on survival after recurrent breast cancer. Their results showed increasing mortality associated with emotional constraint and control of feelings.

Other studies have failed to find a relationship between emotional control and cancer (Hahn & Petitti, 1988; Persky, Kempthorne-Raeson & Shekelle, 1987). The study by Persky contained only males, but with mixed cancers, and using a heterogeneous group may have affected the results. Watson and Greenberg (1996) have criticised the validity of the measures used in these studies.

Only one known study to date has examined the relationship between personality or emotional factors and colorectal cancer. Kune, Kune, Watson and Bahnson (1991) compared 637 new cases of colorectal cancer with 714 age and sex matched controls, for repression and suppression of emotions. The findings indicated a modest but significant difference in denial and repression of emotions, suppression of reactions that may offend others and an avoidance of conflict in the cancer group, as compared to the control group. These factors were able to significantly discriminate between the cancer and control groups. However, the questionnaire used to measure these concepts has not undergone psychometric testing, and as such, is not known whether this is a valid or reliable

measure. The authors did not report how they defined the concepts of repression or suppression, making it difficult to draw any firm conclusions from the research.

A number of methodological issues make a synthesis of the literature difficult. Most of the research has been carried out on women with breast cancer, limiting the generalisability of the findings. Little research has been undertaken where results are given for both men and women, and only one study to date has used patients with colorectal cancer. Studying gender effects is important, as differences have been reported between men and women in emotional expression or inhibition in the general research literature on emotions (Fischer & Good, 1997; McContha, Leone & Armstrong, 1997). Many of the studies have been criticised for not controlling for potential confounds, such as age, stage of treatment or illness. Many researchers have used patients with benign disease as a comparison group, and the appropriateness of this has often been questioned in view of the fact that benign disease may serve as a risk factor for later malignancies. Most studies have been retrospective or quasi-prospective and such study designs cannot indicate causation. Few studies describe the assessments they used, or had evidence for their validity and reliability. Other methodological issues include not specifying the time period selected or using small sample sizes. One of the largest shortcomings, however, is the lack of construct and measure definition, which Eysenck (1994) suggests can obscure important findings. It is unclear in much of the research, which aspects of emotional processing deficits are being studied, making it difficult to be clear about where specifically difficulties may lie. For example, the literature is not yet clear whether the difficulties relate to pervasive emotional processing deficits, or more specific deficits

such as conscious or unconscious problems with identifying emotions, labelling them, experiencing or expressing them.

The current study is concerned with an examination of emotional processing deficits in patients with non-metastatic colorectal cancer. It aims to make a number of important contributions to the research. Using patients with colorectal cancer affords the opportunity to study a cancer` which is the second most common cause of cancer deaths in the United Kingdom. It affects both men and women equally, and as the mean age of onset is seventy years, an older age group can be studied (Department of Health, 1997). The known risk factors account for only 25% of cases, leaving 75% of cases unexplained (Winawer et al., 1997). Psychological factors may add to the explanations offered to date. As the only study conducted on people with colorectal cancer used unvalidated measures, this study will use validated and reliable measures. It will also extend upon previous research by including not only measures of emotional control and alexithymia, but also more specific measures of emotional processing, based on Baker's (2001) model of emotional processing. And, it will examine the relationship between emotional processing deficits and psychological disturbance (depression and anxiety), given that the general literature on emotional processing suggests an association between emotional processing deficits and psychological and physical health problems. It will also consider other potential confounding factors, including marital status and education. It will, therefore, attempt to answer many of the criticisms levelled at previous research including unvalidated measures, poor construct definition and measurement, use of samples of women only with breast cancer, or mixed cancers, small sample sizes, and not controlling for potential confounds.

Aims and hypotheses

The study aims to explore difficulties in emotional processing, emotional control and alexithymia in men and women with non-metastatic colorectal cancer, and to examine the relationships between these difficulties, and psychological disturbance (depression and anxiety).

Hypothesis 1. Patients with colorectal cancer will show significant impairments in emotional processing abilities, as compared to healthy controls, as evidenced by statistically significantly higher mean scores on the Emotional Processing Scale (EPS) overall scale and EPS subscale scores.

Hypothesis 2. Patients with colorectal cancer will control their emotions significantly more than healthy controls, as evidenced by statistically significantly higher mean scores on the Courtauld Emotional Control Scale (CECS) total scale and subscales.

Hypothesis 3. Patients with colorectal cancer will show significantly more alexithymic traits than healthy controls, as evidenced by statistically significantly higher mean scores on the Toronto Alexithymia Scale-20 (TAS-20) total scale and TAS-20 subscales.

Hypothesis 4a.

There will be a significant association between scores on the Symptoms of Anxiety and Depression Scale (SAD) and diagnosis.

Hypothesis 4b.

There will be a significant relationship between scores on the SAD and the emotion scale scores for the colorectal cancer group (EPS, CECS, TAS-20).

METHOD

Design

A cross sectional design was used to compare patients with non-metastatic colorectal cancer with a non-clinical healthy control group. The dependent variables were scores on the questionnaires measuring emotional processing, emotional control, alexithymia, depression and anxiety. The independent variables were whether the participants had colorectal cancer or not, and, within the colorectal cancer group, whether the participants were male or female.

Participants

Colorectal cancer group. All patients (n = 214) who were diagnosed with non-metastatic colorectal cancer, and who fitted the inclusion criteria, were recruited from two hospitals. Inclusion criteria required that patients had been diagnosed between one and five years ago, had completed surgical treatment, were not currently diagnosed with another form of cancer, had not been diagnosed with any other serious or life threatening health conditions or psychological or mental health problems in the past five years, were over eighteen and were English speaking. Of the 214 patients, 85 declined to participate, and a further five had to be excluded due to participants having current mental health

problems or a heart condition. This left a total of 124 participants in the final sample (65 male and 59 female), a response rate of 58%. The age range was 39 to 89 years, with a mean age of 68.7 years.

The decision to only include patients who were diagnosed between one and five years ago and to exclude patients with metastases, or with other serious physical or mental health problems, was made to increase the homogeneity of the sample and to ensure that patients were facing a similar stage in their cancer trajectory.

Healthy Control Group. When selecting participants for the control group, 250 members of the public were invited to participate in the study. Inclusion criteria required that they were aged over eighteen, had not had cancer in the past five years, and had not been diagnosed with a life-threatening illness or psychological or psychiatric problems. Participants were recruited from a number of community sources including social groups, leisure centres, golf clubs, and through work colleagues and friends of the researcher. Of these, 170 declined to participate, and a further three had to be excluded due to the participants currently having cancer. This left a total of 73 participants in the final sample (34 male and 39 female), a response rate of 29%. The age range was 37 to 89 years, with a mean age of 61.0 years.

Measures

Emotional Processing. The Emotional Processing Scale (EPS; Baker, Thomas, Thomas, Holloway, Horne & Lothian, 2002) is a 45-item self-report questionnaire, which assesses emotional processing over the last week. It measures four main factors: 1) overall emotional processing deficits; 2) emotional experience (differentiation, awareness and blunted affect), 3) control of experience (disengagement and suppression) and 4) control of expression (avoidance and uncontrolled expression). Responses to all items are scored on a nine point visual analogue scale from "completely disagree" to "completely agree". Scores can be obtained for each of the factors, as well as a global overall emotional processing deficit score. Higher scores indicate increased emotional processing deficits.

The scale was developed using a cognitive behavioural theoretical base, in order to assist psychological therapists in including an emotional aspect to their conceptualisation of therapy, to measure change in emotional processing and to provide a research tool for research on emotional processing. The scale has been found to have good internal consistency, concurrent and construct validity and test-retest reliability (Baker, Thomas, Thomas, Holloway, Horne & Lothian, 2002).

Emotional Control. The Courtauld Emotional Control Scale (CECS; Watson & Greer, 1983) is a 21-item self-report questionnaire, which assesses the extent to which individuals control their reactions when angry, sad or anxious. The scale consists of the three subscales (anger, anxiety and sadness), which can be summed to give a total emotional control score. A high score indicates a greater control of emotional responses.

The scale was developed for use with cancer patients, and has been shown to have good face, discriminant and construct validity, is free from a social desirability bias, has internal consistency, and is a reliable measure (Watson & Greer, 1983). It has also been widely used in the research assessing emotional control in cancer patients (Greer & Morris, 1975, 1978; Morris, Greer, Pettingale &Watson, 1981; Watson, Pettingale & Greer, 1984).

Alexithymia. The Toronto Alexithymia Scale–20 (TAS-20; Bagby, Parker & Taylor, 1994; Taylor et al., 1997) is a twenty item self-report scale which measures three main factors: 1) difficulty identifying feelings; 2) difficulty describing feelings to others and 3) external-concrete thinking. Responses to all items are scored on a five point Likert scale from "strongly agree" to "strongly disagree". Scores can be obtained for each of the three factors, as well as a global score. Scores range from 0 to 100. Higher scores indicate increased levels of alexithymia. A cut-off score of 61 can also be used to indicate whether an individual has predominant alexithymic features.

The TAS-20 is the scale most often used in the research examining alexithymic features in cancer patients. The stability and replicability of the three-factor structure of the TAS-20 has been demonstrated with both clinical and non-clinical samples (Bagby et al, 1994; Taylor et al., 1997), and across sample populations from different nationalities (Parker, Bagby, Taylor, Endler, & Schmitz, 1993). The TAS-20 has been shown to have good internal consistency, test-retest reliability and convergent, discriminant and criterion

validity. Construct validity has also been demonstrated (Bagby et al., 1994; Bagby et al., 1994; Taylor et al., 1997).

Depression and anxiety. The symptoms of anxiety and depression scale of the Delusions-Symptoms-States Inventory (SAD: Bedford, Foulds & Sheffield, 1976) is a fourteen item self-report scale, which measures depression and anxiety. Responses are rated from 0-3 depending on the severity of the symptom, from "not at all" to "unbearably / extremely". Scores can be obtained for depression, anxiety or a total score. It can be used on clinical and non-clinical populations and is a widely used measure of psychiatric symptomatology. It has been shown to have good construct and concurrent validity (Bedford et al., 1976).

Demographic, disease and treatment variables. Information on sex, age, marital status, years of education and physical or mental health problems was collected using an information sheet at the beginning of the questionnaire booklet. Disease and treatment-related information of cancer patients was collected from the hospitals' medical databases and included information on time since diagnosis and treatments undergone. This information was collected to identify potential covariates to be included within the analyses.

The measures described above were presented in a questionnaire booklet. Demographic, illness and treatment information questions were presented first, followed by the EPS, TAS, SAD, and CECS.

Procedure

Colorectal cancer group. The researcher approached those participants who fulfilled the inclusion criteria during their routine check up appointment at the hospital. They were verbally informed about the study and its aims. If they were willing to participate, they were given a written information sheet about the study, the questionnaire booklet, and a stamped addressed envelope. It was suggested that they could either complete the questionnaire immediately, or take it away, and once completed, post it back in the stamped addressed envelope. Time was taken to answer patients' questions and it was made clear that participation in the study was entirely voluntary, and would not affect the treatment they were receiving in any way.

Following a month of data collection, it became apparent that the number of patients passing through the clinic was too small to provide an adequate sample size (due to changes made in the hospitals clinic appointments procedure). As a result, all patients who were diagnosed with colorectal cancer and treated at the hospital, and who fitted the inclusion criteria were approached by letter, to ask if they would be willing to participate in the study. They were given the same questionnaire booklet and information sheet, and were asked to return their completed questionnaires, in the envelope provided. Participants were encouraged to contact the researcher or their Oncologist if they had any queries regarding the study.

Healthy control group. Potential participants were approached through social and leisure groups and gatherings, or via colleagues and friends. As with the cancer group, participants were informed of the study and asked if they would be willing to participate. They were then given the questionnaire booklet, information sheet and stamped addressed envelope, and asked to post back completed questionnaires. They were encouraged to contact the researcher if they had any questions regarding the study.

Ethical approval was obtained from both hospitals where the research took place, and from the regional ethics committee. Approval was also obtained for the modifications to the data collection procedure.

Statistical methods

Sample size calculation. The sample size calculation was based on the CECS. This was chosen because previous research used the CECS with cancer patients and healthy controls, and sufficient information was available on the means and standard deviations. This research found a 0.43 standard deviation difference in CECS between cancer and control patients (mean difference of 5 points, standard deviation of 12 points), and it is reasonable to power the study on that basis. To have 90% power to show an effect of this magnitude on any of the scales in this study would require 123 subjects per group.

Statistical methods. Statistical tests were chosen which were appropriate to the distribution of the data. Inspection of histograms indicated that with the exception of the SAD, all data were normally distributed.

To compare differences in demographic characteristics between those who did not and those who did take part, and between the cancer and control groups, the chi-squared or independent samples t-tests were used. To test the hypotheses regarding between-group differences on the dependent variables, univariate Analysis of Variance were conducted for the data that were normally distributed, with confounders adjusted for using Analysis of Covariance. For the SAD, because the data were not normally distributed (such a high percentage of respondents scored 0), the data were recoded into three established clinical categories, according to the author's instructions and the chi-squared test was used to test the hypothesis regarding between group differences on the SAD. A two-tailed significance level of 0.05 was used in all these analyses. To test the hypothesis regarding the relationship between the SAD and the EPS, CECS and TAS-20, Spearman's rank order correlations were used and a more conservative significance level of 0.01 was adopted due to the multiple comparisons made. The data were analysed using SPSS for Windows, version 10.

RESULTS

Comparisons were made within the colorectal cancer group, between those who took part in the study and those who declined, on a number of demographic and treatment characteristics. There were no significant differences between the two groups on age, gender, time since diagnosis, or treatment received (see Table 1). Participants within this study were, therefore, considered to be representative of the population they were drawn

from on these variables. Data were not available for participants within the control group who declined to take part.

Insert Table 1 about here

Comparisons were also made between the cancer group and healthy control group on a number of demographic variables. The groups did not differ with regard to gender. They did, however, differ with regard to age. The cancer group was significantly older than the healthy group. The groups also differed with respect to marital status and education. There were significantly more single and married people in the healthy group and significantly more widowed in the cancer group. Of the cancer group, 50% had no qualifications compared to 18% of the healthy group, and 54% of the healthy group were educated to degree level, compared to 29% of the cancer group (see Table 2).

Insert Table 2 about here

Because the two groups differed with regard to age, marital status and years of education, a univariate ANOVA was conducted on all the dependent variables, with age and education included as covariates. Marital status could not be included as a covariate,

given the categorical nature of the data. However, mean scores on the dependent variables were compared according to marital status, to examine any differences, which might account for any variance between groups.

These results (both unadjusted and adjusted for the covariates) will be presented below for each of the dependent variables.

Hypothesis 1:- Patients with colorectal cancer will show significant impairments in emotional processing abilities, as compared to healthy controls, as evidenced by statistically significantly higher mean scores on the EPS total scale and EPS subscales.

There was a significant main effect of diagnosis (cancer group vs. healthy control group) for the disengagement subscale of the EPS, with the cancer group disengaging from their emotions significantly more than the healthy group. This remained significant when age, gender and education were controlled for (see Table 3).

There was also a significant main effect of diagnosis on the uncontrolled expression of emotion subscale of the EPS, with the cancer group controlling their emotional expression significantly more than the healthy control group. This remained significant when age, gender and education were controlled for (see Table 3). For all other subscales, and the EPS overall emotional processing deficit score, there were no significant differences between the two groups either before or after adjustment for the three variables (see Table 3).

Insert Table 3 about here

Hypothesis 2. Patients with colorectal cancer will control their emotions significantly more than healthy controls, as evidenced by statistically significantly higher mean scores on the CECS total scale and CECS subscales.

The main effect of diagnosis for the CECS total subscale and the sadness subscale approached significance. This effect was reduced further when adjusted for the three variables. For the anxiety subscale and the anger subscale there were no significant main effects of diagnosis, either before or after adjustment for the variables (see Table 4).

Insert Table 4 about here

Hypothesis 3. Patients with colorectal cancer will show significantly more alexithymic traits than healthy controls, as evidenced by statistically significantly higher mean scores on the TAS-20 total scale and TAS-20 subscales.

There was a significant main effect of diagnosis for the TAS-20 total score, with the cancer group having a significantly higher alexithymia score. This effect remained with gender controlled for (F (1,188) = 3.63, p = 0.05). However, the effect no longer remained when age (F (1,188) = 1.93, p = 0.17) and education (F (1,186) = 1.70, p = 0.20) were controlled for. After adjusting for all these factors, the difference was no longer significant (see Table 5). This indicates that age and education can account for most of the variance between scores.

There was also a significant main effect of diagnosis for the externally oriented thinking subscale, with the cancer group again having a significantly higher mean score, indicative of more alexithymic traits (see Table 5). This effect remained when gender was controlled for (F (1,188) = 4.89, p = 0.03). However, the effect no longer remained when education (F (1,186) = 1.66, p = 0.20) or age (F (1,188) = 1.46, p = 0.02) were controlled for. After adjusting for all these factors, the difference was no longer significant (see Table 5). This indicates that education and age may be accounting for the variance seen in mean scores between the two groups.

For the description of emotion subscale and the identification of emotion subscale, there was no significant difference between the mean scores on the two groups, either before or after adjustment for the variables (see Table 5).

Insert Table 5 about here

Hypothesis 4a. There will be a significant association between anxiety and depression scores on the Symptoms of Anxiety and Depression Scale (SAD) and diagnosis.

There was a significant association between SAD scores and diagnosis for each of the subscales. There were significantly more cancer patients than healthy controls scoring in the disturbed range for the anxiety, depression and total subscales (see table 6).

Insert Table 6 about here

Hypothesis 4b. There will be a significant relationship between overall scores on the SAD and the emotion scale scores for the colorectal cancer group (EPS, CECS, TAS-20).

Spearman's rank order correlations were used to examine the relationships between the SAD and the EPS, TAS-20 and CECS. Because the focus of the study was on emotional processing deficits in patients with colorectal cancer, and its relationship to psychological symptomatology, these analyses were carried out for the cancer group only.

EPS. There were significant relationships between the SAD overall score and all the EPS subscales, with the exception of the awareness subscale, and the disengagement from emotion subscale (see table 7a).

Insert Table 7a about here

CECS. There was a significant relationship between the SAD overall score and the anxiety subscale of the CECS. There were no significant relationships between the SAD overall score and the total, anger or depression subscales of the CECS (see table 7b).

Insert Table 7b about here

TAS-20. There was a significant relationship between the SAD overall score and the TAS total subscale, and for the identification of emotion and description of emotion subscales, but not for the externally oriented thinking subscale (see table 7c).

Insert Table 7c about here

Supplementary analysis

Data was examined for significant differences between male and female cancer patients on any of the dependent variables using independent samples t-tests.

Emotional processing. There was a significant difference between males and females scores on the differentiation between emotion and awareness of emotion subscales of the EPS. Males had more difficulty differentiating between emotions, but females had less awareness of their emotions compared to males. There were no significant differences between males and females on the blunting of emotion, disengagement from emotion, suppression of emotion, avoidance of emotion, uncontrolled expression of emotion, or overall EPS subscale (see Table 8).

Emotional Control. The difference in the total level of emotional control between the male and female cancer patients was significant. Males controlled their emotions significantly more than females. The difference in the control of anxiety was significant, with males having a significantly higher tendency to control their feelings of anxiety, and the difference in the control of depression was also significant, again, with males having a significantly higher tendency to control their feelings of depression. The difference in the control of anger between males and females was not significant (see Table 9).

Insert Table 9 about here

Alexithymia. There was a significant difference between male and female scores on the externally orientated thinking subscale of the TAS-20, with males showing higher scores than females. There were no significant differences between male and female scores for the identification of emotion subscale, the describing emotions subscale, or the total subscale (see Table 10).

Insert Table 10 about here

Depression and Anxiety

There were no significant associations between SAD scores and gender for each of the SAD subscales (see table 11).

Insert Table 11 about here

DISCUSSION

The present study aimed to investigate emotional processing deficits, including emotional control and alexithymia, in men and women with non-metastatic colorectal cancer. The study also aimed to investigate the relationship between these emotional processing deficits and psychological disturbance (depression and anxiety) in the cancer group. It was predicted that the colorectal cancer group would show significantly greater emotional processing deficits (EPS), emotional control (CECS) and alexithymic traits (TAS-20) than the healthy control group. It was also predicted that there would be a significant relationship between scores on the EPS, TAS-20 and CECS and the measure of psychological symptomatology (SAD).

Significant differences were found between the two groups on the EPS subscales of disengagement from emotion and uncontrolled emotional expression. The differences were in the predicted direction, with the cancer group being significantly more disengaged from their emotions and significantly more controlled in their emotional expression, than the control group. After controlling for age, gender and education, both the disengagement and uncontrolled emotional expression subscales remained significant. Marital status was not included as a covariate, even through the groups differed on this, because it was categorical data. Marital status could be accounting for some of the variability, but examination of the mean scores, split by marital status suggested that they were not different from each other. Marital status was therefore unlikely to be accounting for any additional variance.

There was a trend towards the cancer group being more controlling over their emotions than the control group, as measured by the CECS, but the difference did not reach significance.

In relation to alexithymia, there were significant differences between the two groups on the total TAS-20 subscale and the externally oriented thinking subscale, with the cancer group showing significantly higher alexithymic traits. However, following adjustment for age, gender and education, the differences were no longer significant, indicating that these factors were accounting for the variance between the two groups. The mean scores, split by marital status were not significantly different, indicating that marital status is unlikely to be accounting for any additional variance. There were no significant differences between the two groups on the description of emotion, and identification of emotion subscales.

In relation to anxiety and depression, there were significant differences, in the predicted direction between the cancer and healthy groups. Scores on the SAD indicated that there were significantly higher numbers of people in the cancer group, scoring as depressed and anxious, than in the control group.

Within the cancer group, there were also significant relationships between the SAD overall score and all the EPS subscales, with the exception of the awareness subscale and the disengagement from emotion subscale. There were also significant relationships

between the SAD overall score and the anxiety subscale of the CECS, and all subscales of the TAS-20, with the exception of the externally oriented thinking subscale.

Finally, there were significant differences between the males and females within the cancer group on the differentiation and awareness subscales of the EPS, on the total, anxiety and sadness scales of the CECS, and on the externally orientated thinking scale of the TAS-20. There were no significant differences between males and females on scores of anxiety or depression.

These results only partially supported the findings of previous studies. Of all the subscales of the EPS, the only significant differences between the two groups scores were found on the disengagement from emotion subscale and the uncontrolled expression subscale. The mean differences between the two groups remained significant when other potential confounds were controlled for. These subscales relate to control over the experience and expression of emotion, which have been consistently found in previous studies of emotional control and cancer (Fernandez-Ballesteros et al., 1998; Grassi & Capellari, 1988; Greer & Morris, 1975, 1978; Servaes et al., 1999; Todarello et al., 1989; Watson, Pettingale & Greer, 1984).

In relation to emotional control, as measured by the CECS, the results are not consistent with previous research, as no significant differences were found between the two groups in this study. However, the mean differences in scores between the two groups approached significance and the means were similar to the study conducted by Pettingale,

Watson and Greer (1984). Their results were significant when comparing women with breast cancer to a healthy control group, but their sample sizes were much larger than in the present study. Again, a larger sample size would be needed to assess whether significant findings would emerge. Using the CECS, previous studies have found that anger is the emotion most often controlled (Greer & Morris, 1975, 1978; Pettingale et al., 1984). The current data does not support this finding, as anger was the emotion least controlled. It is not clear why this is the case. Given that this group of cancer patients were older than participants in previous studies, age may be a factor, although it is not clear why this may be. The mean scores were not significantly different between the males and females in this study, so it is unlikely that the difference in findings to previous studies is due to the current study also sampling men.

The literature in relation to alexithymia is currently inconclusive, with some researchers finding an association with cancer (Todarello et al., 1989), and others failing to find an association (Anagnostopoulous et al., 1993; Servaes et al., 1999). The findings of this study may help to shed light on these disparate findings. In the present study, significant differences were found between the two groups, with the cancer group showing significantly higher alexithymic traits on the TAS-20. However, when age and education were controlled for, the effects disappeared. In previous studies, significant findings have only been seen when factors such as age and education have not been controlled for. These results, therefore, suggest that the association between alexithymia and cancer may not in fact be due to having cancer, but that in this study, the variance was explained in terms of other confounds. This highlights the importance of controlling for these factors

in future studies. The lack of significant findings on the TAS-20 is consistent with the findings of a lack of significant differences between the two groups on those EPS subscales, which measure awareness, labelling and linking of emotions, which are similar to the description and identification of emotion subscales of the TAS-20. This suggests that cancer patients in this study do not have problems in the basic apparatus for experiencing emotions, but that the deficits are specific to the control of emotional experience and expression.

The significantly higher frequency of people within the cancer group scoring within the depressed and anxious range of the SAD indicates greater levels of depression and anxiety in the cancer group. This is consistent with previous research indicating higher levels of psychological disturbance for cancer patients, than healthy controls (Ford, Lewis & Fallowfield, 1995; Orsi, McCorkle, Tax & Barsevik, 1996). However, this research is related to depression and anxiety levels up to six months following diagnosis. As these participants were all over one year post diagnosis, it suggests that levels of anxiety and depression can be long lasting, and deserve attention.

The findings of an association between emotional processing deficits, as measured by the EPS and the TAS-20 and psychological disturbance, also supports the research, which suggests that blockages in emotion may be damaging to psychological health (Beutler et al., 1986; Grassi & Molinari, 1988). However, this association was not found on two subscales of the EPS (awareness of emotion, and disengagement from emotion), or the externally oriented thinking subscale of the TAS-20. It was also only found on the

anxiety subscale of the CECS and not the total, anger or sadness subscales. It is unclear from this study, and the wider literature why the association should be found on some measures and not others, and on some subscales and not others. It is possible that given the large numbers of comparisons made, some associations occurred by chance, and as such, caution is required in interpreting these findings. Additionally, given the nature of this study, no causal links can be made between particular emotional processing deficits and psychological symptomatology. As no measures of immune system functioning were taken, it is also not possible to state whether these deficits are related to physical health in addition to psychological health.

The gender-related differences in scores on the dependent variables are interesting. Research has indicated general greater emotional inhibition and less expression in males (Fischer & Good, 1997; McContha et al., 1997). Of the six subscales where there were significant differences between males and females, all but one were in the direction of men having more difficulties than women. Examining all the subscales, although a number were not significantly different between males and females, 74% were in the direction of men experiencing more difficulties than women. These data, therefore, are consistent with previous research and highlights the need to consider gender as an important factor when conducting research of this type.

In terms of clinical implications, this research supports a relationship between the tendency to control emotional expression and non-metastatic colorectal cancer. It also tentatively supports a relationship between some of these deficits and depression and

anxiety. Causal inferences cannot be made from the results of this study regarding emotional processing deficits as causes or results of cancer or of depression and anxiety. It would be worthwhile to devise a program for cancer patients, which helps them to process their emotions more effectively, particularly the expression of emotion. Controlled intervention studies could be conducted to assess the impact of improved emotional expression on physical and mental health. Two intervention studies have found that interventions which facilitated emotional expression, led to increased survival time for patients diagnosed with cancer (Fawzy et. al., 1990, 1993; Spiegel et al., 1989). However, these were not the only components of the intervention so it is not clear whether these factors were responsible for the health improvement. Further intervention studies are warranted, using designs, which allow the relative influence of these factors to be studied.

Using the EPS in this study has helped to highlight where the specific deficits in emotional processing lie. The scale is easy to administer and takes approximately fifteen minutes to complete. This is likely to be a useful clinical tool in assessing emotional processing deficits in patients with cancer (and other physical or mental health conditions), so that interventions can be targeted to patients with difficulties in emotional processing, and can be targeted to their own particular difficulties. None of the other scales are able to do this with any kind of specificity.

This study has a number of important limitations. Firstly, given that it was not a prospective study, no causal inferences can be made about the importance of emotional

processing deficits in the cause or progression of cancer, or of psychological disturbance. However, it does support the hypothesis that there is a relationship, which suggests that larger scale prospective studies are warranted. Future studies particularly warrant examining with greater specificity where the relationships between emotional processing deficits and anxiety and depression are. Although the sample size was greater than in many of the previous studies, to have 90% power to show an effect in this study would require 123 participants per group. This was exceeded within the colorectal cancer group, but only 73 participants responded in the control group. More significant findings may have emerged if a larger control group was sampled. In addition, the response rate was particularly low in the control group, opening up the possibility of selection bias. It may have been that the people that responded were more aware and expressive of their emotions than those who declined to respond, therefore biasing the results. It is not possible to know whether this was the case, given that information could not be collected from those people who declined to take part. Although the response rate in the cancer group was only 58%, comparisons between those who took part and those who declined indicated that the sample was representative of the population they were drawn from. Their mean age was also consistent with national data (Department of Health, 1997). National statistics were not available for any of the other demographic characteristics.

Although strenuous attempts were made to select a control group that was similar in age to the expected age of the cancer group, by sampling from areas frequented by older people, such as over 50's clubs, the cancer group was still older by a mean of eight years. Supplementary statistical analysis indicated that age was indeed a factor accounting for

the some of the variance. Education also accounted for some of the variance. Being more highly educated may impact on ability to understand, label and express emotions, although there is currently no data to support this, and analysis of mean scores separated by education, did not support this. The groups also differed with respect to marital status and this could not be included as a covariate in the analyses. Although it appeared that marital status was not accounting for additional variance, marital status could be controlled for in future studies by matching participants on this variable.

A large number of tests were used in this study, increasing the risk of type 1 errors. Caution therefore needs to be exercised when interpreting the findings.

The nature of the assessment also needs consideration. Given that all the measures were self-report, they may not measure emotional processing abilities, emotional control and alexithymia, but rather reported emotional abilities, or a person's subjective experience, which may be different. Further validity studies are required with all the measures, in which the measures are compared to a variety of other measures of emotional processing, including experimental, behavioural and physiological measures.

The CECS and TAS-20 were chosen because they were considered to be the 'gold standard' for measuring these constructs and having been widely used in the research on emotional processing deficits. The fact that they have been used in previous research, allows for comparison between studies. The EPS, although a new measure which is still undergoing validation, has been useful in pinpointing more specifically where emotional

processing difficulties lie, and has potentially important uses in clinical practice. Use of this assessment has added clarification to the previous research findings. The SAD however, may not have been the most appropriate assessment tool. Although a valid tool, both in research and clinical practice, the data from this study were highly skewed, with many participants scoring at the low end or bottom of the scale. It also contains somatic items, which are not suitable for use with participants with physical health problems. A more appropriate tool may have been the Hospital Anxiety and Depression scale (Zigmond & Snaith, 1983). It is widely used and respected in research as a valid and reliable assessment measure, and is found to perform well in assessing the symptom severity and caseness of anxiety and depression in both the general population, and those with physical health problems (Bjelland, Dahl, Haug & Neckelmann, 2002).

Finally, the SAD scores indicated that cancer patients seemed to have much stronger negative emotions than the control group and this might account for the self-reports of greater emotional control. These findings may be true of any group experiencing strong negative emotions, and may not be specifically related to cancer. This would merit further investigation.

Despite its limitations, this study provides further support for the hypotheses that patients with colorectal cancer, like women with breast cancer, tend to control the experience and expression of their emotions and that this is associated with increased psychological disturbance. It adds weight to the growing literature regarding the role of psychological

factors in cancer and highlights that the role of psychological factors is an interesting and important area for continued research.

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Table 1:- Demographic and treatment characteristics of those cancer patients who took part in the study, and those who declined

	Those who took part	Those who declined	X^2 or t (df)	p value
Number	124	90		
Age				
Mean (SD)	68.73 (10.56)	70.82 (13.24)	t (212) = -1.28	0.20
Gender	N %	N %		
Male	65 (52.42)	49 (54.44)		
Female	59 (48.58)	41 (46.56)	$X^2(1) = 0.32$	0.57
Time since diagnosis	N %	N %		
1 – 2 years	49 (39.52)	32 (35.56)		
2 – 3 years	25 (20.16)	17 (18.89)		
3 – 4 years	19 (15.32)	13 (14.44)		
4 – 5 years	31 (25.00)	28 (31.11)	X^2 (3) = 0.99	0.80
Treatments received	N %	N %		
Surgery and chemotherapy	57 (45.97)	37 (41.11)		
Surgery no chemotherapy	67 (54.03)	53 (58.89)	X^2 (1) = 0.32	0.60

Table 2:- Demographic characteristics of the cancer and healthy control groups

	Cancer group	Healthy control group	X^2 or t (df)	p value
Number	124	73		
Age				
Mean (SD)	68.73 (10.56)	60 .96 (10.69)	t (195) = -4.97	0.000*
Gender	N %	N %		
Male	65 (52.42)	34 (46.58)		
Female	59 (47.58)	39 (53.42)	X^2 (1) = 0.43	0.46
Marital Status	N (%)	N (%)		
Single	5 (4.03)	6 (8.22)		
Married	85 (68.55)	58 (79.45)		
Divorced	11 (8.87)	6 (8.22)		
Widowed	23 (18.55)	3 (4.11)	X^2 (3) = 9.48	0.002*
Education	N (%)	N (%)		
No qualifications	62 (50.00)	13 (17.81)		
'O' Levels	17 (13.71)	12 (16.44)		
'A' Levels	9 (7.26)	9 (12.33)		
Degree level	36 (29.03)	39 (53.42)	X^2 (3) = 21.21	0.000*

* significant at the 0.05 level of significance

Table 3:- Differences in mean scores on the EPS (95% CI) between the cancer group and healthy control group, before and after adjustment for gender, age and education.

EPS subscale	Cancer Group M (SD)	Control Group M (SD)	Unadjusted mean difference (CI)	F test (df=1,186)	p value	Adjusted mean difference (CI)	F test (df=1,181)	p value
EPS overall	35.84 (19.28)	38.27 (14.99)	2.43 (-2.85 to 7.71)	0.82	0.37	3.75 (-2.07 to 9.58)	1.62	0.21
Differentiation	14.60 (8.07)	13.47 (6.99)	-1.12 (-3.31 to 1.06)	1.03	0.31	0.02 (-2.38 to 2.34)	0.00	0.99
Awareness	15.94 (4.88)	15.75 (4.72)	-0.19 (-1.63 to 1.24)	0.07	0.79	-0.44 (-1.99 to 1.12)	0.31	0.58
Blunting	12.71 (8.53)	12.21 (6.84)	-0.50 (-2.86 to 1.86)	0.17	0.68	0.02 (-2.55 to 2.61)	0.00	0.98
Disengagement	14.72 (5.51)	13.04 (4.69)	-1.68 (-3.22 to –0.13)	4.56	0.03*	-1.70 (–3.42 to 0.01)	3.83	0.05*
Suppression	22.97 (10.09)	21.03 (8.39)	-1.95 (-4.77 to 0.87)	1.86	0.17	-0.65 (-3.71 to 2.41)	0.18	0.68
Avoidance	20.28 (9.13)	18.41 (7.60)	-1.90 (-4.42 to 0.68)	2.10	0.15	-0.49 (-3.23 to 2.26)	0.12	0.73
Uncontrolled Expression	16.62 (9.46)	20.52 (7.39)	3.90 (1.30 to 6.50)	8.79	0.003*	4.09 (1.22 to 6.96)	7.92	0.005*

* significant at the 0.05 level of significance

Table 4:- Differences in mean scores on the CECS (95% CI) between the cancer group and healthy control group, before and after adjustment for gender, age and education.

CECS subscale	Cancer Group M (SD)	Control Group M (SD)	Unadjusted mean difference (CI)	F test (df)	p value	Adjusted mean difference (CI)	F test (df)	p value
Total Score	51.71 (11.01)	48.90 (10.38)	-2.81 (-6.08 to 0.45)	2.89 (1,177)	0.91	-1.51 (-5.12 to 2.10)	0.68 (1,172)	0.41
Anger	16.53 (4.03)	15.69 (5.02)	-0.84 (-2.18 to 0.50)	1.54 (1,178)	0.22	-0.18 (-1.67 to 1.31)	0.06 (1,173)	0.81
Anxiety	17.50 (4.39)	16.62 (3.98)	-0.88 (-2.16 to 0.41)	1.82 (1,177)	0.18	-0.66 (-2.05 to 0.75)	0.84 (1,172)	0.36
Sadness	17.68 (4.41)	16.67 (3.94)	-1.02 (-2.30 to 0.27)	2.44 (1,177)	0.12	-0.60 (-2.02 to 0.82)	0.70 (1,169)	0.40

* significant at the 0.05 level of significance

Table 5:- Differences in mean scores on the TAS-20 (95% CI) between the cancer group and healthy control group, before and after adjustment for gender, age and education.

TAS-20 subscale	Cancer Group M (SD)	Control Group M (SD)	Unadjusted mean difference (CI)	F test (df)	p value	Adjusted mean difference (CI)	F test (df)	p value
TAS total	49.90 (12.91)	46.28 (10.63)	-3.61 (-7.18 to 0.04)	4.00 (1,189)	0.04*	-1.69 (- 5.53to 2.15)	0.75 (1,184)	0.39
Identification of feelings	2.26 (0.98)	2.03 (0.64)	-0.23 (-0.49 to 0.02)	3.17 (1,190)	0.08	-0.20 (-0.48 to 0.08)	1.84 (1,185)	0.18
Description of feelings	2.53 (0.91)	2.43 (0.81)	0.10 (-0.35 to 0.16)	0.54 (1,191)	0.46	-0.07 (-0.29 to 0.27)	0.00 (1,186)	0.96
Externally oriented thinking	2.70 (0.60)	2.50 (0.63)	-0.21 (-0.38 to 0.03)	5.34 (1,189)	0.02*	-0.04 (-0.22 to 0.14)	0.21 (1,184)	0.65

* significant at the 0.05 level of significance

Table 6:- Chi-squared test for the cancer group and healthy control group in terms of SAD overall scores and anxiety and depression subscale scores. SAD scores separated by degree of disturbance.

SAD subscale	Cancer Group N (%)	Healthy Control Group N (%)	X^2	p value
Anxiety				
Non anxious	67 (53.60)	52 (71.23)		
Anxious	58 (46.40)	21 (28.77)	X^2 (1) = 5.26	0.02*
Depression				
Non depressed	96 (76.80)	68 (93.15)		
Depressed	29 (23.20)	5 (6.85)	X^2 (1) = 7.55	0.006*
Total				
Non disturbed	75 (60.00)	59 (80.82)		
Disturbed	50 (40.00)	14 (19.18)	X^2 (1) = 8.21	0.004*

* significant at the 0.05 level of significance

Table 7a:- Spearman's rank order correlations between overall SAD score EPS overall and subscale scores

	EPS overall	Differentiation	Awareness	Blunting	Disengagement	Suppression	Avoidance	Uncontrolled Expression
Spearman's rho	0.56	0.33	0.07	0.44	0.14	0.29	0.33	0.32
p value	0.00*	0.00*	0.34	0.00*	0.06	0.00*	0.00*	0.00*

* Correlation is significant at the 0.01 level

Table 7b:- Spearman's rank order correlations between overall SAD score CECS total and subscale scores

	Total Score	Anger	Anxiety	Sadness
Spearman's rho	0.10	0.04	0.17	0.05
p value	0.18	0.62	0.03	0.51

* Correlation is significant at the 0.01 level

Table 7c:- Spearman's rank order correlations between overall SAD score TAS-20 total and subscale scores

	Total Score	Identification of feelings	Description of feelings	Externally oriented thinking
Spearman's rho	0.34	0.42	0.36	-0.05
p value	0.00*	0.00*	0.00*	0.53

* Correlation is significant at the 0.01 level

Table 8:- Mean scores, standard deviations and significance values for male and female cancer patients on the EPS

EPS subscale	Males Mean (SD)	Females Mean (SD)	t (df)	P value
EPS overall	34.44 (17.89)	37.41 (20.90)	t (115) = -0.81	0.40
Differentiation	16.35 (8.17)	12.64 (7.6)	t (115) = 2.54	0.01*
Awareness	14.65 (4.94)	17.40 (4.40)	t (115) = -3.17	0.002*
Blunting	13.78 (8.84)	11.50 (8.08)	t (115) = 1.44	0.15
Disengagement	14.68 (5.70)	14.77 (5.35)	t (115) = -0.08	0.93
Suppression	24.40 (9.96)	21.36 (10.09)	t (115) = 1.64	0.10
Avoidance	19.89 (8.95)	20.71 (9.40)	t (115) = -0.49	0.63
Uncontrolled Expression	16.84 (9.91)	16.39 (9.00)	t (115) = 0.26	0.80

* significant at the 0.05 level of significance

Table 9:- Mean scores, standard deviations and significance values for male and female cancer patients on the CECS

CECS subscale	Males Mean (SD)	Females Mean (SD)	t (df)	p value
Total	53.68 (11.03)	49.58 (10.69)	t (108) = 1.98	0.05
Anger	16.44 (4.00)	16.62 (4.10)	t (108) = -.23	0.81
Anxiety	18.65 (4.10)	16.26 (4.39)	t (108) = 2.95	0.004*
Sadness	18.60 (4.71)	16.70 (3.86)	t (108) = 2.30	0.02*

* significant at the 0.05 level of significance

Table 10:- Mean scores, standard deviations and significance values for male and female cancer patients on the TAS-20

TAS-20 subscale	Males Mean (SD)	Females Mean (SD)	t (df)	p value
TAS total	51.72 (13.44)	47.89 (12.11)	t (117) = 1.63	0.11
Identification of feelings	2.32 (0.99)	2.19 (0.98)	t (118) = 0.76	0.45
Description of feelings	2.61 (0.91)	2.44 (0.90)	t (119) = 1.06	0.29
Externally oriented thinking	2.82 (0.56)	2.56 (0.57)	t (117) = 2.45	0.02*

* significant at the 0.05 level of significance

Table 11:- Chi-squared test for males and females within the cancer group in terms of SAD overall scores and anxiety and depression subscale scores. SAD scores separated by degree of disturbance.

SAD subscale	Males N (%)	Females N (%)	X^2	p value
Anxiety				
Non anxious	39 (60.00)	28 (47.50)		
Anxious	26 (40.00)	31 (52.50)	X^2 (1) = 1.49	0.22
Depression				
Non depressed	51 (78.50)	45 (76.30)		
Depressed	14 (21.50)	14 (23.70)	X^2 (1) = 0.06	0.94
Total				
Non disturbed	44 (67.70)	31 (52.50)		
Disturbed	21 (32.30)	28 (47.50)	X^2 (1) = 2.37	0.12

* significant at the 0.05 level of significance

LIST OF APPENDICES

APPENDIX 1

The Emotional Processing Scale

SECTION 2

This first section tries to understand something about your emotions and feelings. In order to fill it in you will need to fix the last week firmly in your mind.

Could you first of all spend a few minutes thinking back over what you have been doing in the last week. Starting from one week ago today, try to think about where you were, what you were doing, who you met and anything you may remember about the day. If you have a diary or filofax, check for any appointments or reminders of each day.

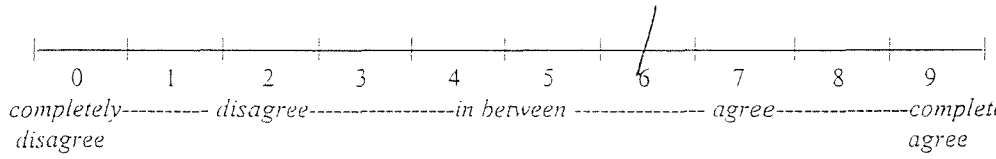
With the last week in mind what would you say was the *strongest* negative or unpleasant emotion that you felt?

With the last week in mind what would you say was the *strongest* positive or pleasant emotion that you felt?

Listed below is a series of statements describing how you may have felt or behaved last week. Each statement is followed by a scale ranging from 'completely disagree' (0) to 'completely agree' (9). After reading each statement indicate how much you either agree or disagree by marking a line on the scale.

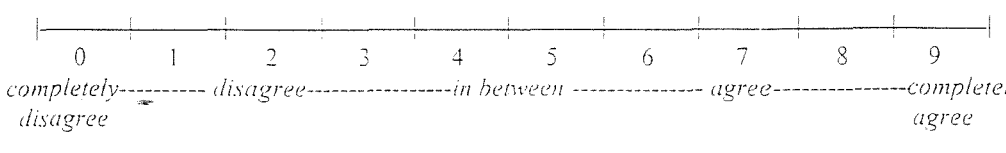
EXAMPLE

I kept my feelings to myself.

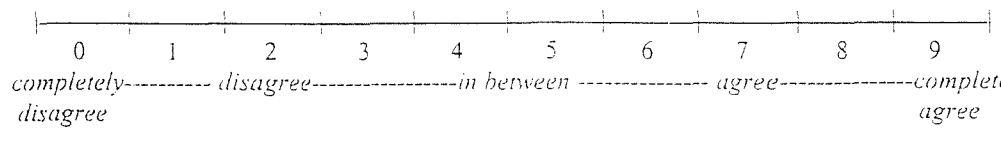


This would indicate that you mildly agree with the statement 'I kept my feelings to myself'. If the statement had been a perfect description of you in the last week you would have rated it as 'completely agree'.

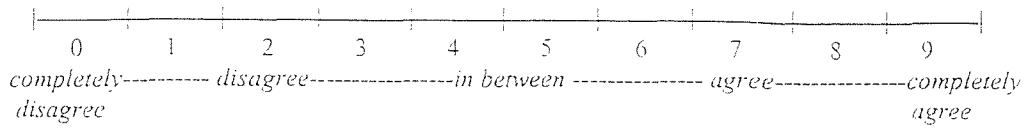
1 **A good night's sleep seemed to deal with upset feelings. (e)**



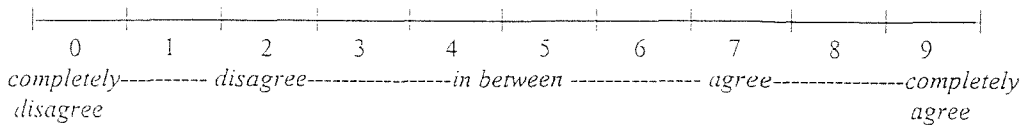
2 **I was very aware of bodily sensations. (w)**



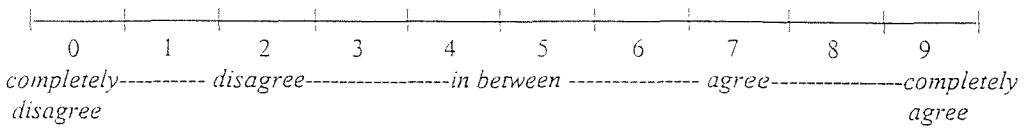
3 My emotions felt blunt or dull. (b)



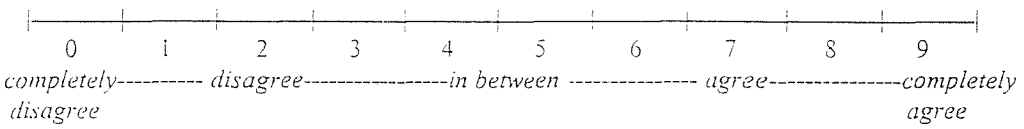
4 I switched off my feelings. (s)



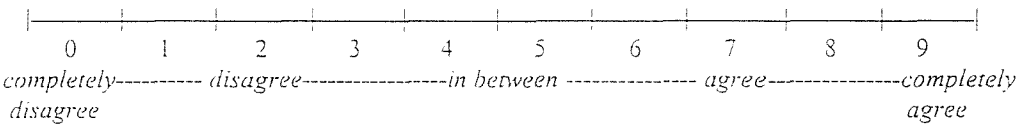
5 I tried to work out why I felt like I did. (u)



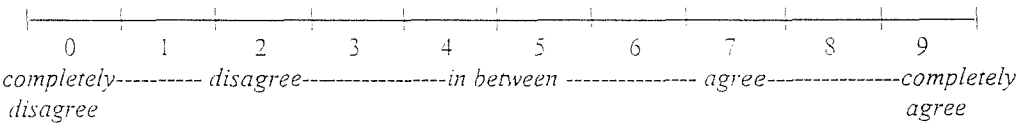
6 Unwanted feelings kept intruding. (e)



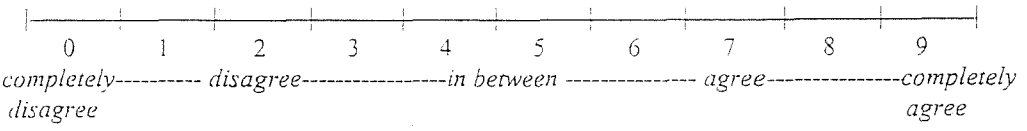
7 Sometimes I got strong feelings but I'm not sure if they were emotions. (l)



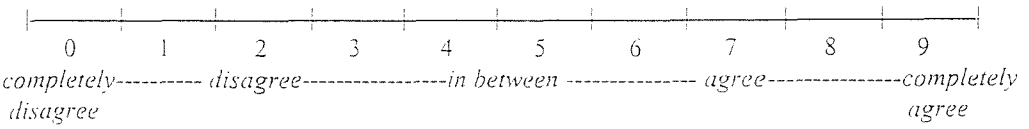
8 I was so busy getting on with life I rarely thought about my feelings. (d)



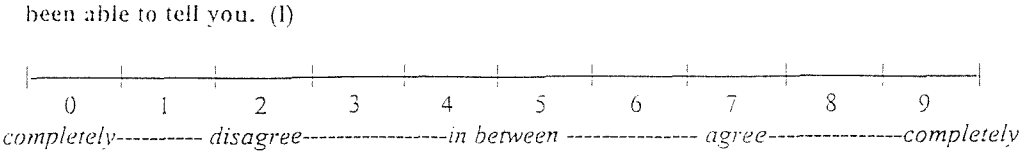
9 I avoided watching unpleasant scenes on TV or reading about unpleasant things. (a)



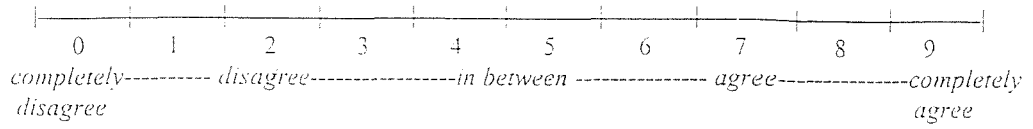
10 My emotional reactions lasted for more than a day. (e)



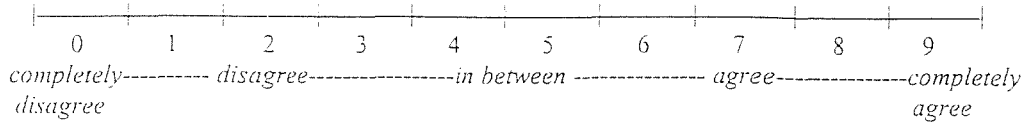
11 If you had said to me in the week 'what emotions are you feeling right now' I would have been able to tell you. (l)



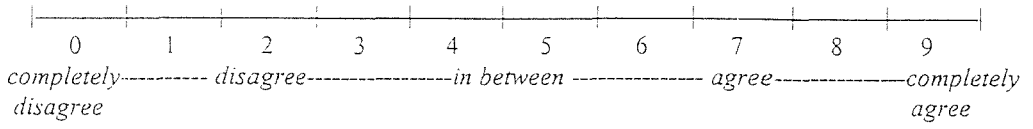
12 I detached myself from emotional feelings. (s)



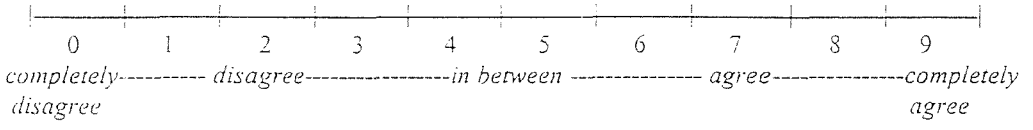
13 When upset or angry it was difficult to control what I said. (u)



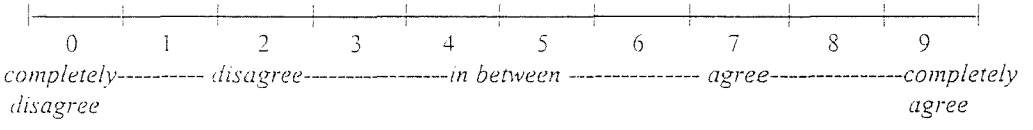
14 My feelings were pretty confused. (e)



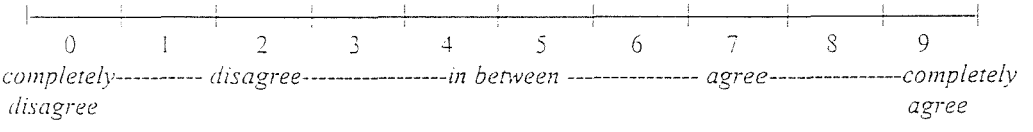
15 I was quite responsive to the emotional atmosphere at home, work, or with friends. (w)



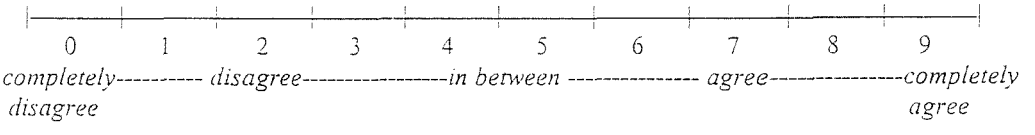
16 My feelings did not seem to belong to me. (b)



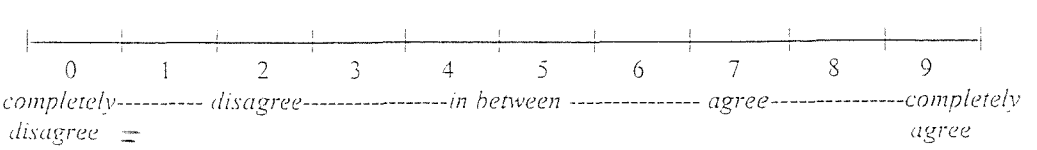
17 Talking about negative feelings seemed to make them worse. (a)



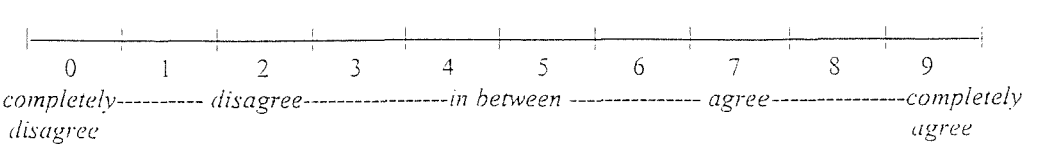
18 I wished I could have removed my emotions. (e)



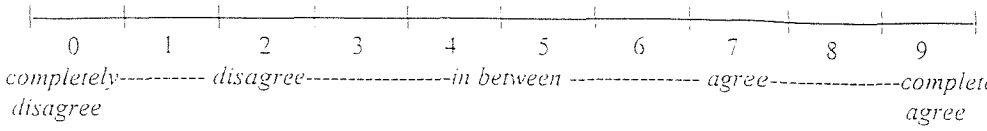
19 My emotions were the result of biological changes in my body rather than things that happened to me. (d)



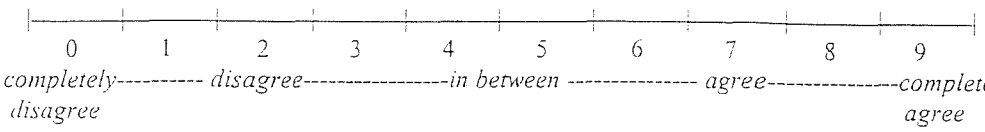
20 When I was upset or angry I smothered my feelings. (s)



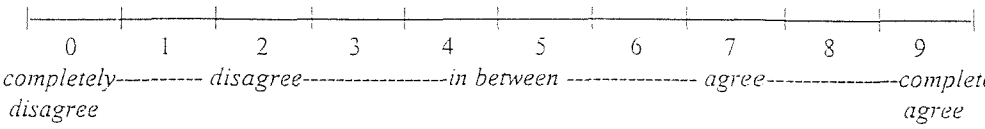
21 I reacted too much to what people said or did. (u)



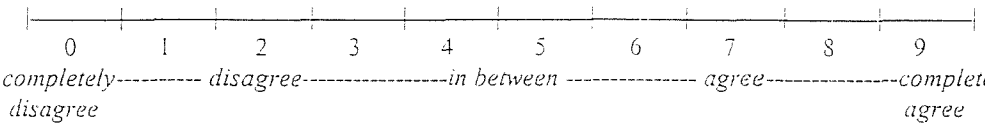
22 I was afraid of strong feelings. (e)



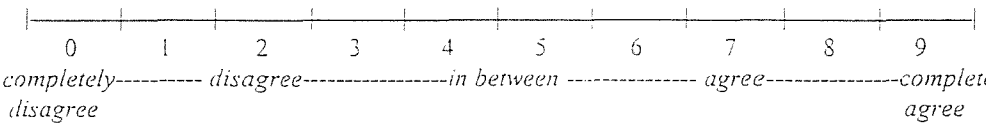
23 It was hard to work out if I felt ill or emotional. (l)



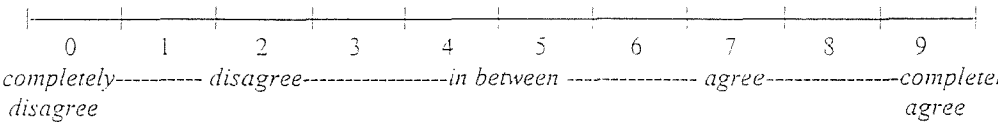
24 There seemed to be a big blank in my feelings. (b)



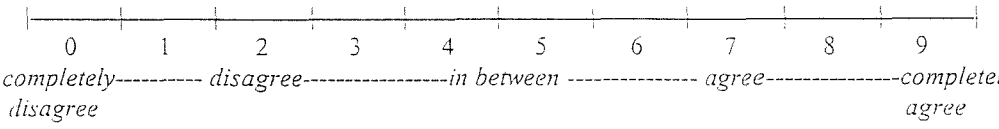
25 I tried to talk only about pleasant things. (a)



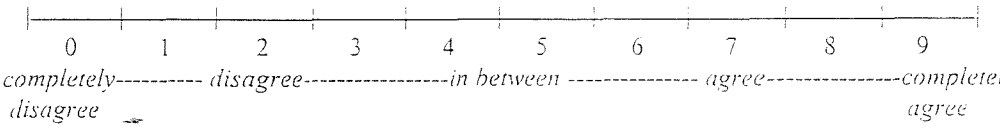
26 I could not tolerate unpleasant feelings. (e)



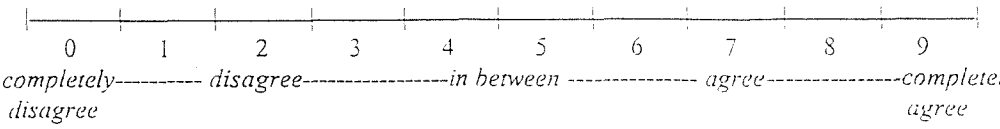
27 I have been able to link my feelings to things that have happened to me in the past week. (l)



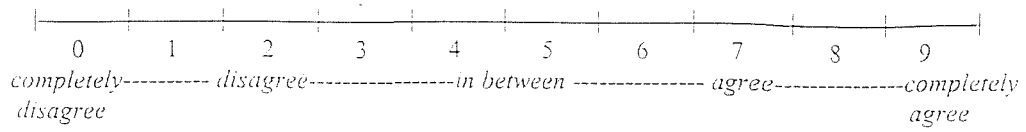
28 When upset or angry I tried to distract myself. (d)



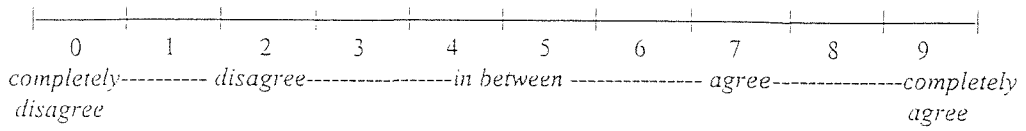
29 I wanted to get my own back on someone. (u)



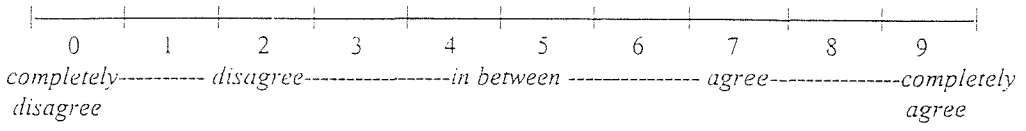
30 Emotions got in the way of my plans. (e)



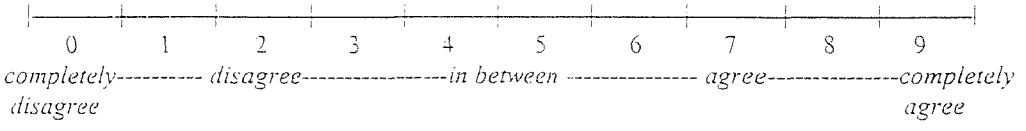
31 I experienced emotions without feeling much bodily sensation. (w)



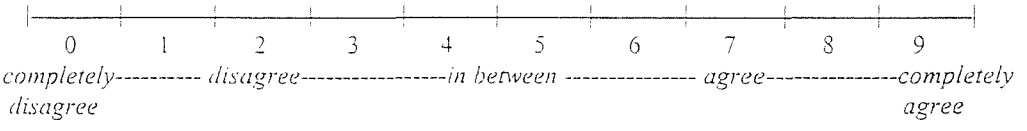
32 I allowed myself to fully feel any emotions that came along. (s)



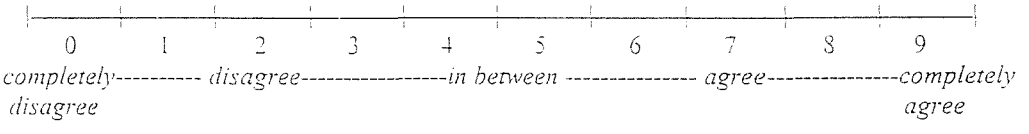
33 My emotions were affected by things I saw on TV or read in newspapers. (a)



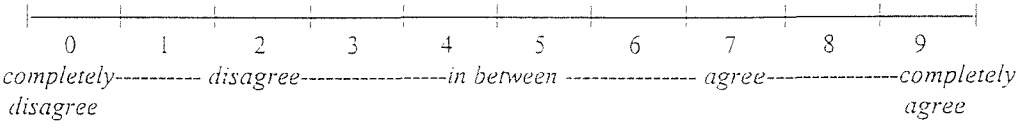
34 By taking notice of my feelings it helped me to make better choices and decisions. (e)



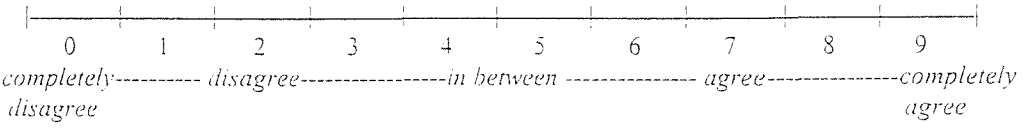
35 I did not experience emotions when I should have. (b)



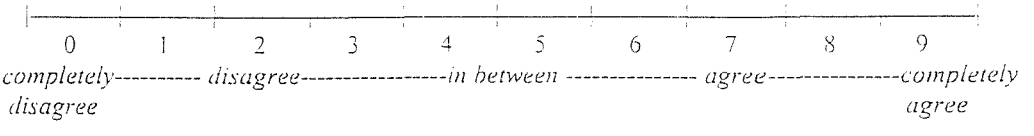
36 I could not express my feelings. (s)



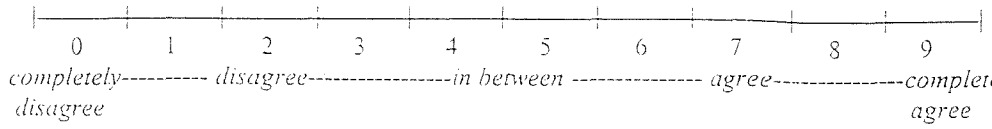
37 I felt the urge to smash something. (u)



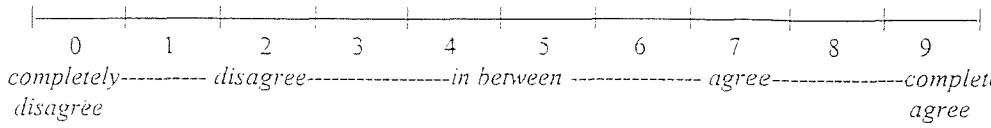
38 It was hard for me to wind down. (e)



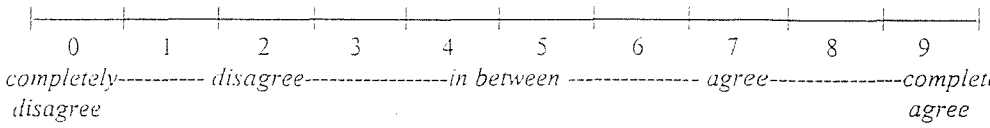
39 Last week I felt anxious or down without knowing why. (l)



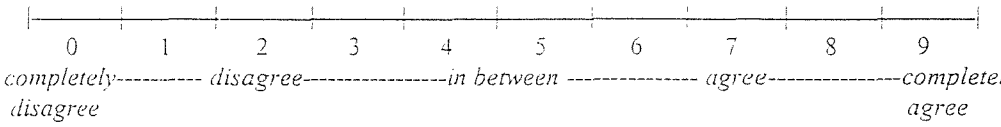
40 The food I ate was responsible for the emotions I felt. (d)



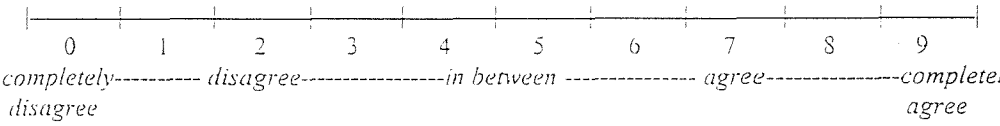
41 I kept quiet about my feelings. (a)



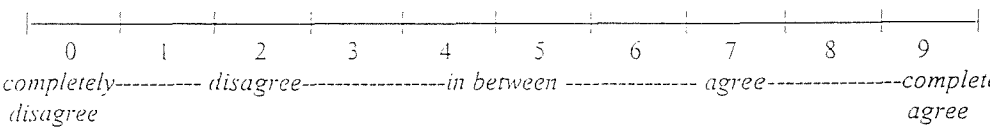
42 I tended to repeatedly experience the same emotion. (e)



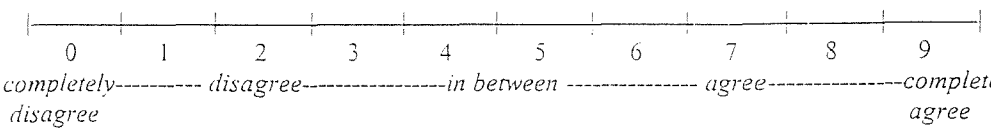
43 I tried to make certain feelings happen. (b)



44 I bottled up my emotions. (s)



45 When emotional or upset I was able to express my point of view constructively. (u)



APPENDIX 2

The Courtauld Emotional Control Scale

SECTION 5

Below are listed some of the reactions people have to certain feelings or emotions. Read through each one and indicate how far it describes the way you generally react. Indicate your answer by circling the appropriate number on the scale. Work quickly and circle only one number for each item.

	Almost Never	Sometimes	Often	Almost Always
When I feel angry (very annoyed)				
1 I keep quiet	1	2	3	4
2 I refuse to argue or say anything	1	2	3	4
3 I bottle it up	1	2	3	4
4 I say what I feel	1	2	3	4
5 I avoid making a scene	1	2	3	4
6 I smother my feelings	1	2	3	4
7 I hide my annoyance	1	2	3	4
When I feel afraid (worried)				
8 I let others see how I feel	1	2	3	4
9 I keep quiet	1	2	3	4
10 I refuse to say anything about it	1	2	3	4
11 I tell others about it	1	2	3	4
12 I say what I feel	1	2	3	4
13 I bottle it up	1	2	3	4
14 I smother my feelings	1	2	3	4
When I feel unhappy (miserable)				
15 I refuse to say anything about it	1	2	3	4
16 I hide my unhappiness	1	2	3	4
17 I put on a bold face	1	2	3	4
18 I keep quiet	1	2	3	4
19 I let others see how I feel	1	2	3	4
20 I smother my feelings	1	2	3	4
21 I bottle it up	1	2	3	4

APPENDIX 3

The Toronto Alexithymia Scale – 20

SECTION 3

Indicate how much you agree or disagree with each of the following statements by ticking one of the boxes.

	Strongly Disagree	Moderately Disagree	Neither Disagree nor Agree	Moderately Agree	Strongly Agree
I am often confused about what emotion I am feeling	☐	☐	☐	☐	☐
It is difficult for me to find the right words for my feelings	☐	☐	☐	☐	☐
I have physical sensations that even doctors don't understand	☐	☐	☐	☐	☐
I am able to describe my feelings easily	☐	☐	☐	☐	☐
I prefer to analyse problems rather than just describe them	☐	☐	☐	☐	☐
When I am upset, I don't know if I am sad, frightened or angry	☐	☐	☐	☐	☐
I am often puzzled by sensations in my body	☐	☐	☐	☐	☐
I prefer just to let things happen rather than to understand why they turned out that way	☐	☐	☐	☐	☐
I have feelings that I can't quite identify	☐	☐	☐	☐	☐
Being in touch with emotions is essential	☐	☐	☐	☐	☐
I find it hard to describe how I feel about people	☐	☐	☐	☐	☐
People tell me to describe my feelings more	☐	☐	☐	☐	☐
I don't know what's going on inside me	☐	☐	☐	☐	☐
I often don't know why I am angry	☐	☐	☐	☐	☐
I prefer talking to people about their daily activities rather than their feelings	☐	☐	☐	☐	☐
I prefer to watch 'light' entertainment shows rather than psychological dramas	☐	☐	☐	☐	☐
It is difficult for me to reveal my innermost feelings, even to close friends	☐	☐	☐	☐	☐
I can feel close to someone even in moments of silence	☐	☐	☐	☐	☐
I find examination of my feelings useful in solving personal problems	☐	☐	☐	☐	☐
Looking for hidden meanings in films or plays distracts from their enjoyment	☐	☐	☐	☐	☐

APPENDIX 4

Symptoms Of Anxiety And Depression Scale
(Delusions-Symptoms-States-Inventory)

SECTION 4

Here are some descriptions of how you may have felt, thought, or acted recently. After reading each statement you have to put a circle round either 'False' or 'True', depending upon which is the correct answer for you. On the occasions where you have marked 'True', you then have to indicate how much this *upset* you. Do this by putting a circle round the *one* phrase or word which best explains this.

If you have marked 'False' with a circle you would just go on to the next statement.

EXAMPLES

A. Recently my concentration has been poor

False (True) If true, this has upset me:

(A bit) A lot Unbearably

This first example would mean that recently your concentration has been poor, which upset you a bit.

B. Recently people have been getting on my nerves

(False) True If true, this has upset me:

Unbearably A lot A bit

The second example would mean that recently people have NOT been getting on your nerves.

NOW PLEASE BEGIN

1 Recently I have worried about every little thing.

False True If true, this has upset me:

A bit A lot Unbearably

2 Recently I have been so miserable that I have had difficulty with my sleep.

False True If true, this has upset me:

Unbearably A lot A bit

3 Recently I have been breathless *or* had a pounding of my heart.

False True If true, this has upset me:

A bit A lot Unbearably

4 Recently I have been depressed without knowing why.

False True If true, how depressed?

Fairly Very Extremely

5 Recently I have been so 'worked up' that I couldn't sit still.

False True If true, this has upset me:

Unbearably A lot A bit

6 Recently I have gone to bed not caring if I never woke up.

False True If true, how serious was this?

Desperately Very Fairly

7 Recently, for no good reason, I have had feelings of panic.

False True If true, this has upset me:

A bit A lot Unbearably

8 Recently I have been so low in spirits that I have sat for ages doing absolutely nothing.

False True If true, this has upset me:

Unbearably A lot A bit

9 Recently I have had a pain *or* tense feeling in my neck or head.

False True If true, this has upset me:

A bit A lot Unbearably

10 Recently the future has seemed hopeless.

False True If true, how hopeless?

Completely Very A bit

11 Recently worrying has kept me awake at night.

False True If true, this has upset me:

A bit A lot Unbearably

12 Recently I have lost interest in just about *everything*.

False True If true, how much loss?

Complete A lot A bit

13 Recently I have been so anxious that I couldn't make up my mind about the simplest thing.

False True If true, how anxious

Fairly Very Extremely

14 Recently I have been so depressed that I have thought of doing away with myself.

False True If true, how seriously?

Completely Very Not very

APPENDIX 5

Information Sheet For Cancer Group

The Royal Bournemouth and Christchurch Hospitals
NHS Trust

CONFIDENTIAL

The Royal Bournemouth Hospital
Castle Lane East
Bournemouth
BH7 7DW

01202 303626
www.rbh.org.uk

Dear

We would like to take this opportunity to invite you to take part in a research project exploring peoples' reactions to having colorectal cancer, led by Dr Tamas Hickish. The aim of the study is to try to understand more about how colorectal cancer affects our patients, and how they cope with it emotionally. We hope that the information we collect will help us to improve the assessment and treatment of patients in the future.

Here is some information to help you decide whether you would like to participate. Taking part in this project is entirely voluntary and involves **no** extra appointments or financial cost. It simply requires you to complete the questionnaire booklet, which accompanies this letter. Filling in the booklet will take you approximately 20-30 minutes.

All answers will be treated in the strictest of confidence. Personal information will not be released to or viewed by anyone other than the researchers involved in this project. If you decide not to participate you do not need to explain why and this will not affect your future medical treatment in any way.

If you decide to take part in the project, please complete the questionnaire and then post it back in the envelope provided. Completion and return of the questionnaire will be taken as evidence of you giving consent to be included as a participant in this project, and for your data to be used in this research.

Thank you very much for taking the time to read this letter. We are constantly reviewing the care we give to our patients and are committed to improving the services we provide. If you have any queries or would like further information about the research please do not hesitate to contact Sharon Lothian, the project coordinator, on 02380 595321, or Dr Tamas Hickish on 01202 665511 (extn 8265).

Yours sincerely

Dr Tamas Hickish
Consultant in Oncology

Poole Hospital NHS
NHS Trust

Longfleet Road
Poole
Dorset
BH15 2JB

Tel: 01202 665511
www.poolehos.org

CONFIDENTIAL

Dear

We would like to take this opportunity to invite you to take part in a research project exploring peoples' reactions to having colorectal cancer, led by Dr Tamas Hickish. The aim of the study is to try to understand more about how colorectal cancer affects our patients, and how they cope with it emotionally. We hope that the information we collect will help us to improve the assessment and treatment of patients in the future.

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Yours sincerely

Dr Tamas Hickish
Consultant in Oncology

APPENDIX 6

Information Sheet For Control Group

Emotional Factors and Health Project

The aim of this research is to help us understand how people cope with emotional events so that we can improve our treatment of physical and mental health conditions. To help us in our research we need a comparison group of people who are not experiencing these problems. This research programme is being run the by the Research and Development Support Unit (RDSU) at Poole Hospital NHS Trust in collaboration with the Royal Bournemouth and Christchurch Hospitals NHS Trust and Southampton University.

Here is some information to help you decide whether or not you would like to take part in this project. Taking part in this study simply involves completing this questionnaire booklet. It is entirely voluntary. Filling in the booklet is likely to take you approximately 20 minutes.

All answers will be treated confidentially. If you decide to take part please fill in this questionnaire booklet and then place it in the pre-paid envelope provided and post it back to us. If you decide not to participate you do not need to explain why.

Thank you very much for taking the time to read this. We hope that the information we collect may be helpful in guiding the assessment and treatment of patients in the future. If you have any queries or would like further information about any aspects of the research please do not hesitate to contact me, Sharon Lothian, on 02380 595321.

Please return to:
Sharon Lothian
Clinical Psychology
Shackleton Building 44
FREEPOST SO286
University of Southampton
Southampton SO17 1YN

Research Team:
Professor Roger Baker
Professor Peter Thomas
Dr Paul Thompson
Dr Tamas Hickish
Mrs Sandra Horne
Dr Sarah Thomas
Ms Jane Holloway
Ms Sharon Lothian

ALL INFORMATION WILL BE TREATED CONFIDENTIALLY

APPENDIX 7

Demographic And Illness Sheet For Cancer Group

SECTION 1

GENERAL INFORMATION

1. Age (in years) .....

2 Sex: male ☐ female ☐

3 Today's Date .....

4 Marital status

☐ Single ☐ Married

☐ Divorced ☐ Widowed

YOUR EDUCATION

Which of these qualifications do you have?
Tick all the qualifications that apply or, if not specified, the nearest equivalent.

☐ No Qualifications

☐ 1+ O levels/CSEs/GCSEs (any grades)

☐ 5+ O levels, 5+ CSEs (grade 1), 5+ GCSEs (grades A-C), School Certificate

☐ 1+ A levels/AS levels

☐ 2+ A levels, 4+ AS levels, Higher School Certificate

☐ First Degree (e.g. BA, BSc)

☐ Higher Degree (eg MA, PhD, PGCE, post-graduate certificates/diplomas)

☐ Other Qualifications (eg City & Guilds, RSA/OCR, BTEC/Edexcel)

YOUR HEALTH

When were you first diagnosed with colorectal cancer?

☐ Less than one year ago

☐ One to two years ago

☐ Two to three years ago

☐ Over three years ago

Have you suffered from any of the following? *Please tick the appropriate box*

Prior to cancer diagnosis	Since cancer diagnosis	Never	
☐	☐	☐	Asthma, hayfever or bronchitis
☐	☐	☐	Eye diseases or problems
☐	☐	☐	A heart problem
☐	☐	☐	Mental health problems (severe enough that you visited a hospital specialist)
☐	☐	☐	Diabetes
☐	☐	☐	Back pain (severe enough that you visited a hospital specialist)
☐	☐	☐	Migraine or headaches
☐	☐	☐	Psychological problems treated by a counsellor or psychologist (not related to cancer counselling)
☐	☐	☐	Ear/nose throat problems

please turn over

APPENDIX 8

Demographic And Illness Sheet For Control Group

SECTION 1

GENERAL INFORMATION

1. Today's date.....

2. Age (in years).....

3. Sex: male ☐ female ☐

4. Marital Status

☐ Single ☐ Married

☐ Divorced ☐ Widowed

YOUR EDUCATION

Which of these qualifications do you have?
Tick all the qualifications that apply or, if not specified, the nearest equivalent.

☐ No Qualifications

☐ 1+ O levels/CSEs/GCSEs (any grades)

☐ 5+ O levels, 5+ CSEs (grade 1), 5+ GCSEs (grades A-C), School Certificate

☐ 1+ A levels/AS levels

☐ 2+ A levels, 4+ AS levels, Higher School Certificate

☐ First Degree (e.g. BA, BSc)

☐ Higher Degree (eg MA, PhD, PGCE, post-graduate certificates/diplomas)

☐ Other Qualifications (eg City & Guilds, RSA/OCR, BTEC/Edexcel)

YOUR HEALTH

Have you suffered from any of the following during the **last five years**?
Please tick the appropriate box on the left.

YES	NO	
☐	☐	Asthma, hayfever or bronchitis
☐	☐	Eye diseases or problems
☐	☐	A heart problem
☐	☐	Mental health problems (severe enough that you visited a hospital specialist)
☐	☐	Diabetes
☐	☐	Back Pain (severe enough that you visited a hospital specialist)
☐	☐	Migraine or headaches
☐	☐	Cancer
☐	☐	Psychological problems treated by a counsellor or psychologist
☐	☐	Ear/nose throat problems
☐	☐	Fainting attacks or giddiness

APPENDIX 9

Ethical Approval And Approval For Amendments Letters

Poole Hospital NHS
NHS Trust

Longfleet Road
Poole
Dorset
BH15 2JB

Tel: 01202 665511
www.poolehos.org

EAST DORSET LOCAL RESEARCH ETHICS COMMITTEE

20 July 2001

Dr T Hickish,
Consultant in Medical Oncologist,
RBGH

Dear Dr Hickish

The role of emotional processing deficits in colorectal cancer
LREC NO 55/01/E [must be quoted in all correspondence]

The East Dorset Local Research Ethics Committee met on 19 July 2001 and discussed the above submission.

Ethical approval was withheld.

The Committee requested clarification on the following :

1. It was unclear as to where the study is taking place. Is it Bournemouth or Poole? It seems to indicate Bournemouth but it has been signed by the Poole Medical Director.
2. There was some concern from Committee members about the ambition of this. For example, what are the hypothetical questions, are they being asked and how. There is no evidence in the proposal.
3. There are issues of possible coercion in the sample recruitment as one of the recruiting areas is employees from a local factory who will be recruited via the Managing Director. How is this being done?
4. The age range contained discriminatory factors. Can you please clarify why the cut off is 75?
5. Section 34, in relation to Caldicott Guardians has not been answered. Can you please do so.
6. The Patient Information Sheet and Consent Form should be on headed paper;
7. In respect of the questionnaire, the Committee felt that the burden of the huge number of questions. Is there any way this could be simplified. Also Section 2, page 7, some examples of how to answer it are not ringed. Please modify.
8. The exclusion criteria for those at the end of their disease, the Committee did feel in terms of vulnerability that probably these would be very few and you might not be approaching them. However, we do need to be satisfied that this is the case.

Present at the meeting :

S Wheeler	M Leggett	R Day	J Begley	B J Waltho
G Roberts	S Elliot	T Hamblin	D Tory	T Hollingberry
C Maunder				

In Attendance : R Hanson

Yours sincerely

STEPHANIE WHEELER
CHAIRMAN, EAST DORSET LOCAL RESEARCH ETHICS COMMITTEE

Poole Hospital NHS
NHS Trust

Longfleet Road
Poole
Dorset
BH15 2JB

Tel: 01202 665511
www.poolehos.org

EAST DORSET LOCAL RESEARCH ETHICS COMMITTEE

Our Ref : SW/RCH/LREC 55/01/E

1 October 2001

Dr T Hickish
Consultant Medical Oncologist
RBGH

Dear Dr Hickish

LREC NO. 55/01/E [must be quoted in all correspondence]
The role of emotional processing deficits in colorectal cancer

The East Dorset Local Research Ethics Committee met on 27 September 2001 to further discuss the above submission.

The Committee tabled a response received from Sharon Lothian on your behalf.. They felt that this was quite a comprehensive response.

Ethical approval was therefore granted.

Present at the meeting :

S Wheeler, Chairman	R Day, Vice Chairman	T Hollingberry
M Burrows	B J Waitho	T Hamblin
S Elliot	F Randall	M Leggett
J Begley	G Roberts	D Tory
G P Clein		

In Attendance : R Hanson

Conditions of approval are set out in the attached sheet.
Protocol amendments should be precised onto one page and accompany any original documentation.
Serious adverse events should be written on the attached form and accompany any original documentation.

Yours sincerely

RACHAEL HANSON
ADMINISTRATOR, EAST DORSET LOCAL RESEARCH ETHICS COMMITTEE

The Royal Bournemouth and Christchurch Hospitals
NHS Trust

☎ 01202 704452 (Direct Line)
01202 704077 (Fax)
email: simon.dursley@rbch-tr.swest.nhs.uk
POST POINT B28

The Royal Bournemouth Hospital
Castle Lane East
Bournemouth
BH7 7DW

01202 303626
www.rbh.org.uk

SCD/PLH/rm/research2001/HICKISH37.01

19th October 2001

Dr Tamas Hickish
Consultant Oncologist
Post Point E01
Royal Bournemouth Hospital

Dear Tamas,

RESEARCH PROJECT : RE 37/01(RBH)
(Please quote the RE number on all future correspondence relating to this project)

COLORECTAL CANCER AND EMOTIONS

The Trust's Research Committee has approved the above project, subject to the following conditions:-

(i) approval of the project on ethical grounds by the East Dorset LREC; and

(ii) you must submit a report to me, at the conclusion of the project, setting out the results achieved from it. This report will be for the information of our own Committee and also the LREC.

Yours sincerely

Dictated by Mr Dursley but signed in his absence

SIMON DURSLEY
TRUST SECRETARY

c.c. Stephanie Wheeler, Chairman, East Dorset LREC, Poole Hospital NHS Trust
John Stevens, General Manager, Pathology Directorate
Sharon Lothian, Trainee Clinical Psychologist

Poole Hospital NHS
NHS Trust

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EAST DORSET LOCAL RESEARCH ETHICS COMMITTEE

Our Ref SW/RCH/LREC 55/01/E

25 November 2001

Dr T Hickish
Consultant Medical Oncologist
RBGH

Dear Dr Hickish

The Role of Emotional Processing deficits in Colorectal Cancer
LREC NO 55/01/E [must be quoted in all correspondence]

The East Dorset Local Research Ethics Committee met on 22 November 2001.

The Committee granted approval for the recruiting of participants from Poole Hospital in addition to the Royal Bournemouth Hospital.

Present at the meeting :

S Wheeler, Chairman	R Day, Vice Chairman	B J Waltho
T Hollingberry	G P Clein	D Tory
M Leggett	J Begley	M Burrows
S Elliot		

In attendance : R Hanson, Administrator

Yours sincerely

RACHAEL HANSON,
ADMINISTRATOR, EAST DORSET LOCAL RESEARCH ETHICS COMMITTEE

Poole Hospital NHS
NHS Trust

MB/lrs/LW/AppLtrPR
08 February 2002

Mrs S Lothian
Flat 1
3 Alton Road
Poole
Dorset BH14 8SJ

Dear Sharon

Re: The Role of Emotional Processing Deficits in Colorectal Cancer

The above named research project has been reviewed by the Research & Development Committee and I am pleased to advise you, that its approval has been granted. You may commence with the project once East Dorset Local Research Ethics Committee has given its approval.

Conditions under which this approval is granted are as follows:

The R&D Department are notified of:

- Any protocol amendments
- Serious adverse events

The progress of this research project will be monitored 6 monthly by the R&D Department and may be selected for audit in accordance with the Research Governance Framework.

Please sign the attached form and return it to me, thus indicating your permission, for this piece of research, to be included in Poole Hospital NHS Trust's next submission to the National Research Register.

Many thanks.

Yours sincerely

Mary Burrows

Mary Burrows
Acting R&D Manager

POOLE HOSPITAL
NHS TRUST

Our Ref : SW/RCH/LREC 64/01/B/55/01/E

28 February 2002

Professor Roger Baker,
Consultant Clinical Psychologist / Co-ordinator Dorset RDSU
Poole Hospital NHS Trust
Longfleet Road
Poole, Dorset

Dear Professor Baker

LREC NO 64/01/B – J Holloway : ***Mental Health and Emotional Processing – Study 1***
LREC NO 55/01/E – Dr T Hickish : ***The role of Emotional Processing Deficits in Colorectal cancer – Study 2***

The East Dorset Local Research Ethics Committee met on 27 February 2002.

They discussed your letter in detail. They agreed with your first solution in that you may eliminate the separate consent form and add a paragraph in the information sheet that consent to participate entails the act of choosing to complete the questionnaire and return it in the pre-paid envelope provided.

However, the Committee noted that in the letter from Dr Hickish in the paragraph it states "do not worry if you do not finish completing the questionnaire booklet before your appointment because you can take it home with you to finish". The Committee feel that this is coercive and would prefer the wording changed to state that "we encourage you to take this booklet home and if you wish to complete, to please return it in the SAE provided. The filling in of this questionnaire implies consent". However, the Committee noted that in para 4 Dr Hickish refers to "informed consent". Please note that participants in this case are giving consent only not informed consent. Please amend.

It should also be made perfectly clear that the signing of consent is for the questionnaire only.

DECISION : APPROVED SUBJECT TO THE ABOVE AMENDMENTS

These amendments must be received within 28 days.

Present :

S Wheeler R Day B J Waltho M Burrows
J Begley A Drury D Tory S Elliot
In attendance : R Hanson

Yours sincerely

Rachael Hanson
Administrator, East Dorset Local Research Ethics Committee

The Royal Bournemouth and Christchurch Hospitals
NHS Trust

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Email: margaret.wheatcroft@rbch-tr.swest.nhs.uk

MAW/TAT

8th April 2002

TO WHOM IT MAY CONCERN

This is to confirm that I have discussed Sharon Lothian's research proposals for "Emotional Processing and Colorectal Cancer" with her and have given permission for her to access the relevant information from the database.

MARGARET WHEATCROFT
CALDICOTT GUARDIAN – BOURNEMOUTH & CHRISTCHURCH HOSPITALS NHS TRUST

APPENDIX 10

Instructions To Authors: British Journal Of Health Psychology

NOTES FOR CONTRIBUTORS

1. The aim of the *British Journal of Health Psychology* is to provide a forum for high quality research relating to health and illness. The scope of the Journal includes all areas of health psychology across the life span, ranging from experimental and clinical research on aetiology and the management of acute and chronic illness, responses to ill-health, screening and medical procedures, to research on health behaviour and psychological aspects of prevention. Research carried out at the individual, group and community levels is welcome, and submissions concerning clinical applications and interventions are particularly encouraged.

The following types of paper are invited:

(a) Papers reporting original empirical investigations
(b) Theoretical papers which may be analyses or commentaries on established theories in health psychology, or presentations of theoretical innovations
(c) Review papers, which should aim to provide systematic overviews, evaluations and interpretations of research in a given field of health psychology
(d) Methodological papers dealing with methodological issues of particular relevance to health psychology.

2. The Journal is international in its authors and readers. Contributors should bear the international readership in mind, particularly when referring to specific health services.

3. Pressure on Journal space is considerable and brevity is requested. Papers should normally be no more than 5000 words.

4. Supplementary data too extensive for publication may also be deposited with the British Library Document Supply Centre. Such material should be submitted to the Editors together with the article for simultaneous refereeing. Further details of the scheme are given in the *Bulletin of the British Psychological Society*, 1977, 30, February, p. 58.

5. This Journal operates a policy of blind peer review. Papers will normally be scrutinized and commented on by at least two independent expert referees as well as by an editor or associate editor. The referees will not be made aware of the identity of the author. All information about authorship including personal acknowledgements and institutional affiliations should be confined to a removable front page (and the text should be free of such clues as identifiable self-citations ('In our earlier work...').) The paper's title should be repeated on the first page of text.

6. The editors will reject papers which evidence discriminatory, unethical or unprofessional practices.

7. Submission of a paper implies that it has neither been published elsewhere nor is under consideration by another journal.

8. In preparing material for submission authors should follow these guidelines:

(*a*) Contributions must be typed in double spacing with wide margins and on only one side of each sheet. Sheets must be numbered. Four good copies of the manuscript should be submitted and a copy should be retained by the author.

(*b*) Tables should be typed in double spacing, each on a separate sheet of paper. Each should have a self-explanatory title and be comprehensible without reference to the text.

(*c*) Figures are usually produced direct from authors' originals and should be presented as good black and white images preferably on high contrast glossy paper, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns or lines and shading should be avoided. Captions should be listed on a separate sheet.

(*d*) The Editors propose to adopt structured abstracts and all articles should be preceded by a structured abstract of between 100 and 250 words (less in the case of a short paper), giving a concise statement of the intention and results or conclusions of the article. Authors requiring further details on structured abstracts should contact the Journals Department (details on inside front cover).

(*e*) Bibliographic references in the text should quote the author's name and the date of publication thus: Hunt (1995). Multiple citations should be given alphabetically rather than chronologically: (Blackburn, 1996; Fortheringhame, 1994; Norman, 1995). If a work has two authors, cite both names in the text throughout: Choi and Salmon (1995). In the case of reference to five authors, use all the names on the first mention and *et al.* thereafter except in the reference list. For six or more, use *et al.* throughout.

(*f*) References cited in the text must appear in the list at the end of the article. The list should be typed double spaced in the following format:

Hunter, M. (1994). *Counselling in obstetrics and gynaecology.* Leicester: The British Psychological Society.

Pruitt, S.D., & Elliott, C.H. (1989). Paediatric procedures. In M. Johnstone & L. Wallace (Eds.), *Stress and medical procedures* (pp. 157–174). Oxford: Oxford University Press.

Ray, C., Phillips, L., & Weir, W.R.C. (1993). Quality of attention in chronic fatigue syndrome: Subjective reports of everyday attention and cognitive difficulty, and performance on tasks of focused attention. *British Journal of Clinical Psychology, 32*, 357–364.

Note that journal titles are cited without abbreviation.

(*h*) Measurements should be in units of the International System.

(*i*) If the title of the article is longer than 80 characters, a short title should be provided for use as a running head.

(*j*) Footnotes are expensive to set and should be avoided.

(9) Proofs are sent to the corresponding author for correction of print but not for rewriting or the introduction of new material. Fifty complimentary copies of each paper are supplied to the corresponding author, but further copies may be ordered on a form supplied with the proofs.

(10) Authors should consult the Journal editor concerning prior publication in any form or in any language of all or part of their article.

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