

SOME CHARACTERISTICS OF WORRYING: EVIDENCE FOR WORRYING AND ANXIETY AS SEPARATE CONSTRUCTS

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Summary—This series of three studies investigated some of the characteristics of worrying which are independent of related constructs such as trait anxiety. The results from all three studies suggested that worry and anxiety can be considered as separate constructs, each with their own unique sources of variance. Worrying was associated with adaptive problem-focussed coping strategies and an information-seeking cognitive style. Trait anxiety was independently associated with psychological processes that are normally considered to result in poor psychological outcomes, including (i) poor problem-solving confidence, (ii) poor perceived personal control, (iii) responsibility for negative but not positive outcomes, (iv) the tendency to define events as threats and (v) avoidance or emotion-focussed coping strategies. The results also suggested ways in which pathological worrying might be generated, especially where adaptive worrying is thwarted or where processes characteristic of adaptive worrying interact with psychological phenomena associated with high levels of anxiety.

INTRODUCTION

Worrying is a particularly common psychological phenomenon which is experienced by most people at some times in their life; it is also a characteristic acknowledged to be a cardinal feature of anxiety-based problems such as generalized anxiety disorder (DSM-III-R) (Barlow, Blanchard, Vermilyea, Vermilyea & DiNardo, 1986; Barlow, 1988). However, although the process of worrying is a well-acknowledged feature of both normal daily life and psychological disorder, it has been relatively neglected in clinical research, and its relationship to anxiety and coping strategies has received only preliminary investigation (e.g. Borkovec, 1985; Borkovec, Robinson, Pruzinsky & Dupree, 1983; York, Borkovec, Vasey & Stern, 1987; Eysenck & Mathews, 1987; Mathews, 1990; Meyer, Miller, Metzger & Borkovec, 1990).

These initial studies of worrying have indicated that it is a process that is associated with both anxiety and negative cognitions. First, measures of worrying have been found to correlate highly with measures of both trait anxiety (Borkovec *et al.*, 1983; Eysenck & Mathews, 1987; Meyer *et al.*, 1990) and state anxiety (Meyer *et al.*, 1990). Secondly, worrying is associated with elevated frequencies of negative and intrusive thoughts. This relationship between worrying and negative cognitions can be found when the subject is focussing on a single monotonous task (Borkovec *et al.*, 1983; York *et al.*, 1987), during a problem solving task, or even during a relaxed wakeful period with no attentional requirements (Pruzinsky & Borkovec, 1990).

This relative dearth of information on the characteristics of worry and worriers has meant that clinicians have only at best been able to speculate on both the pathological and functional nature of worrying (e.g. Mathews, 1990; Borkovec, Shadick & Hopkins, 1990). In an early attempt to discuss the function of worrying, Borkovec (1985) described worrying as an attempted problem-solving process in which the "worry sequence seems to be initiated by a fear stimulus (environmental and/or imaginal) which elicits mental problem-solving activity designed to prevent the occurrence of traumatic future events and/or to devise coping strategies for such events". Mathews (1990) also suggests that the worry process resembles problem solving in that it is an attempt to search for ways of avoiding aversive or threatening events. However, he proposes that those mental processes that we label as worrying are the unsuccessful attempts at problem solving; worry thus results in the constant rehearsal of the threatening outcome, and

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in some cases generates imaginary threat scenarios which actively hinder successful problem solving.

Nevertheless, worrying and problem solving do appear to be closely related, and if worrying does represent an attempt at finding a solution to a stressful situation it appears to be a particularly inefficient process. Evidence for the inefficiency of worrying as a problem-solving process comes from two sources. Borkovec *et al.* (1983) reported that worriers appeared to be very poor at generating successful solutions or effective coping responses but very good at defining problems, while Davey (1990) found that worrying in exam-anxious subjects was associated with defining more problems about the exam and generating fewer helpful exam strategies. Borkovec (1985) has suggested that if worrying is an attempt at problem solving it may be restricted either to defining problems, or to cognitive avoidance of anticipated negative events.

These details suggest that at present there appear to be no acceptable functional or dynamic models of the worrying process which identify its contribution to psychopathological states. The intention of the present study is to begin to fill this void by attempting to define some of the psychological characteristics which are specific to the worrying process and are independent of other psychopathological processes such as anxiety. For instance, some writers (e.g. O'Neill, 1985) have attempted to argue that there is functionally no difference between worrying and anxiety, and that worrying is merely a cognitive manifestation of anxiety. Other writers have argued that worry is a causal by-product of anxiety because worry results from the attentional predisposition to threatening cues which is a pervasive feature of anxiety (e.g. Mathews, 1990). A primary aim of this paper is to test these hypotheses by examining the independent relationship between anxiety and worrying and a variety of psychological processes associated with stress and emotional disorder. Study 1 examines the relationship of worrying and trait anxiety to (i) self-perceived problem-solving efficacy and (ii) various types of coping strategies. Study 2 attempts to replicate the second part of Study 1 and, in addition, to investigate the relationship of worrying and trait anxiety to the tendency to define events as problematic. Study 3 attempts to replicate findings from the first part of Study 1 and also looks at the relationship of worrying and trait anxiety to some particular cognitive styles of stress management (i.e. monitoring vs blunting).

STUDY 1

As outlined in the Introduction, worrying has frequently been characterized as an attempted problem-solving process in which anxious individuals are attempting to ameliorate the effects of the stressor causing the anxiety (cf. Borkovec *et al.*, 1983; Borkovec, 1985). Nevertheless, if this is the case, the problem-solving process appears to be particularly ineffective at reducing stress because worrying is always highly correlated with measures of anxiety (Borkovec *et al.*, 1983; Meyer *et al.*, 1990). However, worrying may still be an *attempt* at problem-solving—but one that fails because of deficiencies in the problem-solving process itself. There are at least two possible sources of such deficiencies which we intend to investigate in this first study. The first is poor problem-solving confidence, and the second is the adoption of coping strategies which fail to deal effectively with the source of stress. First, worriers may simply be individuals who attempt to solve stressful problems but have poor confidence in their own problem-solving capabilities. Secondly, worriers may adopt coping strategies which attempt merely to manage or reduce the stress while failing to deal directly with the stressor itself. In the coping literature, strategies which attempt to deal only with the effects of the stressor are known as emotion-focussed strategies, while attempting to alleviate stress by dealing directly with the stressor is known as problem-focussed coping (Folkman & Lazarus, 1985; Lazarus & Folkman, 1984; Billings & Moos, 1981, 1984; Carver, Scheier & Wientraub, 1989; Endler & Parker, 1990). It may be that worriers are characterized by coping styles which reflect emotion-focussed rather than problem-focussed coping.

Method

Subjects

The Ss were 105 undergraduate students from City University and Goldsmith's College, London. Their ages ranged from 18 to 38 yr with a mean age of 22 yr. There were 57 females and 48 males. All Ss were volunteers who were not paid for their participation.

Assessment

All *Ss* were given a questionnaire that consisted of five sections: (i) the Personal Problem-Solving Inventory (Heppner & Petersen, 1982), (ii) the Health & Daily Living Form (Moos, Cronkite, Billings & Finney, 1986), (iii) a measure of locus of responsibility for positive and negative outcomes (Brewin & Shapiro, 1984), (iv) a measure of worrying (the Student Worry Scale) and (v) a measure of trait anxiety (Spielberger, 1983).

The Personal Problem-Solving Inventory (Heppner & Petersen, 1982). This inventory includes 32 items which are rated on a 4-point scale, and are constructed as face-valid measures of each of three problem-solving constructs: problem-solving confidence (the individual's confidence in engaging in a wide range of problem-solving activities), approach-avoidance style (whether an individual approaches or avoids different problem-solving activities), and personal control (the individual's perception of their degree of control over the problem). Low scores on this inventory indicate behaviours and attitudes normally associated with successful problem solving.

Attribution of responsibility for positive and negative outcomes (Brewin & Shapiro, 1984). This is a 12-item forced-choice format test that measures an individual's own perceived responsibility separately for positive and negative outcomes. High scores on both scales indicate greater degrees of perceived responsibility for either positive or negative outcomes.

The Health & Daily Living Form (Moos et al., 1986). This scale measures strategies for coping with stress. Respondents indicate the most stressful event that has happened to them in recent years and then rate their frequency of use (on a 4-point scale) of 33 different coping responses to deal with it. Responses on this scale can be classified in two major ways. One classification is according to Methods of Coping which includes Active Cognitive Coping (the individual's attempts to appraise and redefine the stressful situation), Active Behavioural Coping (overt behavioural attempts to deal directly with the problem), and Avoidance Coping (attempts to avoid confronting the stressor). The second classification of coping is in terms of the individual Focus of Coping. Coping responses can be classified as Appraisal-focussed (logical analysis—efforts to understand the stressor and assess the consequences of possible coping strategies), Problem-focussed (Information Seeking—trying to find out more about the situation, Problem Solving—taking specific actions to deal directly with a situation) and Emotion-focussed (Affective Regulation—controlling stress-related emotions by suppressing feelings, etc.; Emotional Discharge—indirect efforts to reduce tension by eating, drinking, smoking more or giving vent to expression of unpleasant emotions).

The Student Worry Scale. A sample of 52 students at City University were asked to write down on a blank sheet of paper a list of all the things they worried about. An initial content analysis by the authors revealed that the majority of these worries could be classified into ten main content areas, and these content areas were the ones used for the subsequent Student Worry Scale. These content areas were Financial Concerns, Academic Demands, Accommodation, Health Worries, Job Prospects, World Affairs, Personal Relationships, Religious Matters, Environmental Matters and What People Think of Me. Subjects in the present experiment were asked to indicate on a four-point scale (almost never, sometimes, often, almost always) the extent to which they worry about each item, and an overall measure of worrying was obtained by summing the scores of these items. In addition, to make a preliminary estimation of the validity of this measure, two other simple self-report measures of worrying were taken: (i) *Ss* were asked to estimate, as a percentage, the amount of time that they spent worrying during a typical week and (ii) how frequently they woke up at night worrying (more than once a week, about once a week, less than once a week, less than once a month, almost never).

Trait anxiety. Individual levels of trait anxiety were measured using Spielberger's STAI Y-2 self-evaluation questionnaire (Spielberger, 1983).

Results and Discussion

First, a test of the internal consistency of the Student Worry Scale produced a Cronbach's $\alpha = 0.68$, and there was evidence for the validity of the Worry Scale score which correlated with both percentage of time that *Ss* estimated they spent worrying ($r = 0.4785$, $P < 0.001$), and with frequency with which they reported waking up at night and worrying ($r = 0.5428$, $P < 0.001$).

Table 1. Correlations between Worry Scale Score, Trait Anxiety Score and various indices of locus of control and coping style and strategy (Study 1). (Note that high scores on the Heppner & Petersen Personal Problem-Solving Inventory denote poor perceived problem-solving efficacy)

	Worry Scale Score	Trait Anxiety
<i>Self-perceived problem-solving efficacy (Heppner & Petersen, 1982)</i>		
Problem-Solving Confidence	0.3022***	0.4862***
Approach-Avoidance Style	0.0335	0.1658
Personal Control	0.3951***	0.5525***
<i>Brewin and Shapiro Locus of Control</i>		
Responsibility for Positive Outcomes	0.0756	-0.0958
Responsibility for Negative Outcomes	0.2275**	0.3945***
<i>Health & Daily Living Form (Method of Coping)</i>		
Active Cognitive Coping	0.0498	-0.1434
Active Behavioural Coping	0.1483	-0.1600
Avoidance Coping	0.4423***	0.3773***
<i>Health & Daily Living Form (Focus of Coping)</i>		
Logical Analysis	0.0030	-0.1847*
Information Seeking	0.1830*	-0.0447
Problem Solving	-0.1295	-0.2409**
Affective Regulation	0.1303	-0.0580
Emotional Discharge	0.4329***	0.2898**

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Table 2. Partial correlations of trait anxiety (TA) or worry while holding the other constant (Study 1)

	Partial r with worry holding TA constant	Partial r with TA holding worry constant
Problem-Solving Confidence	0.038	0.401**
Approach-Avoidance Style	-0.073	0.178
Personal Control	0.120	0.434**
Responsibility for Positive Outcomes	0.157	-0.168
Responsibility for Negative Outcomes	0.006	0.331**
Active Cognitive Coping	0.160	-0.208*
Active Behavioural Coping	0.293**	-0.298**
Avoidance Coping	0.299**	0.172
Logical Analysis	0.132	-0.226*
Information Seeking	0.227*	-0.167
Problem Solving	0.008	-0.205*
Affective Regulation	0.198*	-0.161
Emotional Discharge	0.329**	0.067

* $P < 0.05$; ** $P < 0.01$.

Scores on the Student Worry Scale were also found to correlate highly with measures of trait anxiety ($r = 0.5650$, $P < 0.001$).

Table 1 shows the correlation coefficients between measures of worry and trait anxiety and the major sub-scales of the three other sections of the questionnaire. First, on the Personal Problem-Solving Inventory, both worrying and trait anxiety were highly correlated with both poor problem-solving confidence, and poor personal control (i.e. the individual's belief that they have only poor personal control over problems). Second, on the Brewin and Shapiro Locus of Control measure, both worrying and trait anxiety were found to be correlated with responsibility for negative outcomes but not with responsibility for positive outcomes. That is, individuals who report high levels of worrying and trait anxiety are likely to perceive themselves as being responsible only for the negative things that happen to them. Third, on the Health & Daily Living Form Methods of Coping sub-scales, both worrying and trait anxiety were highly correlated with Avoidance-Coping strategies, and unrelated to both Active Cognitive Coping and Active Behavioural Coping strategies. When the Focus of Coping sub-scales are examined, both worrying and trait anxiety are highly correlated with Emotional Discharge, while only worrying was directly associated with Information Seeking, and only trait anxiety was inversely associated with Logical Analysis and Problem-Solving strategies.

In order to assess the extent to which worry and trait anxiety each reflected unique individual variance, partial correlations were calculated for each variable with self-perceived problem-solving efficacy, locus of control and methods and focus of coping while holding the other variable constant (Table 2).

With trait anxiety held constant worry was unrelated to any aspect of self-perceived problem-solving efficacy (problem-solving confidence, approach-avoidance style, personal control) or locus of control (responsibility for negative and positive outcomes), whereas with worry held constant trait anxiety was significantly correlated with poor problem-solving confidence ($r = 0.401$), poor perceived personal control ($r = 0.434$) and responsibility for negative outcomes ($r = 0.331$).

Worry and trait anxiety also exhibited unique sources of variance when partial correlations were carried out with measures of coping. In the case of methods of coping, with trait anxiety held constant worry was significantly positively correlated with Active Behavioural Coping ($r = 0.293$) and Avoidance Coping ($r = 0.299$), whereas with worry held constant trait anxiety was negatively correlated with Active Cognitive Coping ($r = 0.208$) and Active Behavioural Coping ($r = -0.298$). In the case of focus of coping, with trait anxiety held constant worry was significantly correlated

with Information Seeking ($r = 0.227$), Affective Regulation ($r = 0.198$) and Emotional Discharge ($r = 0.329$). In a stepwise regression predicting worry, trait anxiety entered on the first step. Emotional Discharge then accounted for a further 7% of variance in worry scores. With worry held constant, trait anxiety was significantly negatively related to Logical Analysis ($r = -0.226$) and Problem Solving ($r = -0.205$). In a stepwise regression analysis predicting trait anxiety, worry entered on the first step. Logical Analysis then accounted for an additional 3% of the variance in trait anxiety, while Problem Solving did not enter significantly.

First, these results do indicate that worry and anxiety can be considered as separate constructs each with their own unique sources of variance. These differences occur almost entirely in relation to measures of different methods and strategies of coping: with trait anxiety partialled out, worry is *positively* related to Active Behavioural Coping, Avoidance Coping, Information Seeking, Affective Regulation and Emotional Discharge; with worry held constant, trait anxiety is *negatively* correlated with Active Cognitive Coping, Active Behavioural Coping, Logical Analysis and Problem Solving. What is most striking about this list is the fact that trait anxiety is inversely related to a variety of problem-focussed coping strategies whereas worry is directly related to two aspects of problem-focussed coping (Active Behavioural Coping and Information Seeking). Indeed, a measure of Active Behavioural Coping independently contributes significant variance to both worry and trait anxiety—but in opposite directions.

Secondly, worrying is related to some measures of emotion-focussed coping independently on trait anxiety, notably Avoidance Coping, Affective Regulation and Emotional Discharge.

In contrast to these unique differences between worry and trait anxiety when coping strategies are examined, further analysis of the correlations between worry, trait anxiety and self-perceived problem-solving efficacy and locus of control suggested that trait anxiety is the primary source of variance for measures under these latter two headings. Partial correlations indicated that worrying was unrelated to any of these measures when trait anxiety was held constant.

These results suggest that the process that people label as 'worrying' does appear to be a construct which can be considered independently of anxiety and has problem-focussed characteristics. This finding contrasts with those of an earlier study which examined the relationship between worrying and coping strategies. Meyer *et al.* (1990) found that high scores on the Penn State Worry Questionnaire (PSWQ) were associated with coping strategies normally considered to be associated with poorer outcomes (namely self-blame, wishful thinking and problem avoidance). However, these authors did not control for the high correlation between trait anxiety and worry found in their study. It is quite likely, given the findings from the present study, that the relationship that Meyer *et al.* (1990) found between worrying and maladaptive ways of coping was largely due to the high correlations between worrying and anxiety, with trait anxiety being the primary source of variance contributing to scores on measures of maladaptive coping.

However, this leads one to consider why if worrying has such problem-focussed characteristics, it is so highly correlated with measures of trait anxiety. One possible explanation which is consistent with the present results is to suggest that the process of worrying contributes a positive cognitive approach to stressful or threatening life events, but in individuals possessing high levels of trait anxiety other factors can thwart this positive approach before it is permitted to reach fruition in dealing successfully with the stressor. Thus, while worrying might contribute some of the analytic processes characteristic of, for example, Active Behavioural Coping with a stressor, factors associated with trait anxiety (e.g. poor problem-solving confidence, perception of poor personal control over events, etc.) may foil any attempts to act effectively on these deliberations. Hence, the individual who adopts the problem-oriented strategies to a stressor that are characteristic of worrying, but is also high on trait anxiety (with its related poor problem-solving confidence) is likely to be locked into a stressful cycle of perpetual information seeking and problem solving which generates a variety of solutions—none of which the individual feels will be fully successful. This kind of vacillation is characteristic of many worriers, especially those who delay decision making or require a high level of evidence before arriving at a decision (cf. Tallis, 1990).

Nevertheless, this view of worrying does not account for the fact that worrying is also independently related to some features of emotion-focussed coping (i.e. Avoidance Coping, Affective Regulation and Emotional Discharge), suggesting that worrying is not entirely associated with problem-directed activities. One explanation of this apparent paradox may be that worriers

apply problem-focussed strategies not only to problems that are soluble, but also to problems over which they have no control. Since these problems are not resolvable even with the problem-focussed strategies at their disposal, they may end up relying on emotion-focussed coping strategies to deal with the anxiety that is inevitably generated by the uncontrollable stressor. For instance, one characteristic of worrying is the problem-focussed strategy of Information Seeking, where individuals attempt to discover information about the stressor. In this respect the situation of the worrier is similar to that of the individual who perseveres in gathering and evaluating information about a forthcoming trauma over which they have no control (such as terminal illness). Such information-seeking strategies merely exacerbate anxiety by confirming the stressor as threatening without providing any obvious means of dealing with it (cf. Breznitz, 1971; Lazarus & Folkman, 1984; Mechanic, 1962; Miller, 1991; Sparks, 1989; Sparks & Spire, 1988).

STUDY 2

This second study is an attempt to replicate the important findings from Study 1 and to examine a further aspect of the problem-solving approach to worrying, namely that worrying may be related to an increased tendency to define problems (e.g. Borkovec, 1985; Mathews, 1990).

First, since the finding that worrying and trait anxiety possess their own unique sources of variance is of such theoretical importance (cf. O'Neill, 1985; Borkovec, 1985), Study 2 attempts to consolidate these findings by replicating the part of Study 1 that compared worrying and trait anxiety to various coping strategies. However, this second study has one procedural difference. Subjects in Study 1 were asked to base an assessment of their coping strategies on their reactions to the most stressful event that had occurred to them in recent years. Reactions to such an extraordinary stressor may not be representative of the way people cope in general, and indeed, there is evidence that coping strategies are often situation specific (e.g. Edwards & Endler, 1989; Endler & Parker, 1989; Folkman, Lazarus, Dunkel-Schetter, DeLongis & Gruen, 1986). In order to relate worrying to the ways in which people cope in general, *Ss* in Study 2 were asked to indicate which coping strategies they used most frequently.

The second aim of Study 2 is to discover whether worrying is associated with an increased tendency to interpret events as problematic or threatening (the postulated tendency of worriers to define more problems). Mathews (1990) has articulated this possibility more fully by suggesting that worry is driven by an interpretive bias in which ambiguous cues are more likely to be interpreted as threatening. In anxious *Ss*, a pre-attentive bias may direct attention towards threat cues, and this may have the effect of (i) increasing the number of perceived problems that require worrying about and (ii) triggering episodes of worrying when threat cues match a current concern or worry. One implication of this interpretation is that worrying is a consequence of the pre-attentional bias associated with high anxiety levels. If this is so, then worrying should not be related to defining problems once levels of anxiety have been controlled for.

Method

Subjects

The *Ss* were 108 undergraduate students from City University. Their ages ranged from 18 to 38 yr with a mean age of 21 yr. They were 58 females and 50 males. All *Ss* were volunteers who were not paid for their participation.

Assessment

All *Ss* were given a questionnaire that consisted of four sections: (i) the Health & Daily Living Form (Moos *et al.*, 1986), (ii) a measure of the tendency to define both ambiguous and unambiguous situations as threatening (an Ambiguous/Unambiguous Situations Diary), (iii) a measure of trait anxiety (Spielberger, 1983) and (iv) a measure of worrying (the Student Worry Scale).

The Health & Daily Living Form. This was identical to that used in Study 1 except for a change in the introductory instructions. For Study 2 these instructions were altered to read: "The following are ways of reacting to various difficult, stressful, or upsetting situations. By ticking the appropriate

box please indicate how frequently you do each of the following when you encounter a difficult, stressful or upsetting situation."

Ambiguous/Unambiguous Situations Diary. This section consisted of a diary with fictitious entries for 28 consecutive days. Fourteen of these entries were ambiguously worded (i.e. could either be interpreted as threatening or benign), and 14 entries were compiled which were considered to be unambiguous in this respect. Ambiguous items were mainly adapted from ambiguous sentences used in a study of the effect of trait anxiety on recall of ambiguous material by Eysenck, Mathews and Richards (1989). Examples included "I was walking along the seafront today when I saw my friend Helen waving in the sea", "I phoned the doctor today and was surprised to hear the result of last week's check-up", and "As I walked along the quayside I overheard three men discussing the best way to blow up a dinghy". Unambiguous entries were worded as either unambiguously threatening (e.g. "Not only was yesterday's meal out very disappointing, but I now also think I have food poisoning") or unambiguously benign (e.g. "I was really chuffed when I passed by driving test today, this calls for a big celebration"). There were 7 benign and 7 threatening Unambiguous entries. Unambiguous entries were all assessed as benign or threatening prior to the diary being compiled. Any entries that were not correctly rated as either benign or threatening by 100% of 15 independent raters were discarded and replaced. At the beginning of the diary section *Ss* were instructed as follows: "Imagine that the following are extracts from your diary. Read each extract and then decide whether the event for that day would cause you concern (e.g. worry) or not. If you think the event would cause some concern, tick the box marked 'CONCERNED', if you did not think it would cause any undue concern, tick the box marked 'UNCONCERNED'. Please tick only one of the boxes for all the extracts in the diary. There are no right or wrong answers to this, just decide how you yourself would feel in each case." The diary was scored by obtaining separate totals for the number of Ambiguous entries considered to be a cause of concern and the number of Unambiguous entries considered to be a cause of concern. A total score was also calculated by summing the scores for the Ambiguous and Unambiguous sections.

Trait anxiety. Individual measures of trait anxiety were measured using Spielberger's STAI Y-2 self-evaluation questionnaire (Spielberger, 1983).

The Student Worry Scale. Levels of worrying were measured using the same Student Worry Scale devised for Study 1.

Results and Discussion

As with Study 1, scores on the Student Worry Scale were highly correlated with measures of trait anxiety ($r = 0.5538$, $P < 0.001$).

Table 3 summarizes the results of partial correlations calculated separately for worry and trait anxiety with measures of coping strategies while holding the other one constant.

With trait anxiety held constant worrying was significantly related to measures of Active Cognitive Coping ($r = 0.229$) and Active Behavioural Coping ($r = 0.379$). With worrying held constant trait anxiety was significantly inversely correlated with Active Cognitive Coping ($r = -0.259$) and directly related to Avoidance Coping ($r = 0.302$).

Table 3. Partial correlation of trait anxiety (TA) or worry while holding the other constant (Study 2)

	Partial r with worry holding TA constant	Partial r with TA holding worry constant
<i>Method of Coping</i>		
Active Cognitive Coping	0.229*	-0.259*
Active Behavioural Coping	0.379**	-0.128
Avoidance Coping	0.059	0.302**
<i>Focus of Coping</i>		
Logical Analysis	0.172	-0.250*
Information Seeking	0.213*	-0.001
Problem Solving	0.265**	-0.219*
Affective Regulation	0.388**	-0.313**
Emotional Discharge	0.147	0.187

* $P < 0.05$; ** $P < 0.01$.

When Focus of Coping was analysed in this way, partialling out trait anxiety left worrying still significantly correlated with Information Seeking ($r = 0.213$), Problem Solving ($r = 0.265$) and Affective Regulation ($r = 0.388$). Of these, Affective Regulation accounted for most additional variance in worry (an increase in adjusted r^2 from 0.28 with trait anxiety alone to 0.38 including Affective Regulation). With worry held constant, trait anxiety was significantly negatively related to Logical Analysis ($r = -0.250$), Problem Solving ($r = -0.219$) and Affective Regulation ($r = -0.313$). In a regression analysis predicting trait anxiety, worry was entered on the first step. Affective Regulation and Emotional Discharge then accounted for a further 8% of the variance in trait anxiety.

When scores were calculated from the Ambiguous/Unambiguous Situations Diary it was found that both worry and trait anxiety were significantly correlated with the tendency to define both ambiguous episodes as threats ($r = 0.286$ and $r = 0.293$, respectively) and unambiguous episodes as threats ($r = 0.301$ and $r = 0.247$, respectively). However, when these variables were subjected to a partial correlation (with the other held constant), neither worry nor trait anxiety was independently related to defining either ambiguous or unambiguous episodes as threats. Nevertheless, partial correlations between worry and defining *all* events as threats (i.e. the total score) and between trait anxiety and defining *all* events as threats were both very close to significance at the 5% level ($r = 0.1821$, $P = 0.08$ and $r = 0.1799$, $P = 0.09$, respectively).

Analysis of the relationship between worrying and trait anxiety and coping strategies largely confirm the findings from Study 1. First, worrying and trait anxiety again exhibited sources of unique individual variance. Study 2 replicated the independent relationship between worry and Active Behavioural Coping, Information Seeking and Affective Regulation, and the inverse correlation between trait anxiety and Active Cognitive Coping, Logical Analysis and Problem Solving. Indeed, in Study 2 three coping measures (Active Cognitive Coping, Problem Solving and Affective Regulation) were found to contribute positively to worrying and negatively to trait anxiety—further confirmatory evidence of the independence of the constructs of worrying and anxiety.

Secondly, while Study 2 did report positive partial correlations between worrying and the emotion-focussed strategies of Avoidance Coping and Emotional Discharge, these relationships were much weaker than those in Study 1, and failed to reach significance. One explanation of this may be that in Study 1 *Ss* were asked to assess their coping strategies in relation to the most stressful event that had happened in recent years; it is quite possible that such an impressionable event may have been an uncontrollable one which was not soluble using the problem-focussed and information-seeking strategies characteristic of worrying. If so, the individual would have to reduce stress by employing more emotion-focussed coping strategies in the manner described in the Discussion to Study 1. Study 2, however, asked *Ss* to assess how they coped with stress in general, and the problem-focussed strategies characteristic of worry may function satisfactorily to deal with the less severe stressors encountered on a day-to-day basis. This would obviate the need for back-up emotion-focussed strategies.

Thirdly, worrying once again exhibited positive problem-focussed characteristics. In Study 2 it was independently correlated with the problem-focussed strategies of Active Cognitive Coping, Active Behavioural Coping, Information Seeking and Problem Solving. Furthermore, these results were found when *Ss* had been asked to report on the ways they cope in general rather than in relation to a specific stressor.

Finally, while both worrying and trait anxiety were correlated with the tendency to define both ambiguous and unambiguous episodes as threatening, when the other was partialled out, neither worrying nor trait anxiety exhibited a significant relationship with these variables. However, when total diary scores were subjected to partial correlations both worry and anxiety did appear to be independently associated with defining events in general as threatening (we have subsequently replicated this part of Study 2 and discovered significant partial correlations between total score and worry and trait anxiety, Davey & Russell, submitted).

Interpretation of these diary results is not entirely easy, although there does seem to be some relationship between worrying and defining events as threatening which is independent of trait anxiety (as revealed in the partial correlation between worrying and total diary scores). At the very least, this suggests that a pre-attentional bias caused by high levels of anxiety need not necessarily

be the only process contributing to defining events as problematic. Other cognitive processes uniquely characteristic of worrying may also be involved, and one possible process is the strategy of information seeking (see also Davey & Russell, submitted). For instance, worriers may adopt an information-seeking cognitive style when dealing with potentially threatening events. Such a strategy may lead worriers to attempt a thorough analysis of the potential threat by asking the perpetual "What if . . .?" question that is characteristic of worriers. Such a strategy may be likely to uncover further potential threats, requiring further processing. This possibility is outlined further in the General Discussion.

STUDY 3

One of the coping strategies that was consistently associated with worrying in the first two studies was the strategy of Information Seeking, i.e. trying to find out more about potentially stress-inducing events. This strategy seems to be very similar to the coping process known as 'monitoring', and this latter process has received a considerable amount of research attention in recent years (cf. Miller, 1980, 1987, 1991). The monitoring/blunting hypothesis postulates that there are two main modes by which people cope with stressful events: 'monitoring' is the extent to which the individual seeks out threat-relevant information, while 'blunting' is the extent to which the individual attempts to cognitively avoid the threat. According to this hypothesis people can be characterized as monitors or blunners depending on the frequency with which they adopt either of these two strategies (Miller, 1987). Research on this topic has suggested that monitoring and blunting are unrelated to either demographic variables or trait measures (such as repression-sensitization, depression, anxiety, optimism, attributional style and Type A) (Caspi, 1987; Miller, Brody & Summerton, 1988; Miller & Mangan, 1983; Miller, Lack & Asroff, 1981; Steptoe, 1986). However, monitors exhibit higher levels of state anxiety than blunners (Miller & Mangan, 1983; Phipps & Zinn, 1986), and become more distressed when confronted with uncontrollable threats (Sparks, 1989; Sparks & Spirek, 1988).

The main purpose of this third study is to assess the relationship between monitoring and worrying. This would indicate whether the cognitive informational style characterized as monitoring is a feature of the cognitive process that people label as 'worrying'. If so, it suggests that worrying may be a multifaceted process which may, via at least one of its features (informational monitoring), contribute to anxiety and stress in certain stressful circumstances (i.e. circumstances where the stressor is uncontrollable or where information about the stressor is deliberately withheld). A secondary purpose of this third study is to attempt to replicate the relationships found between personal problem-solving efficacy and both trait anxiety and worrying in Study 1.

Method

Subjects

The *Ss* were 94 undergraduate and postgraduate students from City University and The Open University. Their ages ranged from 18 to 55 yr with a mean of 37 yr. There were 62 females and 32 males. All *Ss* were volunteers who were not paid for their participation.

Assessment

All *Ss* were given a questionnaire that consisted of four sections: (i) the Miller Behavioural Style Scale (Miller, 1987), (ii) the Personal Problem-Solving Inventory (Heppner & Petersen, 1982), (iii) the Student Worry Scale and (iv) a measure of trait anxiety (Spielberger, 1983).

The Miller Behavioural Style Scale (Miller, 1987). This consists of four hypothetical uncontrollable, stress-evoking situations (e.g. "vividly imagine that you are afraid of the dentist and have to get some dental work done"). Each scene is followed by eight statements that represent different ways of dealing with the situation. Four of these statements are of a monitoring or information-seeking variety and four are of a blunting or information-avoiding variety. Subjects are asked to indicate the statements that they think might apply to them. Three measures can be derived from this scale: (i) a total 'monitoring' score, (ii) a total 'blunting' score and (iii) a monitoring/blunting difference score which is determined by subtracting the blunting score from the monitoring score.

Table 4. Correlations between Worry Scale Score, Trait Anxiety Score and indices of monitoring/blunting and personal problem-solving efficacy (Study 3). (Note that high scores on the Heppner & Petersen Personal Problem-Solving Inventory denote poor perceived problem-solving efficacy)

	Worry Scale Score	Trait Anxiety
<i>Miller Behavioural Style Scale (MBSS)</i>		
Monitoring	0.2070*	0.0193
Blunting	-0.0531	-0.0903
Monitoring/Blunting Difference	0.1366	0.0486
<i>Self-perceived problem-solving efficacy (Heppner & Petersen, 1982)</i>		
Problem-Solving Confidence	0.2630**	0.5987***
Approach-Avoidance Style	0.0118	0.2270*
Personal Control	0.3881***	0.5247***

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

The Personal Problem-Solving Inventory (Heppner & Petersen, 1982), the Student Worry Scale and the Spielberger STAI Y-2 self-evaluation questionnaire. These were identical to those used in Study 1.

Results and Discussion

As with the first two studies, there was a high correlation between worrying and trait anxiety ($r = 0.5301$, $P < 0.001$). Table 4 displays the simple correlations between worry and trait anxiety and measures derived from the Miller Behavioural Style Scale (MBSS) and self-perceived personal problem-solving scores. The only relationship that measures from the MBSS exhibited with either worry or trait anxiety was the correlation between monitoring and worrying.

However, a number of simple correlations existed between measures of self-perceived problem-solving efficacy and worry and trait anxiety. Both poor problem-solving confidence and poor personal control were positively related to both worry and trait anxiety, whereas a predominantly avoidance style of problem-solving was correlated only with trait anxiety.

Table 5 summarizes the results of partial correlations calculated separately for worry and trait anxiety with MBSS measures and measures of personal problem-solving efficacy.

With trait anxiety held constant worrying was significantly related to measures of monitoring ($r = 0.226$), but not to measures of blunting or the monitoring/blunting difference score. In a regression analysis predicting worry, monitoring accounted for an extra 4% of the variance (an increase in adjusted r^2 from 0.27 with trait anxiety alone, to 0.31 including monitoring). With worrying held constant, trait anxiety was unrelated to any of the MBSS measures.

When personal problem-solving efficacy was analysed in this way, the results obtained replicated those from Study 1. With trait anxiety held constant worry was unrelated to any aspect of self-perceived problem-solving efficacy, whereas with worry held constant trait anxiety was significantly related to poor problem-solving confidence ($r = 0.598$), an avoidance style of problem solving ($r = 0.227$) and poor perceived personal control ($r = 0.524$).

First, these results confirm the findings from Study 1 which indicated that measures of self-perceived problem-solving efficacy were related to trait anxiety rather than worrying. Partial

Table 5. Partial correlations of trait anxiety (TA) or worry while holding the other constant (Study 3)

	Partial r with worry holding TA constant	Partial r with TA holding worry constant
<i>Miller Behavioural Style Scale</i>		
Monitoring	0.226*	-0.105
Blunting	-0.006	-0.073
Monitoring/Blunting Difference	0.130	-0.28
<i>Self-perceived personal problem-solving efficacy</i>		
Problem-Solving Confidence	-0.079	0.561**
Approach-Avoidance Style	-0.131	0.260*
Personal Control	0.152	0.408**

* $P < 0.05$; ** $P < 0.01$.

correlations again demonstrated that worrying was unrelated to any of the measures of problem-solving efficacy when trait anxiety has been partialled out, and that trait anxiety was the primary source of variance for these measures.

Secondly, these results indicated that worrying was associated with the information-seeking strategy of 'monitoring' as measured by the MBSS. This is consistent with results from the first two studies which demonstrated a relationship between worrying and the Information Seeking sub-scale of the Health & Daily Living Form. In all three studies the relationship between worrying and information-seeking coping strategies has been independent of levels of trait anxiety. This suggests that information-seeking styles such as monitoring may be a feature of the cognitive process that people label as worrying, and, as such, may be either adaptive or maladaptive depending on the details of the situation in which worrying or monitoring occur. For instance, monitoring is a process that appears to reduce stress in people labelled as monitors only when the stress-inducing event is controllable (Miller & Mangan, 1983; Watkins, Weaver & Odegaard, 1986; Efran, Chorney, Ascher & Lukens, 1989). When the event is uncontrollable, monitoring can increase stress levels (Miller & Mangan, 1983; Phipps & Zinn, 1986; Sparks, 1989; Sparks & Spirek, 1988). Furthermore, Miller (1991) has proposed that monitoring may contribute to psychological distress in a number of ways. First, Miller, Leinbach and Brody (1989) have shown that hypertensives are characterized by a monitoring style of coping, and Miller (1991) has suggested that their hypertension may be caused by a tendency to monitor for threat-relevant cues even when the situation is uncontrollable. Secondly, Miller (1991) proposed that monitoring may be a central feature of many phobic disorders. This is because phobics continually seek information about their phobia even in places where they are unlikely to encounter their phobic stimulus (such as the snake phobic scanning for snakes on a crowded city street) (May, 1977).

What these findings and hypotheses imply is that stress and anxiety will be determined, at least in part, by a combination of cognitive coping style and context; for instance, an information seeking style is normally adaptive—but only if the individual is in a position to deal effectively with the stressor. The studies reported in this paper so far suggest that worrying is a style of problem-management that contains both information-seeking and problem-focussed elements, and—in the same way as monitoring—worrying may be stress-inducing when the individual cannot act on the information gained about the stressor or execute the strategies devised to deal with the stressor. With these considerations in mind, we have come across three possible circumstances in which worrying (as a cognitive style) may cause stress: (i) when the stressor is uncontrollable, (ii) when information about the stressor is unavailable or is withheld and (iii) when the individual concerned has poor confidence in their own ability to deal effectively with the stressor.

GENERAL DISCUSSION

Worrying and anxiety

The results from the present series of studies suggest that the process that people label as worrying has a number of characteristics which identify it as a construct which is separate from anxiety. This is in contrast to the views of those theorists who have argued that worrying is merely the cognitive manifestation of anxiety (e.g. O'Neill, 1985; Mathews, 1990).

All three studies indicated that worrying and anxiety can be considered as separate constructs, each with their own unique sources of variance. With trait anxiety partialled out, worrying was characterized by a number of psychological processes which included (i) problem-focussed coping strategies (Studies 1 and 2), (ii) information-seeking and monitoring coping strategies (Studies 1, 2 and 3) and (iii) the tendency to define events as threats (Study 2). In contrast, with worry partialled out trait anxiety was characterized by psychological processes that are all normally considered to result in poor psychological outcomes. These included (i) poor problem-solving confidence (Studies 1 and 3), (ii) poor perceived personal control (Studies 1 and 3), (iii) responsibility for negative but not positive outcomes (Study 1), (iv) the tendency to define events as threats (Study 2) and (v) avoidance or emotion-focussed coping strategies (Studies 1, 2 and 3).

If worry and anxiety can be considered as independent constructs in this way, then it should be possible to identify situations in which worrying can occur in the absence of anxiety. The term

worrying is one that is used in many different ways in a variety of contexts, but it is clear that in some contexts it is considered to be a constructive, appropriate process in response to forthcoming potential problems. For instance, the student who is about to take his/her examinations may believe that it is necessary and appropriate to worry about them; similarly, the environmentalist who is concerned about pollution may equally view worrying as an appropriate psychological response to this issue. In neither case need worrying be associated with undue anxiety, but it reflects a constructive, adaptive approach to dealing with events that concern the individual. However the psychologist wishes to define worrying, it must take some account of the fact that people frequently use the term worrying to denote an adaptive problem-solving process. The fact that people also use the term worrying to describe an unwanted pathological state of mind suggests that in certain circumstances those processes which characterize worrying as adaptive can also result in maladaptive states. It is the study of the conditions which define pathological worrying which should be of greatest interest to the clinical psychologist.

Pathological worrying

Even though the present study has identified worrying as a construct with features which are independent of trait anxiety, it is still trait anxiety that accounted for the majority of the variance in worry scores. Since we are no longer asserting that worrying is an integral component of anxiety, some attempt has to be made to explain the close association between levels of anxiety and levels of worrying. One approach is to conceive of this association being generated in circumstances where adaptive worrying is thwarted. That is, if the attempt to find a coping solution to a threatened stressor is constantly thwarted, this will result in continued anxiety and generate further attempts to find a solution (i.e. a vicious cycle of increased anxiety and further time spent worrying). The present results suggest at least two important ways in which this thwarting might occur.

Abortive problem-solving and information seeking. Worrying is associated with information-seeking and problem-focussed processes which attempt to find a practical solution to forthcoming stressful events. However, these strategies are only likely to reduce anxiety and stress if the problem is potentially controllable. There is clear evidence that those individuals who adopt the problem-focussed strategy of information seeking or monitoring actually become more stressed when the situation is an uncontrollable one (Miller & Mangan, 1983; Phipps & Zinn, 1986; Sparks, 1989; Sparks & Spirek, 1988), presumably because the tendency to seek information in such uncontrollable situations merely confirms the situation as threatening without providing any obvious means of dealing with it (cf. Breznitz, 1971; Lazarus & Folkman, 1984; Mechanic, 1962). This would activate the vicious cycle of seeking further information with the consequence of further confirming the stressful nature of the situation, hence the spiralling relationship between anxiety and worrying.

However, not all threatening situations can be clearly defined as controllable or uncontrollable, and there are at least two important factors which will influence this appraisal. First, people will differ in the perception of their own ability to control events. The most influential formulation of beliefs about control is Rotter's (1966) concept of internal versus external locus of control. Individuals who score high on external locus of control will be those who believe that most situations are outside of their own control. The implication of this for the present approach is that individuals who are high on external locus of control and who also adopt problem-focussed strategies of coping (including information seeking) will be prone to the vicious cycle of anxiety and worrying; this is because any attempts at finding a solution to the stressor will be thwarted by the individual's perceived lack of control over it. Secondly, even if a situation is perceived as controllable, the way in which events are connected may mean that exercising this control has stressful uncontrollable consequences. For example, the cancer patient may have the option of controlling a malignancy through chemotherapy. However, the consequences of exercising this control are such stressful uncontrollable outcomes as nausea, hair loss, depression, etc. (Lazarus & Folkman, 1984). Many potential threats are double-edged in this way and initially addressing them with problem-focussed coping strategies may uncover further stressors where the same problem-focussed strategies will merely activate the anxiety-worry spiral.

Vacillatory worrying. One common characteristic of worriers is their apparent inability to make a decision unless they are absolutely sure they are doing the right thing (Tallis, 1990). This 'vacillation' over an appropriate decision merely prolongs the period spent worrying over the

problem. Clearly, the reasons why this vacillation occurs will be important to our understanding of pathological worrying.

One plausible explanation of vacillatory worrying is suggested by the results of the present studies, and rests in the different characteristics associated with the constructs of worrying and anxiety. Worrying is characterized by positive problem-focussed methods of coping and an information-seeking cognitive style, while trait anxiety is independently associated with characteristics representing poor problem-solving confidence. Thus, when these two factors coincide in the same individual, the result will be copious problem-focussed activity but an unwillingness to accept the generated solutions as effective ones. In this case, pathological worrying is generated by a problem-focussed cognitive style being thwarted by a lack of confidence in the solutions being generated. This example suggests that the close association between worrying and trait anxiety results from a conjunction of these two factors in the same individual; presumably, the higher the level of trait anxiety, the greater the lack of confidence in problem-solving abilities, and thus the more worrying is needed in an attempt to achieve an acceptable solution.

One alternative explanation of vacillatory worrying has been proposed by Tallis (1990) and Tallis, Eysenck and Mathews (1987). They suggest that vacillation occurs because worriers have unrealistically high evidence expectations; that is, they require more evidence on which to base a decision. In principle, this account does not seem to be inconsistent with the explanation provided above. For instance, individuals high in trait anxiety have poor problem-solving confidence, and one consequence of this low confidence may be the need for clear evidence that the generated solution will work—hence, elevated evidence requirements.

Catastrophic worrying. One other putative category of worrying has been proposed by a number of writers and is suggested by the present results. This category is characterized by the defining of problems rather than the thwarting of adaptive problem-solving processes. 'Catastrophizing' reflects the occasions when an individual's thoughts about a potential problem tend to get worse and worse, and they define more and more bad outcomes associated with the problem (cf. Tallis, 1990). This is akin to the perpetual "What if . . .?" question that worriers ask about a potentially threatening situation, and it is a process that worriers often report having very little control over (Borkovec, 1985; Borkovec *et al.*, 1983). Basically, this implies that worrying is associated with an increased tendency to define problems, and indeed, the present results confirm this to some extent (see also Davey & Russell, submitted). However, this still begs the question of what psychological processes generate this increased tendency to define problems, and there are at least two possibilities that require discussion here.

First, the views of Mathews (1990) imply that an increased tendency to detect and define events as threatening is the result of a cognitive bias in processing information associated with elevated anxiety levels. That is, anxiety is associated with an attentional bias towards potentially threatening material which gives individuals with higher anxiety levels more potential sources of worrying—hence the high correlation between levels of anxiety and worry. There is much experimental evidence to support the operation of a cognitive processing bias which is associated with anxiety (e.g. Butler & Mathews, 1983; Mogg, Mathews, Bird & MacGreggor-Morris, 1991; Mathews, 1990), and at least some instances of increased levels of problem definition in anxious subjects is likely to result from this cognitive predisposition.

However, the present results (and those of Davey & Russell, submitted) suggest that the tendency to define events as threatening or problematic is associated with worrying independently of levels of trait anxiety. When trait anxiety is partialled out, worrying is still associated with defining events as problematic (Study 2; Davey & Russell, submitted, study 1). This suggests that the attentional bias associated with anxiety may not be the only process generating the identification of problems by worriers. One possibility is that the information-seeking cognitive style associated with worrying may also generate perceived problems. Consistent with this hypothesis is the finding that a monitoring cognitive coping style (as measured by the MBSS) is highly correlated with the tendency to define both ambiguous and unambiguous situations as threatening (Davey & Russell, submitted). What is not immediately obvious from this finding, however, is why an information-seeking cognitive style should result in a tendency to define events as threatening; presumably the information gained from an unbiased information-seeking strategy should lead equally to the rejection or the acceptance of the event as a threat. It may be that

monitors have a lower criterion for accepting an event as a threat than for rejecting an event as a threat; alternatively they may seek the kind of information that tends to confirm rather than reject an event as being problematic. There is no clear evidence on these possibilities in the literature, and they remain to be investigated further.

Nevertheless, there is no reason to believe that this tendency to define events as threats is, *per se*, maladaptive or stress-inducing—especially if the individual possesses the coping skills necessary for dealing with them. Indeed tending to define events as threats can even be viewed as adaptive if it keeps the individual vigilant for threats and enables him/her to rapidly deploy positive coping strategies in dealing with stressors (cf. Mathews, 1990). If this is so, then tending to define events as threats would only contribute to pathological worrying when adaptive problem-solving processes were unable to cope with these events or were thwarted (as in the two examples given above).

CONCLUDING SUMMARY

This series of three studies has attempted to investigate some of the characteristics of worrying which are independent of related constructs such as anxiety. The results from all three studies suggested that worrying and anxiety can be considered as separate constructs with worrying associated with adaptive problem-solving and information-seeking coping strategies, and trait anxiety independently associated with psychological processes and coping strategies that are normally considered maladaptive. The results also suggested ways in which pathological worrying might be generated, especially where adaptive worrying is thwarted or where processes characteristic of adaptive worrying interact with psychological phenomena associated with high levels of anxiety.

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