Main Section

CATASTROPHIZING ASSESSMENT OF WORRY AND THREAT SCHEMATA AMONG WORRIERS

Martin D. Provencher

Université Laval, Québec, Canada

Mark H. Freeston

Centre de Recherche Fernand-Seguin, Montréal, Canada

Michel J. Dugas

Concordia University, Montréal, Canada

Robert Ladouceur

Université Laval, Québec, Canada

Abstract. Several authors have suggested that threat schemata of high worriers may differ from those of less worried individuals with regards to the manner with which information is structured in the Long Term Memory (LTM) or the content of the information stored in the LTM. The present study tested this hypothesis using the catastrophizing interview technique (c.f., Vasey & Borkovec, 1992). Results revealed that high worriers evaluated the likelihood of the occurrence of feared consequences generated for each worry as more likely to actually happen than low worriers did. Second, the ultimate outcome generated in the catastrophizing sequence for a given worry was more severe for high worriers. Finally, high worriers generated ultimate outcomes that were more similar in content, presumably reflecting tightly organized threat schemata. It is argued that activation of these threat schemata in the LTM contributes to the maintenance of worry and anxiety in anxious individuals.

Keywords: Worry, catastrophizing, threat schemata, cognitive assessment, information processing.

Introduction

Several authors have suggested that individuals high in trait anxiety or high worriers possess danger or threat schemata stored in the long term memory (LTM) (c.f., Butler & Mathews, 1983, 1987; Eysenck, 1984; Mathews & MacLeod, 1985; Pratt, Tallis, & Eysenck, 1997; Vasey & Borkovec, 1992). These threat schemata filter perceptions and guide judgements based on an individual's life experience (Kendall & Ingram, 1987). It has been suggested that threat schemata of high worriers differ from those of less worried individuals in the manner with which information is structured and in the content of the information stored in the LTM (Mathews, 1990). Threat schemata of high worriers would be highly elaborated and tightly structured, and may contain material that is more threatening in content. Essentially, this means that high worriers may have more threat or worry related information in the LTM and that this information is stored in tight clusters. According to Bower's (1981) network theory on mood and memory, threat related information is easily retrieved by high worriers when in anxious mood, since information that is stored together in tight clusters is more accessible. Thus, tightly structured threat schemata stored in the LTM would account for the elevated estimation of the likelihood of occurrence of negative events by high worriers (Butler & Mathews, 1987; Vasey & Borkovec, 1992) and generalized anxiety patients (Butler & Mathews, 1983), since individuals estimate the likelihood of occurrence of events by the ease with which this information comes to mind (Kahneman, Slovic, & Tversky, 1982).

Although this concept of a tightly structured threat schemata stored in the LTM is not novel, there has been little systematic evaluation of the storage characteristics of worry related content in the LTM (Pratt et al., 1997). This is surprising, as worry is an important clinical phenomenon and is the defining feature of Generalized Anxiety Disorder (GAD), one of the most prevalent anxiety disorders. Individuals with GAD therefore provide a particularly clear example of excessive worry and may be considered as clinically high worriers. It has been suggested that the most important factor in determining the number and duration of worry episodes experienced by an individual may be the number and degree of elaboration of their worry clusters stored in the LTM (Eysenck, 1984; Pratt et al., 1997). Thus, a better understanding of storage characteristics of worry and threat schemata of high worriers would lead to a better understanding of the phenomenology of worry and provide insight for improved treatment.

In order to assess threat schemata, it is important to prime such information stored in the LTM. One way of doing this is by using the catastrophizing interview technique (c.f., Davey, Jubb, & Cameron, 1996; Vasey & Borkovec, 1992). This technique permits assessment of the depth of a worry by asking participants what is it that worries them about a particular worry until they identify the worst possible outcome. Presumably, the ultimate outcome generated using this technique reflects a deeper level of meaning that is closely related to threat schemata stored in the LTM. Using this technique, Vasey and Borkovec (1992) asked high and low worriers to list worries that they currently worried about using free recall. The authors then proceeded with the catastrophizing technique for the worry topic that participants worried most about during the preceding week and for the worry topic they worried least. They found that high worriers generated more feared consequences for a given worry, evaluated each consequence on average as more likely to actually happen, and showed an increase in discomfort as the catastrophizing sequence proceeded downward. They argued

that these results show that anxious individuals possess threat schemata that contain more learned and rehearsed answers to ''what if'' questions, and that these answers are more accessible. However, they did not assess the threat schemata of both groups. The present study attempts to do this.

The purpose of this study is to test the hypothesis that threat schemata of high worriers differ from that of less worried individuals in the manner with which information is structured and with regards to the content of the information that is stored in the LTM (Mathews, 1990). In order to gain a better understanding of the threat schemata, a comprehensive list of worries experienced by the participant within the last 6 months was identified. The catastrophizing interview technique (c.f., Vasey & Borkovec, 1992) was applied for each worry in order to find out if the worries of a given participant lead to feared consequences that are similar in content. If so, it may suggest that these individuals have tightly organized threat schemata. As proposed by Vasey and Borkovec (1992), later steps in the catastrophizing sequence may reflect core fear structures or threat schemata that are more highly elaborated and tightly organized than surface level concerns.

The following hypotheses are proposed. High worriers would have a higher number of feared consequences generated for each worry. These feared consequences would be evaluated by high worriers as more likely to actually happen. Secondly, the ultimate outcome generated for each worry using the catastrophizing technique would be objectively more threatening in content for high worriers. Finally, the final consequences generated for each worry using the catastrophizing technique would be more closely related to each other for high worriers, suggesting the presence of more tightly organized threat schemata for these individuals.

Method

Participants

Six hundred and seven students recruited in social science courses completed two selection devices in order to form two groups characterized by (a) high levels of worry (analogue GAD) or (b) low levels of worry. The Worry and Anxiety Questionnaire (WAQ) (Dugas, Freeston, Lachance, Provencher, & Ladouceur, 1995b) contains 16 items that measure criteria for Generalized Anxiety Disorder based on *Diagnostic and statistical manual or mental disorders* (APA, 1994) and current research questions about worry. It is a revised and updated French version of the Generalized Anxiety Disorder Questionnaire (GAD-Q; Roemer, Borkovec, Posa, & Borkovec, 1995), a self-report diagnostic measure of GAD originally based on the DSM-III-R (APA, 1987) criteria and later adapted for DSM-IV (APA, 1994) criteria. The WAQ uses a 9-point Likert scale (0-8) with five anchor points. The seven questions relevant to this study represent the diagnostic criteria for GAD: anxiety and worry are excessive, difficulty controlling worry, at least three somatic symptoms from a list of six, and worry causes interference. The WAQ has been shown to have very good specificity and sensitivity in non-clinical samples and GAD patients, and test-retest reliability is satisfactory (Dugas et al., 1995b). The second symptom questionnaire is the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ contains 16 items that measure a trait-like tendency to worry. It has been shown to have a high internal consistency and test-retest reliability, as well as convergent and discrim-

inant validity (Meyer & al., 1990). The French translation of the PSWQ also has sound psychometric properties (Ladouceur et al., 1992).

Participants were classified in the high worry group if they scored in the 80th percentile or above on the PSWQ (score between 55 to 80) and if they met DSM-IV (APA, 1994) GAD criteria on the WAQ. In order to meet diagnostic criteria of GAD on the WAQ, participants had to score 4 or greater on a scale from 0 to 8 for the following criteria: excessive anxiety and worry, difficulty controlling the worry, interference of the worry in important areas of functioning, and at least three of six GAD somatic symptoms. Participants in the low worry group scored between the 10th and 40th percentile on the PSWQ (score between 31 and 40) and did not meet GAD criteria as identified by the WAQ (all GAD criteria were rated below a score of 4). These stringent criteria were selected to ensure that groups were indeed distinct in terms of levels of worry.

Of those who agreed to participate in the interview phase, 44 met inclusion criteria for either the high worry group or the low worry group, and were thus scheduled for an interview. Before the interview, participants completed the WAQ and PSWQ a second time to ensure classification reliability, as strongly recommended by Kendall and Ingram (1989). Data from participants who no longer met inclusion criteria ($N = 24$) were excluded from all analyses: the data were retained only for categorization development and training. The remaining participants ($N = 20$) who still met all criteria on both measures were included in the study. The interviewer was not informed of group classification.

Thus, a total of 20 individuals participated in the study. The high worry group ($N = 10$) was comprised of three men and seven women with a mean age of 20.9 years ($SD = 1.1$) and a mean score of 65.4 ($SD = 5.7$) on the PSWQ. The low worry group ($N = 10$) was comprised of two men and eight women with a mean age of 22.6 years ($SD = 3.9$) and a mean score of 36.1 ($SD = 3.5$) on the PSWQ. None of the participants were presently in treatment for anxiety or other emotional disorders.

Procedure

An interview was scheduled in the weeks following the group testing session. Participants were interviewed by the first author using the catastrophizing interview technique (c.f., Vasey & Borkovec, 1992) in order to assess all the worry themes and the worst possible consequence (ultimate outcome) of each worry within the last 6 months. Participants who did not complete the process in a first interview ($N = 14$) were then scheduled for a second interview in the following days to complete data collection.

Topic generation phase. Worries experienced by the participants within the last 6 months were identified first by free recall and then by using a comprehensive list of worry themes, the Categorization Grid for Worries (CGW; Dugas, Freeston, Doucet, Lachance, & Ladouceur, 1995a) to prime such worries back to memory. The CGW was originally developed using data obtained from 200 university students to categorize worry themes identified in the GAD-Q and WAQ. First, 14 worry themes were identified from 114 worries reported on 50 questionnaires. Using this initial grid, an inter-rater reliability of 89% was obtained in categorizing 251 worries reported on 90 questionnaires. Following steps in the validation of the CGW led to a final version of 18 items (see Dugas et al., 1995a). The CGW has been used in a number of studies with different populations (e.g., adolescents, university students,

elderly, clinical participants) by our research team and inter-rater reliability for categorization of worries has been high, varying between 83% to 90% (Dugas et al., 1995a). In the present study, inter-rater reliability reached 88%. The CGW was used to prime participants and to ensure that they recalled all significant worries experienced during the last months. Recall of all worries was a crucial step for determining whether different worries lead ultimately to similar feared consequences.

Catastrophizing phase. Once a list of worries was identified for a given participant, the assessor proceeded with the catastrophizing technique phase of the interview. For each worry reported by participants, the assessor started the catastrophizing phase of the interview by asking ''What is it about (blank) that worries you?'', where the blank was filled with the worry theme. After the participant answered, the assessor proceeded with the question ''If (blank) actually happened, what are you afraid would happen next?'' where the blank was filled with the participant's response to the previous prompt. This question was repeated until the participant could not generate a response. When participants did not identify another consequence, they were asked if the last consequence they generated was the worst possible consequence that could happen. If they said no, the interview questions continued until they identified what they considered to be the worst possible consequence for them. For some cases, the worst consequence occurred beyond death. The final response generated was thus considered the worst consequence and the ultimate outcome for a given worry, which was later used to determine threat schemata of individuals (see Threat Schemata Analysis below). After this process was completed for a given worry, the assessor repeated each consequence generated up to the ultimate outcome and asked the participant to rate the likelihood (0-100%) of each consequence occurring if the previous consequence actually occurred (see Table 1 for sample transcripts). This entire procedure was then repeated for each worry. Once this was completed, participants were debriefed.

Content analysis of ultimate outcomes. The Catastrophizing Consequence Grid (CCG) was used to categorize the severity of consequences generated for each worry. The CCG consists of an 8-point severity scale ranging from mild consequences, such as emotional arousal and minor conflict with others, and gradually building up, level by level, to the most severe consequences. In the present study, only the ultimate outcome generated for each worry was categorized. This grid is a revised and updated version of a grid used by our research team in other studies (e.g., Lachance, Langlois, Rhéaume, Freeston, & Ladouceur, 1994). The CCG was originally devised to measure the severity of consequences generated on a responsibility questionnaire by an analogue group of Obsessive-Compulsive Disorder (OCD) participants ($N = 50$). First, seven levels of severity were originally defined from 350 consequences reported on 25 questionnaires. Following this step, 414 consequences reported on another 25 questionnaires were categorized by two independent raters whereby inter-rater reliability reached 77%. Clarifications were then made for the final version of the grid and categorization of consequences on 25 new questionnaires, which reached an acceptable inter-rater reliability of 88% (Lachance et al., 1994). In the present study, one level was added to the CCG to better reflect the depth of consequences generated by worriers. Thus, the version used in the present study consisted of eight levels of severity. Consequences generated by the catastrophizing technique from the 24 participants that were excluded were used operationally to define the levels of the CCG. Note that a range of outcomes were available for each level of severity. Following this step, 248 ultimate out-

Table 1. Feared consequences, probability of occurrence, and ultimate outcome generated using the catastrophizing technique

Catastrophic consequences	Probability of occurrence (%)
High worrier	
Hand in my paper late	50
I would be penalised	50
I would have a bad grade	25
It would not reflect my capacities	25
I would be disappointed	100
I would not make any effort	50
My grades would go down	100
I would become unmotivated	100
I would drop out	100
I would not get my diploma	100
I would not be able to be a teacher	100
I would be dissatisfied with my life	100
I would be at odds with everybody	100
I would become depressed	50
I would kill myself	50
Low worrier	
I would not have enough time to study	25
I would not be able to answer a question	5
I would be slightly discouraged	5
I'd stop making efforts for the exam	3
I would fail my course	30
I would have to retake the course	50
It would be expensive	100

comes generated by the 20 participants in the study were categorized; inter-rater reliability reached 91%.

Threat schemata analysis. The final categorization was used to find out if all the worries for a given participant lead to similar consequences, presumably reflecting more tightly organized threat schemata. The procedure was developed on the transcripts of the 24 participants who were excluded. The first author categorized the ultimate outcomes for all participants into clusters based on similarity of content. The second author, who also was not informed of group classification, repeated the same steps independently. The number of consequences that were categorized as belonging to the same cluster was calculated. Specific clusters for participants were agreed upon and differences were settled by consensus. Following this, both authors independently rated each ultimate outcome on their relatedness within a given cluster. The following 4-point scale was used: (0) unrelated, when consequences were not categorized as belonging to a cluster, reflecting content that was not closely tied together; (1) slightly related, when content had similarities; (2) highly related,

Table 2. Threat schemata, saturation level of clusters, ultimate outcomes, and relatedness of consequences

Threat schemata	Saturation (%)	Ultimate outcomes	Relatedness (0–3)
		High worrier	
Suicidal ideation	100	Suicidal ideation	3
		Suicidal ideation	3
		Wanting to kill myself	3
Depression[a]	71	Depression	3
		Depression	3
		Depression	3
		Being depressed	2
		Being depressed	2
		Isolate myself and cry	1
		Unsatisfied with myself	1
Society	33	World war	1
		It would elevate the mortality rate	1
		Life has no meaning	1
Unclassifiable	00	Have to see a psychologist	0
		Our relationship would end	0
		Let things go	0
		Attempted suicide by my brother	0
		Low worrier	
Work/school	60	Having to study in another program	2
		Change program	2
		Put more pressure on myself in school	2
		There would be a lack in my training	2
		Harder to reintegrate my job	1
Negative mood	50	It would make me sad	2
		Have regrets	2
		Lower my self esteem	1
		Increase my worrying	1
Unclassifiable	00	Get sick	0
		Being single for a long time	0
		Influence my perception of things	0

[a] Saturation for this cluster = $100 \times (3 + 3 + 3 + 2 + 2 + 1 + 1)/(7 \times 3) = 71\%$

when consequences were quite similar, reflecting content that was closely tied together and (3) identical content. Thus, ultimate outcomes that were not categorized in a cluster were given a score of zero, and were discarded from the statistical analysis of the saturation level of clusters. The saturation level, which represented how closely linked ultimate outcomes were, was calculated by adding all the relatedness scores of ultimate outcomes in a cluster and dividing it by the number of ultimate outcomes in that cluster multiplied by three. This score obtained was multiplied by 100 in order to obtain a percentage level of saturation for each cluster, higher levels of saturation reflecting more closely related consequences (see

Table 3. Means and standard deviations for analyses of number of worries, feared consequences, ultimate outcomes, and worry clusters generated using the catastrophizing technique

	High worrier (N = 10)		Low worrier (N = 10)	
	M	*SD*	*M*	*SD*
Number of worries*	14.8	3.3	10.8	4.2
Average number of feared consequences in chain	8.0	2.5	6.3	2.7
Average likelihood of consequences (%)*	69.5	13.2	56.6	10.4
Average severity of ultimate outcomes*	3.8	1.4	2.6	0.6
Percentage of items in clusters	83.6	10.7	82.4	16.6
Number of clusters	3.0	0.8	2.8	1.6
Average ultimate outcomes per cluster	4.3	1.2	3.5	0.9
Average saturation level of clusters (%)*	73.8	11.7	57.7	14.3

* Significant, $p < .05$.

Table 2 for sample transcripts and example of calculation). Inter-rater reliability for the number of clusters and inclusion of ultimate outcomes in a specific cluster was calculated and reached 80% for both.

Results

Topic generation phase

High worriers reported a greater number of worries than low worriers, and this difference was statistically significant, $t(18) = 2.37$, $p < .05$ (see Table 3). Content analysis of worry themes using the CGW revealed a similar pattern of worries between groups. For high worriers, the most worrisome topics were interpersonal relationships (26.4%), work and academic concerns (19.6%), and threats to self (16.9%). These were followed by time management (9.5%), existential concerns (9.5%), threats to others' well-being (7.4%), financial concerns (6.1%), and miscellaneous (4.7%). For low worriers, the most worried about topics were interpersonal relationships (26.7%) and work and academic concerns (26.7%). These were followed by threats to self (12.0%), existential concerns (11.1%), threats to others' well-being (7.4%), financial concerns (7.4%), time management (5.6%), and miscellaneous (2.8%). The general ranking and frequency were similar for both groups as interpersonal concerns, work and academic concerns, and threats to self accounted for most of the worries reported by high and low worriers.

Catastrophizing phase

Although high worriers produced more consequences on average than low worriers did, the groups did not differ significantly. Each consequence was also rated from 0 to 100% on the likelihood of occurrence if all of the previous consequences actually occurred. A score for each participant was calculated by first combining the consequences within each worry leading to the ultimate consequence and then averaging across all worries. This revealed a significant effect for the average likelihood, $t(18) = 2.43$, $p < .03$. High worriers reported

that, on the average, the ultimate consequences were more likely to actually happen than for low worriers.

Content analysis of ultimate outcomes

The second hyothesis concerned the ultimate outcome generated for each worry during the catastrophizing phase. Content analysis using the severity grid (CCG) led to objective ratings of ultimate outcomes. These were averaged across worries for each participant. There was a significant effect between groups, $t(18) = 2.60$, $p < .03$ (see Table 3). High worriers reported more severe ultimate outcomes than low worriers did. Generally speaking, low worriers reported ultimate outcomes that were of mild to moderate severity. According to the grid, consequences at this level of severity are temporary and not persistent, such as high emotional arousal (being sad, feeling guilty), occasional conflict with others, and minor impairment in work or school, such as a bad grade. For high worriers, there were fewer mild consequences and there were more consequences in the more severe categories representing difficulties causing serious and persistent interference in the normal functioning of the individual, such as the presence of an emotional disorder (depression), major interpersonal problems (separation, few friends), work or school failures (loss of job, thrown out of college), and major financial problems.

Threat schemata analysis

The third hypothesis tested whether all the ultimate outcomes for a given participant were similar in content, thus presumably reflecting more tightly organized threat schemata. The number of ultimate outcomes that were classifiable in one of the different clusters did not differ between groups as 83% of the ultimate outcomes in both groups were included in one of the clusters. There was no significant difference in the number of clusters generated, as high worriers reported almost the same number of clusters as did low worriers. Further, the number of items per cluster for high worriers and low worriers did not differ significantly. However, for the clustered outcomes, there was a significant difference on the saturation level of clusters, $t(18.0) = 2.76$, $p < .02$. As predicted, high worriers reported clusters that were more highly saturated than low worriers (see Table 3).

Discussion

The purpose of this study was to test the hypothesis proposed by several authors that threat schemata of high worriers differ from that of low worriers in the manner with which information is structured and in the content of the information that is stored in the LTM. The catastrophizing interview technique (Vasey & Borkovec, 1992) was used to study the threat schemata of these individuals.

On a descriptive level, high worriers reported more worries than low worriers did. This is not surprising since, by definition, high worriers tend to worry more than low worriers. The content of these worries was also examined. As found by others (Borkovec, Shadick, & Hopkins, 1991; Craske, Rapee, Jackel, & Barlow, 1989), the ranking and frequency of worry themes reported by high and low worriers are quite similar, so differences in content of

worries are unlikely to account for differences found in this study. Interpersonal relationships as well as work and academic concerns are primary worry spheres for both groups.

The first hypothesis was partially confirmed. High worriers did not report a significantly higher number of feared consequences for each worry, but they did evaluate these consequences as more likely to actually happen than low worriers. These results partially replicate those obtained by Vasey and Borkovec (1992). In their study, high worriers reported a higher number of feared consequences, which they evaluated as more likely to actually happen. The difference between the studies may be due to several factors. First, the present study may lack statistical power: the effect size is in fact .65 in favour of the high worry group, which would indicate a moderate to large effect size and low power. Second, methodological differences between studies may explain the difference. In the Vasey and Borkovec (1992) study, only the highest and lowest rated worries were used for catastrophization. In the present study, all worries for each participant were used for catastrophization with worries that varied in severity. It may be that the difference in number of feared consequences generated is more marked with more severe worries. In this study, using the number of feared consequences averaged across worries for each participant might have lessened the difference. This hypothesis is supported by the fact that in both studies, participants tended to generate less feared consequences with worries of lesser intensity.

In the present study, these feared consequences were also evaluated by high worriers as more likely to actually happen. This lends further support to the idea that high worriers and generalized anxiety patients overestimate the probability of occurrence of negative events (Butler & Mathews, 1983, 1987), and that anxiety states are characterized by an expanded effort in entertaining consequences that are unlikely (Kendall & Ingram, 1987). The availability heuristics (Kahneman et al., 1982; Twersky & Kahneman, 1973) may explain this finding. Participants may make higher probability judgements based on the ease with which they can retrieve information from the long term memory (LTM). Since high worriers may have easier access to a larger store of fear provoking possibilities, they may evaluate these consequences as more probable.

Taken together, feared consequences, and the overestimation of likelihood of occurrence of these consequences, may provide a glimpse into deeper fear structures of individuals (Vasey & Borkovec, 1992). With the second hypothesis, we examined the participants' worst fears, by looking at the content of the ultimate outcome generated for each worry. The hypothesis is supported, as high worriers generate ultimate outcomes that are objectively more severe than for low worriers. High worriers report ultimate outcomes that can, on average, cause serious and persistent interference in the normal functioning of the individual. Low worriers report ultimate outcomes that are, on average, related to high emotional arousal that slightly affect the individual on a temporary basis. Also, high worriers seem to report more ultimate outcomes related to death and depression than low worriers. This supports findings by early studies with anxious patients that found that ideation of these patients revolved around themes such as death, mental illness, and physical injury (Beck, Laude, & Bohnert, 1974; Hibbert, 1984), but is contrary to results obtained by Vasey and Borkovec (1992). The latter found few differences in the content of catastrophic consequences generated by high and low worriers. The authors argued that their study may not have constituted an ideal test for such differences and that more qualitative aspects may be important distinguishing features. With the present study, we attempted to do this by qualifying the content of ultimate outcomes on their level of severity. Presumably, consequences

included in the same category in the Vasey and Borkovec (1992) study may have been rated at different levels of severity in the present study. An alternative explanation would be that catastrophic consequences in general are not different in content, but as the catastrophic sequence proceeds downward, high worriers generate possible consequences that are objectively more severe. Finally, the stringent selection criteria in the present study may mean that the high worriers manifested more severe worry than in the Vasey and Borkovec (1992) study.

With the third hypothesis, we examined the characteristics of threat schemata of high and low worriers based on the relatedness of ultimate outcomes. Approximately 83% of ultimate outcomes in both groups were classifiable into a cluster. High worriers reported the same number of clusters as low worriers, but these clusters were more saturated for high worriers. It seems unlikely that the higher saturation of clusters among high worriers was merely an artefact of fewer possible outcomes at higher levels of severity, given that several alternative outcomes were possible even at high levels of severity. Thus, it seems that the feared consequences reported by high and low worriers might be construed as being organized in identifiable threat schemata. These threat schemata are presumably more tightly organized for high worriers, as reflected by the higher degree of saturation of final consequences. In turn, these threat schemata are comprised of consequences that are objectively more severe for high worriers. This supports the affirmation that later steps in the catastrophizing sequence represent elaborated and tightly organized threat schemata that may be activated by catastrophizing (Vasey & Borkovec, 1992).

According to Borkovec and Lyonfields (1993), these threat schemata may be more vividly imaginable and anxiety provoking than surface level worries. We speculate that activation of these threat schemata contributes to the maintenance of worry. When activated by anxiety or priming, as with the catastrophizing technique, these threat schemata may render threatening information in the network more accessible (Bower, 1981). As the sequence of catastrophic consequences proceeds downward, anxiety increases (Vasey & Borkovec, 1992). This, in turn, renders threatening information even more accessible and leads to overestimation of the probability of occurrence of negative events (Butler & Mathews, 1983, 1987; Vasey & Borkovec, 1992). In order to minimize entertaining such negative consequences and the uncomfortable somatic activation that accompanies them, high worriers may use cognitive avoidance by switching to more surface level worries that are less severe and less anxiety provoking (Borkovec & Lyonfields, 1993). This has the advantage of stopping further elaboration of threat related information, but hinders adequate processing of such information, maintaining threat schemata in the LTM (Foa & Kozak, 1986).

The above account is consistent with recent conceptualizations for the treatment of worry and GAD that suggest that cognitive avoidance is an important factor in the maintenance of worry (Borkovec & Lyonfields, 1993; Brown, O'Leary, & Barlow, 1993; Dugas, Gagnon, Ladouceur, & Freeston, 1998). These authors have suggested that cognitive exposure to material that activates these threat schemata in the LTM may be effective in reducing worry. This is supported by preliminary results that show that cognitive exposure may be an effective component in reducing intrusive worry (Borkovec, Wilkinson, Folensbee, & Lerman, 1983; Ladouceur et al., 1999; O'Leary, Brown, & Barlow, 1992). We would argue that cognitive exposure to material that activates these threat schemata in the LTM would be highly effective in reducing worry. If the theory of emotional processing is accurate, cognitive exposure to deeper levels of meaning would lead to activation of these threat schemata

in LTM and to effective treatment of worry. Exposure to more surface level concerns would not lead to activation of threat schemata in the LTM. It may indeed lead to the *chaining* of different worry topics and maintain worry instead, as a possible consequence in one chain serves as the starting point for another.

Although the results found in the present study are relatively clear, pointing towards tightly organized threat schemata for high worriers, differences found among groups must be interpreted cautiously. First of all, of the 44 participants who met initial inclusion criteria, only 20 still met these criteria at the interview phase 4 weeks later. Although this surprising result may question the reliability of the measures used, it can better be explained by the use of stringent inclusion criteria. Participants in both groups had to meet all criteria, seven overall, on both measures, at both times, to be included in the study. In retrospect the criteria may have been overly stringent and more liberal group classification, like those used in the Vasey and Borkovec (1992) study, may have been appropriate. Second, the high worry group is composed of non-clinical participants that meet all GAD criteria on the WAQ, and score in the clinical range on the PSWQ. They are not clinical GAD patients seeking treatment. This would seem a major limitation, but as emphasized by Vasey and Borkovec (1992), previous work suggests that analogue groups of college student chronic worriers are very similar to clinical populations. Finally, the elaborate categorization scheme used in the present study may call for caution in the interpretation of these results. Obviously, if the integrity of the measures used or the categories that are extracted from them is brought into question, then the results of the present study may be seriously questioned. In order to address these concerns, existing measures or measures derived from them were used when possible. When no existing measure was readily available, as was the case with the CCG, a measure was developed based on earlier work by our research team, and extensive categorization training was carried out on separate data. Inter-rater agreement was carried out on all steps in the categorization process, and four independent raters participated in the different categorization processes so that raters were not influenced by familiarity with the data. All raters were unaware of group classification. Inter-rater reliability was good for all categorization levels as it varied between 80% and 91%. Although inter-rater reliability has its limitations, high agreement between raters suggests that the categories derived from the instruments in the present study are reliable.

In summary, this study replicates and extends the results obtained in the Vasey and Borkovec (1992) study. As proposed by these authors and others, compared to low worriers, anxious individuals who worry excessively seem to possess more tightly organized threat schemata. These schemata are comprised of possible negative outcomes that would be objectively more severe, if they were to occur, and subjectively more likely to happen. Further work with a larger sample and clinical GAD patients needs to be done in order to determine how the activation or avoidance of these threat schemata in the LTM contributes to the maintenance of worry.

Acknowledgements

References

AMERICAN PSYCHIATRIC ASSOCIATION (1987). *Diagnostic and statistical manual of mental health disorders* (3rd ed., rev.). Washington, DC: Author.

AMERICAN PSYCHIATRIC ASSOCIATION (1994). *Diagnostic and statistical manual of mental health disorders* (4th ed.). Washington, DC: Author.

BECK, A. T., LAUDE, R., & BOHNERT, M. (1974). Ideational components of anxiety neurosis. *Archives of General Psychology, 3*, 319–325.

BORKOVEC, T. D., & LYONFIELDS, J. D. (1993). Worry: Thought suppression of emotional processing. In H. W. Krohne (Ed.), *Attention and avoidance* (pp. 101–118). Seattle: Hogrefe & Huber.

BORKOVEC, T. D., SHADICK, R., & HOPKINS, M. (1991). The nature of normal and pathological worry. In R. M. Rapee & D. H. Barlow (Eds.), *Chronic anxiety: Generalized anxiety disorder and mixed anxiety-depression*. New York: Guilford Press.

BORKOVEC, T. D., WILKINSON, L., FOLENSBEE, R., & LERMAN, C. (1983). Stimulus control applications to the treatment of worry. *Behaviour Research and Therapy, 21*, 247–251.

BOWER, G. H. (1981). Mood and memory. *American Psychologist, 36*, 129–148.

BROWN, T. A., O'LEARY, T. A., & BARLOW, D. H. (1993). Generalized anxiety disorder. In D. H. Barlow (Ed.), *Clinical handbook of psychological disorders* (2nd ed., pp. 137–188). New York: Guilford.

BUTLER, G., & MATHEWS, A. (1983). Cognitive processes in anxiety. *Advances in Behaviour Research and Therapy, 5*, 51–62.

BUTLER, G., & MATHEWS, A. (1987). Anticipatory anxiety and risk perception. *Cognitive Therapy and Research, 11*, 551–565.

CRASKE, M. G., RAPEE, R. M., JACKEL, L., & BARLOW, D. H. (1989). Qualitative dimensions of worry in DSM-III-R generalized anxiety disorder subjects and nonanxious controls. *Behaviour Research and Therapy, 27*, 397–402.

DAVEY, C. G. L., JUBB, M., & CAMERON, C. (1996). Catastrophic worrying as a function of changes in problem-solving confidence. *Cognitive Therapy and Research, 20*, 333–344.

DUGAS, M., FREESTON, M. H., DOUCET, C., LACHANCE, S., & LADOUCEUR, R. (1995a). Structured versus free-recall measures: Effect on report of worry themes. *Personality and Individual Differences, 18*, 355–362.

DUGAS, M. J., FREESTON, M. H., LACHANCE, S., PROVENCHER, M., & LADOUCEUR, R. (1995b, July). *The worry and anxiety questionnaire: Initial validation in non clinical and clinical samples*. Poster presented at the World Congress of Behavioural and Cognitive Therapies, Copenhagen, Denmark.

DUGAS, M. J., GAGNON, F., LADOUCEUR, R., & FREESTON, M. H. (1998). Generalized anxiety disorder: A preliminary test of a conceptual model. *Behaviour Research and Therapy, 36*, 215–226.

EYSENCK, M. W. (1984). Anxiety and the worry process. *Bulletin of the Psychonomic Society, 22*, 545–548.

FOA, E. B., & KOZAK, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*, 20–35.

HIBBERT, G. A. (1984). Ideational components of anxiety: Their origin and content. *British Journal of Psychiatry, 144*, 618–624.

KAHNEMAN, D., SLOVIC, P., & TVERSKY, A. (1982). *Judgement under uncertainty: Heuristics and biases*. Cambridge, UK: Cambridge University Press.

KENDALL, P. C., & INGRAM, R. E. (1987). The future for cognitive assessment of anxiety: Let's get specific. In L. Michaelson & L. M. Ascher (Eds.), *Anxiety and stress disorders: Cognitive-behavioural assessment and treatment*. New York: Guilford.

KENDALL, P. C., & INGRAM, R. E. (1989). Cognitive behavioural perspectives: Theory and research on depression and anxiety. In P. C. Kendall & D. Watson (Eds.), *Anxiety and depression: Distinctive and overlapping features*. New York: Academic Press.

LACHANCE, C., LANGLOIS, F., RHÉAUME, J., FREESTON, M. H., & LADOUCEUR, R. (1994, November). *Responsibilité excessive chez une population non-clinique* [Excessive responsibility in a non-clinical population]. Poster presented at the XVIIth congress of the Société Québécoise de la Recherche en Psychologie, Montréal, Canada.

LADOUCEUR, R., DUGAS, M. J., FREESTON, M. H., LÉGER, É., GAGNON, F., & THIBODEAU, N. (1999). *Effectiveness of a new cognitive-behavioural treatment for generalized anxiety disorder: Evaluation in a controlled clinical trial*. Manuscript submitted for publication.

LADOUCEUR, R., FREESTON, M. H., DUMONT, J., LETARTE, H., RHÉAUME, J., GAGNON, F., & THIBODEAU, N. (1992). Penn State Worry Questionnaire: Validity and reliability of a French translation. *Canadian Psychology, 33*, 236.

MATHEWS, A. (1990). Why worry? The cognitive function of anxiety. *Behaviour Research and Therapy, 28*, 455–468.

MATHEWS, A., & MACLEOD, C. (1985). Selective processing of threat cues in anxiety states. *Behaviour Research and Therapy, 23*, 563–569.

MEYER, T. J., MILLER, M. L., METZGER, R. L., & BORKOVEC, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy, 28*, 487–496.

O'LEARY, T. A., BROWN, T. A., & BARLOW, D. H. (1992, November). *The efficacy of worry control treatment in generalized anxiety disorder: A multiple baseline analysis*. Poster presented at annual meeting of the Association for Advancement of Behaviour Therapy, Boston, Mass.

PRATT, P., TALLIS, F., & EYSENCK, M. (1997). Information-processing, storage characteristics and worry. *Behaviour Research and Therapy, 35*, 1015–1023.

ROEMER, L., BORKOVEC, M., POSA, S., & BORKOVEC, T. D. (1995). A self-report measure of generalized anxiety disorder. *Journal of Behaviour Therapy and Experimental Psychiatry, 26*, 345–350.

TVERSKY, A., & KAHNEMAN, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology, 5*, 207–232.

VASEY, M. W., & BORKOVEC, T. D. (1992). A catastrophizing assessment of worrisome thoughts. *Cognitive Therapy and Research, 16*, 505–520.