Pain Catastrophizing as Repetitive Negative Thinking: A Development of the Conceptualization

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Abstract. Pain catastrophizing is a well-known concept in the pain literature and has been recognized as one of the most powerful psychological determinants of negative outcomes for pain problems. However, relatively little effort has been put into developing its theoretical underpinnings. More specifically, the intrinsic *function* of catastrophizing is not explicitly dealt with in contemporary theoretical models. The aim of this article is to add to existing models by proposing a development of the conceptualization of catastrophizing that stresses its function as an emotion regulator. We argue that catastrophizing can be conceptualized as a form of *negative repetitive thinking*, which is *abstract*, *intrusive*, and *difficult to disengage* from. It has been argued that repetitive negative thinking is a form of ineffective problem solving that functions to downregulate negative affect and that it can be regarded as an avoidant coping strategy because it impedes processing of emotional and somatic responses. Thus, in our conceptualization, catastrophizing is proposed to be a form of problem-solving behavior that functions to reduce negative emotion triggered by pain, and other related stimuli. Furthermore, we argue that catastrophizing is preferably regarded as a process where cognitions, emotions, and overt behavior are intertwined and not viewed as separate entities. To underscore the latter, we suggest the term *catastrophic worry*. Our intention with this development of the conceptualization is to give rise to new ideas for research and clinical practice and to revitalize discussions about the theoretical framework around pain-related catastrophizing. *Key words:* *repetitive negative thinking; catastrophizing; avoidance; coping strategy*

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Persistent pain is a huge problem among people in Western societies. About 20% of European adults report that they suffer from persistent pain of moderate to severe intensity, seriously affecting their work capacity and quality of life (e.g., Bergman et al., 2001; Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). In the last decades, there has been a remarkable increase in research findings about the importance of psychological factors for pain experience and pain-related outcomes such as disability and sick leave (e.g., Linton & Shaw 2011; Nicholas, Linton, Watson, & Main, 2011). It is now well known and accepted that psychological factors indeed are important for how people experience and handle problems with pain.

Pain catastrophizing is a well-known concept in the pain literature, and it has been recognized as one of the most powerful psychological determinants of pain and pain-related disability (e.g., Keefe, Rumble, Scipio, Giordano, & Perri, 2004; Leeuw et al., 2007; Quartana, Campbell, & Edwards, 2009; Severeijns, Vlaeyen, van den Hout, & Weber, 2001; Sullivan et al., 2001, 2002). Broadly speaking, catastrophizing reflects “an exaggerated negative mental set brought to bear during actual or anticipated pain experience” (Sullivan et al., 2001). It has been linked to a number of negative consequences, cross-sectionally as well as prospectively (for reviews, see Keefe et al., 2004; Sullivan et al., 2001). Considering the amount of research confirming the link between

catastrophizing and negative outcomes for pain problems, relatively little effort has been put into its theoretical underpinnings. More specifically, the intrinsic *function* of catastrophizing is not explicitly dealt with in contemporary theoretical models. The aim of this article is to add to existing theoretical models by proposing a development of the conceptualization of catastrophizing, where the focus is on the function of catastrophizing. This conceptualization builds on theories and findings from the current psychological literature and applies this knowledge into the pain area. In our conceptualization, catastrophizing is framed as repetitive negative thinking, and the proposed function is to downregulate negative affect. Furthermore, we argue that catastrophizing is preferably regarded as a process where cognitions, emotions, and overt behavior are intertwined and not viewed as separate entities. To underscore the latter, we suggest the term *catastrophic worry*. Our intention with this text is to revitalize the discussion about the theoretical underpinnings of pain catastrophizing.

Earlier conceptualizations

Before the term was introduced in the pain area, catastrophizing was most commonly described in the cognitive literature about emotional disorders. It was proposed to be a maladaptive pattern of thinking, frequently observed in people with depressive and anxiety disorders (Beck 1976). Beck (1979) described catastrophizing as one of several types of cognitive distortions that characterize *depressive schemas*. Catastrophizing was conceptualized as a cognitive concept, which increased the risk for the development as well as the perpetuation of emotional disorders. Later on, the concept was transferred to the pain field and other theoretical frameworks emerged to explain specifically pain-related catastrophizing.

The *fear-avoidance model of pain* (Vlaeyen & Linton 2000) (Figure 1) is perhaps the most commonly used framework when theorizing about pain catastrophizing. The model illustrates how some people react with intense fear and catastrophizing when confronting a pain stimulus, which results in subsequent avoidance of pain-related movements. Catastrophizing has been referred to as “the cognitive element” of this fear network (Leeuw et al.,

Figure 1. The fear-avoidance model of pain (adapted from Vlaeyen & Linton 2000).

2007). Implicitly, the model infers that catastrophizing is a cognitive precursor of fear and avoidance, although the sequential order of the model has been questioned (Nicholas 2009; Vlaeyen, Crombez, & Linton, 2009; Wideman, Adams, & Sullivan, 2009). However, the model does not provide a conceptualization of catastrophizing per se, but rather positions it as the cognitive part of a broader fear network.

One point of critique against the fear-avoidance model is that many pain patients do not necessarily express or experience fear, which generally is considered a response to an obvious and present-oriented threat (Asmundson, Norton, & Vlaeyen, 2004). Instead, the threat is often more vague, uncertain, and future oriented, and therefore the response is better described as pain-related anxiety. In order to conceptually refine the original fear-avoidance model, Asmundson et al., (2004) presented an extended version. This *fear-anxiety-avoidance model* is more elaborate in describing how different concepts such as fear, anxiety, and catastrophizing are interrelated. However, even though this model is conceptually more stringent, it is more complicated and includes many different terms and concepts. This might explain why the original fear-avoidance model is still the most widely referenced model.

The *appraisal model* is another framework, which has been put forward to explain pain catastrophizing (Severeijns, Vlaeyen, & van den Hout, 2006). This model is based on the transactional model of stress and coping (Lazarus & Folkman 1984), and it positions catastrophizing in a coping framework stressing the cognitive aspects of the concept. Specifically, catastrophizing is described as a

result of underlying *beliefs*, *primary appraisal* (i.e., evaluation of the situation), and *secondary appraisal* (i.e., evaluation of ability to cope with the situation). In other words, if a person evaluates a pain stimulus as threatening and estimates that he or she is unable to handle the situation, this might result in catastrophizing.

Another model that also frames catastrophizing in a coping perspective, but from a different angle, is the *communal coping model* (CCM) (Sullivan et al., 2001; Thorn, Ward, Sullivan, & Boothby, 2003). This model takes a step away from the cognitive conceptualization of catastrophizing by emphasizing the importance of the social context. According to the CCM, people who catastrophize exaggerate their expressions of pain as a way to maximize social support from people around them. This model explains one possible function of catastrophizing—to elicit social support. However, even though a number of studies have confirmed the link between catastrophizing and the social environment (Giardino, Jensen, Turner, Ehde, & Cardenas, 2003; Keefe et al., 2003; Lackner & Gurtman 2004; Sullivan, Adams, & Sullivan, 2004), the model has received substantial criticism (Severeijns et al., 2006). One argument is that the CCM focuses on the *consequences* of catastrophizing rather than on the origin—people most likely elicit social support because

they catastrophize, and not the other way around. Furthermore, the CCM focuses on social support seeking as the one and only function of catastrophizing, which might be considered as a rather narrow scope.

A recent model that has advanced the coping framework around catastrophizing is the *misdirected problem-solving model* (Eccleston & Crombez 2007; Figure 2). This model builds on proposals from the fear-avoidance model and the CCM and reframes them within a problem-solving perspective. Catastrophizing is here conceptualized as part of a process of worry that functions as an active attempt to solve a problem. The misdirected problem-solving model proposes that worry and catastrophizing motivate pain patients to actively search for pain relief or a “cure.” If total pain relief is not a viable option, which is often the case in patients with persistent pain, these attempts might become “misdirected” and prevent a more adaptive shift to other goals such as having a rich life despite pain. Thus, in this model, catastrophizing is part of an unsuccessful problem-solving strategy, which involves repeated fruitless efforts at finding a cure for pain.

The short description of the models above illustrates that pain catastrophizing has been described within quite diverse theoretical frameworks. It is noteworthy that these frameworks

Figure 2. A stylized version of the misdirected problem-solving model (Eccleston & Crombez 2007) focusing on the perseverance loop. Note. The original term worry is replaced here with the term catastrophic worry to underscore the intensity and the extreme nature of this tendency.

might be seen as complementary and overlapping. Two recurring aspects are that catastrophizing in these frameworks is proposed to be related to emotional responding as well as to coping. In recent years, the psychological literature has advanced our understanding of these two aspects and put them into a more functional perspective (e.g., Stroebe et al., 2007). This provides the basis for our conceptualization of catastrophizing, which aims to add to existing models described above.

Need for a development of the conceptualization

We argue that there is a need for a new and complementary view of catastrophizing, where we apply theories and findings from contemporary psychological literature into the pain area. More than a decade ago, Turner & Aaron (2001) highlighted a need for advancements in the understanding of the nature and function of catastrophizing. They also questioned whether current measures of catastrophizing such as the Pain Catastrophizing Scale (PCS; Sullivan, Bishop, & Pivik, 1995) and the Coping Strategies Questionnaire (CSQ; Rosenstiel & Keefe 1983) really capture the substance of the construct. Since then, an impressive number of studies have been published on the topic of catastrophizing. However, most research still focus on associations between ratings on the PCS or the CSQ and outcome in terms of pain or disability. With all respect to these self-report instruments, catastrophizing has often been treated as being the content of these scales. This approach hinders contributions to the theoretical understanding of the concept. For example, it tells us nothing about *why* some people get caught in catastrophic thinking, which they have difficulties in disengaging from, despite obvious poor long-term effects such as heightened pain and disability. We propose that a conceptualization of catastrophizing that includes a focus on function would enhance our understanding of what catastrophizing is and provide more insight into why people engage in catastrophic thinking.

The necessity for an expansion of earlier conceptualizations, which incorporates current psychological theory, was proposed already a few years ago (Haythornthwaite 2009). While function has been implicated in

recent models of catastrophizing, it has not explicitly been put forward. Both the CCM and the misdirected problem-solving model are to a certain extent related to a functional view of catastrophizing. However, in the CCM, the proposed function of catastrophizing is to elicit social support, which means that catastrophizing is dependent on the social context. In the misdirected problem-solving model, on the other hand, the proposed function of intense worry such as catastrophizing is to maintain vigilance to threat and to promote problem solving. Our conceptualization fits well with both these models, but is more explicit in expressing the intrinsic function of catastrophizing, irrespective of context.

Pain catastrophizing as repetitive negative thinking

We propose that the intrinsic function of catastrophizing is to reduce negative affect, which might arise in a stressful situation such as suffering from persistent pain. From a functional perspective, catastrophizing can be conceptualized as a form of *repetitive negative thinking*, similar to worry or rumination. Repetitive negative thinking has been defined as “a style of thinking about one’s problems (current, past, or future) or negative experiences (past or anticipated) that is *repetitive*, at least partly *intrusive*, and is *difficult to disengage from*” (Ehring et al., 2011).

It has been argued that repetitive negative thinking is an avoidant coping strategy (Stroebe et al., 2007), which is characterized by an abstract content (Watkins 2008). According to this perspective, patients with high levels of pain-related fear and anxiety might engage in catastrophizing as a way of reducing the intensity of the aversive physiological and psychological aspects of the fear response (Borkovec, Alcaine, & Behar, 2004). The catastrophizing is negatively reinforced because abstract cognitive activity (“Why do I suffer from pain?”) impedes activation, and thereby also processing, of emotional and somatic responses (e.g., Cribb, Moulds, & Carter, 2006; Stöber 1998). Concurrently, the catastrophizing may also be positively reinforced through metacognitions about dwelling on the problem as beneficial for finding a solution to the problem (Mathews 1990; Watkins &

Baracaia 2001). The catastrophizing may thus be both negatively and positively reinforced in the short term, despite the paradoxical long-term consequences such as more pain and disability.

In other words, the patient gets stuck in passive and abstract catastrophizing, instead of moving into constructive, concrete problem solving. Interestingly, pain patients have *not* been found to suffer from a deficit in general problem-solving skills (De Vlieger, Bussche, Eccleston, & Crombez, 2006). However, the same authors suggest that the deficit is instead a high level of rigidity and fixedness in using the skills. This perspective is in line with the misdirected problem-solving model (Eccleston & Crombez 2007), which suggests that inflexible (catastrophic) worry obstructs constructive problem solving. Taken together, the conceptualization of catastrophizing as repetitive negative thinking provides an alternative way to look at catastrophizing as covert avoidance, which is characterized by an abstract content and inflexibility.

According to this conceptualization, catastrophizing is viewed as a process where thoughts, emotions, and overt behavior are intertwined. Considering catastrophizing as a process underscores that catastrophizing is a *behavior*, which is repetitive and intrusive by its nature and these features are more important than the specific content since this may shift over time.

This line of reasoning is inspired by the growing research about repetitive negative thinking as a *transdiagnostic* construct, identified across disorders (for a review, see Watkins 2008). According to this research, there are more similarities than differences between different forms of repetitive negative thinking such as worry, catastrophizing, and rumination. As an example, rumination has been defined as “passive focus on one’s symptoms of distress and the possible causes and consequences of these symptoms. The individual repeatedly goes over problems and his or her feelings about the problems, without moving into [constructive, auth. note] problem solving” (Nolen-Hoeksema 2005). This definition might also serve for catastrophizing. In fact, one of the subscales in the PCS is labeled rumination, which indicates that these processes indeed are interrelated, and may both

be included in the overall term repetitive negative thinking.

Although characterized by perseverance, repetitive negative thinking may come in bouts or vary in intensity, and some moderators have been proposed. For example, research has shown that individuals have different stop rules (i.e., cognitive rules, e.g., “as many as can” vs. “do I feel like continuing”) that interact with mood to influence the degree of task persistence (e.g., Startup & Davey 2001; Vlaeyen & Morley 2004). Repetitive thinking can be construed as a mental problem-solving task and there is indeed evidence that stop rules and mood influence the duration of worry bouts (Davey, Eldridge, Drost, & MacDonald, 2007; Hawksley & Davey 2010). Taken together, this would imply that low mood and positive metacognitions about worry being constructive problem solving (e.g., “as many as can” stop rule) may moderate the likelihood of individuals getting stuck in repetitive and perseverant negative thinking that is difficult to disengage from.

To underscore the similarities between different forms of repetitive negative thinking, we put forward the term *catastrophic worry*. The term itself is not new, but has been used earlier to describe more intense forms of worry (e.g., Davey & Levy 1998). However, in the pain area, the term catastrophizing is entirely predominant. We suggest a resumption of the term catastrophic worry because of three main reasons. First, we believe that catastrophic worry provides a clearer description of what this tendency is all about and is the term used in areas outside of the pain field. Worry is commonly defined as “... a chain of thoughts and images, negatively affect laden and relatively uncontrollable ...” (Borkovec, Robinson, Pruzinsky, & DePree, 1983). This definition is very similar to the current conceptualization of catastrophizing, and the term catastrophic worry underscores these similarities. In the anxiety literature, catastrophic worry has been described as a perseverative iterative style (i.e., rumination), feelings of personal inadequacy (i.e., helplessness), and a perception of catastrophizing thoughts as containing relevant information (i.e., magnification) (Davey & Levy 1998). This description entirely overlaps with the subscales in the PCS, the most commonly used tool for assessing pain-related catastrophizing

(Sullivan et al., 1995). To use the term catastrophic worry also in the pain field would create uniformity between the different areas. Second, the term catastrophic worry facilitates understanding of the relation between catastrophizing, anxiety, and emotional processing. Borkovec et al., (2004) have presented convincing support for their *avoidance theory of worry*. According to this theory, worry is a perseverative cognitive activity that allows individuals to approach emotional material (e.g., preoccupation with pain) at an abstract and superficial level, which inhibits aversive images and intense negative emotions in the short run. In the long run, however, this avoidance of intense emotional reactions actually delays emotional processing and creates more anxiety. Delayed emotional processing is one explanation of how catastrophic worry is associated with increasing emotional problems (e.g., depression and anxiety) and long-term pain-related disability. As catastrophic worry indeed is framed as an avoidant coping strategy in our conceptualization, we propose that catastrophic worry is a suitable term to describe this tendency. Third, the term catastrophic worry highlights that from a functional perspective, it makes no sense to distinguish between different forms of repetitive negative thinking since they are functionally equivalent. Therefore, we will hereafter use the term catastrophic worry.

Advantages with our conceptualization

Considering catastrophic worry as repetitive negative thinking has several advantages. First, our analysis treats catastrophic worry as a *process* that captures the cognitive, emotional, and behavioral aspects involved. Consequently, this provides one explanation of how comorbid problems such as depression or sleep disorders occur. For example, the transdiagnostic view would consider catastrophic worry to be an essential process that contributes to the pain, and to the depression and sleep disturbances; it is the same underlying process, but with different comorbid problem descriptions. Considered as a transdiagnostic, this also sheds light on interventions since targeting catastrophic worry might have benefits for the pain

problem as well as for problems with depression or sleep.

A second and related advantage is that our perspective of catastrophic worry focuses on the *function* it serves rather than its content, opening the door for new treatment strategies. This highlights its function in terms of learning theory where our contention is that catastrophic worry is an avoidance response reinforced by immediate reductions in negative affect. Thus, our view provides a parsimonious explanation and it suggests that catastrophic worry might be targeted directly by manipulating learning paradigms, just as activity avoidance may be directly tackled by exposure treatments (Vlaeyen, de Jong, Heuts, & Crombez, 2008). Indeed, viewing catastrophic worry in this way paves the way for new treatment strategies that might improve results. For example, in the depression literature, it is well known that repetitive negative thinking may block the effects of behavioral activation (Jacobson, Martell, & Dimidjian, 2001). In fact, when behavioral activation treatment stalls, clinical advice is to review with the client the role of thoughts and attention while doing the activities. If attention is focused on negative repetitive thinking while doing the activities, then the client is not engaged in the activity and the expected positive reinforcement is eliminated. The same may be true for graded activation and exposure treatments for patients suffering pain. Catastrophic worry as negative repetitive thinking may block the potential benefits and limit treatment outcomes.

A third advantage is that the proposed view is parsimonious. As suggested above, current theoretical models such as the fear-avoidance model treat catastrophizing as a cognitive element. However, catastrophic worry is known to be closely linked to emotions, but these are viewed as a separate entity. Moreover, catastrophic worry overlaps to a large extent with the idea of worry and has overt behavioral aspects as well. Thus, our proposed view, by combining the cognitive, emotional, and behavioral aspects into a process, is simpler. It also invokes only learning paradigms while other conceptions tend to mix cognitive, emotional, and learning paradigms, again making the proposed view more parsimonious. In addition, considering catastrophic worry as repetitive negative thinking is quite in

line with developments in the psychological literature (e.g., Ehring & Watkins 2008; Watkins 2009). Thus, the current proposal would actually move the psychology of pain closer in line to current psychological knowledge.

The advantages above are essential because taken together they provide an excellent basis for understanding the process and utilizing it in the treatment and prevention of persistent pain problems.

Conclusion

Although pain catastrophizing is a widely studied concept, which repeatedly has been linked to poor outcomes such as higher ratings of pain and disability, its theoretical underpinnings have received less focus. In this article, we have argued for a parsimonious conceptualization of catastrophizing, which includes a resumption of the term catastrophic worry. We conceptualize catastrophic worry as repetitive negative thinking, which serves the function to downregulate negative affect.

This conceptualization fits well with contemporary models such as the CCM and the misdirected problem-solving model. In fact, it might add to these models by explicitly focusing on the intrinsic function of the catastrophic worry. This conceptualization also builds on basic learning paradigms as well as recent research about transdiagnostic processes.

This conceptualization provides a parsimonious perspective and might have important implications. First, it forms the ground for new interventions aiming at addressing catastrophic worry in clinical contexts. Specific strategies to effectively target catastrophic worry are highly needed, in particular for high catastrophizing patients who are often not helped by current treatments (e.g., Flink, Boersma, & Linton, 2010; Turner, Holtzman, & Mancl, 2007). One possibility would for example be to work with problem-solving skills training to concretize the diffuse content and formulate an articulated problem, which is possible to tackle through different solutions. Problem-solving skills training, when used in the context of this conceptualization, would address both the inflexibility and abstractness of the catastrophic worry, and facilitate the patient confronting the problem instead of avoiding it. Even though problem-solving

skills training is a well-known strategy within cognitive behavior therapy, it has not been used particularly for patients with high levels of catastrophic worry. Second, this framework provides a base for further research. For example, it gives rise to several hypotheses, which are to be tested in experimental paradigms. One such hypothesis is that catastrophic worry is a form of covert avoidance, where the immediate effect is to downregulate negative affect. Even though there is evidence from the worry literature that worry is a form of covert avoidance (for an overview, see Borkovec et al., 2004), it is unknown whether pain-related catastrophic worry also serves this function. The assumptions underlying our conceptualization are mainly based on research from other areas and whether they are applicable specifically on pain-related catastrophic worry is still to be explored.

One question that might be raised is whether pain catastrophizing and catastrophic worry denote the same phenomenon or whether catastrophic worry may be describing a different aspect of the pain experience. We argue that while the constructs may have somewhat different connotations, they denote the same mental behavior. While the term catastrophizing mainly highlights the catastrophic content of repetitive thought, the term catastrophic worry is also thought to highlight the potentially important intrusive and abstract qualities of this thinking and its function to avoid immediate intense negative images and emotions. The conceptualization of catastrophic worry therewith shifts focus from content to process and function. Consequently, it may be less effective to focus on changing the topography of thought (its content) than it is to target its function. Future studies are necessary that investigate the effectiveness of interventions geared toward altering the function of catastrophic worry as compared to methodologies that focus on thought content change.

One challenge with the current conceptualization is how to assess catastrophic worry. Possibly, the commonly used self-report inventories to assess repetitive negative thinking (e.g., the Perseverative Thinking Questionnaire [PTQ]; Ehring et al., 2011), or specifically pain-related catastrophizing (e.g., PCS; Sullivan et al., 1995), need to be

complemented with an interview procedure. One example of such a procedure is the Catastrophizing Interview (Vasey & Borkovec 1992). This would, for instance, reveal the level of abstraction of the worries (for an example of the procedure, see Davey 2006; Stöber, Tepperwien, & Staak, 2000), as an indication of avoidance of aversive images. However, precise details about the best procedure to assess catastrophic worry, based on the conceptualization in this paper, are challenges for future research. Taken together, this development of the conceptualization gives rise to new ideas for research and clinical practice, and we hope that it will inspire revitalizing discussions about the theoretical framework around pain-related catastrophizing.

References

- Asmundson, G. J. G., Norton, P. J., & Vlaeyen, J. W. S. (2004). Fear-avoidance models of chronic pain: An overview. In G. J. G. Asmundson, J. W. S. Vlaeyen, & G. Crombez (Eds.), *Understanding and treating fear of pain* (pp. 3–24). Oxford: Oxford University Press.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York: International Universities Press.
- Beck, A. T. (1979). *Cognitive therapy of depression*. London: The Guilford Press.
- Bergman, S., Herrström, P., Höglström, K., Petersson, I. F., Svensson, B., & Jacobsson, L. (2001). Chronic musculoskeletal pain, prevalence rates, and sociodemographic associations in a Swedish population study. *The Journal of Rheumatology*, 28(6), 1369–1377.
- Borkovec, T. D., Alcaine, O., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 77–108).
- Borkovec, T., Robinson, E., Pruzinsky, T., & DePree, J. A. (1983). Preliminary exploration of worry: Some characteristics and processes. *Behaviour Research and Therapy*, 21(1), 9–16.
- Breivik, H., Collett, B., Ventafridda, V., Cohen, R., & Gallacher, D. (2006). Survey of chronic pain in Europe: Prevalence, impact on daily life, and treatment. *European Journal of Pain*, 10(4), 287–333.
- Cribb, G., Moulds, M. L., & Carter, S. (2006). Rumination and experiential avoidance in depression. *Behaviour Change*, 23(3), 165–176.
- Davey, G. C. L. (2006). The catastrophizing interview procedure. In G. Davey & A. Wells (Eds.), *Worry and its psychological disorders* (pp. 157–176). Chichester: Wiley.
- Davey, G. C. L., Eldridge, F., Drost, J., & MacDonald, B. A. (2007). What ends a worry bout? An analysis of changes in mood and stop rule use across the catastrophizing interview task. *Behaviour Research and Therapy*, 45(6), 1231–1243.
- Davey, G. C. L., & Levy, S. (1998). Catastrophic worrying: Personal inadequacy and a perseverative iterative style as features of the catastrophizing process. *Journal of Abnormal Psychology*, 107(4), 576–586.
- DiTommaso, E., & Spinner, B. (1993).
- Eccleston, C., & Crombez, G. (2007). Worry and chronic pain: A misdirected problem solving model. *Pain*, 132(3), 233–236.
- Ehring, T., & Watkins, E. R. (2008). Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy*, 1(3), 192–205.
- Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schönfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy and Experimental Psychiatry*, 42(2), 225–232.
- Flink, I. K., Boersma, K., & Linton, S. J. (2010). Catastrophizing moderates the effect of exposure *in vivo* for back pain patients with pain-related fear. *European Journal of Pain*, 14, 887–892.
- Giardino, N. D., Jensen, M. P., Turner, J. A., Ehde, D. M., & Cardenas, D. D. (2003). Social environment moderates the association between catastrophizing and pain among persons with a spinal cord injury. *Pain*, 106(1–2), 19–25.
- Hawksley, J., & Davey, G. C. L. (2010). Mood-as-input and depressive rumination. *Behaviour Research and Therapy*, 48(2), 134–140.
- Haythornthwaite, J. (2009). *It's a belief. It's an appraisal. It's coping ... No, it's catastrophizing*. Paper presented at the Current Topics in Pain: 12th World Congress on Pain, Glasgow, UK.
- Jacobson, N. S., Martell, C. R., & Dimidjian, S. (2001). Behavioral activation treatment for depression: Returning to contextual roots. *Clinical Psychology: Science and Practice*, 8(3), 255–270.
- Keefe, F. J., Lipkus, I., Lefebvre, J. C., Hurwitz, H., Clipp, E., Smith, J., & Porter, L. (2003). The social context of gastrointestinal cancer pain: a preliminary study examining the relation of patient pain catastrophizing to patient perceptions of social support and caregiver stress and negative responses. *Pain*, 103(1–2), 151–156.
- Keefe, F. J., Rumble, M. E., Scipio, C. D., Giordano, L. A., & Perri, L. M. (2004). Psychological aspects of persistent pain: Current state of the science. *The Journal of Pain*, 5(4), 195–211.
- Lackner, J. M., & Gurtman, M. B. (2004). Pain catastrophizing and interpersonal problems: A circumplex analysis of the communal coping model. *Pain*, 110(3), 597–604.

- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.
- Leeuw, M., Goossens, M., Linton, S. J., Crombez, G., Boersma, K., & Vlaeyen, J. W. S. (2007). The fear-avoidance model of musculoskeletal pain: Current state of scientific evidence. *Journal of Behavioral Medicine*, 30(1), 77–94.
- Linton, S. J., & Shaw, W. S. (2011). Impact of psychological factors in the experience of pain. *Physical Therapy*, 91(5), 700–711.
- Mathews, A. (1990). Why worry? The cognitive function of anxiety. *Behaviour Research and Therapy*, 28(6), 455–468.
- Nicholas, M. K. (2009). First things first: Reductions in catastrophizing before fear of movement. *Pain*, 145(1), 6–7.
- Nicholas, M. K., Linton, S. J., Watson, P. J., & Main, C. J. (2011). Early identification and management of psychological risk factors (“yellow flags”) in patients with low back pain: A reappraisal. *Physical Therapy*, 91(5), 737–753.
- Nolen-Hoeksema, S. (2005). *Lost in thought: Rumination and depression*, Paper presented at the Annual Conference of the American Psychological Association, Washington, DC.
- Quartana, P. J., Campbell, C. M., & Edwards, R. R. (2009). Pain catastrophizing: a critical review. *Expert Review of Neurotherapeutics*, 9(5), 745.
- Rosenstiel, A. K., & Keefe, F. J. (1983). The use of coping strategies in chronic low back pain patients: Relationship to patient characteristics and current adjustment. *Pain*, 17(1), 33–44.
- Severeijns, R., Vlaeyen, J. W. S., & van den Hout, M. A. (2006). Do we need a communal coping model of pain catastrophizing? An alternative explanation. *Pain*, 11(1), 226–229.
- Severeijns, R., Vlaeyen, J. W. S., van den Hout, M. A., & Weber, W. E. J. (2001). Pain catastrophizing predicts pain intensity, disability, and psychological distress independent of the level of physical impairment. *The Clinical Journal of Pain*, 17(2), 165–172.
- Startup, H. M., & Davey, G. C. L. (2001). Mood as input and catastrophic worrying. *Journal of Abnormal Psychology*, 110(1), 83–96.
- Stöber, J. (1998). Worry, problem elaboration and suppression of imagery: The role of concreteness. *Behaviour Research and Therapy*, 36(7-8), 751–756.
- Stöber, J., Tepperwien, S., & Staak, M. (2000). Worrying leads to reduced concreteness of problem elaborations: Evidence for the avoidance theory of worry. *Anxiety, Stress & Coping: An International Journal*, 13(3), 217–227.
- Stroebe, M., Boelen, P. A., van den Hout, M., Stroebe, W., Salemink, E., & van den Bout, J. (2007). Ruminative coping as avoidance. *European Archives of Psychiatry and Clinical Neuroscience*, 257(8), 462–472.
- Sullivan, M. J. L., Adams, H., & Sullivan, M. E. (2004). Communicative dimensions of pain catastrophizing: Social cueing effects on pain behaviour and coping. *Pain*, 107(3), 220–226.
- Sullivan, M. J. L., Rodgers, W. M., Wilson, P. M., Bell, G. J., Murray, T. C., & Fraser, S. N. (2002). An experimental investigation of the relation between catastrophizing and activity intolerance. *Pain*, 100, 47–53.
- Sullivan, M. J. L., Bishop, S. R., & Pivik, J. (1995). The Pain Catastrophizing Scale: Development and validation. *Psychological Assessment*, 7, 524–532.
- Sullivan, M. J. L., Thorn, B., Haythornthwaite, J. A., Keefe, F. J., Martin, M., Bradley, L. A., & Lefebvre, J. C. (2001). Theoretical perspectives on the relation between catastrophizing and pain. *The Clinical Journal of Pain*, 17, 52–64.
- Thorn, B., Ward, L., Sullivan, M., & Boothby, J. (2003). Communal coping model of catastrophizing: Conceptual model building. *Pain*, 106(1), 1–2.
- Turner, J. A., & Aaron, L. A. (2001). Pain-related catastrophizing: What is it? *The Clinical Journal of Pain*, 17(1), 65.
- Turner, J. A., Holtzman, S., & Mancl, L. (2007). Mediators, moderators and predictors of therapeutic change in cognitive-behavioral therapy for chronic pain. *Pain*, 127, 276–286.
- Vasey, T. W., & Borkovec, T. D. (1992). A catastrophizing assessment of worrisome thoughts. *Cognitive Therapy and Research*, 16(5), 505–520.
- Vlaeyen, J. W. S., Crombez, G., & Linton, S. J. (2009). The fear-avoidance model of pain: We are not there yet. Comment on Wideman *et al.*, “A prospective sequential analysis of the fear-avoidance model of pain” [Pain, 2009] and Nicholas “First things first: reduction in catastrophizing before fear of movement. *Pain*, 146(1), 222–223.
- Vlaeyen, J. W. S., de Jong, J., Heuts, P. H. T. G., & Crombez, G. (2008). Graded exposure *in vivo* for pain-related fear. In W. H. Breivik, W. Campbell, & M. K. Nicholas (Eds.), *Clinical pain management: Practice and procedures* (2nd ed.). London: Hodder & Stoughton.
- Vlaeyen, J. W. S., & Linton, S. J. (2000). Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain*, 85, 317–332.
- Vlaeyen, J. W. S., & Morley, S. (2004). Active despite pain: The putative role of stop-rules and current mood. *Pain*, 110, 512–516.
- Watkins, E., & Baracaia, S. (2001). Why do people ruminate in dysphoric moods? *Personality and Individual Differences*, 30(5), 723–734.
- Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin*, 134(2), 163–206.
- Watkins, E. R. (2009). Depressive rumination and co-morbidity: Evidence for brooding as a transdiagnostic process. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 27(3), 160–175.
- Wideman, T. H., Adams, H., & Sullivan, M. J. L. (2009). A prospective sequential analysis of the fear-avoidance model of pain. *Pain*, 145(1–2), 45–51.