

Worry

Kevin D. McCaul and Paul W. Goetz

North Dakota State University

Description and Theoretical Background

Worry has been conventionally defined as a **chain of thoughts and images, which are negatively affect-laden and relatively uncontrollable** (Borkovec, Robinson, Pruzinsky, & Dupree, 1983). Early research concerning worry focused on what might be called **pathological worry**—the extremes of worry that make it the main feature of generalized anxiety disorder (GAD; Sanderson & Barlow, 1990). It is possible to worry, of course, without having a clinical diagnosis of GAD. Ruscio and Borkovec (2004) tested high worriers with and without GAD and reported that the former group experienced less control over their negative thoughts and reported greater arousal after worrying. The feeling of not being able to control one's worry ("meta-worry") is probably the key to distinguishing between "pathological" and "normal" worrying.

Even **normal worrying** has been associated occasionally with negative health outcomes, although all of the data are correlational. Kubzansky et al. (1997), for example, showed in a prospective study that men who worried more about social conditions (e.g., economic recession) were more likely to suffer from coronary heart disease, and Brosschot and Thayer (2004) identified a general positive relationship between **dispositional worry** and risk for coronary heart disease. **Specific worries** may also increase one's risk of negative health outcomes. Cohen et al. (2003), for example, discovered that greater worry about prostate cancer was associated with

higher levels of prostate-specific antigen (PSA) levels—a screening index of prostate cancer.

Although worry may have negative effects, worry may also have value. Investigators have pointed out that **day-to-day worries** function to motivate action to cope with the threat that is causing the worry (Davey, 1993b). Nearly everyone worries occasionally, and many people say that they worry every day (Tallis, Davey, & Capuzzo, 1994). Data from a study asking people to complete daily diaries suggest that many of these worrisome thoughts are related to problem solving. Szabo & Lovibond (2002) asked students to self-monitor and to record worrisome thoughts each time they had worried at least a little bit. Raters later categorized these thoughts, and well over half involved problem solving, such as worrying about how to break up with a significant other, resolving a dispute with a friend, or making a plan. The other half were more stereotypically “worrisome” thoughts, including anticipating bad outcomes, ruminating, and self-blame.

Still, worry is often related to an increase in behaviors that the worrier believes will protect his or her health. For example, higher worry levels predict:

- obtaining an ultrasound test supposedly useful as an ovarian cancer screening tool (Schwartz et al., 1995)
- requests for genetic testing for breast cancer (Lerman et al., 1997)
- whether sunbathers take a coupon for sun screen (Mermelstein, Weeks, Turner, & Cobb, 1999) and attending a screening clinic for skin cancer (melanoma; De Rooij, Rampen, Schouten, & Neumann, 1997)

- interest in cancer prevention surgery (undergo bilateral prophylactic mastectomy) among high-risk women (Stefanek, 1999).

It is important to note that worry may not always lead to self-protective health behaviors, and the relationship between worry and behavior may not be a particularly strong one (McCaul, Branstetter, Schroeder, & Glasgow, 1996). Still, we might ask why worry should influence health behavior. Here are some possibilities (McCaul et al., 2005): a) worry can add a set of thoughts adding to one's reasons for taking health-protective action, b) worry is intrusive and, as such, it may keep a health threat salient, serving to remind the worrier to *do* something, c) worry could motivate specific planning, and d) worry may promote mental simulations of the health threat, including coping actions.

Use in Health Behavior Theories

Worry *per se*, whether assessed as a trait or as a temporary feeling, has been ignored by all health behavior theories. Of course, affect in the form of *feelings* (as opposed to “affective judgments”) does not appear in most health behavior theories. No mention of feelings is made in these commonly used theoretical approaches to health and behavior: the **Health Belief Model** (Hochbaum, 1998), the **Theory of Reasoned Action** (Fishbein & Ajzen, 1975) (and its extension, the **Theory of Planned Behavior**, Ajzen, 1991), and the **Transtheoretical Model** (DiClemente et al., 1991).

Three models do explicitly acknowledge the potential role of feelings. The first model was introduced by Ronald Rogers (e.g., Rogers & Prentice-Dunn, 1997) to explain how people respond to threatening messages. In the model, called **Protection Motivation Theory**, emotion is produced by the interaction of two perceptions created

by the message: the severity of the health threat and one's vulnerability to the health threat. Thus, the threat of lung cancer could cause fear among people who a) know about the short life expectancy for people with the disease and b) feel at personal risk because of their smoking behavior. Rogers was interested in when people are motivated to protect themselves from a health threat, and it is interesting to note that he did not provide any role for fear as a contributor—one way or the other—to self-protective motivation. Instead, he proposed that the cognitions did the work and fear was merely present. In a recent meta-analysis of variables in the theoretical model, the authors neglected to discuss fear, illustrating the minimal causal importance they attached to the construct (Floyd, Prentice-Dunn, & Rogers, 2000).

A second theoretical approach explicitly provided a role for emotions in health behavior. Specifically, Leventhal's **Common-Sense Model of Health and Illness Self-Regulation** (Leventhal, Brissette, & Leventhal, 2003) suggests that a health threat prompts parallel motives to cope with the a) threat itself and b) emotions caused by the threat. Thus, in Leventhal's approach, **emotion** is *motivating*. Some authors include a variety of emotions in Leventhal's model, but Leventhal's initial ideas arose out of his research on fear messages for communicating threat (cf. Cameron, 2003). In keeping with those initial ideas, Witte (1998) identified fear as the crucial emotion in her discussion of an "**Extended Parallel Process Model**" (an extension of Leventhal's common-sense model). Witte predicted that when people are exposed to a threatening message, they will do something to ameliorate the threat, if possible; otherwise, they will experience fear. In the latter case, according to Witte, people will be motivated to reduce the negative emotion but not necessarily by engaging in self-protective actions.

Both Leventhal and Witte would suggest that emotion drives actions, with slightly different theoretical twists. For Leventhal, expectations about the affective outcomes of the self-protective behavior (will cancer screening make me feel better?) determine the course of action; for Witte, expectations about one's ability to perform the self-protective behavior (can I easily obtain a cancer screening?) will determine the course of action. In both cases, however, low levels of emotionality will not be motivating.

The third approach that acknowledges feelings is Suzanne Miller's **Cognitive Social Health Information Processing** (C-SHIP) model (Miller, Shoda & Hurley, 1996). Miller considers many feelings in her model; worry is just one of many potential reactions in decision making about health behaviors. Miller et al. also propose that the relationship between worry and behaviors will depend on the intensity of emotionality, with either very low or very high levels of worry impeding action. This proposal is also known as a "curvilinear" or "inverted U-shaped" hypothesis, and is prominently embedded within the model. The notion of a curvilinear relationship between emotion and behavior is an old idea in psychology (Teigen, 1994). It is worth noting that existing empirical evidence is much more likely to support a linear, positive relationship between worry and self-protective behaviors (McCaul & Mullens, 2003; Hay, McCaul, & Magnan, 2005). Part of the problem with the curvilinear hypothesis is that it is imprecise. For example, it is unclear how to define "very high levels of worry." Miller et al. also suggest that high worry can lead to both avoidance of a self-protective response but also *excessive* performance of the response, without explaining when one behavioral solution is more likely to be adopted than the other. Finally, it is important to acknowledge that Miller's theory is one of the few to explicitly incorporate individual

differences (though not dispositional worry, which deserves greater theoretical attention).

MEASURES

Trait Measures. Most research on worry per se has focused on the construct as a trait, and the “standard” questionnaire is the 16-item **Penn State Worry Questionnaire** (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). A sample item is “I am always worrying about something;” (1 = not at all typical of me; 5 = very typical of me). Meyer et al. reported strong internal consistency ($\alpha = .93$) and good test-retest reliability over an 8-10 week period ($r = .92$). The PSWQ captures the intensity and controllability of worry (Molina & Borkovec, 1994), and it discriminates between persons with GAD and post-traumatic stress disorder. Other researchers show that the PSWQ has excellent psychometric qualities, whether used with college students (e.g., Fresco, Heimberg, Mennin, & Turk, 2002) or outpatients with anxiety disorders (Brown, 2001).

The PSWQ is a “global” worry measure that is free of worry content; that is, it asks about the extent of worries without identifying the possible targets of those worriers. Tallis, Davey, and Bond (1994) developed a content-dependent worry questionnaire, called “**The Worry Domains Questionnaire**” (WDQ). It assesses how much people worry about the domains of relationships, self-confidence, the future, work, and finances. Sample items are “I worry that my money will run out,” and “I worry that I’ll never achieve my ambitions.” Test-retest over 3 weeks was good for the overall score ($r = .79$); not surprisingly, these values were smaller for some domains for which circumstances may strongly affect worrying (e.g., test-retest for worry about relationships was $r = .46$). The WDQ is strongly correlated with the PSWQ ($r = .67$), but

the two questionnaires also assess different features of worrying. The WDQ, for example, may address task-oriented constructive worrying better than the PSWQ (Davey, 1993a).

Domain Specific Measures. It is likely that people may worry about different, specific health outcomes, and such worries may be independent of or at least only modestly correlated with trait worry. One of the earlier scales in the health area was constructed by Caryn Lerman and her colleagues to study breast cancer (Lerman et al., 1991). The “**Lerman Breast Cancer Worry Scale**” includes three items, one measuring the frequency of worrying about “getting breast cancer some day,” and two items measuring the *impact* of worry on mood and performing daily activities. In the original study, Lerman et al. averaged the latter two items separately from the worry frequency item, a logical approach because the impact items do not ask about experiencing worry per se.

Partly because of dissatisfaction with the “Lerman Breast Cancer Worry scale,” Champion et al. (2004) recently created “**The Breast Cancer Fear Scale**.” The authors especially wished to capture reports of physiological arousal (e.g., heart rate) and also subjective aspects of fear. The focus on physiological responding—even though measured just as self-report—makes this scale different from others that assess worry. Note, for example, the lack of items targeting physiological arousal on the PSWQ. The 8 items on the fear scale provide a scale range of 8-40, and the items hang together well ($\alpha = .91$). The scale is reliable over a 2-month interval ($r = .70$). It would be interesting to know how closely this scale correlates with other measures intended to measure worry per se.

Because worry involves negative thoughts, some researchers have used the intrusive thoughts subscale from the **Revised Impact of Events Scale** (RIES; Horowitz, Wilner, & Alvarez, 1979) to measure the concept. The **intrusive thoughts subscale** has strong internal consistency (e.g., $\alpha = .86$) and good test-retest reliability ($r = .87$ for one week; see Sundin & Horowitz, 2002). The RIES was originally constructed as a measure of stress reactions following traumatic events, and it has been used in that manner in the cancer arena as well (e.g., Vickberg, Bovbjerg, DuHamel, Currie, & Redd, 2000). However, Wells and Papageorgiou (1995) proposed that, to the extent that worry interferes with emotional processing, worry itself could lead to the subsequent production of intrusions. In this model, then, worry actually creates higher levels of intrusive thoughts, a phenomenon that has been demonstrated by Borkovec and colleagues (York, Borkovec, Vasey, & Stern, 1987). These data suggest that intrusive thoughts are a *product* of different kinds of worrying rather than another measure of worry. The intrusions subscale includes seven items, and it can be reworded to measure how often during the previous week the respondent experienced intrusive thoughts about the consequences of different health outcomes (e.g., one could use lung cancer in the items, producing statements such as, “Pictures about lung cancer popped into my mind;” “Any reminder brought back feelings about lung cancer;” 0 = not at all; 1 = rarely; 3 = sometimes; 5 = often).

Finally, it is possible to construct very brief scales that will measure worry about a particular domain reliably. In our work, we have used two items that ask directly about the degree of worry (e.g., “How worried are you about developing a smoking-related medical condition?”, and “How much does thinking about a smoking-related medical

condition bother you?" 0 = not at all; 4 = extremely). In a study of college-student smokers, these two items were inter-correlated ($\alpha = .87$), and the average score correlated modestly with the PSWQ ($r = .31$), intrusive thoughts ($r = .29$) and the motivation of these smokers to quit ($r = .29$; McCaul et al., 2005).

Dijkstra and Brosschot (2003) recently took a similar approach, creating a worry "scale" to study smoking. Their 4 items focused on the intensity of worry [e.g., "I worry about my health because of my smoking"—not at all (1) to very much (7)]. Smokers in their prospective study who worried more about the health effects of smoking also reported higher quitting activity.

Summary. How *should* one measure worry? The PSWQ makes perfect sense if the researcher is interested in a relatively brief, well documented trait-worry scale that lends insight into the general intensity and controllability of everyday worrying. The WDAQ also makes sense as a general measure—in this case, one assessing worrying about five everyday domains. Measuring worry about particular health events is more up in the air, and none of the existing scales is perfect. Lerman's scale includes both frequency but also "impact" items, Champion's fear scale asks about fear (rather than worry; see below) and also includes physiological arousal, which is not a part of the worry construct as envisioned by most theorists. Intrusive thoughts are related to worry but may not be the same thing, and the two-item scales we have used address worry intensity (how much do you worry?) but not frequency ("how often do you worry?"). The final scale included in the Appendix is one that we created to illustrate both dimensions of worry. It has not been tested, but it borrows from the other scales and could be a reasonable measure for researchers to try. Note carefully, however, that we do not

have psychometric data for it as yet, and we do not know whether worry frequency and intensity should necessarily be combined or whether they should be considered as separate influences on health behaviors. More research along these lines would be welcomed.

SIMILAR CONSTRUCTS

Risk. Worry about a health event is likely to be related to one's appraisal of risk concerning that event. Indeed, Slovic (1987) has proposed that the concept of risk has many dimensions, one of which is represented by affective terms such as dread (also see Weinstein, 2003). However, empirically, risk and worry are not highly related—data from many different health areas results in a relationship of around $r = .30$ (McCaul & Mullens, 2003). Moreover, each variable may independently contribute to health behaviors (Moser, McCaul, Peters, Nelson, & Marcus, 2005). In short, risk and worry are similar but by no means identical.

Fear. Most theorists would agree that worry and fear are different constructs with the latter term reserved for brief but intense emotional episodes (Russell & Barrett, 1999). Worry, in contrast, is typically carried out over time, and the affect attached to worry is much more modest than for fear. A person could worry about cancer for several consecutive minutes many times during a single day; it is unlikely that one would experience full-blown fear that frequently. That said, fear and worry do share some similar features. In particular, persons who are afraid feel that they do not have control over a situation, and they are uncertain about how the situation is likely to turn out (Lerner & Keltner, 2000). Similar feelings characterize worried individuals (Borkovec et al., 1983).

Other feelings. Finally, it is worth noting that worry is one of many affective responses to health outcomes that could be assessed. As one example, some decision scientists have studied the construct of regret, feelings that one might have either after selecting one decision alternative vs. another or while anticipating making a decision. Some data suggest that regret may be a more powerful predictor of self-protective behavior (getting a flu immunization) than worry (see Chapman & Coups, in press; Weinstein et al., 2005). The overall point, however, is that feelings matter and deserve attention to better understand self-protective health behaviors.

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Penn State Worry Questionnaire (PSWQ)

Below are some statements about worrying. Please circle *one* number (1-5) next to each statement that describes how typical that statement is for you.

	Not at all typical of me				Very typical of me
1. If I do not have enough time to do something I do not worry about it	1	2	3	4	5
2. My worries overwhelm me.	1	2	3	4	5
3. I do not tend to worry about things	1	2	3	4	5
4. Many situations make me worry	1	2	3	4	5
5. I know I should not worry about things, but I just can't help it.	1	2	3	4	5
6. When I am under pressure I worry a lot.	1	2	3	4	5
7. I am always worrying about something.	1	2	3	4	5
8. I find it easy to diminish worrisome thoughts.	1	2	3	4	5
9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10. I never worry about anything.	1	2	3	4	5
11. When there is nothing more I can do about a concern, I do not worry about it any more.	1	2	3	4	5
12. I have been a worrier all my life.	1	2	3	4	5
13. I notice that I have been worrying about things.	1	2	3	4	5
14. Once I start to worry, I cannot stop.	1	2	3	4	5
15. I worry all of the time.	1	2	3	4	5
16. I worry about projects until they are done.	1	2	3	4	5

<i>I worry...</i>	<i>Not at all</i>	<i>A little</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>
1. that my money will run out	1	2	3	4	5
2. that I cannot be assertive or express my opinions	1	2	3	4	5
3. that my future job prospects are not good	1	2	3	4	5
4. that my family will be angry with me or disapprove of something that I do	1	2	3	4	5
5. that I'll never achieve my ambitions	1	2	3	4	5
6. that I will not keep my workload up to date	1	2	3	4	5
7. that financial problems will restrict holidays and travel	1	2	3	4	5
8. that I have no concentration	1	2	3	4	5
9. that I am not able to afford things	1	2	3	4	5
10. that I feel insecure	1	2	3	4	5
11. that I can't afford to pay bills	1	2	3	4	5
12. that my living conditions are inadequate	1	2	3	4	5
13. that life may have no purpose	1	2	3	4	5
14. that I don't work hard enough	1	2	3	4	5
15. that others will not approve of me	1	2	3	4	5
16. that I find it difficult to maintain a stable relationship	1	2	3	4	5
17. that I leave work unfinished	1	2	3	4	5

18.	that I lack confidence	1	2	3	4	5
19.	that I am unattractive	1	2	3	4	5
20.	that I might make myself look stupid	1	2	3	4	5
21.	that I will lose close friends	1	2	3	4	5
22.	that IU haven't achieved much	1	2	3	4	5
23.	that I am not loved	1	2	3	4	5
24.	that I will be late for an appointment	1	2	3	4	5
25.	that I make mistakes at work	1	2	3	4	5

“Lerman Breast Cancer Worry scale”

Worry Frequency

1. How worried are you about getting breast cancer someday?

1 = not at all; 2 = rarely; 3 = sometimes; 4 = often; 5 = almost all the time

Worry Impact

2. How much does your worry affect your mood?

1 = not at all; 2 = a little; 3 = somewhat; 4 = a lot

3. How much does your worry affect your ability to perform your daily activities?

1 = not at all; 2 = a little; 3 = somewhat; 4 = a lot

Champion et al., “Breast Cancer Fear Scale”

For all items, 1= Strongly disagree; 5 = Strongly agree

1. The thought of breast cancer scares me.
 2. When I think about breast cancer, I feel nervous
 3. When I think about breast cancer, I get upset
 4. When I think about breast cancer, I get depressed
 5. When I think about breast cancer, I get jittery
 6. When I think about breast cancer, my heart beats faster
 7. When I think about breast cancer, I feel uneasy
 8. When I think about breast cancer, I feel anxious
-

INTRUSIVE THOUGHTS SUBSCALE OF REVISED IMPACT OF EVENTS SCALE

We wish to know how frequently the following thoughts and feelings happened for you DURING THE PAST SEVEN DAYS—in other words, since you began this study. Simply circle one number by each statement.

	NOT AT ALL	RARELY	SOMETIMES	OFTEN
1. I thought about it when I didn't mean to.	0	1	2	3

2. I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind.	0	1	2	3

3. I had waves of strong feelings about it.	0	1	2	3

4. I had dreams about it.	0	1	2	3

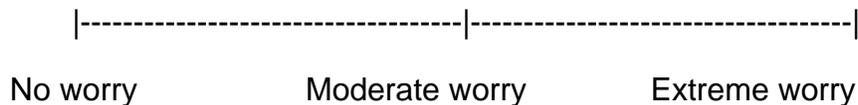
5. Pictures about it popped into my mind.	0	1	2	3

6. Other things kept making me think about it.	0	1	2	3

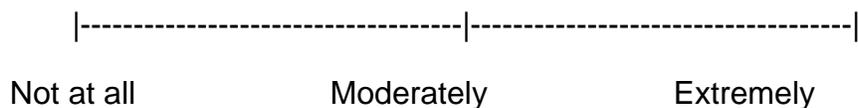
7. Any reminder brought back feelings about it.	0	1	2	3

BRIEF WORRY SCALE (INTENSITY)

How much does thinking about colon cancer *worry* you? (Draw a line anywhere along the scale)



8. How *bothered* are you by thinking about colon cancer?



Dijkstra and Brosschot (2003) BRIEF WORRY SCALE ABOUT SMOKING

All items scored from 1 (not at all) to 7 (very much)

1. I am afraid of the physical consequences of smoking.
2. I worry about my health because of my smoking.
3. I feel anxiety when I think of the possible consequences of smoking.
4. I brood about the physical consequences of smoking.

BRIEF WORRY SCALE (FREQUENCY & INTENSITY)

Frequency

1. During the past week, how often have you *worried* about getting prostate cancer sometime in your lifetime?

Never Rarely Sometimes Often All of the time

Intensity

2. How *bothered* are you by thinking about getting prostate cancer?

Not at all Somewhat Moderately A Great Deal Extremely

3. How *worried* are you about getting prostate cancer?

Not at all Somewhat Moderately A Great Deal Extremely