

# The role of fundamental fears in the engagement in health protecting behaviour and the use of health care services

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## Abstract

**Introduction** Fundamental fears have been found to contribute to the engagement in health protective behaviour and the use of health care services before. These behaviours are proposed to contribute to the development of chronic pain. In order to validate these results, anxiety sensitivity (AS), injury/illness sensitivity (IS), and fear of negative evaluation (FNE) were tested in regard to these behaviours and general health concerns. **Method** Measures of fundamental fears, health protecting behaviour, use of health care services and perceived health were administered online to 121 participants. Correlations were tested with Pearson correlation tests. Predictive values of the fundamental fears were calculated with linear regressions. **Results** IS correlated positively with all behavioural measures and was the best predictor for all three behavioural measures. AS only correlated with perceived health. FNE showed a trend with perceived health and somewhat predicted health protecting behaviour. **Discussion** Results partially replicate previous findings, but also contradict other findings. This study further confirms the notion that fundamental fears are involved in pain-related behaviours and recommends further investigation in these relations.

## Keywords

Health protecting behaviour, use of health care services, general health concerns, fundamental fears.

## Introduction

The development of chronic pain is a complex phenomenon. Alternative models of pain and chronic pain incorporate psychological (e.g. cognition, perception, affect) and

behavioural factors (e.g. avoidance) and have led to an increase in our understanding of pain (Asmundson, Norton, & Norton, 1999). Chronic pain and fear have been associated with each other for some time. A recent model of the fear-avoidance model of exaggerated pain perception (Vlaeyen, Kole-Snijders, Boeren, & Van Eek, 1995) postulates two opposing behavioural responses to acute pain: confrontation and avoidance. If acute pain is not interpreted as threatening, this will probably lead to confronting daily activities after an injury. Most likely, this approach will lead to a fast recovery without the development of chronic pain. However, if acute pain is interpreted as threatening (pain catastrophizing), this could lead to pain-related fear, which can lead to avoidance behaviours, hypervigilance to bodily sensations, and eventually even to disability, disuse, and depression. As a consequence, pain experiences are maintained and the vicious cycle of pain and avoidance is allowed to spiral further down, resulting in chronic pain (Vlaeyen & Linton, 2000).

Since the introduction of fear-avoidance models of pain, numerous studies have examined the role of pain-related fear, associated fear, and anxiety constructs in pain. In 1985, Reiss and McNally created an expectancy model of fear based on the concept of the fear of fear, in an attempt to explain the acquisition of anxiety and fear behaviour (as cited in Reiss, 1991). The theory assumes that human motivation to avoid a feared object is a function of two classes of variables: expectations and sensitivities. Expectations refer to the beliefs an individual holds about what will happen when a feared object or situation is encountered. Sensitivity refers to an individual's reasons for fearing a particular event or object. The expectancy model of fear (Reiss, 1991) divides sensitivity into three factors: anxiety sensitivity (AS), injury/illness sensitivity (IS), and fear of negative evaluation (FNE). These three sensitivities (or fears) are considered to be fundamental, which means that they are fears of inherently noxious stimuli and that ordinary or common fears can be logically reduced to them (Taylor, 1993). Of these fundamental fears, research has predominantly been done with regard to AS; one's sensitivity to experiencing anxiety, i.e. the fear of fears. It arises through the catastrophic interpretation of anxiety sensations, believing that these sensations will have physical, mental, or social consequences (Reiss, 1991). IS refers to one's sensitivity to personal injury. It involves exaggerated and excessive worrying about future injury and illness (Reiss, 1991). This sensitivity is the least investigated of the fundamental fears. FNE is a person's sensitivity to negative evaluation by others (Reiss, 1991). The three are considered to be trait-like individual differences (Reiss, 1991), which entails that they do not alter very much over a lifetime.

The fundamental fears are proposed to be part of a hierarchical model of negative emotionality (Lilienfeld, 1996). In this model, trait anxiety is a lower order construct of

negative emotionality and the three fundamental fears are a lower order construct of trait anxiety. AS is suggested to be a higher order construct of physical, mental, and social concerns. Keogh and Asmundson (2004) adapted the model by adding pain-relevant constructs for IS. This sensitivity is proposed to be the higher factor of pain catastrophizing and fear of pain. This hierarchical model would explain the differences in reactivity between individuals to certain stimuli. This is because, like other traits, trait anxiety implies interactions between one's trait levels and trait relevant stimuli. The assimilative properties of traits explain these differences in reactivity (Lilienfeld, 1996). Therefore, an individual with a certain level of trait anxiety does not necessarily respond to the same set of stimuli as someone else with the same level of trait anxiety would.

As mentioned before, avoidance behaviour seems to be an important factor in the development of chronic pain (Vlaeyen et al., 1995; Vlaeyen & Linton, 2000). This study is the first one to explore the characteristics of countries involved in strategic alliances. When summarizing the results, strategic alliances are mainly found within Western countries who are part of the European Union and who use a Bismarck oriented financing system. England, Germany and France show most involvement in strategic alliances. As most of the i. Several studies already investigated the role of AS in pain-related avoidance and found an indirect positive relationship between the two (Asmundson & Norton, 1995; Asmundson & Taylor, 1996; Norton & Asmundson, 2004). The hierarchical model of negative affectivity (Keogh & Asmundson, 2004) provides another factor that might influence one's reaction to pain: IS. This sensitivity is a higher order factor to both fear of pain and pain catastrophizing. Therefore, it would seem conceivable that IS has a relation with pain-avoidance behaviour. A Dutch study found IS to be the single best predictor for the engagement in health protecting behaviour (Vancleef, Peters, Gilissen, & De Jong, 2007). In the same study, AS was found to be the sole predictor for the use of health care services, while IS did not correlate with this behaviour. This would suggest that AS is correlated with solution seeking for existing complaints and IS correlates with a more preventive, future directed behaviour that is independent of actual complaints. This would imply that AS and IS are involved in different aspects of the development and persistence of chronic pain.

The goal of this study was to replicate the results of the Vancleef study (2007). It is relevant to research the role of the fundamental fears in pain-related behaviour, as this relationship has not yet been researched very thoroughly. Especially with regard to IS, little research has been done. In order to test the relationship of other fundamental fears with these

pain-related behaviours, this study used a larger and more diverse research population. The current study investigated the relationship between the fundamental fears, the use of health care services and health protecting behaviour in a similar setup to the Vancleef study. This study also tested the relationship of FNE on both of these behaviours, as this construct has not yet been tested in the context of such pain-related behaviours. Furthermore, perceived health was included as an indication to how the participants regard their own health status and how they believe it compares to that of others.

IS and AS are both hypothesised to correlate with health protecting behaviour, as both constructs refer to a fear of experiencing unpleasant bodily sensation. Therefore, people with high AS or IS would seem to be more likely to prevent such sensations from happening and thus be more likely to engage in health protecting behaviour. Only AS is expected to be correlated with use of health care services. A rationale for this relation is that AS refers to concerns about having bodily sensations. This could lead to someone with high AS to use health care services. IS is regarded as fear of future injuries and illnesses, and not so much as fear of current bodily sensations. Therefore this fear is not expected to correlate with use of health care services. No correlation is expected between FNE and the behaviours. As of yet no indication has arisen that FNE interacts with either health protecting behaviour or one's use of health care services. Health perception is expected to associate mainly with AS, because this, too, is a factor that taps into someone's current concerns and health status.

## Method

This study was a part of a larger study that examined the psychometric properties of the Dutch Injury/illness Sensitivity Index (ISI). Results of this validation study are not yet available. It should be noted, though, that some research has been done to measure the reliability of this Dutch translation (see Vancleef, Peters, Roelofs, & Asmundson, 2006).

### Participants

Participants had to be between the age of 18 and 65 and had to be able to understand Dutch in order to be included in this study. Both participants with and without physical pain were allowed to take part in the study. As the behavioural outcome measures were assessed in phase two, this study only included participants who completed the second phase. The first phase consisted of 302 participants, of whom 145 participated in phase two. Of these 145, 17 were excluded due to incomplete entries. One was deleted because of double participation; another one was deleted because the participant had only moderate

understanding of the Dutch language. Five participants were excluded because they reported to have become seriously ill or injured in the time between phase one and two. After their exclusion, the sample consisted of 121 participants of whom 97 (80%) were female. Their mean age was 34.76 years ( $SD = 15.89$ , range = 18-65). Of the total sample, 58 participants (48%) reported to have chronic pain, with pain complaints lasting longer than three months.

### Materials and measures

The fundamental fears were assessed with questionnaires based on a 5-point Likert scale. AS was measured with the Reis-Epstein-Gursky Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). This index consists of 16 items ( $\alpha = .85$ ) that measure the negative consequences of experiencing anxiety. The 9-item Illness/Injury Sensitivity Index-Revisited (ISI-R) ( $\alpha = .89$ ) is a measure of the fear and catastrophic appraisal of illness and/or injury (Carleton, Park, & Asmundson, 2006). The Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983) is a 12-item questionnaire ( $\alpha = .98$ ) for assessing the fear of situations of public observable behaviour and evaluation situations.

Health protecting behaviour was measured with 12 vignettes ( $\alpha = .62$ ) designed by Vancleef et al. (2007). These vignettes assess one's tendency to act in a health protecting way. Each vignette contained the description of a situation that suggests a certain health risk. Respondents had to express the degree of certainty to how likely they were to engage in a suggested health protecting behaviour. The answers on these questions were scored on a scale from 1 through 4 (ranging from "definitely not", "probably not", "probably", to "certainly"). Higher scores indicate more engagement in health protecting behaviour (Vancleef et al., 2007).

The use of health care services was measured with a 6-item questionnaire created by Vancleef et al. (2007). It measured the respondents' use of health care service in the last 12 months. Three items assessed the number of visits to the general practitioner and participants' over-the-counter and prescription medication usage in the last three months. The remaining three items measured the number of visits in the last twelve months to a medical specialist, a physical or manual therapist, or an alternative healer. The answers score from 1 to 4 ("Not at all", "once or twice", "three or four times", and "more than four times"). A sum score was calculated, with higher scores indicating higher usage of health care services (Vancleef et al., 2007).

Perceived health was measured with an additional 4 items based on a 5-point Likert scale. The items asked about the participants' beliefs about their general health status (ranging from "excellent" to "bad"), if they believe that they use a lot of medication in comparison to their peers and if they believe that they more often use health care services compared to their peers (ranged from "not at all" to "definitely"), and if they often worry about their health (ranging from "never" to "constantly"). High scores on the sum score indicate more general health concerns.

### Procedure

Participants were approached both online and through advertisements in several public buildings in the vicinity of Maastricht University. In the first phase, AS, IS, and FNE were measured. Any pain complaints and their duration were registered. Four weeks later, the participants were requested to participate in the second phase. In this phase, engagement in health protecting behaviour, use of health care services, and perceived health were measured. In addition, the occurrence of injuries or illnesses and their severity after completion of the first phase were inquired.

### Statistical analysis

Analyses were conducted with SPSS version 21 (IBM, New York). The data was analysed for the descriptives gender, age, and chronic pain. Normality of the data was tested with Shapiro-Wilk tests. Correlations between scores on the ASI, ISI-R, and BFNE and the scores on the vignettes, use of health care and health perception were individually tested with Pearson correlation tests. To examine the contribution of AS, IS, and FNE to health protecting behaviour, linear regression analyses were carried out with AS, IS, and FNE as the independent variables and vignette scores as the dependant variable. The contribution of the fundamental fears to health perception and use of health care was tested with linear regression analyses in a similar fashion.

## Results

No severe departure from normality was found in the distribution of the outcome measures after checking multiple parameters.

**Table 1.** Mean sum scores with standard deviations, ranges and Pearson Correlation Coefficients for the fundamental fears and the behavioural measures (n = 121)

	Mean (SD)	Range	Protecting behaviour	Use of health care	Perceived health
ASI	26.79 (7.27)	16–50	0.13 (.144)	.04 (.653)	.19 (.034)
ISI-R	15.80 (6.02)	9–39	.33 (.000)	.20 (.026)	.35 (.000)
BFNE	28.48 (13.88)	12–60	-.01 (.877)	-.02 (.814)	.16 (.075)
Protecting behaviour	28.95 (4.36)	17–38			
Use of health care	9.60 (3.05)	6–20			
Perceived health	8.45 (2.80)	4–17			

Abbreviations: ASI, Anxiety Sensitivity Index; ISI-R, Illness/Injury Sensitivity Index-Revisited; BFNE, Brief Fear of Negative Evaluation scale.

Mean scores on the scales were calculated for AS, IS, FNE, health protecting behaviour, use of health care services, and perceived health (table 1). Table 1 also shows the Pearson correlation coefficients between these measures. A significant positive correlation between ASI and health perception was found, which indicates that higher levels of AS were associated with higher general health concerns. ASI scores did not correlate with health protecting behaviour or use of health care services. ISI-R showed a significant positive correlation with health protecting behaviour and perceived health. Furthermore, it also showed a positive correlation with use of health care services. These results suggest that higher IS scores are associated with a higher tendency for engagement in health protecting behaviour, more use of health care services, and more general health concerns. Correlation analysis between BFNE and perceived health showed a positive trend between the two. This indicates an association between higher FNE and more general health concerns. BFNE did not significantly correlate with the other two behavioural measures.

**Table 2.** Summary statistics of the regression analyses with the fundamental fears as predictors of the behavioural measures

Dependant	Variable	B	SE B	$\beta$	T	P
<b>Health protecting behaviour (analysis 1)</b>						
	ASI	-.05	.07	-.09	-0.72	.476
	<b>ISI-R</b>	<b>.34</b>	<b>.08</b>	<b>.47</b>	<b>4.06</b>	<b>.000</b>
	<b>BFNE</b>	<b>-.06</b>	<b>.03</b>	<b>-.18</b>	<b>-1.73</b>	<b>.086</b>
<b>Use of health care services (analysis 2)</b>						
	ASI	-.05	.05	-.13	-0.99	.323
	<b>ISI-R</b>	<b>.17</b>	<b>.06</b>	<b>.33</b>	<b>2.74</b>	<b>.007</b>
	BFNE	-.02	.02	-.10	-0.95	.344
<b>Perceived health (analysis 3)</b>						
	ASI	-.03	.05	-.08	-0.68	.499
	<b>ISI-R</b>	<b>.18</b>	<b>.06</b>	<b>.39</b>	<b>3.28</b>	<b>.001</b>
	BFNE	.01	.02	.04	0.35	.724

Abbreviations: ASI, Anxiety Sensitivity Index; ISI-R, Illness/Injury Sensitivity Index-Revisited; BFNE, Brief Fear of Negative Evaluation scale. Significant predictors are presented in bold.

The predictive value of AS, IS, and FNE for the dependant variables was tested by entering these measures as predictors in linear regression analyses, with health protecting behaviour, use of health care services, and perceived health as dependant variables. Table 2 presents the results of these regression analyses. The model for health protecting behaviour (analysis 1) was found to be overall significant ( $F(3,117) = 6.78, P < .001, R^2 = .15, R^2$  adjusted = .13), with IS being highly significant and FNE being marginally significant. AS did not reach significant levels. Regression analysis on the use of health care services (analysis 2) resulted in an overall significant model ( $F(3,117) = 2.68, P = .050, R^2 = .06, R^2$  adjusted = .04), with the only significant predictor being IS. Both AS and FNE did not reach significance. The model for health perception (analysis 3) was also overall significant ( $F(3,117) = 5.47, P = .001, R^2 = .12, R^2$  adjusted = .10), with the only significant predictor being IS.

## Discussion/Conclusion

The goal of this study was to investigate the relationship between the three fundamental fears, AS, IS, and FNE, and health protecting behaviour, use of health care services, and perceived health. In accordance with the hypothesis, this study indicated that higher IS

levels associate with higher tendencies to engage in health protecting behaviour. Moreover, in a linear regression model, IS was found to be the single best predictor for engagement in health protecting behaviour. This relation has been found before (Vancleef et al., 2007) and it supports the speculation that IS is related to future-oriented behaviour (Vancleef et al., 2006). Besides engagement in health protecting behaviour, IS was also found to be associated with both use of health care and general health concerns and was the sole predictor for both these behaviours in a linear regression analysis. This was an unexpected result, as IS is regarded as a more future-oriented behaviour. Both of these behaviours reflect actions and beliefs that one would have as a response to experienced bodily sensations. However, IS is considered to be a higher-order construct of pain catastrophizing (Keogh & Asmundson, 2004). This might imply that, due to pain catastrophizing, people with high IS might be likely to seek help more or sooner when they experience unpleasant bodily sensations and hold more concerns about their health status.

AS did not correlate with engagement in health protecting behaviour. This is contrary to previous findings (Vancleef et al., 2007) and also contradicts the proposed association between AS and pain-related avoidance (Asmundson & Norton, 1995; Asmundson & Taylor, 1996; Norton & Asmundson, 2004). More in line with the hypothesis was the positive association between AS and general health perception. With AS being considered as a reference to the negative consequences of current bodily sensations (Vancleef et al., 2007), it would make sense that those with higher AS hold more concerns about their current health status. In this study, AS was not associated with use of health care, which is contrary to the hypothesis and previous research (Vancleef et al., 2007). This contradiction to previous findings is hard to explain. The mean ASI scores in this research seems to be quite high in comparison to previous studies (Asmundson & Norton, 1995; Asmundson & Taylor, 1996; Vancleef et al., 2007). What should be acknowledged in this comparison, is that it is unknown if the ASI was scored from one through 5 or from zero through four in the Asmundson and Norton (1995) and the Asmundson and Taylor (1996) study.

FNE showed a positive trend with regard to general health concerns. This may not be an illogical finding. FNE refers to the fear of negative evaluation from others and this association might imply a social component in how one perceives their own health status to be in comparison to that of others. People with high FNE have been found to rate their perception of autonomic and somatic symptoms (e.g. sweating palms, hot face, trembling, shortness of breath) to be worse in a social-evaluative situation (Chen & Drummond, 2008). Perhaps a similar effect was also seen in this study.

It should be acknowledged that the Dutch version of the ISI-R has not yet been thoroughly tested for psychometric properties. However, this should not be seen as a major flaw in the design, as the original version of the ISI-R has been found to be adequate (Carleton, Thibodeau, Osborne, Taylor, & Asmundson, 2014). Furthermore, a study that tested the psychometric properties of the Dutch Sensitivity Index (SI), which includes the ISI, showed good to excellent internal consistencies for the scale and the subscales (Vancleef et al., 2006). Further limitations could be that the questionnaires were performed online. As a consequence, testing environments were not controlled. The period between phases one and two also is a limitation that should be avoided in future research. It should not be a problem that the fundamental fears and the behavioural measures were not measured at the same time, since the fundamental fears should be quite stable (Reiss, 1991). However, it is possible that only certain participants were willing to continue to take part in this study. Finally, it cannot be ruled out that participants' health state influenced the behavioural measures. Those who were inflicted with injuries or illness in the interval between phases one and two were excluded and the existence of chronic pain was reported. Nonetheless, existing health problems lasting less than 3 months were not taken into account and long-term illness was not an exclusion criterion.

In conclusion, results from this study do not fully replicate that of Vancleef et al. (2006), yet they do further add to the idea that fundamental fears are relevant for explaining aspects of pain-related behaviour, with IS looking very promising to explain some of these aspects. It seems valuable to further study this relation, perhaps with a more observational design, as it could explain part of the development of chronic pain.

## Role of the student

Janneke Pepels was an undergraduate student working under the supervision of Linda Vancleef when the research in this report was performed. The topic was proposed by the supervisor. The design of the questionnaire was performed by graduate students under the supervision of Linda Vancleef. The processing of the results as well formulation of the conclusions and the writing were done by the student.

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