European Journal of Pain (2000) **4**: 259–266
doi:10.1053/eujp.2000.0178, available online at http://www.idealibrary.com on IDEAL®

Validation of the German version of the Fear-Avoidance Beliefs Questionnaire (FABQ)

Michael Pfingsten[a], Birgit Kröner-Herwig[b], Eric Leibing[c], Uta Kronshage[b] and Jan Hildebrandt[a]

[a]*Department of Algesiology, Center of Anesthesiology,* [b]*Department of Clinical Psychology,* [c]*Department of Psychosomatics and Psychotherapy, Georg-August-University of Göttingen, FRG-37075 Göttingen, Germany*

Fearful avoidance of physical activities is a major factor in low back pain (LBP) and disability. In 1993 Waddell *et al.* developed the Fear-Avoidance Beliefs Questionnaire (FABQ) focusing on patients' beliefs about how physical activity and work affect LBP. The focus of our study was to analyse and validate the German version of the FABQ. Three-hundred and two consecutive LBP outpatients participating on a functional restoration programme filled in the FABQ. Factor analysis yielded three factors which accounted for nearly 65% of the total variance of the questionnaire. Whereas the factor 'physical activity' (8.9% of the variance) remained the same as in the English version, the second factor of the original version split into two: one related to, 'work as cause of pain' (43.4% of the variance) and the other to patients' assumptions of their probable return to work (11.8% of the variance). Both work-related subscales showed a good internal consistency (α=0.89, resp. α=0.94), whereas the consistency of the subscale 3 'physical activity' was only modest (α=0.64). Test–re-test reliability score was fair to good for the whole scale (r=0.87; n=30). Regression analysis demonstrated that fear-avoidance beliefs account for the highest proportion of variance (35%) regarding disability in activities of daily living and work loss. Patients out of work demonstrated more fear-avoidance beliefs in comparison to those who were still working. It can be concluded that the German version of the FAQB is a reliable and valid instrument, but it shows a different factor structure from the original English version. The FABQ has been proven to identify patients with maladaptive beliefs which have to be focused on in proper treatment.

IINTRODUCTION

Low back pain (LBP) is the most prevalent health care problem in industrialized nations, demonstrating a dramatic increase in epidemiology and associated costs (Linton, 1998). In most back pain patients no relevant structural impairment can be found, so non-specific back pain exists in more than 90% of the cases (Fordyce, 1995).

Cognitive and affective variables are relevant determinants of pain experience and disability (Gatchel *et al.*, 1995). A central assumption of patients with LBP is that activity will exacerbate pain, leading to avoidance of activities. This has been shown as a major contribution to maintenance of LBP. Several authors focused on the relationship between fear of pain and avoidance. Avoidance leads to a vicious circle characterized by decreased self-efficacy, fear, further avoid-

Paper received 14 August 1999 and accepted in revised form 14 April 2000
Correspondence to: Dr M. Pfingsten, Schwerpunkt Algesiologie, Zentrum Anaesthesiologie, Rettungs- und Intensivmedizin, Georg-August-Universität Goettingen, Robert-Koch-Str. 40, D-37075 Goettingen, Germany.
Tel: +49 551/398816; Fax: +49 551/394164;
Email: pain@med.uni-goettingen.de

1090-3801/00/030259 + 08 $35.00/0

ance and disability (Asmundson *et al.*, 1997, Lethem *et al.*, 1983; Philips 1987; Vlaeyen *et al.*, 1995; Waddell *et al.*, 1993). According to cognitive–behavioural theory this circle is maintained by the reduction of anxiety, which is achieved through avoidance of feared activities.

On this background, Waddell *et al.* (1993) developed the 'Fear-Avoidance Beliefs Questionnaire' (FABQ), a 16-item self-report questionnaire focusing on patients' beliefs about how physical activity and work affect low back pain. The FABQ yields two subscales, one for beliefs about physical activity and the other for beliefs about work. The latter was consistently the stronger predictor of disability and work loss (Klenerman *et al.*, 1995). The psychometric properties of the English version are satisfactory: the internal consistency is 0.88 resp. 0.77, the scales account for 43.7% resp. 16.5% of the total variance and the test–re-test reliability is 0.95 resp. 0.88.

The FABQ has proven its validity by predicting disability in daily activities (Waddell *et al.*, 1993), work loss due to back pain (Waddell *et al.*, 1993), treatment outcome (Klenerman *et al.*, 1995) and performance level in behavioural tests (Crombez *et al.*, 1999; Newton and Waddell, 1993; Pfingsten *et al.*, submitted). Fear-avoidance beliefs were the best predictors of return to work after a functional restoration treatment program (Pfingsten *et al.*, 1997).

The purpose of this study was to analyse and validate the translated, German version of the FABQ. According to our knowledge no replication of the original psychometric analysis of the FABQ (Waddell *et al.*, 1993) exists up until now.

METHODS

Subjects

The whole clinical sample consists of 302 consecutive LBP outpatients with non-specific, chronic musculoskeletal pain and with none or minor organic findings. Most of them were directly referred by their General Practitioner to our multidisciplinary pain clinic for attending a functional restoration treatment programme during 1997–1998.

The mean age was 44.6 years (SD=10.6, range 23–63), with 52.3% (n=158) males. Using an 11-point numerical rating scale, mean pain intensity was 6.3 (SD=1.9), with an average duration of pain of 71.4 months (SD=80.5, range 2–420 months).

Fifty-eight of the 302 patients were not working, because of being unemployed, being students/trainees or housewives/housemen. In order to achieve a clear distinction between a working and a non-working group of patients, this subgroup was excluded from data analysis concerning work-related questions.

One-hundred and twenty (47.5%) of the remaining 249 patients have been absent from work due to low back pain with an average duration of about 12.8 weeks (SD=21.7) per year. One-hundred and twenty-nine patients (52.5%) have still been working despite having back pain. All patients presented different stages of disability. This ranged from high disability with long-standing absence from work (up to 128 weeks) to lower disability (still working).

Thirty patients took part in the test–re-test reliability analysis. This sample was comparable to the rest of the group concerning gender, age, pain intensity, pain duration, disability and work loss.

Self-report instruments

Before entering the functional restoration program, patients were asked to complete the following questionnaires:

- The 'Hannover Functional Ability Questionnaire' (FFbH-R; Kohlmann and Raspe, 1994) is a German 12-item self-report questionnaire to assess functional capacity in daily activities (i.e. walking, lifting, clothing). Answers (yes = 2; only with great effort = 1; no, or only with help = 0) were summed up and transformed into a relative score (functional capacity 0–100%). The scale was designed for LBP patients and is comparable to the Quebec Back Pain Disability Scale (Kopec *et al.*, 1995).
- Depression and anxiety was assessed using the German version of the Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983; Hermann *et al.*, 1995). The HADS consists of

14 items (scaled 0–3) which sum up to subscale scores for anxiety and depression.
- The German version of the FABQ is identical in terms of instruction and format with the English version. The 16 items were answered on a seven-point Likert scale (strongly disagree – strongly agree). The translation into German was already carried out in 1994 by the first author and checked by a native speaker who was unaware of the FABQ.

Since questionnaires were immediately checked for completeness, no missing values occurred.

Data analysis

Test–re-test reliability of the FABQ was calculated on 30 patients using product moment correlation. Factor structure was evaluated using factor analysis (principal-component, varimax rotation) on 302 patients. The relationship of the FABQ scales to other variables was identified by correlational analyses (Spearman's Rho) and hierarchical multiple regression on 249 patients. Group differences were analysed using *t*-tests. In case of multiple testing Bonferroni's adjustment of the α-level was used.

RESULTS

Test–re-test reliability (*n*=30)

In order to determine test–re-test stability 30 consecutive patients (11 female, 19 male) filled in the questionnaire twice: at the first visit to the clinic and on the first day of treatment in the functional restoration programme. Due to organizing requirements, the time period between both points of measurement was relatively long (M=29 days, range 11–42). Although this might have led to a reduced test–re-test value, we found most sufficient reliability scores, indicating that the items represent relatively stable beliefs. A coefficient of r=0.87 was found for all items taken together. The three subscales showed the following coefficients of reliability: subscale 1: r=0.83, subscale 2: r=0.89 and subscale 3: r=0.90. In comparison, Waddell *et al.* (1993) reported reliability coefficients of r=0.95 for scale 1 and r=0.88 for scale 2. However, one must take into account that a much shorter interval of testing (48 h) was carried out in their study.

Item and scale analysis of the FABQ (*n*=302)

No item had to be excluded from the questionnaire because of lack of understanding. Only item 8 ('I have to claim compensation for my pain') demonstrated a skewed distribution: nearly 50% of the answers accounted for 0 ('completely disagree'). Furthermore, item 8 showed a minor correlation to all other items and therefore was excluded from further analysis.

Factor analysis was conducted to examine the factorial structure of the questionnaire. Items were accepted on the final factors if they had a loading of more than 0.50 on the corresponding factor and no more than 0.35 on any other factor. The analysis revealed an unambiguous three-factor solution (eigenvalues 6.51/1.77/1.43, scree test). Each of the three factors consists of five items (see Table 1 for M, SD and median).

The first factor accounted for 43.4% of the variance explained. The items represent patients' beliefs about characteristics of the work environment which could be responsible for their current low back pain ('work as a cause'). The second factor explained 11.8% of the variance and consists of items which relate to patients' assumptions about their probable return to work ('work prognosis'). The single 'work factor' of the English version of the FABQ was thus split into two separate factors. The third factor ('physical activity') was identical to the second factor of the English version and accounted for 8.9% of the total variance. The items focused on patients' beliefs that general physical activity negatively affects their current back pain.

Subscale scores were calculated by adding the corresponding items of each factor. Intercorrelation of the three subscales were r_{12}=0.67, r_{13}=0.35 and r_{23}=0.43. While the latter intercorrelations can be interpreted as indicating independency, the intercorrelation between subscales 1

TABLE 1. Results of the principle component analysis with varimax rotation of 15 items of the FABQ (*n*=302).

Factor 1 (variance explained 43.4%)				r^h=0.89[a]
	'Work as a cause'			
Items	Loading	Mean	SD	median
6. ... 'caused by work'	0.72	3.28	2.28	3
7. ... 'work aggravated pain'	0.86	4.26	2.02	4
9. ... 'work too heavy'	0.68	2.43	2.18	3
10. ... 'work makes pain worse'	0.84	3.49	2.05	3
11. ... 'work might harm my back'	0.80	3.38	2.04	3
Factor 2 (variance explained 11.8%)				r^h=0.94[a]
	'Prognosis work'			
Items	Loading	Mean	SD	Median
12. ... 'should not do my work'	0.63	3.23	2.28	3
13. ... 'cannot do my normal work'	0.70	3.06	2.32	3
14. ... 'wait until pain is treated'	0.75	2.96	2.43	3
15. ... 'no return within 3 months'	0.80	2.04	2.19	2
16. ... 'no return at all'	0.59	1.71	2.15	1
Factor 3 (variance explained 8.9%)				r^h=0.69[a]
	'Physical activity'			
Items	Loading	Mean	SD	Median
1. ... 'caused by physical activity'	0.59	3.86	1.95	4
2. ... 'physical activity worsens pain'	0.67	4.47	1.74	5
3. ... 'physical activity might harm'	0.68	3.45	2.33	3
4. ... 'better no physical activity'	0.69	4.45	1.78	5
5. ... 'cannot do physical activity'	0.59	3.75	1.89	3

[a]r^h = homogeneity.

TABLE 2. Product–moment correlation coefficients for the correlation of subscales of the FABQ with other clinical variables (*n*=249).

	FABQ-1		FABQ-2		FABQ-3	
Duration of pain	0.04	NS	0.12	NS	0.03	NS
Intensity of pain	0.26	***	0.38	***	0.24	***
Depression (HAD depression)	0.13	NS	0.18	NS	0.15	NS
Anxiety (HAD anxiety)	0.20	NS	0.20	NS	0.17	NS
Disability: FFbH-R	0.36	***	0.51	***	0.41	***
Disability: work loss (weeks)	0.33	***	0.60	***	0.18	NS

Significance was Bonferroni-adjusted: ***P<0.002; NS not significant.

and 2 (r_{12}=0.67) reveals a closer relationship.

Internal consistency (Cronbach's α) for the total scale was α=0.91, with values for subscale 1 of α=0.89, subscale 2 of α=0.94 and subscale 3 of α=0.69.

Relationship of FABQ to clinical variables (validity)

In order to investigate the construct validity, correlations of FABQ-subscales with clinical variables was conducted (Table 2). Correlational analysis was limited to those 249 patients of whom information about their working situation could be assessed (see methods). In order to minimize α error by multiple testing, Bonferroni's adjustment to the α level was used. Dividing α by the number of tests carried out, the adjusted α=0.002 (α=0.05/18=0.002).

No significant correlation was found regarding sex or age. We expected the FABQ subscales to significantly correlate with measures of disability (activities of daily life, work loss) and psychological symptoms (depression and anxiety).

As seen in Table 2, the relation to pain intensity was found to be moderate but statistically significant for all three FABQ subscales. Only

TABLE 3. Results of hierarchical multiple linear regression analyses with disability in activities of daily living (FFbH-R) and length of being out of work (in weeks) as dependent variable (n=249).

Dependent variables	Independent	R^2	adjusted R^2	Standard β
• Disability (FFbH-R)	FABQ2	0.27	0.26	0.35**
	FABQ3	0.32	0.31	0.22*
	Pain intensity	0.35	0.34	0.19*
• Work loss	FABQ2	0.35	0.32	0.65***
	FABQ3	0.36	0.35	0.12*

* p<0.05; ** p<0.01; *** p<0.001.

TABLE 4. Group differences in FABQ subscales between patients out of work (n=120) and those still working (n=129).

	n	Mean	SD	t-value
Still working/out of work	129/120	FABQ1: 2.88 *vs* 4.00	1.69 *vs* 1.63	5.28***
		FABQ2: 1.36 *vs* 3.80	1.55 *vs* 1.74	12.60***
		FABQ3: 3.64 *vs* 4.26	1.22 *vs* 1.40	3.73***

* p<0.05; ** p<0.01; *** p<0.001.

low and non-significant relations of the FABQ subscales to depressive symptoms (HADS) could be demonstrated. A strong relationship of fear-avoidance beliefs and measures of disability was found, with subscale 2 ('work prognosis') revealing the highest correlations. These findings were similar for both disability variables: work loss and functional disability (FFbH-R).

In multiple regression analyses (Table 3), prediction of both disability variables (criteria) was tested by including sociodemographic variables (age, gender), symptom variables (pain intensity, pain duration, depressive symptoms, anxiety) and fear-avoidance beliefs (FABQ subscales). Results demonstrated that fear-avoidance beliefs accounted for the highest proportion of variance for both variables of disability (see Table 3). Subscale 2 ('work prognosis') explained the highest proportion of variance in both disability variables, followed by subscale FABQ3 ('physical activity'). Pain intensity was a significant predictor in only one analysis, but was less powerful than the FABQ3. None of the other variables contributed to the explanation.

As a further aspect of the validity the differences in the FABQ subscales between groups of patients who were either working despite back pain (n=129) or not working due to back pain (n=120) was computed. Patients out of work demonstrated a significantly higher level in all three FABQ subscales (see Table 4). The highest difference could be seen in subscale 2 ('work prognosis').

DISCUSSION

The intention of this study was to analyse and validate the German version of the Fear-Avoidance Beliefs Questionnaire (Waddell *et al.*, 1993) in a sample of LBP outpatients. Item 8 ('compensation') had to be excluded due to skewed distribution and minor intercorrelation to all other items. This was suggested by Waddell *et al.* (1993) before, pointing at the comparability of both versions.

Psychometric properties of the questionnaire turned out to be fair to good, with an internal consistency of 0.91 for the total scale and a test–re-test reliability of all items of r=0.87. These properties of the total scale were similar to those reported by Waddell *et al.* (1993) and Crombez *et al.* (1999).

In their validation study of 1993, Waddell *et al.* identified two subscale scores of the FABQ: one for beliefs about physical activity and the other for beliefs about work. In their study, both

factors explained 60.2% of the variance, of which the latter factor was consistently the stronger predictor of disability and work loss. In contrast to the results of Waddell *et al.* (1993) we identified a three-factor solution accounting for 64.1% of the total variance, which means an increase in variance explained. While the 'activity' subscale, accounting for 9% of the variance, remained the same as in the original version, the 'work' subscale of the original version was split into two separate factors in the German version. Due to the meaning of the items, they represent two different sets of beliefs: (a) representing patients' beliefs about characteristics from the work environment being responsible for their current low back pain ('work as a cause' accounting for 43% of the variance), and (b) representing patients' assumptions of their probable return to work ('prognosis work' accounting for 11.8% of the variance). Since both factors deal with characteristics of the work environment, the size of their intercorrelation was comprehensible (r=0.67). Nevertheless, all items had salient loadings on their respective factor with no considerable loading on the other.

The separate scoring on both subscales provides important information justifying a change to the subscale structure of the test: items of the first 'work' subscale ('work as a cause') represent a widespread, quite 'normal' assumption that back pain may be a consequence of working conditions. These beliefs may have only minor influence on perpetuating avoidance behaviour. We assume that the new subscale 2 ('prognosis work') has much more significance in identifying patients with problematic beliefs, which will probably strongly influence their future behaviour. Content validity analysis demonstrated unique characteristics of both work-related factors since the latter ('work prognosis') was a much stronger predictor of disability and failure to return to work after treatment. Sandstöm and Esbjornsson (1986) as well as Hildebrandt *et al.* (1997) used similar items. They asked patients prior to treatment if they believed they would be able to return to work after finishing the treatment. In both studies the patients' poor expectations were one of the strongest predictors of failure to return to work. Obviously those patients, who are convinced that they will continue to have back pain and remain disabled, are likely to fulfill their own prophecy. In a recent study on 86 patients with low back pain, subscale 2 of the FABQ ('work prognosis') was found to be the best predictor for the return to work after a functional restoration programme (Pfingsten *et al.*, 1997). The second best predictor was the change in the FABQ subscale 3 ('physical activity'): those who returned to work demonstrated a significant decrease in beliefs about physical activity causing harm. Those patients who did not return to work after treatment demonstrated no change in FABQ subscale 3 and thus still had the assumption that physical activity will cause more pain and probably re-injury. Therefore, the third subscale of the FABQ ('physical activity') can identify patients whose disability is partly caused by reinforcement of fear and avoidance. These beliefs have to be directed in the treatment process. These patients presumably will profit from therapy in which back pain is treated as a consequence of an inadequate avoidance behaviour resulting from the motivation to reduce (assumed) pain. In other words, back pain should be treated as a phobia, as Lethem *et al.* (1983) and Kori *et al.* (1990) have already pointed out.

In accordance with the results of Waddell *et al.* (1993), regression analyses regarding disability as a criterion variable, fear-avoidance beliefs added a completely separate dimension of variance explained. In this way, it is the patients' beliefs rather than the underlying physical reality that determines disability behaviour.

In contrast to the findings of Waddell *et al.* (1993), who found that the two factors of the FABQ are largely independent of any pain measures, we found that this could only be confirmed regarding duration of pain. Intensity of pain demonstrated a significant correlation to all three FABQ subscales. Another inconsistent finding was the missing correlation between FABQ subscales and the measure of depression (HADS). In the study by Waddell *et al.* (1993), depressive symptoms had a moderate relationship to both subscales (r=0.41 and 0.36 respectively). In our sample we could not replicate this finding since no FABQ subscale had a significant

correlation to depressive symptoms. Furthermore, FABQ subscales showed no significant correlation to general symptoms of anxiety (HADS). In accordance with the findings of Asmundson *et al.* (1997) our results confirmed that fear-avoidance beliefs do not correspond with other measures of emotional state such as depression and anxiety. Main and Waddell (1991) postulated that current cognitive measures (i.e. coping strategies) are too general to adequately explain low back disability, which was the starting point to create the FABQ. Similarly, our findings suggest that current emotional measures, such as depression and anxiety, may be too general to explain a substantial portion of variance of disability. Thus, FABQ scales represent an independent contribution to the prediction of disability.

The internal consistencies of the subscales 1 and 2 were fair and quite similar to those of the total score. The only exception was the FABQ physical subscale (subscale 3) which only demonstrated an α of 0.69. Similar results in internal consistency for this subscale were reported by Waddell *et al.* (1993) and Crombez *et al.* (1999). Because of the hypothesized importance of this subscale in predicting disability and avoidance behaviour this lower consistency of the subscale 3 may be accepted.

Psychological disturbance in patients with chronic pain is commonly considered as a consequence of longstanding pain. On the other hand, by use of the FABQ, Klenerman *et al.* (1995) had demonstrated that chronic back pain could be initiated by psychological factors which already exist in the early stages of experiencing pain. In this way, fear-avoidance beliefs and avoidance behaviour may predict chronicity. Fear of pain and its avoidance are needed to be taken into account in both the assessment and the management of musculoskeletal disorders in the early stages of the natural history of back pain. The early identification of at risk-patients is a major purpose of clinical assessment. Pain-related fear and avoidance must be considered as risk factors. The FABQ is a questionnaire with good psychometric properties and is able to identify patients whose level of disability is not related to pain intensity or emotional state but to pain-related fear. In conclusion, the FABQ is a very promising measure of pain-related anxiety in patients with low back pain.

It was not the aim of our study to pronounce a different German subscale version of the FABQ as compared to the original. We are aware of the fact that changing a questionnaire should be supported by considerable amount of data. On the other hand, we strongly believe that the three-factor solution, as described in our study, has considerable advantages in more precisely identifying problematic patients' beliefs and attitudes which probably will determine their future behaviour. In their study, Waddell *et al.* (1993) also identified a comparable three-factor structure, but the third factor was small and weak, and was more related to questions of compensation; consequently it was dropped in further analysis (Waddell, pers. comm.). Of course, it will be necessary to re-analyse the FABQ in another sample and scrutinize the factor structure. More studies are also needed to further explore the extent to which the FABQ and its subscales can be applied. Do they show sensitivity to treatment? Do changes in FABQ scales due to therapy correlate with different measures of outcome and what is the pattern of correlation? Are the reported results equally valid for other groups of chronic pain patients (e.g. other musculoskeletal pain or sympathetic reflex dystrophy)?

In any case, the reported findings allow some optimism regarding the future use of the FABQ in pain research and practice.

ACKNOWLEDGEMENT

The study was supported by a grant from the Deutsche Forschungsmeinschaft (DFG) (KR 756/10–2).

REFERENCES

Asmundson GJ, Norton GR, Allerdings MD. Fear and avoidance in dysfunctional chronic back pain patients. *Pain* 1997; **69:** 231–236.

Crombez G, Vlaeyen JW, Heuts PH, Lysens R. Pain related fear is more disabling than pain itself. *Pain* 1999; **80:** 329–339.

Fordyce WE (editor). *Back Pain in the Workplace. Task Force on Pain in the Workplace. International Association for the Study of Pain*. Seattle: IASP Press, 1995.

Gatchel RJ, Polatin PB, Mayer TG. The dominant role of psychosocial risk factors in the development of chronic low back disability. *Spine* 1995; **20:** 2702–2709.

Herrmann C, Buss U, Snaith RP. *HADS-D—Hospital Anxiety and Depression Scale—Deutsche Version*. Bern, Göttingen: Huber, 1995.

Hildebrandt J, Pfingsten M, Saur P, Jansen J. Prediction of success from a multidisciplinary treatment program for chronic low back pain. *Spine* 1997; **22:** 990–1001.

Klenerman L, Slade PD, Stanley IM. The prediction of chronicity in patients with an acute attack of low back pain in a general practice setting. *Spine* 1995; **20:** 478–484.

Kohlmann T, Raspe HH. Die patientennahe Diagnostik von Funktionseinschränkungen im Alltag. *Psychomed* 1994; **6:** 21–27.

Kopec JA, Esdaile JM, Abrahamowitz M. The Quebec Back Pain Disability Scale. *Spine* 1995; **20:** 341–452.

Kori SH, Miller RP, Todd DD. Kinisophobia: a new view of chronic pain behaviour. *Pain Management* 1990; **Jan/Feb:** 35–43.

Lethem J, Slade PD, Troup JDG, Bentley G. Outline of a fear-avoidance model of exaggerated pain perception. *Behav Res Ther* 1983; **21:** 401–408.

Linton SJ. The socioeconomic impact of chronic back pain. *Pain* 1998; **75:** 163–168.

Main CJ, Waddell G. A comparison of cognitive measures in low back pain. *Pain* 1991; **46:** 287–298.

Newton M, Waddell G. Trunk strength testing with iso-machines. *Spine* 1993; **18:** 801–811.

Pfingsten M, Kröner-Herwig B, Harter W, Hempel D, Hildebrandt J, Kronshage U. Fear-avoidance behaviour and anticipation of pain in patients with chronic low back pain—a randomized controlled study. *Spine* (submitted)

Pfingsten M, Leibing E, Franz C, Bansemer D, Busch O, Hildebrandt J. Fear-avoidance-beliefs bei Patienten mit Rückenschmerzen. *Der Schmerz* 1997; **6:** 387–395.

Philips HC. Avoidance behaviour and its role in sustaining chronic pain. *Behav Res Ther* 1987; **25:** 273–279.

Sandstrom J, Esbjornsson E. Return to work after rehabilitation: the significance of the patients' own prediction. *Scand J Rehabil Med* 1986; **18:** 29–33.

Vlaeyen JW, Kole-Snijders AM, Boeren RG, vanEek H. Fear of movement/(re)injury in chronic low back pain and its relation to behavioural performance. *Pain* 1995; **62:** 363–372.

Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A fear-avoidance beliefs questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low-back pain and disability. *Pain* 1993; **52:** 157–168.

Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psych Scand* 1983; **67:** 361–370.