Confirmatory Factor Analysis of the Tampa Scale for Kinesiophobia

Invariant Two-Factor Model Across Low Back Pain Patients and Fibromyalgia Patients

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Objectives: (1) To investigate the factor structure of the Tampa Scale for Kinesiophobia (TSK) in a Dutch-speaking sample of chronic low back pain (CLBP) patients using confirmatory factor analysis, (2) to examine whether the internal structure of the TSK extends to another group of fibromyalgia (FM) patients, and (3) to investigate the stability of the factor structure in both patient groups using multi-sample analysis.

Patients and Methods: TSK-data from 8 studies collected in Dutch and Flemish chronic pain patients were pooled. For 188 CLBP patients and 89 FM patients, complete data were available. Confirmatory factor analyses were performed to assess 4 models of kinesiophobia, and to examine which factor model provided the best fit. Furthermore, a multi-sample analysis was performed to investigate the stability of the factor structure in both patient groups.

Results: For both CLBP and FM patients, the 2-factor model containing the factors “activity avoidance” and “pathologic somatic focus” was superior as compared with the 4-factor model containing the factors “harm,” “fear of (re)injury,” “importance of exercise,” and “avoidance of activity”. Moreover, the 2-factor model was found to be invariant across CLBP and FM patients, indicating that this model is robust in both pain samples.

Discussion: As the 2-factor structure provided the best fit of the data in both patient samples, we recommend to use this version of the TSK and its 2 subscales in both clinical practice and research. Based on the content of the items, the subscales were labeled “Harm” and “Fear-avoidance.”

Key Words: chronic pain, confirmatory factor analysis, TSK, pain-specific fear

Clinical and experimental research reveals that pain-specific fear amplifies the experience of pain, avoidance, and pain-related disability. Indeed, individuals with high pain-specific fear have a reduced range of motion during standard physical tests,1 have more difficulties to attend away from high-intensity pain,2 are less active during daily life,3 are prone to discontinue activities that are associated with pain,4,5 and avoid activities that are expected to increase pain.6 Furthermore, pain-specific fear has been shown to be a better predictor of disability than medical status variables or pain itself.7–9 Although the criteria of pain-specific fear have never been explicitly formulated, it has been defined as a “highly specific negative emotional reaction to pain eliciting stimuli involving a high degree of mobilization for escape/avoidance behavior.”10

Reliable and valid instruments to assess pain-specific fear are of importance in clinical practice and in furthering our theoretical understanding of pain, suffering, and disability. Several questionnaires are available to measure constructs related to fear. Among the most important are questionnaires to assess trait anxiety, a personality trait characterized by low mood and the predisposition to appraise personal and emotional situations as threatening (ie, Spielberger Trait Anxiety Scale)11 and questionnaires to assess state anxiety, a situation-dependent form of anxiety (ie, Spielberger State Anxiety Scale).11 Although these generic measures of fear and anxiety have been widely used in psychological research and practice, the item content of these instruments is not pain-specific and should be considered as an approximate of pain-specific fear.

Exploring these ideas, McCracken and colleagues12 have demonstrated that pain-specific fear is more useful than more general fear or anxiety in predicting and understanding pain, disability, and pain behavior. Also in several theoretical
models, pain-specific fear plays a key role in explaining suffering and disability. At present, several questionnaires that assess pain-specific fear have been developed, among which are the Pain Anxiety Symptoms Scale1 and the Fear-Avoidance Beliefs Questionnaire.8 The Pain Anxiety Symptoms Scale was designed to assess several components of pain-specific fear, namely (1) cognitive anxiety symptoms, (2) escape and avoidance responses, (3) fearful appraisals of pain, and (4) physiological anxiety symptoms related to pain. Using confirmatory factor analysis, Osman et al16 found support for this 4-factor structure, but this could not be replicated by Larsen et al.17 The Fear-Avoidance Beliefs Questionnaire is a 16-item measure with 2 factors, identified by means of a principal component analysis, namely fear-avoidance beliefs about work and fear-avoidance beliefs about physical activity.8

Another widely used instrument is the Tampa Scale for Kinesiophobia (TSK),18 which measures fear of movement and fear of (re)injury during movements. Several studies have found evidence for the predictive validity of the TSK.19 High fear of movement and/or (re)injury as measured with the TSK has been found to be associated with poor performance on a number of physical tests. Studies that incorporate behavioral tests, such as a weight lifting task, isokinetic tests, or lumbar extension tests, have found that individuals with high fear of movement and/or re-injury have poorer test performance than those with low fear.5,9,19 In some of the studies there were strong indications that patients were avoiding a maximal performance.19 Furthermore, a high score on the TSK has proven to be a powerful predictor of disability, and even more powerful than biomedical signs/symptoms, pain severity, pain duration, and anxiety.9,20

Although the predictive validity of the TSK is now well established, the construct validity of the instrument is less clear. Two different factor structures of the TSK have been reported, using an exploratory factor analytic approach. The factor structure of the Dutch version of the TSK was examined by Vlaeyen and colleagues20 in 129 patients with chronic low back pain (CLBP). They performed a principal component analysis with oblique rotation on all 17 items. Five items (item numbers 5, 7, 8, 16, and 17) were excluded from further analysis, as their factor loading was smaller than 0.40. Based on the χ²-test for the sufficient number of factors extracted and the interpretability of the factors, a 4-factor solution was chosen, which accounted for 36.2% of the total variance. Based upon the content of the items with the highest factor loadings, the factors were assigned the following labels: Harm (TSK-H; 3 items: 3, 6, 11), Fear of (re)injury (TSK-F; 2 items: 1, 9), Importance of exercise (TSK-E; 3 items: 4, 12, 14), and Avoidance of activity (TSK-A; 4 items: 2, 10, 13, 15). A short description of the items is given in the Appendix.

Clark and colleagues21 examined the internal structure of the TSK in 167 male veterans with chronic pain admitted to an inpatient pain center, performing a principal component analysis with Varimax rotation. Four of the 17 items were excluded from further analysis as item analysis proved that these items had a weak association with the total TSK score. The 4 excluded items were all the reversed key items (items 4, 8, 12 and 16). Factor analysis revealed that the 13 items measured 2 constructs accounting for 49% of the total variance. The first factor, activity avoidance, reflects the belief that activity may result in reinjury or increased pain. The second factor, pathologic somatic focus, was related to a belief in underlying and serious medical problems. Using the same analysis, Geisser et al22 have found a similar solution in 133 persons with chronic back pain. A scree plot and an inspection of the eigenvalues suggested that a 2-factor solution best fitted the data, accounting for 69.2% of the total variance. Inspection of the factor loadings indicated that 12 of the 13 items loaded on the same factor reported by Clark et al,21 with the exception of item 7. This item loaded slightly higher on the “activity avoidance” factor than on the “pathologic somatic focus” factor. However, as the item loaded highly on both factors, they retained the original factor structure of Clark et al.21

The main objective of the present study was to validate the TSK by investigating its internal structure. The first aim of the study was to investigate the factor structure of the TSK in a Dutch-speaking sample of CLBP patients, by means of a confirmatory factor analysis (CFA). As yet, studies have only investigated the internal structure of the TSK using an exploratory factor analysis in which no model is specified prior to the analysis. In this study, we want to compare the fit of the 4-factor model as proposed by Vlaeyen et al20 with the fit of the 2-factor model as proposed by Clark et al.21 This is only feasible with a confirmatory factor analytic approach.22 A second aim is to investigate whether the internal structure of the TSK extends to another patient group. The TSK was specifically developed for low back pain patients, but it is also used in other pain syndromes, for example, fibromyalgia (FM) patients.24 It is, however, unclear in these samples whether the TSK is assessing the same constructs as in low back pain patients. Therefore, the factor structure of the TSK is investigated in FM patients. The third aim was to investigate the stability of the factor structure in both patient groups. To our knowledge, this study is the first to examine the invariance of the factor structure of the TSK across different pain patient groups by means of a multi-sample analysis.

**MATERIALS AND METHODS**

**Sample**

Data from 8 studies collected in Dutch and Flemish chronic pain patients were pooled (n = 339). For 62 patients, some item scores were missing, reducing our sample to 277 patients (93 males and 184 females). The mean age was 41.33 years (SD = 10.90). One hundred and eighty-eight patients re-
ported low back pain as the most important complaint. The remaining 89 patients reported pain in different parts of the body and met the criteria of FM.25 Both patient groups included more females than males, $\chi^2(1) = 4.61, P < 0.05$. There was no significant difference in duration of pain complaints between CLBP patients (Mean = 97.91 months; $SD = 100.21$) and FM patients (Mean = 116.40 months; $SD = 83.37$), $t(212) = -1.54$, ns.

**Instrument**

The Tampa Scale for Kinesiophobia (TSK) is a 17-item questionnaire, measuring fear of movement and (re)injury (eg, “My body is telling me I have something dangerously wrong,” “simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening”, “it’s really not safe for a person with a condition like mine to be physically active”). Each item is answered on a 4-point Likert scale, ranging from “strongly disagree” to “strongly agree.” A total score is calculated after inversion of the individual scores of item numbers 4, 8, 12, and 16. The original TSK was translated into Dutch (TSK-DV) by Vlaeyen and colleagues.5 The same scoring format was maintained. The TSK-DV was found to be valid and sufficiently reliable.26 Cronbach’s alphas for the total scale varied from $\alpha = 0.68$ to $\alpha = 0.80$.5,9,20 The criterion validity and construct validity of the TSK-DV were supported.26

**Statistical Analyses**

Confirmatory factor analysis was performed using the INTERACTIVE LISREL 8.50 (linear structural relations) framework developed by Du Toit and colleagues.27 The models were specified in advance by defining a pattern of linkage between the observed scores and 1 or more underlying factors. In line with the recommendations of Bollen and Long,28 several fit indices were used to assess model fit. In the present study, model fit was assessed using the following goodness-of-fit indices: $\chi^2$, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI).

The most frequently used fit index is $\chi^2$. This likelihood-ratio test statistic is used to determine whether a significant amount of observed covariance between items remains unexplained by the model. A disadvantage of this index is its sensitivity to sample size. In a small sample, a poor fit may result in a nonsignificant $\chi^2$. It is also possible that in a large sample a good fit results in a statistically significant $\chi^2$.29 In the present study, the $\chi^2$ is the normal theory weighted least squares $\chi^2$, as the other fit indices are based upon this index in the LISREL 8.50 program.

The goodness-of-fit index (GFI) and the adjusted goodness-of-fit index (AGFI)30 assess the extent to which the model provides a better fit compared with no model at all. These indices generally range between 0 and 1, with high values (GFI > 0.90 and AGFI > 0.80) reflecting a good fit of the model.

The Root Mean Square Error of Approximation (RMSEA)31 is a fit measure based on population error of approximation. The idea behind this is that it is unreasonable to assume that the model holds exactly in the population. The RMSEA takes into account the error of approximation in the population. According to Browne and Cudeck,31 a RMSEA value of 0.05 indicates a close fit and values up to 0.08 represent reasonable errors of approximation in the population.

Finally, the comparative fit index (CFI)32 is an incremental fit index that produces a statistic in the range between 0 and 1. It represents the proportionate improvement in model fit by comparing the target model with a baseline model (usually a null model in which all the observed variables are uncorrelated). CFI values larger than 0.90 indicate an adequate fit.33

**RESULTS**

**Assessing 4 Models of Kinesiophobia**

To investigate the internal structure of the TSK-DV in CLBP and FM patients, 4 alternative models were specified: *model 1*: a 1-factor model including all items of the TSK-DV; *model 2*: the 4-factor model, as proposed by Vlaeyen and colleagues,20 *model 3*: a 1-factor model with omission of the inversed key items (item numbers 4, 8, 12, and 16); *model 4*: the 2-factor model as proposed by Clark and colleagues.21

Table 1 summarizes the goodness-of-fit indices of all 4 models. These suggest that the 2-factor model of Clark et al.21 is the best model for both the CLBP patients and the FM patients. In CLBP patients the 2-factor model has a reasonable fit. Three indices indicate an acceptable fit (RMSEA < 0.08, GFI = 0.90, AGFI > 0.80) and 1 index an almost adequate fit (CFI = 0.85). All other models have a poor fit of the data. In FM patients the 2-factor model has an excellent fit to the data (RMSEA < 0.05, GFI = 0.89, AGFI > 0.80, CFI > 0.90). The 1-factor model with omission of the inversed items also approaches an acceptable fit to the data in this patient group (RMSEA < 0.08, GFI = 0.86, AGFI = 0.80, CFI = 0.89). The factor structure found by Geisser et al,22 in which item 7 loaded slightly higher on the “activity avoidance” subscale than on the “pathological somatic focus” subscale, also had a good fit of the data (CLBP patients: RMSEA = 0.069, GFI = 0.91, AGFI = 0.87, CFI = 0.87; FM patients: RMSEA = 0.051, GFI = 0.88, AGFI = 0.83, CFI = 0.93).

Because the 2-factor model (model 4) and the 1-factor model with omission of the inversed items (model 3) are nested, we can statistically compare their adequacy using $\chi^2$ difference tests. The comparison of the 1-factor model with omission of the inversed items with the 2-factor model reveals that the latter model explains the data significantly better than
the former in the CLBP sample ($\Delta \chi^2(1) = 49.81, P < 0.001$) and in the FM sample ($\Delta \chi^2(1) = 20.82, P < 0.001$). [As also the 1-factor model with 17 items and the 4-factor model are nested, we can statistically compare their adequacy using \( \chi^2 \) difference tests. This analysis reveals that the latter model explains the data significantly better than the former in the CLBP sample ($\Delta \chi^2(71) = 62.35, P < 0.001$) and in the FM sample ($\Delta \chi^2(71) = 104.13, P < 0.001$).] Also, for the FM patients the 90% RMSEA Confidence Intervals for the 2-factor and 4-factor model do not overlap, indicating a better fit of the 2-factor model. In CLBP patients, there was an overlap of confidence intervals for RMSEA (see Table 1). These results indicate that the TSK can be considered as representing 2 latent dimensions, namely activity avoidance and pathologic somatic focus. These 2 latent factors were highly correlated in the CLBP sample ($r = 0.70$) and the FM sample ($r = 0.74$). [Given the high intercorrelation between the 2 factors, a second-order (hierarchical) model was tested, in which the 2 first-order factors were assumed to load on the second-order factor “Fear of movement/(re)injury.”] For CLBP patients, the results provided partial support for such a second-order model (RMSEA = 0.083, GFI = 0.95, AGFI = 0.93, CFI = 0.86). For FM patients, the fit for the second-order model was definitely worse in comparison with the 2-factor model of Clark et al.$^{21}$ (RMSEA = 0.089, GFI = 0.89, AGFI = 0.84, CFI = 0.84).

The internal consistency of the TSK without the key reversed items is good. Cronbach’s alpha is 0.80 in CLBP patients and 0.82 in FM patients. Also the 2 subscales are sufficiently reliable. In CLBP patients, Cronbach’s alphas are 0.73 (activity avoidance) and 0.70 (pathologic somatic focus) and in FM patients 0.76 (activity avoidance) and 0.70 (pathologic somatic focus). The standardized factor loadings of the 2-factor model for CLBP patients and FM patients are presented in Figures 1 and 2.

### Invariance of the Models

To examine whether model 4, that is, the 2-factor model of Clark and colleagues, is invariant across the patient groups, multi-sample analyses were conducted. In a first multi-sample analysis, the model was fit separately for CLBP patients and FM patients, and a \( \chi^2 \) statistic for the overall fit was computed to assess overall parameter invariance. Following the procedure recommended by Hoyle and Smith,$^{34}$ a sequence of increasingly more restrictive hypotheses was evaluated. A very restrictive model, equating the number of factors, the factor loadings, the correlations between the factors, and the error variances, was supported. The results of this multi-sample analysis showed that the specified model can be considered as adequately fitting the data (RMSEA = 0.053, CFI = 0.90), which means that the 2-factor model is invariant across patient groups. The 13 items represent 2 latent variables and contribute equally to their respective factors in CLBP patients and FM patients (invariance of factor loadings). Furthermore, the intercorrelations between the latent “pathologic somatic focus” and “activity avoidance” variables and the error variances of both variables do not differ across patient sample (invariance of factor intercorrelations and invariance of error variances). Medians, means, and standard deviations of the TSK without the reversed items and of the 2 factors in both patient samples are presented in Table 2.

In a further exploration of the data, we found no invariance of the 4-factor model across CLBP patients and FM patients. Even the least restrictive model, equating the number of factors and the pattern of loadings on those factors, was not supported (RMSEA = 0.13, CFI = 0.81).

### DISCUSSION

The present study evaluated the factor structure of the TSK using confirmatory factor analysis in 2 different patient samples (patients with CLBP and FM). The results indicate that the TSK can be considered as representing 2 latent dimensions. These dimensions are activity avoidance and pathologic somatic focus. The standardized factor loadings of the 2-factor model for CLBP patients and FM patients are presented in Figures 1 and 2. The internal consistency of the TSK without the key reversed items is good. Cronbach’s alpha is 0.80 in CLBP patients and 0.82 in FM patients. Also the 2 subscales are sufficiently reliable. In CLBP patients, Cronbach’s alphas are 0.73 (activity avoidance) and 0.70 (pathologic somatic focus) and in FM patients 0.76 (activity avoidance) and 0.70 (pathologic somatic focus). The standardized factor loadings of the 2-factor model for CLBP patients and FM patients are presented in Figures 1 and 2.

### TABLE 1. Goodness-of-Fit Indices of LISREL Confirmatory Factor Analyses of the TSK

<table>
<thead>
<tr>
<th>Model</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>RMSEA (90% CI)</th>
<th>GFI</th>
<th>AGFI</th>
<th>CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chronic low back pain patients</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Model 1</td>
<td>181.60</td>
<td>119</td>
<td>0.077 (0.054;0.099)</td>
<td>0.80</td>
<td>0.75</td>
<td>0.78</td>
</tr>
<tr>
<td>Model 2</td>
<td>119.25</td>
<td>48</td>
<td>0.089 (0.069;0.110)</td>
<td>0.90</td>
<td>0.84</td>
<td>0.81</td>
</tr>
<tr>
<td>Model 3</td>
<td>178.29</td>
<td>65</td>
<td>0.097 (0.080;0.110)</td>
<td>0.87</td>
<td>0.82</td>
<td>0.78</td>
</tr>
<tr>
<td>Model 4</td>
<td>128.48</td>
<td>64</td>
<td>0.073 (0.055;0.092)</td>
<td>0.90</td>
<td>0.86</td>
<td>0.85</td>
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<tr>
<td><strong>Fibromyalgia patients</strong></td>
<td></td>
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</tr>
<tr>
<td>Model 1</td>
<td>201.69</td>
<td>119</td>
<td>0.089 (0.067;0.110)</td>
<td>0.79</td>
<td>0.73</td>
<td>0.73</td>
</tr>
<tr>
<td>Model 2</td>
<td>97.56</td>
<td>48</td>
<td>0.110 (0.077;0.140)</td>
<td>0.84</td>
<td>0.75</td>
<td>0.74</td>
</tr>
<tr>
<td>Model 3</td>
<td>92.60</td>
<td>65</td>
<td>0.069 (0.032;0.100)</td>
<td>0.86</td>
<td>0.80</td>
<td>0.89</td>
</tr>
<tr>
<td>Model 4</td>
<td>71.78</td>
<td>64</td>
<td>0.037 (0.000–0.076)</td>
<td>0.89</td>
<td>0.84</td>
<td>0.97</td>
</tr>
</tbody>
</table>

Model 1 = 1-factor model with 17 items, Model 2 = 4-factor model of Vlaeyen et al., Model 3 = 1-factor model (without reversed items 4, 8, 12, and 16), Model 4 = 2-factor model of Clark et al.$^{21}$ 90% CI = 90% Confidence Interval for RMSEA.
samples, that is, CLBP patients and FM patients. Furthermore, the invariance of the factor structure was investigated across patient groups (CLBP patients versus FM patients) using multi-sample analysis. Of importance to this study was a comparison of the fit of the 4-factor model as proposed by Vlaeyen et al\textsuperscript{20} with the fit of the 2-factor model as proposed by Clark et al\textsuperscript{21} in CLBP and FM patients. Results favored the 2-factor solution which included an 8-item activity avoidance subscale and a 5-item pathological somatic focus subscale. First, the model of Clark et al\textsuperscript{21} provided an excellent fit for the data of the FM patients. The results for the CLBP patients were in the same line. The 2-factor model almost adequately fitted the data for the CLBP patients. Second, the 2-factor structure was robust in both pain samples. It was found to be invariant across CLBP patients and FM patients. This was not the case for the 4-factor model. A third reason for selecting the 2-factor model over the 4-factor model is parsimony, that is, the 2-factor model captures the construct in a more concise manner. Fi-
nally, as the subscales of the 2-factor model contain more items than those of the 4-factor model, the subscales can be used in further research.

The results of this study have a number of implications. Our analyses showed that a 2-factor structure provided the best fit of the data in both patient samples. Therefore we recommend using the version of the TSK without the reversed key items in both clinical practice and future research. As the interrelationship between the 2 subscales is strong, a total score may be preferred. However, also the use of subscale scores is possible; both scales have a good internal consistency. The factors were labeled by Clark and colleagues\textsuperscript{21} as “pathological somatic focus” and “activity avoidance.” Inspection of the items of the former factor indicates that “Harm” may be a more appropriate label for this factor. Moreover, the items of this factor include the items of the “Harm” factor of Vlaeyen et al.\textsuperscript{20} Furthermore, in our opinion, the label “pathological somatic focus” overemphasizes the psychopathological aspect.

FIGURE 2. Standardized factor loadings of the 2-factor model of Clark et al\textsuperscript{21} in fibromyalgia patients.
The label “Harm” may be less stigmatizing, especially if the TSK will be used in other populations. Inspection of the items of the factor “activity avoidance” indicates that the factor not only measures activity avoidance, but also fear of (re)injury. Therefore, we think it is more justified to label the factor “Fear-avoidance.” Moreover, the factor also incorporates the items of the “avoidance of activity” subscale and the “fear of (re)injury” subscale of Vlaeyen et al.20

The finding that the 2-factor structure is invariant is important. Researchers too easily assume that a questionnaire score has the same meaning for different patient groups. This study confirms that the 2-factor structure is stable in CLBP patients and FM patients. Third, although the TSK has been designed specifically for assessing pain-specific fear in low back pain patients, the instrument assesses the same processes of fear of movement/(re)injury in different populations. Differences in fear of movement/(re)injury between different patient groups are therefore likely to be quantitative, and not qualitative in nature. Further research has to investigate whether the 2-factor model also holds in other pain syndromes such as whiplash and rheumatoid arthritis. Fourth, our results suggest a cross-cultural invariance of the factor structure of the TSK, as we were able to replicate the 2-factor structure of Clark et al21 using a translated version of the TSK and using non-American participants.

There are a few issues that warrant future research. First, the construct and discriminant validity of the identified factors “Harm” and “Fear-avoidance” requests further research. Second, research is needed to confirm the factor structure of the TSK in other syndromes (eg, whiplash associated disorders, chronic fatigue syndrome) and in other cultures. Third, a limitation of the current study is the rather small sample size of the FM patients. Therefore, some differences between models might have been non-significant due to a lack of statistical power.

In summary, the present study found that the 2-factor structure as found by Clark and colleagues21 best fitted the data for FM patients and CLBP patients. Moreover, this 2-factor structure was found to be invariant across both patient groups. We therefore suggest that a shortened version of the TSK, namely the 13 items without the reversed key items, may be used instead of the original 17-item TSK in clinical practice as well as in scientific research.

ACKNOWLEDGMENTS

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**APPENDIX**

**Description of the Items of the Tampa Scale for Kinesiophobia (TSK)**

1. Afraid of injuring oneself if one exercises
2. Pain would increase if one would try to overcome it
3. Body is telling there is something dangerously wrong
4. Pain would be relieved if one would exercise
5. Medical condition isn’t taken seriously enough by other people
6. Body is put at risk for rest of life due to accident
7. Pain = I have injured my body
8. Something aggravated my pain it is dangerous
9. Afraid of injuring oneself accidentally
10. Safest thing one can do to prevent pain from worsening = being careful not to make unnecessary movements
11. Pain = something potentially dangerous going on in body
12. Be better off if physically active although condition is painful
13. Pain says when to stop exercising so one does not injure oneself
14. Not safe for a person with a condition like mine to be physically active
15. Can’t do things normal people do because of ease to get injured
16. Something is causing a lot of pain ≠ actually dangerous
17. When in pain, no one should have to exercise