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**We discount the pain of others
when pain has no medical explanation**

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Running title: Pain is discounted in the absence of medical evidence

Key words: pain; observer responses; medical evidence; psychosocial influences

Abstract and Perspective

The present studies investigated the impact of medical and psychosocial information upon observer's estimations of pain, emotional responses and behavioral tendencies towards another person in pain. Participants were recruited from the community (study 1: $N = 39$; 10 men; study 2: $N = 41$; 12 men), and viewed videos of 4 patients expressing pain, paired with vignettes describing absence or presence of a) medical evidence for the pain and b) psychosocial influences upon the pain experience. A similar methodology was used for study 1 and 2, except for the explicit manipulation of the presence/absence of psychosocial influences in study 2. For each patient video, participant estimations of the patient's pain, their own distress, sympathy and inclination to help (VAS) were assessed. In both studies, results indicated lower ratings on all measures when medical evidence for pain was absent. Overall, no effect of psychosocial influences was found, except in study 2 where participants indicated to feel less distress when psychosocial influences were present. The findings suggest that pain is taken less seriously when there is no medical evidence for the pain. The findings are discussed in terms of potential mechanisms underlying pain estimations as well as implications for caregiving behavior.

Perspective: The present studies indicate that observers take the pain of others less seriously in the absence of clear medical evidence for the pain. These findings are important to further understand the social context in which pain for which there is no clear medical explanation is experienced.

Key words: pain, observer responses, medical evidence, psychosocial influences

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Introduction

Many individuals adhere to a strict biomedical orientation, considering a medical cause as the only explanation for illness.¹² In the context of pain, people are often convinced that pain is directly linked and proportional to physical pathology.^{9,12} However, pain for which there is no clear medical explanation is a common phenomenon^{17,19,21,22,32}, representing a struggle, for the pain sufferer as well as for others dealing with the person in pain.¹⁰ When a clear biomedical cause is lacking, pain sufferers may feel disbelieved, misunderstood or unaccepted by others.^{1,29,43} Others (e.g., health care practitioners) may feel uncertain about the genuineness of the pain symptoms²⁴ and/or may feel ineffective in caregiving.²⁸

To understand the struggle that patients and others experience when dealing with pain in these situations, a focus upon others' reactions and responses is important. Pain is a social experience¹⁵ and observers often estimate the pain of others, and react to the pain of others both in terms of emotional and behavioral responses.^{13,14} Observers' responses are likely to be conditional on the (judged) genuineness of the pain symptoms. According to an evolutionary perspective, observers are alert to social cheating (e.g., when someone claims help when actually not in pain).⁴⁴ As the majority of individuals considers a medical explanation as a prerequisite to "real" pain, we might expect that observers' suspicion is heightened when pain has no clear medical explanation. In line with this view are the results of vignette studies describing fictitious patients with pain. These studies revealed that individuals attribute lower pain to patients when clear medical evidence for the pain is absent.^{5,6,16,39,40,42}

Relatedly, it may be that observers become alert to social cheating when they are informed that pain is profoundly affected by psychosocial influences. A strict biomedical orientation does not acknowledge the influence of psychosocial factors, and there is a danger that pain is not considered "real" and warranting full attention, when psychological variables

account for the pain experience.²⁵ Although psychosocial influences (e.g., a depressive mood, relational problems) are common in case of pain suffering^{11,23}, we are not aware of any published study that has investigated the role of information about psychosocial influences on the observer estimates of another's pain. In support of this idea are the findings in the context of heart complaints. Martin and colleagues^{26,27} and Swartzman and McDermid³⁸ demonstrated that the presence of psychosocial factors was related to a disregard of physical symptoms by observers.

This study had three aims. First, we examined the effects of medical explanation for the pain using videos of actual pain patients displaying facial pain expressions. Previous research on this issue has largely relied on short stories about fictitious patients. Our approach is more akin to natural settings, in which the pain behavior (amongst which facial pain expression) of the person with pain provides (in)direct feedback to the observer⁴⁴, potentially limiting or facilitating the effects of medical explanation. Second, the study investigated the effect of psychosocial influences on pain, independently from the effect of medical explanations. To our knowledge, this is the first study to do this. Third, we also explored the impact of medical evidence and psychosocial influences on emotional responses (distress/sympathy) and the inclination to help.

Participants viewed pictures and videos of actual patients³¹, and were asked to estimate the patient's pain, to rate their sympathy for the patient, their own distress and their inclination to help the patient with daily activities. We report two studies using healthy volunteers recruited from the community.

Study 1

Materials and Methods

Participants

Forty (10 men, 30 women) participants were recruited from the community by means of an advertisement in local newspapers. To be eligible, participants had to be aged 18 years or older and speak Dutch fluently. Individuals who reported a current psychiatric disorder were excluded. One individual was excluded as she reported a borderline personality disorder. The mean age of the remaining thirty-nine participants was 28.77 years ($SD = 11.36$; range = 18 – 55 years). All participants were Caucasian. About three quarter of the participants was married, in a relationship or cohabiting (74.4%). One third of the participants (33.3%) had a higher education (beyond the age of 18 years). One third of the participants was employed (33.4%), 12.8% was unemployed and about half of the participants were university or college students (53.8%). The reported pain intensity of participants during the last six months was 3.46 ($SD = 2.21$; range = 0-7) on a numerical scale from 0 to 10 (0 = no pain; 10 = pain as bad as could be). Five percent (2 participants) was a healthcare provider and 10% (4 participants) was following education in a health-related field. The study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Design

Participants were shown pictures of 4 different patients that were presented with a vignette. The information in the vignettes was manipulated in a 2 x 2 within-subjects design. Vignettes described the presence or absence of (1) medical evidence for the pain and (2) psychosocial influences upon the pain experience. After each picture, a video of the patient performing a pain inducing activity was shown. Immediately thereafter, participants estimated the patient's pain, and their own distress, sympathy and inclination to help the patient with daily activities.

Materials and measures

Videos and pictures. Videos and pictures of four patients (two females, two males; three patients were Caucasians, one patient was South Asian; $M_{\text{age}} = 51.25$, range = 44 – 57 years) were used. The videos were selected from a set of videos displaying facial pain expressions of shoulder pain patients undergoing a standardized assessment by a physiotherapist.³¹ Facial pain expression scores consisted of a composite index based on the intensity of four facial actions which are highly indicative of pain.^{30,33} The scores can range from 0-16. For the present study, patients expressing moderate pain (score of 8) were selected. Videos were presented by the INQUISIT Millisecond software package¹⁸ on a 745 Dell Optiplex computer with a 75 HZ, 19-inch colour CRT monitor. Each video had a length of 8 seconds. Pictures of the patients were obtained by means of a screenshot of the videos.

Vignettes. Vignettes described (1) the presence or absence of medical evidence for the pain and (2) the presence or absence of self-reported psychosocial influences upon the pain experience. Medical evidence in the vignettes was referred to as “a little fracture” or “an inflammation”. Vignettes describing the presence of psychosocial influences included “job stress” or “stress at home”. These different biomedical explanations/psychosocial influences were counterbalanced across vignettes. In order to make the pictures and videos of the patients more vivid/realistic for the participants, information about ‘medical evidence’ and ‘psychosocial influences’ provided within the vignettes was embedded within a broader context entailing information about patient’s (fictitious) first name (Sam, Jo, Kim, Dominik), age (49, 48, 46, 45) job (surveyor, teacher, public employee, bank employee) and number of children (4, 2, 1, 3). This background information presented in the vignettes was counterbalanced across the vignettes and across the patients so that the results of the study could not be confounded by this information. To investigate the effects of psychosocial influences, the information about the presence of psychosocial influences was only presented

in half of the vignettes. In the other vignettes, psychosocial issues were not addressed (see Appendix A for examples of vignettes).

Rating scales. Visual analogue scales (100 mm) were used to assess participant estimates of the patient's pain, inclination to help the patient with daily activities, sympathy for the patient and own distress while observing the patient. The left endpoints of the scales were marked by 'no pain at all', 'totally unwilling', 'no sympathy at all', and 'no distress at all' respectively. The right endpoints were marked by 'pain as bad as could be', 'totally willing', 'a lot of sympathy', and 'a lot of distress' respectively.

Procedure

In the experiment room, the participant was seated in front of a computer at a distance of about 60 cm from the screen. Participants were informed that this study examined people's impression formation of others in pain. Participants were told that (1) verbal information about 4 persons and their pain complaints would be given, followed by 2) presentation of video fragments of these persons on the computer screen. Written informed consent was obtained. When the participant pressed ENTER on the PC keyboard, a picture of a first patient displaying a neutral facial expression combined with one vignette was shown. When the participant pressed ENTER again, the video fragment of the same patient performing a pain-inducing activity was presented. This procedure was repeated with the video fragments of the three other patients. Vignettes were counterbalanced across the four patients and within every participant, the four patients were presented with a different vignette describing 1) medical evidence and psychosocial influences, 2) no medical evidence and psychosocial influences, 3) medical evidence and no psychosocial influences or 4) no medical evidence and no psychosocial influences. To ensure reliable assessment of participants' ratings, each patient video, in combination with the same vignette, was shown twice. The four patients were randomly presented to the participants and the same patient was never presented on two

succeeding trials. In sum, eight videos per participant were shown and each video had a length of 8 seconds. After the presentation of each video, a black screen appeared and participants were requested to rate the patient's pain, their own distress while observing the patient, their sympathy for the patient and their inclination to help the patient. Afterwards, participants were debriefed.

Statistical analyses

Outcome variables were participants' ratings on pain, sympathy, distress and inclination to help. As each patient was shown twice and the ratings for each presentation were highly correlated (pain: $r = .84$, sympathy: $r = .95$, distress: $r = .97$, inclination to help: $r = .94$; $p < .001$), a mean score for each outcome variable was calculated per patient. To investigate the impact of the presence/absence of medical evidence and psychosocial influences, a 2 (medical evidence: present versus absent) x 2 (psychosocial influences: present versus absent) repeated measures ANOVA was performed for each dependent variable with both factors entered as within subject variables. To control for multiple testing, we corrected our p-values using the Benjamini and Hochberg method.³ This method controls the expected proportion of false discoveries amongst the rejected hypotheses (i.e., the false discovery rate). In our study, the false discovery rate was set at 5% to assure that the chance of identifying false positives did not exceed 5%. To be able to use the norms of Cohen⁷ (.20 = small effect, .50 = medium effect and .80 = large effect), effect sizes were measured using the formula of Dunlap and colleagues^{4,8}.

All data were normally distributed except participants' distress ratings which were negatively skewed ($KS\ Z\text{-score}\ (39) = 1.58$, $p < .05$). These scores +1 were log-transformed. Log transformation resulted in normal distribution of this score ($KS\ Z\text{-score}\ (39) = .63$, ns).

Results

Impact of presence/absence of medical evidence/psychosocial influences

Results demonstrated that participants reported lower pain estimates ($F(1,38) = 19.78, p < .001$), less sympathy ($F(1,38) = 16.71, p < .001$), less distress ($F(1,38) = 6.68, p < .05$) and less inclination to help ($F(1,38) = 21.73, p < .001$) when medical evidence for pain was absent. These findings remained significant after controlling for multiple testing. Both the effect of psychosocial influences as well as the interaction between medical evidence and psychosocial influences were not significant. Means and effect sizes are presented in Table 1.

– INSERT TABLE 1 ABOUT HERE –

Discussion

Study 1 investigated the impact of (1) medical evidence and (2) psychosocial influences on pain upon participant estimates of a patient's pain, own distress and sympathy, and inclination to help. In sum, the findings revealed that, when medical evidence for the pain was lacking, participants ascribed lower pain to a patient, felt less sympathy for the patient, were less distressed and were less inclined to help the patient. No effect of the presence/absence of psychosocial factors influencing pain was found.

These findings are in line with previous studies who demonstrated by means of vignettes describing fictitious patients and their pain that observers ascribe less pain in the absence of medical evidence.^{5,6,16,39,40,42} Of interest, the effects occurred in the absence of any apparent influence of knowledge about psychosocial correlates of pain such as job stress or stress at home. This suggests that psychosocial factors are not sufficient cues to influence observer estimates of another's pain. However, an alternative explanation for the non-significant findings might be the omission of information on the absence of psychosocial variables influencing pain, leaving more room for interpretation (error). Therefore, we decided to conduct a second study in which we directly defined whether an influence of psychosocial factors was present or absent. Further, the salience of this information was enhanced by 1) giving elaborated information about the psychosocial influences and 2)

including this information in the (communication of the) diagnosis by the physician. Finally, in order to investigate the generalizability of the results to other medical causes not referring to mechanical dysfunction, we changed the type of biomedical cause from “a little fracture” to “a muscle strain”.

Study 2

Materials and Methods

Participants

Forty-one participants, recruited from the community (12 men, 29 women) volunteered to participate in the study. Similar inclusion criteria as in study 1 were used. Mean age of the sample was 30.29 years ($SD = 12.38$; range = 18 – 59 years). All participants were Caucasian. About half of the participants were married, in a relationship or cohabiting (58.5%). One third of the participants (35%) had a higher education (beyond the age of 18 years). Further, about half of the participants were employed (47.5%), 7.5% were unemployed and 45% were university or college students. The mean pain intensity experienced during the last six months was 3.10 ($SD = 2.54$; range = 0-8) on a numerical scale from 0 to 10 (0 = no pain; 10 = pain as bad as could be). One participant was a healthcare provider and one participant was following education in a health-related field. The study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Design

The design in study 2 was the same as in study 1.

Materials

Videos and pictures. The same videos and pictures as in study 1 were used.

Vignettes. The vignettes used in this study were similar to the vignettes used in study 1, except that it was clearly defined by the physician whether an influence of psychosocial

factors was present or absent. Further, the presence of psychosocial factors was more elaborated. Medical evidence in the vignettes was referred to as “a muscle strain” or “an inflammation”. Vignettes describing the presence of psychosocial influences included “job stress and feelings of anxiety” or “relational problems and a depressive mood” (see appendix A for examples of vignettes).

Rating scales. The measures were the same as in study 1.

Procedure

The procedure was the same as in study 1.

Statistical analyses

The statistical analyses were the same as in study 1. Again, each patient was shown twice and the ratings for each presentation were highly correlated (pain: $r = .78$, sympathy: $r = .88$, distress: $r = .89$, inclination to help: $r = .94$; $p < .001$).

Results

Impact of presence/absence of medical evidence/psychosocial influences

All data were normally distributed. Results demonstrated that participants reported lower pain ratings ($F(1,40) = 33.93$, $p < .001$), less sympathy ($F(1,40) = 6.85$, $p < .05$), less distress ($F(1,40) = 5.05$, $p < .01$) and less inclination to help ($F(1,40) = 29.87$, $p < .001$) when medical evidence for pain was absent in comparison to when medical evidence was present (see Table 2). No effect of psychosocial influences was found, except for distress ($F(1,40) = 6.91$, $p < .05$), indicating lower scores on distress when psychosocial influences were present compared to when psychosocial influences were absent ($M_{\text{nopsychosocial influences}} = 19.28$; $M_{\text{psychosocial influences}} = 14.62$; $d = 0.26$). Further, a medical evidence x psychosocial influences interaction was found for sympathy ($F(1,40) = 5.63$, $p < .05$), indicating that when medical evidence is present, participants indicated to feel less sympathy for the patient when psychosocial influences were present compared to when psychosocial influences were absent.

No two-way interaction was found for pain, distress or inclination to help. After controlling for multiple testing, the initially found significant results remained significant, except for the interaction between medical evidence and psychosocial influences (false discovery rate = 9%).

– INSERT TABLE 2 ABOUT HERE –

Discussion

In study 2, the salience of the presence/absence of psychosocial influences upon the pain experience was enhanced by clearly defining whether an influence of psychosocial factors was present or absent. As in study 1, findings of study 2 indicated that, in case medical evidence was absent, participants ascribed lower pain, felt less sympathy for the patient, were less distressed while observing the patient and were less inclined to help the patient. No effect of the presence/absence of psychosocial influences upon the pain experience was found, except for the ratings on distress: participants reported to feel less distress while observing patients when there were psychosocial influences compared to when there were no psychosocial influences on the patient's pain experience.

Overall, these results mirror our findings of study 1, attesting the robustness of the effect of medical evidence upon pain estimations, distress, sympathy and inclination to help.

General discussion

The present studies investigated the impact of presence/absence of (1) medical evidence and (2) psychosocial influences on pain upon participant estimations of patients' pain, participants' sympathy, distress and inclination to help. Both factors were manipulated by means of vignettes, which were presented together with a picture of a patient. Subsequently, a video of this patient, performing a pain inducing activity, was shown and participants were asked to rate pain, distress, sympathy and inclination to help (VAS). In study 2, the presence/absence of psychosocial influences was made more explicit in order to enhance the

salience of psychosocial influences. Participants gave lower ratings on all four measures in case medical evidence was absent. Participant ratings were not influenced by information on psychosocial variables affecting the patient's pain.

The results of study 1 and the replication of these findings in study 2, indicate that the absence of a medical explanation for pain not only affects the pain estimations, but also the distress and sympathy felt by the observer, as well as the inclination to help the pain sufferer. One – intuitively appealing – explanation may be that the participants became suspicious about the pain, and questioned the genuineness of the pain for which there was no medical explanation.

Contrary to our expectations, overall, participant responses were unaffected by psychosocial influences. We had expected that when psychosocial variables accounted for pain, participants would lower their pain estimates, would indicate less sympathy, distress and inclination to help compared to when no psychosocial variables accounted for pain. This was not the case in study 1, and – except for the ratings on distress – also not in study 2, in which the psychosocial influences were made explicitly salient. In general, it seems that lay observers do not take into account information regarding psychosocial influences. This is in line with the findings of Salmon and colleagues^{34,35} who found that psychosocial cues are often disregarded in clinical medical encounters. Although possible, this explanation is still premature and awaits further corroboration. Accordingly, the (rather small) finding that psychosocial influences had an influence on the reported distress in study 2, suggests that psychosocial influences are not fully disregarded by observers. Further, it is plausible that participants strongly relied on the information about medical evidence for the pain so that no further information was needed to make the judgments. Indeed, people may only make use of *additional* contextual information when feeling uncertain in a particular situation.²⁰ In order to further disentangle the impact of information about psychosocial influences, future

research may focus upon situations in which higher uncertainty in observers is established; for example, by investigating the impact of both medical evidence and psychosocial influences upon observer responses when the patient's level of pain expression is manipulated. Indeed, Tait and colleagues⁴¹ argue that high levels of self reported pain severity enhance uncertainty in observers, and may thus be more susceptible to contextual factors. Similar processes may apply to the context in which patients are *expressing* low and high pain. For example, Solomon and colleagues³⁶ found that observers underestimated pain more when patients were expressing high pain. However, it remains to be investigated whether, in more uncertain circumstances, information about medical evidence, *as well as* information about psychosocial influences is considered informative when making judgments about another's pain. Another explanation for the finding that psychosocial factors did not overall affect participants' responses may be that the psychosocial influences in our vignettes were rather weak or 'benign' in comparison with the psychosocial issues (e.g., clinical mood or anxiety disorders) that are prominent in pain management.² This could also explain why our results are not in line with the results of Martin and colleagues^{26,27} and Swartzman and McDermid³⁸ who used highly stressful life events (e.g., a sister's car accident) instead of common psychosocial stress complaints. Next, the psychosocial influences were formulated very briefly, without any information about the history of the complaints. Hence, we may assume that the knowledge of the participants about the psychosocial factors influencing the patient's pain experience was not very elaborated, which may account for the overall absence of an effect of the psychosocial information.

The present findings underline the importance of future research into consequences of observer responses in the absence of medical explanation for pain, especially given the high prevalence of pain that is not fully understood in terms of clear physiological processes.^{17,19,21,22,32} Results suggest that the pain of persons in the absence of medical

evidence might be taken less seriously. Although it is unclear how lower pain estimates, lower distress and sympathy as well as lower inclination to help translate into actual behavior, it may be that these responses are related to less helping behavior in the everyday social environment, which may, in turn affect the sufferer's wellbeing.

This study has some limitations. First, our experimental approach may limit the ecological validity of our study. Indeed, participants were laypeople who were unfamiliar with the pain patients in our vignettes. Our results may not necessarily generalize towards professional caregivers and friends/relatives. Future research may include more information about the history of the psychological complaints and the medical history of the patient. Additionally, observer reactions in the vignette studies may differ from real-life interactions. For example, observers' real-life reactions to someone in pain might be more governed by emotions. Second, future research may benefit from including more clinically relevant psychosocial factors in the vignettes, such as clinical mood or anxiety disorders, which are often associated with pain complaints.² Third, additional measures of felt sympathy (e.g., approach-avoidance behaviour measures) and distress (e.g., psychophysiological measures) may strengthen the validity of the results as the self-reports of sympathy and distress may be prone to social desirability. Fourth, studies are needed to further investigate the impact of psychosocial influences upon observer judgments. For example, future research should investigate the influence of psychosocial influences when there is enhanced observer uncertainty about their judgments. Fifth, in the present studies, only the patient's facial display of pain was shown to participants. Although facial pain expressions are a salient source of information, other forms of pain behavior, such as guarding or rubbing, are relevant as well.³⁷ Therefore, future research may benefit from including information on full body movements. Sixth, future research may benefit from measuring participants' belief in deception and genuineness. For example, it may be that the effect of the presence or absence

of clear medical evidence for the pain is mediated by a belief in deception. Finally, we opted for a within subject design which may have made the study transparent for the participants. However, to reduce demand effects, we included varying background information, so that along with the experimental manipulation other information varied. Also, at the end of the experiment, none of the participants in our study indicated that she or he knew the true purpose of the study.

To conclude, the results suggest that pain is taken less seriously when clear medical evidence for the pain is lacking. Further research into the impact of information about psychosocial influences is needed. Finally, investigation of the moderating role of pain expression and replication of the data with professional caregivers as well as with other pain behavior is recommended.

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Disclosures

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Table 1

Mean differences between scores on the 4 rating scales in study 1 for vignettes describing medical evidence and vignettes describing no medical evidence

dependent variable	medical evidence	M_1	SD_1	<i>Cohen's d₁</i>
pain	present	48.37	18.25	.50
	absent	38.87	19.84	
sympathy	present	50.03	19.66	.51
	absent	40.05	19.46	
distress	present	18.07	20.81	.22
	absent	13.63	17.51	
help	present	44.31	22.28	.49
	absent	33.77	20.76	

Note₁. Pain = pain estimates, sympathy = sympathy for the patient, distress = distress while observing the patient, help = inclination to help the patient with daily activities

Note₂: M_1 , SD_1 , *Cohen's d₁* are the means, standard deviations and effect sizes in study 1

Table 2

Mean differences between scores on the 4 rating scales in study 2 for vignettes describing medical evidence and vignettes describing no medical evidence

dependent variable	medical evidence	M_2	SD_2	<i>Cohen's d₂</i>
pain	present	54.13	15.28	.97
	absent	40.09	13.47	
sympathy	present	51.59	17.71	.42
	absent	43.82	19.25	
distress	present	19.15	19.11	.25
	absent	14.75	15.50	
help	present	47.77	21.71	.60
	absent	35.27	19.65	

Note₁. Pain = pain estimates, sympathy = sympathy for the patient, distress = distress while observing the patient, help = inclination to help the patient with daily activities

Note₂: M_2 , SD_2 , *Cohen's d₂* are the means, standard deviations and effect sizes in study 2

APPENDIX A

Examples of vignettes used in study 1

“Dominik is 45 years and the parent of three children. Dominik works as a bank employee. Dominik indicates that he/she has had shoulder pain for a while. The orthopedist examined Dominik’s shoulder. Based upon the medical examination, there appeared to be no injury in the shoulder.” (*biomedical evidence absent; psychosocial influences absent*)

“Jo is 48 years and the parent of two children. Jo works as a teacher in primary school. Jo indicates that he/she has had shoulder pain for a while. The orthopedist examined Jo’s shoulder. Based upon the medical examination, there appeared to be a little fracture.” (*biomedical evidence present; psychosocial influences absent*)

“Kris is 45 years and the parent of four children. Kris works as a self-employed surveyor. Kris indicates that he/she has had shoulder pain for a while. The orthopedist examined Kris’ shoulder. Based upon the medical examination, there appeared to be no injury in the shoulder. Kris reports having more pain when experiencing job stress.” (*biomedical evidence absent; psychosocial influences present*)

“Kim is 45 years and the parent of one child. Kim works as public employee. Kim indicates that he/she has had shoulder pain for a while. The orthopedist examined Kim’s shoulder. Based upon the medical examination, there appeared to be an inflammation. Kim reports having more pain when experiencing stress at home.” (*biomedical evidence present; psychosocial influences present*)

Examples of vignettes used in study 2

“Kris is 45 years and the parent of four children. Kris works as a self-employed surveyor. Kris indicates that he/she has had shoulder pain for a while. Based upon the medical examination, there appeared to be no injury in the shoulder. Based upon a subsequent consult, the doctor decided that psychosocial factors do not have an impact upon the pain.” (*biomedical evidence absent; psychosocial influences absent*)

“Jo is 48 years and the parent of two children. Jo works as a teacher in primary school. Jo indicates that he/she has had shoulder pain for a while. Based upon the medical examination, there appeared to be a muscle strain. Based upon a subsequent consult, the doctor decided that psychosocial factors do not have an impact upon the pain.” (*biomedical evidence present; psychosocial influences absent*)

“Kim is 45 years and the parent of one child. Kim works as a public employee. Kim indicates that he/she has had shoulder pain for a while. Based upon the medical examination, there appeared to be no injury in the shoulder. Based upon a subsequent consult, the doctor decided that psychosocial factors have an impact upon the pain, in particular job stress and feelings of anxiety.” (*biomedical evidence absent; psychosocial influences present*)

“Dominik is 45 years and parent of three children. Dominik works as a bank employee. Dominik indicates that he/she has had shoulder pain for a while. Based upon the medical examination, there appeared to be an inflammation. Based upon a subsequent consult, the doctor decided that psychosocial factors have an impact upon the pain, in particular relational problems and a depressive mood.” (*biomedical evidence present; psychosocial influences present*)